XVIII. — THE DRAGONFLY-FAUNA OF TRINIDAD IN THE BRITISH WEST INDIES, (ODONATA).

BY D. C. GEIJSKES. LEIDEN, HOLLAND. WITH 18 TEXTFIGURES.

The origin of the present paper is based on two large collections of Odonata, recently made in Trinidad. The first one is my own collection brought home from my stay in the island in July and August 1929, containing several hundreds of specimens from different localities. The second one is that of Dr. E. M. WALKER in Toronto Ontario, generously sent to me for examination. It also contains many hundreds of individuals, collected in the island in Sangre Grande by G. BELMONTES in 1930 and 1931.

Lateron in 1931 and '32 two sendings of the same collector were received for my collection, by which it was enlarged by some rare and not yet represented species. It may be interesting to know that duplicates of most of the species in my collection are handed over to 's Rijks Museum van Natuurlijke Historie at Leiden.

In the following account I have attempted to gather up all notes and indications of all Odonata which have been recorded from Trinidad, or which are otherwise known to me to occur in this country. Therefore it must be understood as a foundation, by which future discoveries will prove to be facilitated and as it makes our view on the fauna of this island more complete, a useful contribution to our poor knowledge of the Lesser Antilles.

Attention must be called to the important results of E. B. WILLIAMSON, who visited the island in 1912 during a collecting trip in the West Indies with his father the late L. A. WILLIAMSON and B. J. RAINEY. A rich collection of Odonata was brought home by these gentlemen, of which since many particularities have been recorded. The first contribution to the Odonate-fauna of Trinidad was furnished by J. H. HART in the Entomological Register for the year (Ann. Rep. Roy. Bot. Gard. Trinidad, June 1891, p. 9, 1892) in a list of 9 species (8 Libellul., 1 Agrion.), names only. A footnote at the bottom of that page would imply, that they were identified at the British Museum. The only Agrionine here mentioned is *Argia modesta* De Selly (*A. modesta* de Selys), of which the identification is probably wrong and must apparently be replaced by *Argia difficilis* Selys, as since *modesta* has never been met with.

The following reports in reference to the Odonata of Trinidad, are made in working up the collection Williamson, published in different papers as follows:

1. E. B. WILLIAMSON, "Notes on Neotropical Dragonflies, or Odonata", (Proc. U. S. Nat. Mus. Vol. 48, pp. 601—638, 1915), including three new species of *Metaleptobasis* collected in a swamp near Cumuto, a new species of *Telagrion* from the same locality and *Protoneura amatoria* as to occur also in Trinidad.
2. E. M. WALKER, "Notes on Staurophlebia reticulata Burm". (The Canadian Entomologist, pp. 387—395, Dec. 1915). In this paper attention is called to the difference in coloration between specimens from British Guiana, Trinidad and Guatemala, in consequence of which new subspecies have been proposed for these countries.
3. E. B. WILLIAMSON, "On certain Acanthagrions, including three new species (Odonata)", and C. H. KENNEDY "Notes on the penes of Zygoptera (Odonata), no. 1, Species limits in the genus Acanthagrion" (Ent. News, Vol. XXVII, pp. 313—358, 1916).

   In discussing the Acanthagrion-species of the "gracile"-group, two species are recorded from Trinidad, one of which is described as new. They are distinguished at once by the form of the penis, as has been studied by KENNEDY.
4. Dr. F. RIS, Libellulinen 9 Coll. Zool. de SELYS LONGCHAMPS, Fasc. XVI (Deuxième partie) 1916. In this monumental work all material of Coll. WILLIAMSON, belonging to the Libellulinae, is recorded, of which forty species are reported from Trinidad.
5. E. B. WILLIAMSON, "Some Species of Leptagrion with Descriptions of a new Genus and a new Species (Odonata)", (Ent. News, Vol. XXVIII, June 1917, pp. 241—255).

   On page 250 under the localities where the type of the new genus Aeolagrion is found, Cumuto is mentioned for Trinidad.
6. E. B. WILLIAMSON, "Notes on the habitats of some tropical species of Hetaerina (Odonata)", (Occ. Papers Mus. Zool. U. Michigan, no. 130, Febr. 10, 1923, pp. 1—46).

   Special attention is drawn to the two species of this genus inhabiting the island concerning their habitat.
7. E. B. WILLIAMSON, "Notes on American species of Triacanthagyna and Gynacantha" (Misc. Publ. Mus. Zool. U. Mich. no. 9, July 1923, pp. 1—68).

   Only two species are recorded from this country on page 19 and 43.
8. E. B. WILLIAMSON, "Some Peculiarities of the Dragonfly-Fauna of Trinidad (Odonata)" (Ent. News, Vol. XXXIV pp. 263—265, Nov. 1923. In this very interesting paper, the writer points at the connection with the Amazonian subregion and the division of the fauna in the island itself into a western and a southern partition.

9. RIS Dr. F., "A Revision of the Libelluline Genus Perithemis" (Misc. Publ. no. 21 Mus. of Zool. Mich., Sept. 1930).

In this revision some species have been classified otherwise and a new species proposed, which is also known from Trinidad.

10. BORROR Donald J., "The Genus Oligoclada", (Misc. Publ. no. 22, Mus. of Zool. Mich. Apr. 1931).

The revision of this genus is based on the Oligoclada's in Coll. WILLIAMSON, containing several new species. The only species of Oligoclada known from Trinidad has been described for both sexes in this publication.

Working up my own collection and that of Dr. WALKER, many species new for the Trinidad fauna have been discovered and a few more new species were detected of which one already has been published by myself in a provisional description entitled: "A new species of Oligoclada (Odonata) from Trinidad B.W.I." (Entom. Berichten, DL. VIII, no. 178, 1 Mrt. 1931, p. 213—214). More general remarks with some notes on the distribution of the Odonata in the neighbouring countries were given by the writer in a report at the winter-meeting of the "Nederl. Entom. Ver." (Tijdschr. v. Entom. LXXIV, 1931, pp. 37—42). Many other stray notes are to be found in general works viz. de SELYS Synopsis des Agrionines, CALVERT Biol. Centr. Am., Neur., RIS, Libellulines, fasc. IX—XVI.

The total number of the species known at present amounts to 91, where of 2 belonging to the Calopterygidae, 23 to the Agrionidae, 14 to the Aeschnidae and 52 to the Libellulidae. In this first part, the Zygoptera (Calopt. and Agrion.) are dealt with, discussed in text as far as there was reason for it and in addition some biological notes if any. The second part of this study including the Anisoptera (Aeschn. and Libell.) will follow in the near future in the same periodical.

Localities, dates and collectors are noted for every species and if not mentioned otherwise, the collectors for the Coll. WILLIAMSON are: E. B. WILLIAMSON, L. A. WILLIAMSON and B. J. RAINEY; for the Coll. GEIJSKES: Rev. Dom. MAURUS MAINGOT O.S.B. and D. C. GEIJSKES; for the Coll. WALKER: G. BELMONTES. The figures in text are all original prism drawings, with exception of 3, 4, 6, 7 and 12.

In the following places in Trinidad Messrs. WILLIAMSON and RAINEY collected during the months February and March 1912: viz. Arima, Cumuto, Baracon Chaguanas, Cunapo River, Diego Martin River, Maracas River, San Juan River, St. Joseph River, St. Ann River, Pitch Lake.

The localities where the author collected in July and August 1929

are: Mt. St. Benedict and neighbouring ravines, Mt. Thabor a mountain, 2500 ft. high, north of Mt. St. Ben., partly covered by woods and grassy regions, with a very small pool at the top, a breeding spot of many Aeschnines; the smaller streams in the lower parts near St. John, St. Michael Est., Tunapuna, St. Augustine and St. Joseph. Twice the swampland near Guaico was visited (Aug. 17 and 20) exposing a very rich breeding place of Odonata, identical with the collecting-spots of WILLIAMSON in Cumuto and of BELMONTES in Sangre Grande. In one day (Aug. 21) a lot of dragonflies was caught in Caroni River Station and more than one hundred and fifty specimens from this place were papered. In the south at different localities has been collected as: Siparia along small streams in woodland, Oropuche and Erin on streams near coast, in Penal in the ricefields and swamps, La Brea near Pitch-Lake (23—27 July).

On most of these trips I had the much appreciated company of Rev. Dom. MAURUS MAINGOT O.S.B., for whose energetic help and activity as well as the trouble he took after my departure to Europe in collecting Odonata and sending the results on to me, I want to express here my heartiest thanks. I am also greatly indebted to the odonatologists E. M. WALKER in Toronto for placing his important material from Trinidad at my disposal for identification, to Mr. E. B. WILLIAMSON in Michigan for his valuable help by sending his literature and his interesting and kind correspondence about some doubtful questions, to Prof. Dr. P. P. CALVERT in Philadelphia for his assistance in dealing with the species of the genus *Argia* and to Mr. KIMMINS at the British Museum, London, for his report on the Odonata from Trinidad in the British Museum.

SYSTEMATIC.

Ordo: **ODONATA.**

Subordo: **Zygoptera.**

Fam. CALOPTERYGIDAE.

Subfam. Calopteryginae.

Hetaerina caja Drury.

Trinidad: Coll. Williamson: Arima 4. III. 1912, 3 ♂ 7 ♀; Cumuto 6. 8. 10. III, 1912, common; Chaguanas 7. III, 1 ♀; Cunapo River 27. II. 1912, common; Diego Martin River 29. II., 3. 7. 10. III.

