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RESULTS OF THE UNIVERSITY OF MICHIGAN-
WILLIAMSON EXPEDITION TO COLOMBIA,
1916-1917

I. TWO INTERESTING NEW COLOMBIAN GOMPHINES
(ODONATA)

BY E. B. WILLIAMSON

The genus and species described in this paper were taken in Colombia in 1917. A detailed account of the expedition and a description of the region in which the collections were made have been given in a previous paper.¹

***Erpetogomphus sabaleticus*, new species**

Description: Abdomen, male 33 mm., female 32 mm.; hind wing, male 26 mm., female 28.5 mm.

Male.—Head exactly like *tristani*, as described by Calvert,² except that the hind margin of the occiput, in the median line, has a short shallow rounded depression.

¹ A Collecting Trip to Colombia, South America, Miscellaneous Publications, Museum of Zoology, University of Michigan, No. 3, February, 1918.

² Entomological News, Vol. XXIII, July, 1912, plate XVII, pp. 289-295.

Prothorax also like *tristani*, except that the submedian dorsal spots on the middle lobe are wanting in *sabaleticus*, and the posterior lobe is divided in its anterior half by a broad brown band which is continued posteriorly as a yellowish or paler area than the adjoining green.

Thoracic pattern as figured (plate II, fig. 9); essentially the same as *tristani*, a few minor differences are no more than individual variations.

Abdomen like *tristani*; a green dorsal basal spot on 2, fading out posteriorly, but no pale dorsal posterior spot in either species; Calvert's description of the dorsal abdominal markings requires some correction; the pale yellowish or whitish middorsal stripes are confined to 3-6, 7, as frequently in gomphines, having an entirely different pattern; moreover, on 3-5 these dorsal stripes reach the apices of the segments as thread-like lines; the basal two-fifths or half of 7 is yellow, this pale area with a narrow, median, interrupted, transverse brown ring; 10 is conspicuously paler than 9 in both species, being that dull reddish orange or brown which appears in the coloration of many gomphines; 9, and more conspicuously 10, narrowly margined apically with black; lateral spots on 3-6 pale gray, as described in *tristani*.

Form of abdomen as described for *tristani*, except that the hind margin of 9 is as figured (plate II, fig. 10). It is the same in the specimen of *tristani* given me by Dr. Calvert.

Genitalia of 2 indistinguishable from those of *tristani* as figured and described by Calvert.

Abdominal appendages as figured (plate II, figs. 10 and 11). The superior appendages are distinguished at once from those of *tristani* by the more apical position of the dorsal and ventral branches of each appendage, as seen in profile, and by the greater development in *sabaleticus* of the dorsal branch and the

lesser development of the inferior branch. The inferior appendage is higher and curved forward farther so the enclosed space at the apex, as seen in profile, is vertical rather than horizontal as it is in *tristani*. Superior appendages yellow or yellowish, shading into black at the apices of the various branches; the inferior dark, almost black, shining reddish brown. In the specimen of *tristani* given me by Dr. Calvert the ventral branch of the superior appendage, as seen in profile, is more triangular and more sharply set off than in the type specimen, as figured by Calvert.

Legs as described for *tristani*, except that the pale under color of the middle femora is greenish brown, darker and duller than the under color of the first femora, and this color is not limited to a distal spot on the middle femora, but is continuous the length of the femora.

Female.—Head, thorax and abdomen as described for *tristani*; the coloration of head and thorax essentially like that of the male. Segments 3-10 badly faded and discolored, more or less blotched with brown and black; the median dorsal stripes on 3-6 nearly or quite obliterated, seen here and there as minute spots or short thread-like lines of color; the basal lateral spots on 3-6 are obscure but discernible; on 7 the pale areas in the blotched pattern are greater in extent than on 3-6, but in its discolored condition no description is possible, and unfortunately no living color notes were made of this specimen; 8-10 are progressively darker, 8 being largely reddish brown, and 10 being largely black. Vulvar lamina as in *tristani*.

Male and Female.—Wings clear in the male with yellowish tinges basally to about the level of the triangles; yellowish smoky tinged throughout in the female