1912, common; Maracas River 5. III. 1912, 2 ♂; San Juan River 2. III. 1912, common; St. Joseph River 28. II., 11. III. 1912, common; Coll. Geijskes: Mt. St. Benedict ravine 13. VII. 1929, 3 ♂, 27.VII. 1929, 1 ♀; Guaico 20.VII. 1929, 8 ♂; Caroni River Station 21.VIII. 1929, 1 ♂; St. Joseph River 23.VIII. 1920, 1 ♂; Arouca 2. 6. XII. 1930, 7 ♂ (Fr. Maurus Maingot); Sangre Grande 3. 4. 5. 30. VII. 1930, 7 ♂, 5 ♀ (G. Belmontes). Coll. Walker: Sangre Grande 20. 21. 22. 23. I. 1930, 11 ♂, 11 ♀ (G. Belmontes).

Length abd. + apps. ♂ 35. 5—38, hindw. 25—27; ♀ 28—29, hindw. 23.

This species seems to prefer exposed streams, occurring on the sunniest stretches of them, where their flow is slower and the bed less rocky. Such habitats are found on the edge of the Northern Mountain Range down into the plain of Caroni and Oropuche, where the species is common. As for the following one, *caja* only occurs in the northern parts of the island.

Hetaerina macropus Selys.

Trinidad: Coll. British Mus.: 1 ♂ (H. Caracciolo); Coll. A. N. S.: 3 ♂ (H. Caracciolo); Coll. Williamson: Cunapo River 27. II. 1912, 1 ♀; Digo Martin River (blue Basin) 29. II, 3. 7. 10. III. 1912, common; Maracas River 5. III. 1912, 3 exp.; San Juan River 2. III. 1912, common; St. Ann. River 1. III. 1212, common; St. Joseph River 28. II, 11. III. 1912, not common; Coll. Geijskes: Mt. St. Benedict ravine 13. 22. VII. 1929, common; St. John River 22. VII. 1929. common; St. John ravine 6. 7. 9. XI. 1930, 2 ♂ 3 ♀ (fr. Maurus Maingot); Sangre Grande 3. 4. 5. 30. VII. 1930, 17 ♂ 3 ♀ (G. Belmontes).

Length abd. + app. ♂ 34—39, hindw. 23—26; ♀ 29—31.5, 24—26.5.

It is also a common stream frequenting species, but up stream among the rocks in the ravines with small waterfalls, many ripples and some quiet pools. In the lower courses of the streams we find both species of *Hetaerina* and on the edge of the mountains *macropus* may be mentioned as rare.

Regarding the varying size of the pterostigma, in Trinidad only the form with the pterostigma surmounting one cell (*occisa*-type) is represented.

Fam. AGRIONIDAE.

Subfam. Lestinae.

Lestes tenuatus Rambur.

Trinidad: Coll. Geijskes: Erin 25. VII. 1929, 1 ♂ 1 ♀ (in oviposition);

Caroni River Stat. 21. VIII. 1929, 1 ♀ juv.; Mt. St. Benedict ravine 6. VI. 1931, 1 ♂ (fr. Maurus Maingot).

Length abd. + apps. ♂ 40.5, hindw. 25; ♀ 35—36, 25—26.

The specimens are distinct *tenuatus*. The pectoral colourpattern figured by CALVERT (Ann. Carn. Mus. Vol. VI, p. 264, pl. I, fig. 12, 1909 of a ♂ from Don Diego Columbia, does not differ from my specimens.

The appendages also figured by CALVERT (Proc. Calif. Acad. Sc. Zool. I, p. 376, tab. 25 fig. 3, 1899) are more rounded at the top of the superiores. In discussing the anal appendages, it must be said, that the inferiores are nearly half as long as the superiores.

In Erin in the south of the island, I took a pair in oviposition. Striking with the net over the grassplants along a small muddy stream, which was somewhat overflowed by the rainshowers of the last days, a ♂ and ♀ coppled one another, arose from the plants, the ♀ half the abdomen wet.

Subfam. Pseudostigmatinae.

Mecistogaster ornatus Rambur.

Trinidad: Coll. Selys: 1 ♂; Coll. Mac. Lachlan: 1 ♀; Coll. Geijskes: Port of Spain 6. II. 1922, 1 ♀ (F. W. Urich); Mt. St. Benedict ravine 13.VII. 1929, 1 ♂; 13. IX. 1929, 1 ♀ (fr. Maurus Maingot); Mt. Thabor 18. VII. 1929, 1 ♂.

Length abd. + app. ♂ 82.5—90, hindw. 55—61; ♀ 71—79, 52—60.

This representative of the linearly largest Odonata does not give rise to ample discussions. The variation in length and size of abdomen and pseudostigmata are remarkable. It seems that the Trinidad specimens are of a long size and with a small pterostigma. SELYS (Rev. Syn. Agr. Ière Mem. Acad. Roy. Belg. 1886, p. 18 described as "race? *acutipennis*" a ♂ from Trinidad (abd. 90, hindw. 61) with the pseudostigma occupying two rows of cells and recorded a ♀ from the same locality in coll. MAC LACHLAN with the pseudostigma occupying three rows of cells in hind wing. In my collection the males have this stigma in the hindwing occupying two rows of cells (Mt. Thabor) and three rows of cells (Mt. St. Ben.).

In the females from Port of Spain and Mt. St. Ben, they occupy four rows of cells.

The species is not rare in the ravines in the Northern Mountains. They rest hanging in a vertical position, on shrubs and trees, invisible amidst the contrasting leaves and twigs in sunshine, but on the wing

they attract attention by their yellow stigma spots and they are easy to catch by their slow flight.

Subfam. Protoneurinae.

Neoneura esthera Williamson.

Neoneura esthera Williamson, Transact. Am. Ent. Soc. XLIII No. 763, 1917 pp. 232—236, figs. 16, 17, 18, 19, 52, 53, 54, 55, 87, 88, 104.

Trinidad: Coll. Williamson: Diego Martin River 29. II, 7. III. 1912; Cunapo River 27. II. 1912; San Juan River 2. III. 1912, a total of 31 ♂, 8 ♀.
Coll. Walker: Sangre Grande 16, 20, 26. I. 1930, 12 ♂, 4 ♀; 11. II. 1930, 5 ♂ (G. Belmontes).

Length abd + apps ♂ 25.5—28, hindw. 16—17; ♀ 22.5—23.5, 17.

The specimens in Coll. Walker fully correspond with the original description.

"This is the only species of Neoneura known from Trinidad, where it occurs along the smaller rapid streams" (Williamson l. c. p. 236).

Protoneura amatoria Calvert.

Protoneura amatoria Calvert, Biol. Centr. Am. Neur. Suppl. pp. 395—396, Nov. 1907, tab. X, figs. 49—52.

Trinidad: Coll. Williamson: Diego Martin River (near Port of Spain) 2. II. 1912, 2 ♂ 1 ♀.
Coll. Geijskes: Brasso 1. II. 1932, 1 ♂ (G. Belmontes).

Length abd. ♂ 31, hindw. 19.

Williamson in his "Notes on Neotropical Dragonflies or Odonata", (Proc. U. S. Nat. Mus. Vol. 48, May 12, 1915, p. 623) has noted for this species. "Its capture in Trinidad, far from where I collected the types in Honduras, was indeed a surprise" and further on "The specimens from Trinidad are colored like the (13) Costa Rica males" (fig. 15, pl. 43), where in the colourpattern of the thorax the red antehumeral and antealar spots are narrowly separated by the black. The note of Williamson on the Trinidad specimens also applies to the only male in my collection.

Protoneura calverti Williamson.

Protoneura calverti Williamson, Proc. U. S. Nat. Mus. Vol. 48,

May 12, 1915, pp. 620—623, pl. 41 fig. 1, pl. 43 figs. 11, 12, pl. 44, figs. 23, 24.

Trinidad: Coll. Geijskes: Mt. St. Benedict 19. V. 1930, 1 ♂ (fr. Maurus Maingot).

Length abd. + apps. ♂ 33, hindw. 18.

The supposition of WILLIAMSON (l.c.p. 622): "Twice in Trinidad at different small streams I caught the flame-flash of the red-spotted thorax of this or a similar species, but in neither case was I able to obtain a second glimpse of the insect itself", is verified by the above mentioned capture. The specimen fully corresponds with the original description ot the examples from British Guiana and it is the only known stream-dwelling dragonfly in Trinidad of Brazilian-Guianian origin.

Subfam. Agrioninae.

Argia translata Hagen.

Trinidad: Coll. Geijskes: Mt. St. Benedict ravine 13. 14. 15. 16. 22. VII. 1929, 7 ♂ 3 ♀; same loc. 20. VIII. 1929, 1 ♂; St. John River 22. VII. 1929, 1 ♂; Erin 25. VII. 1929, 1 ♂; Guaico 20. VIII. 1929, 1 ♂; Aronca 2. XII. 1930, 1 ♂ (fr. Maurus Maingot); Sangre Grande 3. 4. 5. VII. 1930, 17 ♂ 5 ♀ (G. Belmontes).
Coll. Walker: Sangre Grande 3. 17. 18. 20. 21. 22. 23. 24. I. 1930, 43 ♂, 13 ♀ (G. Belmontes).

Length abd. + app. ♂ 28—30, hindw. 19—22, antenodal cells $\frac{4.4}{4.4}$, ($\frac{5.4}{4.4}$). ♀ 26—30, 20—21.5 antenodal cells $\frac{4.4}{4.4}$, ($\frac{4.4}{3.3}$).

Dr. CALVERT who has examined a pair of this species, noted on it in a letter dated June 1. 1930: "Apparently *Argia translata* Hagen by ♂ apps. and ♀ mesostigmal laminae and mesepisternal tubercles, but with fewer antenodal cells beyond the quadrilateral. They are very mature individuals".

In his key of Argia males, CALVERT gives in Biol. C. Am Neur. p. 70, for *translata*: "basal half to fourth of dorsum of 9 pale", and in the description under the species of the abdomen ♂ (p. 77) "9 with the basal half to fourth blue remainder black, whose anterior margin is deeply sinuate, rarely the apical black on 9 is reduced to a stripe on either side of the dorsum in its apical half".

In the large number of individuals from Trinidad of this species, no specimen is seen with the 9th abdominal segm. on dorsum partly pale coloured. They all had the last abdominal segments entirely black. In

general the variation in extent of the pale coloured spots on the body is very great and mostly it is a question of age, but I have examined several specimens of different age and none of them was pale coloured on the 9th segment. Dr. CALVERT added to his brief note on the examined Trinidad specimens: "They are very mature individuals", probably alluding to the pruinescence on thorax and abdomen and the black last abd. segments. It is my opinion, that we have here a variation, which is apparently dependent on the locality.

The species is common throughout, inhabiting swampy grounds as well as small rivers in the plain and in the mountains.

Argia pulla Hagen.

Trinidad: Coll. Geijskes: Mt. St. Benedict ravine 15. VII. 1929, 1 ♂ 1 ♀; St. Joseph River 21. VII. 1929, 3 ♂; St. John River 22. VII. 1929, 1 ♂ 1 ♀; Erin 25. VII. 1929, 2 ♂ 2 ♀; Guaico 20. VIII. 1929, 5 ♂ 1 ♀; Sangre Grande 7. VII. 1930, 4 ♂ 2 ♀ (G. Belmontes); Arouca 2. 6. XII. 1930, 4 ♂ 2 ♀ (fr. Maurus Maingot); Cumuto 5. XII. 1930, 1 ♂ (fr. Maurus Maingot).
Coll. Walker: Sangre Grande 16. 17. 20. 21. 26. I. 1930, 11 ♂ 1 ♀; Sangre Grande 11. 15. II. 1930, 1 ♂ 1 ♀ (G. Belmontes).

Length abd. + apps. ♂ 25—28, hindw. 16.5—18; antenodal cells $\frac{3.3}{3.3}$; ♀ 24—28, 17.5—20, $\frac{3.3}{3.3}$, $(\frac{4.4}{3.3})$.

In the same places as *translata* but more in swamps. In Guaico I observed some pairs in copula among the grassplants in a swampy land.

Dr. CALVERT noted on a few specimens: "for the ♀ corresponds better with *A. frequentula*, but the other characters are as in *pulla*".

Argia difficilis Selys.

Trinidad: Coll. Geijskes: Mt. St. Benedict ravine 29. I. 1929, 1 ♂ 5 ♀ (fr. Maurus Maingot), 13. 15. 16. 20. VII. 1929, 7 ♂ 2 ♀ same locality; 2. VIII. 1929, 2 ♂ same locality; Mt. Thabor, 18. VII, 13. VIII. 1929, 2 ♂ 1 ♀; St. Joseph River 21. VII. 1929, 12 ♂ 1 ♀; same locality 6. 7. 9. XI. 1930, 2 ♂ 3 ♀ (fr. Maurus Maingot); Sangre Grande 17. VIII. 1930, 1 ♂ (G. Belmontes).

Length abd. + apps. ♂ 25.5—29, hindw. 18—20, antenodal cells beyond quadr. $\frac{4.4}{3\,3}$; ♀ 24—28.5, hindw. 19—23, ant. cells beyond quadr. $\frac{3.3}{3.3}$, $(\frac{4.3}{3.3})$.

The identification of this species is difficult. There are some marks

for *A. oculata* Hagen, but in general it speaks for *difficilis*, as in the ♂ the less extent of the mid-dorsal stripes on abdominal segments 3—6 and in the ♀ the black labrum, the absence of a pale mid-dorsal stripe on segm. 4 and 5 and the shape of the mesostigmal laminae on the thorax. The ♂ appendages of *difficilis* and *oculata* don't differ enough to make an exact distinctives between the two species.

Dr. CALVERT noted on a male: "*A. difficilis* Selys, or intermediate between *difficilis* and *oculata* Hagen, having the bright blue of oculata, but with no blue dorsal stripes in continuation of the basal ring on segments 5 and 6".

The following short description may be of some use for the student: ♂: Labrum, clypeus and frons blue, postocularspots blue, not connected with each other. Dorsum prothorax black, lateral each side with a blue spot. Synthorax with the antehumeral stripe blue, smaller as the black middorsal stripe till the carina, on the lower end somewhat wider and rounded at the outside. Second lateral suture with a black line. Legs black. Wings hyaline or a little smoked in distal parts in matures.

Abdomen, segm. 2 each side with a wide black stripe united with its fellow of the opposite side on the dorsum at base aud usually at apex, leaving between them an oval blue spot.

Segm. 3—7 black with a narrow blue transverse basal ring and a middorsal stripe, on 3 and 4 pointed on its hinder end, extending from the base on 3 till $^2/_3$ the length of the segm., on 4 till $^1/_3$; segm. 5, 6 and 7 only with a transverse basal ring. Segm. 8, 9 and 10 blue, each side with an inferior black stripe as long as each segment or not quite reaching the base on 8. Abd. app. black.

♀: Labrum and clypeus black, genae dull green, postocular spots blue separated one another. Dorsum of prothorax black, frontlobe with a pale line. Antehumeral stripe on synthorax yellowish green, smaller as the blackmid-dorsal stripe till the carina, near the lower end enlarged. Second lateral suture marked by a small black or brownish line. Wings hyaline. Abdominal segm. 2 as in male, but the oval blue spot on dorsum smaller. Segm. 3 with a transverse basal blue ring and a narrow middorsal blue line, not confluent with the basal ring, extending apically to $^2/_3$ the length of the segm. Segm. 4—7 black only with a transverse blue basal ring; segm. 8,9 and 10 blue with an inferior black stripe as in male but on dorsum of 8 and 9 the basal half black, in 8 somewhat bifid and not confluent with the inferior stripe. Appendages black.

I found the species common along the small streams on the edge of Mt. St. Benedict in July and August 1929, especially in open places

with a rank vegetation in or at the wateredge. Oviposition was observed in the open ravine near St. Michael Est., between the plants of an overflowed part of a grassfield. Sometimes individuals were found upstreams in the mountains (2000 ft) where they were conspicuous by their intensive blue colour, when resting on leaves in sunshine.

Argia orichalcea Hagen.

Trinidad: Coll. Geijskes — Mt. St. Benedict ravine 13. 15. 22. VII. 1929, 10 ♂ 9 ♀; same locality 19. X. 1929, 1 ♂ (fr. Maurus Maingot); St. John River 15. 22. VII. 1929, 11 ♂ 8 ♀; same loc. 14. VIII. 1929, 1 ♂; same loc. 9. XI. 1930, 1 ♂ (fr. Maurus Maingot); Caroni River Stat. 21. VIII. 1929, 1 ♂ 1 ♀; Sangre Grande 3. 4. 5. VII. 1930, 5 ♂ 2 ♀ (G. Belmontes).

Length abd. ♂ 27—30, hindw. 19. 5—21, antenodal cells $\frac{5.5}{4.4}$; ♀ 24—27, 19. 5—22, antenodal cells $\frac{5.5}{4.4}$.

On some specimens Dr. CALVERT noted: "Apparently *A. cuprea* Hagen, although not precisely corresponding with the figures of the appendages of the ♂ which have been published (Biol. Centr. Am. Neur.; HAGEN Bull. M. C. Z.)". Later on after a reexamination I found that the species much better corresponds with the description of *orichalcea* Hagen, for the male the not metallic labrum and anteclypeus, the blue colourpattern on abdomen and the smaller size and for the female also the absence of a mesepisternal tubercle.

In the key to *Argia*-species given by CALVERT in Ann. Carn. Mus. Vol. VI—1—1909, for both sexes it runs out to *orichalcea*, but in the male the lower branch of the inferior appendages is less robust than the upper branch (s. fig. 1). Under *orichalcea* in the same paper (p. 144) are recorded some specimens from Columbia, Bonda in Dept. Magdalena having in the males "segm. 3—7 black with a blue basal ring occupying only one fifteenth of the segments length, und 8, while badly faded in most of the examples, is in others inquestionably blue, with an inferior black stripe each side of variable length, 9 blue with an inferior black stripe reduced to a spot", which is in accordance with my Trinidad males of this species.

In the papered specimens, the blue colourpattern on abdomen are mostly faded and very dark, but a few alcohol specimens give an excellent idea of these markings (s. figs. 4 and 5). These examples were taken in oviposition, coupled one another, in the ravine near St. John July 22, 1929.

The following description will be of some use for the student: ♂: Labrum, anteclypeus and genae light brown with no metallic reflexion, the first with a narrow black line at base. Postclypeus, frons and vertex brilliant metallic copper coloured, postocular spots small, blue and round.

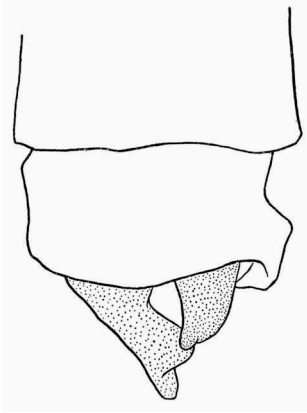

Fig. 1. — *Argia orichalcea* Hagen. Trinidad St. John. ♂ appendages, lateral view from left. (Original).

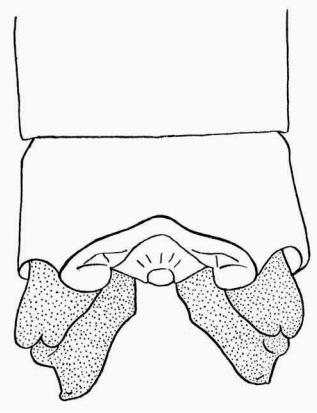

Fig. 2. — *Argia orichalcea* Hagen. Trinidad St. John. ♂ appendages, dorsal view. (Original).

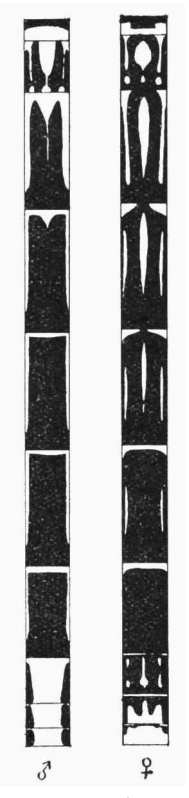

Fig. 3 and 4. *Argia orichalcea* Hagen. Trinidad St. John. Abdominal colour-pattern of male and female. (Original).

Dorsum prothorax and synthorax to first lateral suture brilliant metallic copper shining with no antehumeral stripes; met-episternum and epimeron pale blue, passing into cream below. Second lateral suture marked by a narrow black line. Legs black. Colour-pattern on abdomen s. fig. 3, the dorsal pale markings blue, the lateral stripes ochreous. Appendages black (s. figs. 1 and 2).

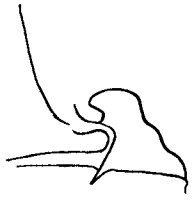

Fig. 5. *Argia orichalcea* Hagen. Trinidad St. John. ♀ Mesostigmal lamina, left side. (Original).

♀: Head as in male, except that front of frons is also pale coloured. Synthorax with pale blue antehumeral stripes, one fourth or one third as wide as the metallic copper shining middorsal stripe. Humeral stripe metallic copper, the mesepimeral branch reaching to the short black line on the upper end of the first lateral suture or not. The metallic shining areas less brilliant as in male. Second lateral suture not or fadedly marked by brown; metepisternum and epimeron pale blue passing into cream below. Mesostigmal lamina s. fig. 5. Legs black, the inner basal half of femora pale.

Abdomen s. fig. 4, the pale markings on dorsum light blue or greenish

blue, the lateral markings pale cream coloured. Valvula vulvae light blue, black below. Appendages black.

The species inhabits rivers and small streams in the mountains. In the ravines near Mt. St. Benedict and St. John I found it to be as common during the months July and August in 1929 and many pairs in oviposition were observed, ♂ and ♀ coppled one another, the ♀ tipping with the end of abdomen for the apical half under water on plants and roots among big stones in the stream.

Still alive the eyes of the male are of a beautiful red.

Argia ierea spec. nov.

Trinidad: Coll. Walker: Sangre Grande 16. I, 3. III. 1930, 24 ♂ 9 ♀.
Coll. Geijskes: Sangre Grande 14.VII. 1930, 1 ♂, 1 ♀; same loc. 16.VII.1930, 2 ♂, 1 ♀ (G. Belmontes).

Total area of black markings on abdominal segments 3—6 and thoracic dorsum less than the pale area on the same parts. The pale colour blue.

♂: *androtype* (16. I. 1930). Length abd. + app. 30, hindw. 21.5.

Rear of head black, with pruinose, a pale stripe along the eyes below. Labrum blue, ante- and postclypeus and front of frons greenish blue, genae from dull olive green to bluish green above. Vertex and hindpart of frons black, the pale colour of frons and genae ending to the black of frons in a straight bar, crossing the base of antennae. Between lateral ocellus and antennae each side, starting from the ocellus, a small drop-like blue spot as long as the ocellus itself. Postocular spots bluish green somewhat larger in size as the area surrounding the ocelli, reaching the eye-margin. On the occipital margin behind each lateral ocellus a very small but distinct round blue spot.

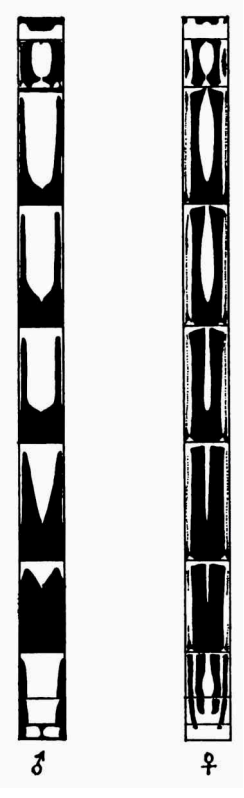

Fig. 6 and 7.
Argia ierea sp. nov.
Trinidad Sangre Grande. Abdominal colourpattern of male and female. (Original).

Frontlobe of prothorax blue, dorsum of median lobe black, lateral with a large blue spot followed by a smaller one on the margin, hindlobe black, a blue spot at the lateral ends.

The blue antehumeral stripe on synthorax about equal in width to the middorsal black. The black humeral stripe $^1/_3$ as wide as the pale antehumeral, not forked in the upper end. Mes- and metepimeron blue, passing into dull grey below, ventral side with pruinescence. Second lateral suture marked by a small black line, faded below. Legs black. Wings hyaline, pterostigma oblique, distal part the most, surmounting one cell (in one hindwing a little shorter), dark brown, paler just against the enclosing veins. Antenodal cells beyond the quadrangle $\frac{5.5}{4.4}$.

Colourpattern on abdomen see fig. 6, the pale areas blue, passing

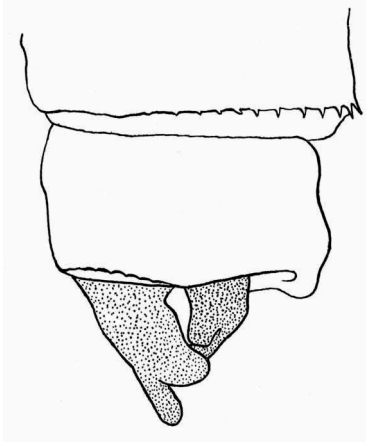

Fig. 8. — *Argia ierea* sp. nov. Trinidad Sangre Grande. ♂ appendages lateral view from left. (Original).

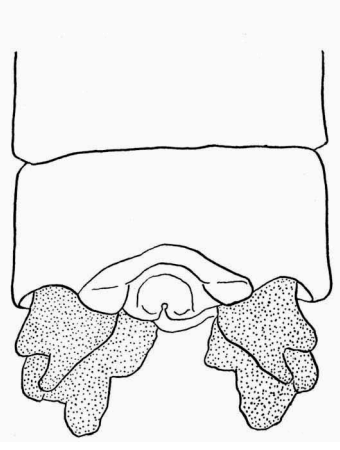

Fig. 9. — *Argia ierea* sp. nov. Trinidad Sangre Grande. ♂ appendages dorsal view. (Original).

into lightbrown below. Appendages black, superiores deeply bifid with the inner branch longer than the outer branch, inferiores deeply bifid also, the lower branch longer than upper branch (s. figs. 8 and 9).

♀: *gynetype* (22. I. 1930). Length abd. 27.5, hindw. 22. Rear of head black with pruinescence, along the eyes a pale line below. Labrum dull bluish grey, ante- and postclypeus olive to brown, darker above. Before the median ocellus the black ending in a sharp point. The minute pale spots between lateral ocelli and antennae as in male, postocular spots smaller than in male, bluish grey, about equal the area within the ocelli, connected with the eyemargin for half the maximal width or less. The minute blue spots at occipital margin as in male.

Prothorax as in male, the pale colours dull blue, hindlobe with a small pale median spot. Synthorax as in male, dull blue, lateral bluish

grey. Mesostigmal lamina s. fig. 10. Legs black, femora of first pair with proximal fourth pale, second and third pair with a narrow pale line on the outer side to half and entire the length respectively; tibiae black, on the outer side below pale, tarsae and claws black. Wings hialine as in male (in one frontwing less than one cell), light brown, paler against the enclosing veins. Antenodal cells beyond the quadr. $\frac{5.5}{4.4}$.

Colourpattern of abdomen s. fig. 7, the pale areas dull blue, passing into light brown below. Appendages sup. black, conic, shorter than segm. 10.

♂: adulti, *paratypes*. Very similar to the type, except that in some specimens the occipital margin is entirely black with no blue spots, the lateral superior black stripe on abd. segm. 2 not bifid at the end but triangular and not reaching the hindmargin and segm. 10 on dorsum blue. In one case the labrum is olive and in another one occipital margin with the blue spots very distinct and segm. 10 on dorsum blue. Length abd. + app. 29, hindw. 21.

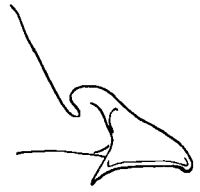

Fig. 10.
Argia ierea sp. nov. Trinidad Sangre Grande. ♀ Mesostigmal lamina, left side. (Original).

♂: semiadult. The pale colour on head and thorax dull olive green the last abdominal segments dark violaceous blue. One of the examples has a small pale spot in the middle of hindlobe of prothorax.

♂: juv. Pale colour on head dull olive, on the body violaceous with the ventral side flesh coloured. Lateral superior black stripe on abd. segm. 2 fadedly connected by brown with the inferior black stripe, which stripes in adulti are confluent, forming a lateral black streak. Segm. 10 blue on dorsum.

♀: *paratypes* adulti. Differences in comparison with the gynetype are: Black stripe in front of median ocellus T-shaped, the black middorsal stripe on synthorax broader than the antehumeral stripe and abdominal segm. 2 with the lateral superior black stripes connected on dorsum in the apical half. The minute blue spots at occipital margin in one specimen enlarged and confluent, with the result that the total hindmargin is pale. One female (16. VIII. 1930) has the small blue spots on the occipital margin lacking and the spots between lateral ocelli and antennae very small.

There is no reason for doubting the conspecific rank of the females to this species, for they are very similar in colourpattern to the males.

Examined 27 ♂ of which 13 are adult, 12 semi-adult and 2 teneral, collected 16. 26. I. 1930 and 14. 16. VII. 1930, length abd. + app. 31—29 (average 30), hindw. 20.5—22 (average 21.5); 11 ♀ of which 6 are adult and 5 semiadult, collected 17. I. 1930 and 14. 16. VII. 1930, length abd. 25—29 (average 27), hindw. 20.5—22.5 (average 21).

This species is very closely related to *A. barretti* Calv. (Biol. Centr. Am. Neur. p. 87, Jan. 1902, tab. IV, figs. 46, 46s) known from one male only and captured in Mexico Linares in Nuevo Leon, from which *ierea* differs in having more black generally and in the form of the appendages. Fortunately there was a good series of both sexes of different ages, by which I could describe the variation in this species. However the differences in his most related form are minute, so that *ierea* will prove not to be easily distinguished from *barretti*.

Dr. CALVERT who has seen one male and one female for comparison with his type of *barretti*, has recorded his experiences in a letter, dated Aug. 22, 1930, as follows:

"The following differences shown by a comparison of the ♂ you sent with the description of *barretti* in the B. C. A. are confirmed by an examination of the type of *barretti* viz: Blue antehumeral stripe not as wide proportionally, i.e., about equal in width to the black middorsal (in stead of twice as wide in *barretti*); as a result the black humeral is only $^1/_3$ as wide as the pale antehumeral. Abd. segm. 2 with the inferior black spot not isolated but partly confluent with the superior black stripe; black on dorsum of 3—6 occupying the apical fourth (instead of fifth or sixth); blue of 7 reduced to basal 10th; stigma of front wing a little shorter, costal margin 9 (vs. 1.00 *barretti*), 1.06 mm. hindwing (vs. 1.25 *barretti*), surmounting only one cell, except on right hindwing, where it surmounts a little more than one cell. Size smaller, abd. 29 (vs. 34 *barretti*), hindwing 21 (vs. 24 mm. *barretti*).

Following are other differences which I found on the direct-comparison of your ♂ with the type of *barretti*:

(There is apparently no difference in the penis except that of *barretti* is a little larger than one would expect). Inner branch of sup. app. in dorsal view a little longer as compared with the outer branch, and a little more cylindrical, while in *barretti* it is more conical. Infer. apps, in profile view: superior margin a little more concave, the superior branch a little more hook-like, in your ♂.

No minute pale bluish mark between each lateral ocellus and the adjoining antenna (such is present in *barretti*).

Occipital margin between the pale blue postocular spots black. (In *barretti* with two large blue spots) [1]).

No mid-dorsal blue spot on the hindmargln of the hind pronotal lobe [2]) (such a spot is present in *barretti* in addition to the blue spot at the lateral ends of that margin possessed by both insects). (The mid-dorsal, humeral and lateral thoracic black stripes are similarly shaped in both). In your ♂, the inferior blue on tergites of 3—6 if not faded, is much narrower than the lateral postbasal black streak, or absent. Transverse black at base and at apex of abd. segm. 10 connected by black middorsally in your ♂ (not connected dorsally in *barretti*).

Barretti has proximal and distal ends of pterostigmata nearly parallel; in your male the distal end is more oblique than the proximal with the result that the distal costal angle is more acute.

Your ♂ and *barretti* are very similar, but *barretti* has more blue on the body generally than your ♂. I know only the single type ♂ of *barretti* and hence am unable to say anything about the individual variation which may exist. For the same reason I can say nothing about the ♀".

Telagrion raineyi Williamson.

Telagrion raineyi ♂ Williamson, Proc. U.S. Nat. Mus., Vol. 48, p. 613—616, fig. a, b, c (app. ♂), 1915.

Trinidad: Coll. Williamson: Cumuto 10. III. 1912, 1 ♂ (B. J. Rainey). Coll. Geijskes: Brasso 5. II. 1932, 1 ♂; 8. II. 1932, 1 ♀; 10. II. 1932, 1 ♂ (G. Belmontes).

Length abd. ♂ 31—33, hindw. 17.5—18, anq. $\frac{10.10}{8.8}$, $\frac{11.10}{9.9}$.

„ „ ♀ 30.5 , „ 19.5 , „ $\frac{10.10}{9.9}$.

This very rare species was described from the only male in coll. WILLIAMSON, collected by Mr. B. J. RAINEY in Trinidad in a swamp near Cumuto. In the sending of 1932 of Belmontes from Brasso I found this species represented by two males and one female. An exact examination of the males and a comparison with the original description has stated that they don't differ from the type specimen, with the exception of one of them, having abdominal segm. 8 not black at all with the sides in

1) In most of the males of *iera* the spots between the lateral ocelli and antennae and those at the occipital margin (although very small) are present, unfortunately it was not so in the example seen by Dr. CALVERT.

2) I have seen one exception (s. antea).

the apical half blue in a triangular area, with the result that the dorsal black is narrowed apically.

The following is a brief description of the female, hitherto unknown. ♀ (allotype): In general very similar to the male. Head above brown orange, pale coloured below. Labrum light brown, clypeus and frons darker brown, vertex and occipit brown orange with irregularly rounded blue postocular-spots, separated from the eyes by a black line. The black band through the orange, as described for the males by WILLIAMSON (l.c.) is not present, so that the postocular spots on the inner side are enclosed by orange. Frontlobe of prothorax blue, dorsum of median- and hindlobe golden brown, the sides pale blue, flesh coloured below. Hindmargin rounded as in the male.

Thorax as in the male, with two blue stripes each side, the first one is the antehumeral stripe, the second one is lying on the metepisternum. Dorsal and between these stripes the thorax is golden brown; metepimeron and ventral side are bluish green and flesh coloured.

Abdominal segm. 1 blue on dorsum, sides yellow; segm. 2—8 black above with green metallic reflections; interrupted basal rings on 3—7 and a complete one on 8. Sides of 2—5 greenish yellow, brighter on the proximal segments, darker and more obscure on the distal segments. Dorsal colour carried on the sides apically of 3—7 as lateral spots; sides of 7 and 8 largely blue, extending in the apical half of 8 to nearly the median dorsal line with the result, that the middorsal black is narrowed towards the handmargin. Segm. 9 and 10 blue; appendages superiores black one-third as long as 10. Genital valves reaching farther than the level of the end of appendages. Vulvar spine wanting.

Wing venation as in the male.

?*Leptagrion* sp.

Trinidad: Coll. Walker: Sangre Grande 15. II. 1930, 1 ♀; 11. III. 1930, 2 ♀. (G. Belmontes).

Length abd. ♀ 35—37, hindw. 21.

♀: Labrum, ante and postclypeus grey, a median impressed black spot and the lateral margins on labrum black. Postclypeus with a faded T-figured black stripe. Genae and front of frons yellow or cream coloured. Head above black, copper shining. Between lateral ocellus and antenna an oval cream coloured or white spot, connected with the ocellus and reaching at half the distance to the antenna. Along the eyemargin a comma-like pale spot, Rear of head black with an inferior pale line along the eyemargin below.

Prothorax red brown, the hindlobe dull blue, semicircular and in the median flat, (s. fig. 11). Dorsum of synthorax its entire length broadly metallic green, bordered on either side by a dull blue stripe at humeral suture. Mesepimeron metallic green, other parts on thorax pale and along the second lateral suture dull blue. Wings hyaline, pterostigma dark brown (s. fig. 12). Legs pale with black spines, tooth on tarsal claw large, equalling the claw; external face of femora dark. Dorsum of abdomen black or metallic green shining, paler inferiorly, a narrow yellow transverse basal ring and with a trace of an apical black ring on segm. 3—7. Last three segments pale (orange in life?). Vulvar spine wanting, valvula vulvae just passing abdominal end.

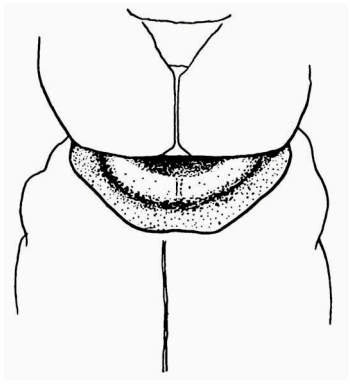

Fig. 11. — ? *Leptagrion* sp. Trinidad, Sangre Grande. ♀ hindlobe of prothorax, dorsal view. (Original).

WILLIAMSON in his notes "On some species of *Leptagrion* with descriptions of a new Genus and a new species" (Ent. News Vol. XXVIII June 1917 pp. 241—255), describes a new genus *Aeolagrion*, separated from *Leptagrion* by the spatulated wings with the hindmargin not paralleling the front margin, the descending crossvein continuing to the wing margin, the marginal cells on either side of it low and quadrangular. Rs and M_3 narrowly separated at the proximal crossvein between them; tooth on tarsal claw well developed but distinctly shorter than claw; male inferior appendages well developed (p. 242).

For this genus a subdivision is made by which one species (*Ae. flammeum*) is separated from the other species on account of the origin of M_2 arising in frontw. at the 7th postnodal, in the hindw. at the 6th and the place of the cubito-anal crossvein distal to first antenodal nearly or slightly more than one half the second antenodal costal space, in hindwing more than one half to nearly two thirds and A in frontwing arising proximal to the cubito-anal crossvein.

In the other species (*dorsale* Brm., type of the genus, and *demararum* Will.) M_2 in frontwing is arising at the 5th postnodal, in the hindw. at the 4th; cubito-anal crossvein in frontw. distal to first antenodal from one fourth to one-third the second antenodal costal space, in hindwing less than one half and A in frontwing arising at or distal to the cubito-anal crossvein.

In the three females from Trinidad the wingvenation is as follows

(s. fig. 12): Front- and hindmargin parallel or nearly so, the wing not spatulated as described for *Aeolagrion*, but they are not so broad as in *Leptagrion* (at the level of the origin of M_2 in frontw. $4^1/_3$ mm., in hindw. 4 mm. Descending crossvein from the subnodus not continued directly to the wingmargin the marginal cell against which it ends pentagonal, about half as high as broad, hindmargin not rounded. M_2 in frontw. arising at the 6th postnodal, in hindw. at the 5th. (In one specimen $(\frac{7.6}{6\,6})$. Rs and M_3 narrowly separated at the proximal crossvein between them. A. in frontw. and hindw. arising proximal to the cubito-anal crossvein; cubito-anal crossvein in frontw. distal to first antenodal slightly more than one half the second antenodal costal space, in hindw. nearly two thirds.

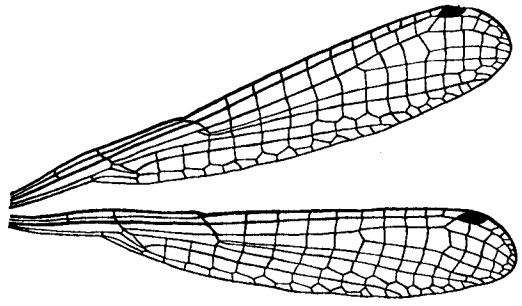

Fig. 12. — ? *Leptagrion* sp.
Trinidad, Sangre Grande. Wingvenation ♀, right side. (Original). In hindwing origin of M_3 abnorm.

With regard to the wingvenation this species would be placed between the genus *Leptagrion* and *Aeolagrion*, closer related in the last genus to *flammeum* than to the other species [1]).

The specimens were sent to Mr. WILLIAMSON who has noted on it: "*Leptagrion* sp.?, I believe generic, position is correct but at present time species not determinable. E B.W. 11. 19. '30".

I believe that these specimens represent an unnamed species, but in so far as apparently males are more frequently taken than females, to name this species at this time might result in delay. Our knowledge regarding the *Leptagrion*-group and related forms is not yet clear enough and it is much better to solve this question later on in a resuming revision of the whole group, than to create confusion at the present time by naming a species on females only.

Aeolagrion dorsale Burmeister.

Agrion dorsale Burmeister, Handbuch der Entomologie, Bd. II, 1839.

1) A female of Rio de Janeiro in my collection belonging to the *Leptagrion*-group, corresponds as for the wingvenation with the Trinidad examples, but is of a larger size (abd. 42, hw. 25.5) and with the hindlobe of prothorax quadrangular.

Leptagrion dorsale Selys, Bull. Acad. Roy. Leg. Agr. 1876, p. (271).
Aeolagrion dorsale Williamson, E. B. Ent. News, Acad. Nat. Sc. Pa. Vol. XXVIII, June 1917, pp. 248—250, pl. XVII, fig. 5, 6; pl. XVIII, fig. 21.

Trinidad: Coll. Williamson: Cumuto 8. 10. III. 1912, 4 ♂ 1 ♀.

Length abd. ♂ 27—30 (average 28.3), hindw. 17—19 (average 17.7); ♀ 27—28, 18—19.

Known to me from Trinidad, only from the description of WILLIAMSON (l.c.).

Enallagma coecum Hagen, subsp. *novae-hispaniae* Calvert.
Agrion coecum Hagen, Syn. Neur. N. Am., p. 84, 1861.
Enallagma coecum Selys, Bull. Acad. Belg. (2), X, p. 528, 1876.
" " subsp. *novae-hispaniae* Calvert, Biol. Centr. Am. Neur., p. 381, 1907.

Trinidad: Coll. Geijskes: Sangre Grande 14/16. VIII. 1930, 4 ♂ 2 ♀ (G. Belmontes); Bonier Arouca 2. XII. 1930, 2 ♂; 6. XII. 1930, 1 ♀ (fr. Maurus Maingot).

Length abd. + app. ♂ 24.5—26, hindw. 16—18; ♀ 23—25, 17—18.

♂: Labrum, postclypeus and frons pale coloured the postclypeus with a black line at the articulation with the frons. Occiput black bronze with large postocular spots; the occipital margin pale coloured. Rear of head around foramen black, other parts pale yellowish.

Prothorax black, except the frontlobe and hindmargin of hindlobe while the pale colour on the middle lobe is confined to the lateral hind margin each side, not sinuated by the dorsal black.

Thorax marked by black at the middorsal carina by a straight stripe and the humeral suture by a stripe pointed in the upper part and widened below and the dorsal third of mesinfra-episternum. The second lateral suture has a small black spot on the upper end only. Remainder of thorax violet blue, pale below.

Legs black, femora on the inner side, tibia at the outer side pale coloured. Wings hyaline, postnodal crossveins $\frac{11.11}{9.9}$, pterostigma covering less than one cell, nearly as long as high, with the distal costal edge most acute.

Abdomen with the three first segments violet, dorsum of 1 basal half black, 2 with a U-shaped figure with the ends directed forward, 3 has the apical fourth black, 4—7 black with a small transverse basal ring

interrupted by a narrow black line in the median. Segm. 8 and 9 blue, both with an inferior black stripe each side in 8 not reaching the base of the segment and enlarged dorsally to a transverse black band over the apical thirdth; 9 blue on dorsum; dorsum and sides of 10 black at all.

Appendages as stated for the typical continental examples. Superiores widely bifid in profile view, the upper branch larger and conic, the lower branch more flat with the sides parallel and top rounded, about $^4/_5$ the length of the upper branch. Inferiores much shorter, reaching to the

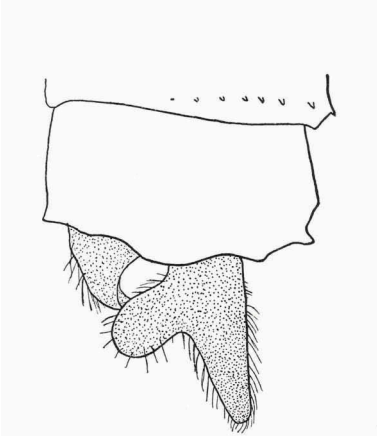

Fig. 13.
Enallagma coecum Hagen, subsp. *novae-hispaniae* Calvert.
Trinidad, Arouca. ♂ appendages, lateral view from left. (Original).

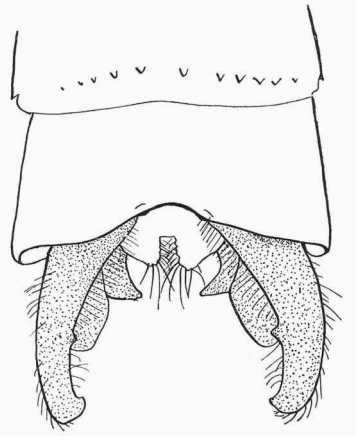

Fig. 14.
Enallagma coecum Hagen, subsp. *novae-hispaniae* Calvert.
Trinidad, Arouca. ♂ appendages, dorsal view. (Original).

basal side of lower branch of superiores, curved inward and upward at tip (s. figs. 13 and 14).

♀: Head and thorax very similar marked as in male. The black on nasus at the articulation with the frons more distinct and pointed forward in the median and on each side. Postocular spots smaller. The black middorsal stripe on thorax wider than in the male; on the lower end of the black humeral stripe, there is a black line in the suture between mesinfraepisternum and mesepimeron, directed upward at half way the pale antehumeral stripe.

Dorsum of abd. segments 2—7 black, 2 in the basal half narrower than in the apical half and in the latest enlarged each side, the pale sides blue. 3—7 with the black in the apical fourth enlarged each side and at base a small transverse pale blue ring interrupted in the median by a narrow black line; 8 blue, lateral and apical thirdth black; 9 black,

each side with an apical lateral blue spot; 10 black on dorsum, sides blue, appendages black.

Enallagma coecum has been described at first by Hagen (l.c.) as *Agrion coecum* from St. Thomas, Porto-Rico and Haïti and the variating specimens from Cuba as *Agrion cardenium*. DE SELYS (l.c.) gives under this species the Cuban examples as race ? *cardenium* and noted under "Patrie": "Ile de la Trinité par M. M. GUNDLACH et POEY, cll. HAGEN, SELYS".

As CALVERT has pointed out in his critical study of "Gundlach's work on the Odonata of Cuba" (Transact. Am. Ent. Soc. XLV, Dec. 23, 1919, pp. 350—353) *cardenium* must be understood as a geographical race, occurring Cuba and Florida. In his work on the Odonata in Biol. Centr. Am. Neur., he described under *coecum* a new subspecies as *novae-hispaniae* occurring on the continent only, from Lower California to Pernambuco in Brazil. The specimens which I have received from Trinidad fully correspond with the description given for this subspecies, so that Trinidad is now the first place not on the continent, boarding this subspecies. However, it is evident that it came in as an immigrant from the continent and apparently from Venezuela.

With this knowledge of the species, it is doubtful to number the subspecies *cardenium* with the Trinidad fauna and the reason to add Trinidad under the localities to this form by DE SELYS, must apparently be imputed to the representation in his collection of the female sex only.

Acanthagrion kennedii Williamson.

Acanthagrion kennedii Williamson E.B., Ent. News, Ac. Nat. Sc. Pa., Vol. XXVII, p. 314, pl. XVII, fig. 5, 6, 8 (app. ♂); pl. XVIII, fig. 14, 15 (penis), July 1916.

Trinidad: Coll. Williamson: Cunapo River 27. II. 1912, 10 ♂ 1 ♀; Arima 4. III. 1912, 15 ♂ 1 ♀; Cumuto 6. 8. 10. III. 1912, 88 ♂ 8 ♀. Coll. Geijskes: Siparia 25. VII. 1929, 1 ♂; Guaico 17. 20. VIII, 1929, 10 ♂ 6 ♀; same loc. 12. VI. 1930, 2 ♀ (fr. Maurus Maingot); Sangre Grande 12. VII. 1930, 3 ♂ (G. Belmontes); Cumuto 5, XII. 1930, 2 ♂ (fr. Maurus Maingot).
Coll. Walker: Sangre Grande 21, 24. 25. I. 1930, 3 ♀; same loc. 1930, 14 ♂ (G. Belmontes).

Length abd. + app. ♂ 23—27, hindw. 14.5—17.5; ♀ 21—25, 15—18.

By the determination of the *Acanthagrion* species, I profitably made use of the penis study by KENNEDY on this genus (Ent. News Vol. XXVII

p. 325—330) and found it very helpful and in accordance with the figures given under the species. To the ample description of WILLIAMSON (l.c.), I would only add that the males and females in my collection have a very distint black second lateral suture line and the pale colour-pattern on the head reduced. From Siparia there is a single ♂ with the pale areas on thorax and abdomen bright blue, whereas all my other captures from Guaico have these areas yellowish green. The teneral females are green or yellowish green on thorax and abdomen, the adulti blue.

A. kennedii is found in swamps as well as along small rivers. In Guaico I took several pairs in coitu among the high grass vegetation. The species is hitherto known from Trinidad only.

Acanthagrion ascendens Calvert.

Acanthagrion gracile ascendens Calvert, Ann. Carn. Mus. pp. 165—166, 1909, pl. V figs. 81, 81*a* (app. ♂).

Acanthagrion ascendens Williamson E. B., Ent. News Acad. Nat. Sc. Pa. Vol. XXVII, p. 351, pl. XVII, fig. 13, 1916.

Acanthagrion ascendens Form *a* Ris, Arch. f. Natur Gesch. Jhrg. 82, 1916, p. 125.

Trinidad: Coll. Williamson: Cunapo River 27. II. 1912, 11 ♂; St. Joseph River 28. II. 1912, 10. III. 1912, 2 ♂; St. Ann River 1. III. 1912, 1 ♂; Arima 4. III. 1912, 2 ♂; Maracas River 5. III. 1912, 2 ♂; Cumuto 6. III. 1912, 1 ♂; Baracon Chaguanas 7. III. 1912, 1 ♂.

Coll. Geijskes: Siparia 23. 25. 26. VII. 1929, 10 ♂; Erin 25. VII. 1929, 3 ♂ 1 ♀; Penal 26. VII. 1929 2 ♂; Sangre Grande 5. 15. VII. 1930, 17 ♂ 1 ♀; same loc. 5. 16. VIII. 1930, 4 ♂ (G. Belmontes); Arouca 2. XII. 1930, 1 ♂ (fr. Maurus Maingot).

Coll. Walker: Sangre Grande 16. 19. I. 1930, 2 ♂; same loc. 2. II. 1930, 1 ♂ (G. Belmontes).

Length abd. ♂ 26.5—29, hindw. 16.5—19 [1]); ♀ 26.5—27, hindw. 17.5.

Most of my males are of a dark type with a distinct black second lateral suture stripe and the pale colourpattern on head reduced. The males of this species are well known by the descriptions of CALVERT and WILLIAMSON (loc. cit.), but the female has been described only by WILLIAMSON from a teneral specimen from British Guiana. In Erin in the south of the island, fortunately a coppled pair was taken by myself

1) A very small male (abd. 23, hw. 16) was in the series from Sangre Grande in my collection; an exact examination controlled by the penis, has ascertained the fact that it must belong to this species.

along a small stream, by which I am able to add a description of a mature female:

♀: Labrum yellow with an impressed posterior median spot and the posterior lateral margins dark brown. Genae and anteclypeus yellowish green; postclypeus with a black crescent of which the horns enclose two yellow spots; the extreme lateral corners yellow. Frons in front with a yellowish green bar, constricted in the median by black, at the lower side from the suture black of postclypeus and at the upper side from the black of occiput. Dorsum of head black, in front of the median ocellus two oblique yellow spots and at the inner side of antennae a small rounded yellow spot, however not connected with those of the median ocellus. Postocular spots greenish blue, rounded, somewhat larger than the circle enclosing the ocelli. Rear of head above level of foramen black, pale below.

Prothorax as in ♂, dorsum in the middle with two yellow points near the hindlobe and at the hindlobe in the middle between the two lateral spots a small yellow point just at the top of the lobe.

Synthorax, dorsum black, the antehumeral stripe greenish blue, wider as in male and nearly as wide as the middorsal black stripe to the carina. Humeral stripe black, second lateral suture marked by a diffuse brown line. Mesepimeron and metepimeron bluishtinged above, greenish blue in the middle and cream-coloured in the under parts and along the sec. lateral suture. Pruinescence on the cream-coloured met-infraepisternum, meso- and metasternum and coxae.

Wings hyaline, pterostigma brown. Legs pale, dark markings confined to the dorsal suffice of the femora, darkest apically and reduced on the last femora. The first pair the darkest the third pair the palest.

Abdomen dorsum black, segm. 1 and 2 patterned as in the male, the pale colour greenish-blue; 3—7 with a narrow light brown basal ring, ventral side light brown; 7 and 8 black with the apical integument blue, 9 black, the apical fourth blue, pointed to base by a middorsal stripe. 10 blue with an inferior black basal spot. Appendages sup. black.

As noted by WILLIAMSON (l.c.) the female of *ascendens* is well marked by the mesepisternalfossa and mesostigmal lamina "having the first one at about the midheight of the mesepisterna, the carina between the fossae, as seen in lateral view, elevated into a small semi-circular prominence".

The teneral female from British Guiana differs from the above described female by the light bright blue colour of the postocular spots and pale markings of thorax and basal abdominal segments, the absence of black markings on the second lateral suture and abd. segm. 8 with the apical

third or fourth blue and scgm. 10 with no inferior black at base. Later on in the collection from Sangre Grande I found a second female of *ascendens* which differs from the above described example as follows:

The yellow bar in front of frons is interrupted in the median by a black line from postclypeus to occiput. The oblique yellow spots in front of the median ocellus very small and hardly visible and two yellow points behind the antennae.

The post ocular spots smaller and about equal to a circle enclosing the ocelli. Antehumeral stripe somewhat smaller, about $^3/_4$ as wide as middorsal black to carina.

Humeral stripe at the upper end narrow and pointed. The faded brown at the second lateral suture only present in the upper half.

Abd. Segm. 10 blue, with no inferior black basal spot.

It is a local species along slowly running water in woodland, preferring a rank vegetation at the wateredge. My captures are made in the south on small muddy streams near Siparia and Erin. WILLIAMSON mentioned the species from several localities in the north of the island.

On the wing the ♂ is conspicuous by the beautiful orange antehumeral stripes and the blue tip of abdomen.

Telebasis griffinii Martin.

Erythragrion griffinii Martin, Boll. Mus. Zool. Torino, XI, No. 240, p. 2, 1896.

Telebasis griffinii Calvert, Biol. C. Am. Neur. Dec. 1902, pp. 116—117 and 383, tab. V, figs. 31, 32 (app.).

Trinidad: Coll. Geijskes: Sangre Grande 10. VII. 1930, 2 ♂; 14. VII. 1930, 1 ♂; 5. VIII. 1930, 1 ♂ (G. Belmontes).

Length abd. + app. ♂; 22.5—23, hindw. 15—15.5.

The specimens fully correspond with the descriptions and figures given by CALVERT. What is noted for the species contrary to the original description also applies to the Trinidad examples. The postnodal cross-veins are $\frac{9.9}{8.8}$, $\frac{10.10}{8.8}$, $\frac{9.9}{7.8}$, $\frac{9.9}{8.8}$. The capture of this species in Trinidad is somewhat surprising for it is known from Central America only.

Telebasis sanguinalis Calvert.

Telebasis sanguinalis Calvert, Ann. Carn. Mus. Vol. VI, I, 1909, pp. 192—193, pl. V, fig. 101 (app. ♂), (Brazil Chapada).

Trinidad: Coll. Geijskes: Guaico swamp 20. VIII. 1929, 2 ♂.

Length abd. + app. ♂ 23—23.5, hindw. 14—14.5.

The original description applies quite well to these specimens and the form of the appendages fully corresponds with the figure given by CALVERT (l.c.). There are still a few differences in the colourpattern of prothorax which is reddish brown, with the suture line between front and middle lobe and middle- and hindlobe dark metallic green. The rear of head is dark and pale only along the eyes below.

Wings hyaline, pterostigma brown, postnodal crossveins: $\frac{10.10}{9.9}$; $\frac{10.10}{9.8}$. Legs pale, dark markings confined to the dorsal surface of the femora.

In the swampland near Guaico, I took the specimens at one place among a high grass vegetation on some small pools. In spite of intense search, females or other males were not to be seen.

Metaleptobasis byrsonima Williamson.

Metaleptobasis brysonima ♂, Williamson E. B., Proc. U. S. Nat. Mus., Vol. 48, p. 602—607, pl. 38, fig. 5—8, 1915.

Metaleptobasis byrsonima ♂, idem, Ent. News Acad. Nat. S. Pa, Jan. 1917, p. 8 (correction).

Trinidad: Coll. Williamson: Cumuto 10. III. 1912, 1 ♂.

Length abd. ♂ 34, hindw. 20.5.

Known to me from the original description only. The species is not found elsewhere.

Metaleptobasis mauritia Williamson.

Metaleptobasis mauritia ♂, Williamson E. B., Proc. U. S. Nat. Mus., Vol. 48, 1915, pp. 603—607, pl. 38, fig. 9—12.

Trinidad: Coll. Williamson: Cumoto 10. III. 1912, 3 ♂.
Coll. Walker: Sangre Grande 26. I. 1930, 1 ♂; 23. II. 1930, 1 ♂; 1. III. 1930, 1 ♂; 9. III. 1930, 1 ♂; 13. II. 1930, 1 ♀; 6. III. 1930, 1 ♀; 11. III. 1930, 1 ♀ (G. Belmontes).

Length abd. ♂ 36—37, hindw. 21.5—22; ♀ 35, 23.

In the collection WALKER, there were 4 males and 4 females of *Metaleptobasis* of which the specimens for the males fully corresponds with the description and figures given by WILLIAMSON (l.c.) under *M. mauritia*. Three of the males are semi-adult and one adult. There are no differences in colour or black markings with the original description, except that in the semi-adult specimens the pale blue on the head is replaced by a yellowish green. I have not seen differences in the venation

outside the extreme sizes given in the original tabulation. Three of the females resemble in general the males and they are undoubtedly referable to the same species; the other one, I am of opinion, belongs to the next species.

♀ ad.: *gynetype* (Trinidad 26. I. 1930 Sangre Grande). Hitherto unknown. Length abd. 35, hindwing 23. Similar to the male. Labium pale flesh, cleft in median lobe widest near the middle, sides not parallel. Labrum light brown, basal in the middle and on each side near the lateral margin a dark brown spot, lateral margins dark brown. Anteclypeus (rhinarium) green with a dark brown spot on either side of median line. Postclypeus (nasus) brown, anterior edge dark brown in the middle smallest. Frons in front dull yellow, above gray. Vertex obscurely patterned

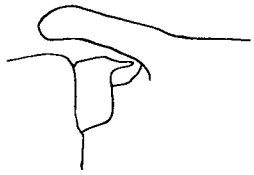

Fig. 15.
Metaleptobasis mauritia Williamson.
Trinidad, Sangre Grande. ♀ gynetype, mesothoracic horn, lateral view from left side. (Original).

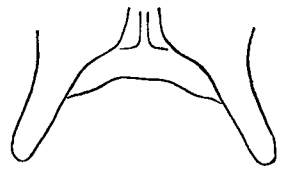

Fig. 16.
Metaleptobasis mauritia Williamson.
Trinidad, Sangre Grande. ♀ gynetype, mesothoracic horns, dorsal view (Original).

with slightly lighter spots as in male. Genae yellowish green, a round black spot not quite reaching the eye, opposite anterior face of frons. Rear of head pale flesh coloured; antennae black, second joint pale, except extreme apex.

Prothorax flesh coloured, darker above with some black stripes, no horns or projecting parts on anterior lobe. Thorax with the middorsal stripe metallic green, on each side of the carina $^1/_3$ as broad as mesepisternum, the last pale brown, passing ventrally and posteriorly into pale flesh on mesepimeron and metepimeron. Mesothoracic-horns long, pale coloured (s. figs. 15 and 16).

Legs pale, tarsal claws not toothed. Wings hyaline, stigma covering one cell (frontw.) or nearly so (hindw.), as in male. Cubito-anal crossvein from quadrangle about twice its own length. Ratio of anterior side of quadrangle to posterior side in front- and hindwing as in male. Postnodal cells $\frac{12.12}{11.11}$; origin of M_2 in fr. w. near 7th postnodal in h. w. near

6th postnodal; origin of M_{1a} in fr. w. and h. w. at 10th postnodal. Cu_1 in fr. w. ending at the level of the 10th or near 11th postnodal, in h. w. at the level of the 10th postnodal. Cu_2 in fr. w. at the level of the 6th postnodal, in h. w. at the 6th or 7th.

Abdomen, segm. 1 flesh coloured, apical half dorsal dark brown, lateral green; segm. 2—8 on dorsum dark brown with pale interrupted basal rings and dark rings at apex; 8—10 dorsal reddish brown, lateral yellowish green. Ventral side 2—5 pale yellowish green, 6—10 light brown. Appendages sup. conic, dark brown.

The paratypes are similar to the above described female. The relation of these females to this species is based on the wingvenation especially.

Metaleptobasis manicaria Williamson.

Metaleptobasis manicaria ♂ Williamson E.B. Proc. U. S. Nat. Mus. Vol. 48, 1915, pp. 602—607, pl. 38, figs. 13—18 (app. ♂ and mesoth. horns), pl. 39, fig. 1—2 (wings).

Trinidad: Coll. Williamson: Cumuto 8. 10. III. 1912, 66 ♂.
Coll. Walker: Sangre Grande 5. III. 1930, 1 ♀ (G. Belmontes).

Length abd. ♂ 37, hindw. 21; ♀ 35.5, 21.5.

♀: *gynetype* (5. III. 1930, Trinidad, Sangre Grande), hitherto unknown. Labium pale flesh, cleft in median lobe similar to *mauritia* (s. antea). Labrum yellowish light brown, lateral margins dark brown. Anteclypeus green with a dark spot on either side of median line. Postclypeus brown, anterior edge black, smallest in the middle. Frons in front dull yellow, above brownish gray patterned with dark markings. Vertex dull gray with dark markings, posterior edge and rear of head dull light brown, ventral flesh coloured. Genae and antennae as in *mauritia*. Prothorax ventral flesh coloured, lateral reddish, darker above, no horns or projecting parts on anterior lobe. Thorax with the middorsal stripe metallic green on each side of the carina $^1/_4$ as broad as the mesepisternum itself, the last pale brown, passing ventrally and posteriorly into pale flesh on mesepimeron and metepimeron. Mesothoracic horns short, the top dark brown and bristled (s. figs. 17 and 18).

Legs pale, tarsal claws not toothed. Wings hyaline, stigma covering one cell, light brown or gray, paler against the enclosing veins. Cubito-anal crossvein from quadrangle about three times its own lenght. Posterior wingmargin meeting anal-vein distal, about the length of the cubito-anal crossvein itself. Ratio of anterior side of quadr. to posterior side in front and hindwing same as *mauritia*.

Postnodal cells $\frac{13.13}{12.13}$; origin of M_2 in front- and hindwing at 6th postnodal; origin of M_{1a} in frontw. at 11th postnodal, in hindw. at 10th or 11th. Cu_1 in frontw. ending near the level of the 11th postnodal, in hindw. at the level of the 10th postnodal. Cu_2 in frontw. at the level of the 7th, in hindw. at the level of the 7th or 8th.

Abdomen flesh coloured; segm. 1—7 on dorsum dark metallic green with pale interrupted basal rings and dark brown rings apically; 8—10 reddish brown. 7 dorsal darker on its entire length (except a small paler basal ring), 8 on its basal $^3/_4$ and 9 on its basal $^1/_3$; 8 and 9 lateral bluish green shining, valvula vulvae just passing the abdominal appendages; abd. app. sup. pale brown.

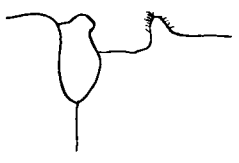

Fig. 17.
Metaleptobasis manicaria Williamson.
Trinidad, Sangre Grande. ♀ gynetype, mesothoracic horn, lateral view from left side. (Original).

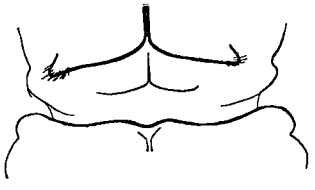

Fig. 18.
Metaleptobasis manicaria Williamson.
Trinidad, Sangre Grande. ♀ gynetype. Mesothoracic horns and hindlobe of prothorax, dorsal view. (Original).

I refer this specimen to *manicaria* on account of the wingvenation and the width of the mid-dorsal mesepisternal stripe. In the male of *manicaria*, however, the mesothoracic horns are well developed, whereas in this female they are very small, but this question is not a reason for doubting the relation to *manicaria*. The only species to which this female otherwise may belong is *diceras*, described by de SELYS, but the ♀ of this species has the posterior lobe of prothorax shaped otherwise and on the abdomen there is a large basal ring on segm. 7. From the ♀ of *mauritia* it differs especially by the mesothoracic horns, the width of the middorsal mesepisternal stripe and some differences in the wing venation. From *bovilla* Calv. it differs by the cleft in median lobe of labium, the width of the mesepisternal stripe and the place of the cubito-anal crossvein, being from quadrangle at a distance 3 times its own length. From the other ones as *byrsonima* Will., *foreli* Ris and a unnamed but described ♀ from British-Guiana by WILLIAMSON, by the

length of abdomen and the shape of the mesothoracic horns especially. I believe it is not likely we have here a female of an unnamed species.

Ischnura ramburi Selys, var. *credula* Hagen.

Trinidad: Coll. British Mus.: Roy. Bot. Gard. ♂ ♀? (W. E. Broadway). Coll. Geijskes: Erin 25. VII. 1929, 1 ♂.

Length abd. ♂ 25, hindw. 15, postnodal crossveins $\frac{9.10}{7.7}$.

The single male in my collection belongs to the intermediate form between the variety *credula* and the typical *ramburi*, having the abd. segm. 9 blue with the apical black on dorsum narrowly connected with base.

Concerning its appearance it may be said, that apparently the species is not rare in several places near the coast.

Ceratura capreola Hagen.

Trinidad: Coll. Geijskes: Guaico 17. VIII. 1929, 1 ♀; 20. VIII. 1929, 6 ♂ 4 ♀ (3 ♀ var. citr.); 12. VI. 1930, 1 ♀ (var. citr.) (fr. Maurus Maingot); Arouca 2. XII. 1930, 1 ♂ 1 ♀; 3. XII. 1930, 1 ♂; 5. XII. 1930, 1 ♂ (fr. Maurus Maingot).

Length abd. ♂ 16.5—18, hindw. 9—10, postnodal crossv. $\frac{6.6}{5.5}$, $\frac{7.7}{5.5}$, $\frac{7.7}{6.6}$, $\frac{8.8}{6.6}$; ♀ 17—18, 10—11, $\frac{7.7}{5.5}$, $\frac{7.7}{6.6}$; ♀ var. 16.5—17, 10.5—11, $\frac{6.6}{5.5}$, $\frac{7.7}{6.6}$.

In the males the transverse apical blue on segm. 8 is not interrupted by black lines or spots. In the females (type-form) in one case abd. segm. 9 is entirely black, while in another one it is entirely blue as in all the specimens of var, *citrine* Selys.

The individuals of this very small species from Guaico were collected on some local pools along the road. As I could observe there, they fly very quickly, skinning the water among the plants on the wateredge and when striking with the net through the plants, they fall down in the rank vegetation and are not to be found again. The ♀ of the var. *citrine* is more conspicious by the fine yellow thorax.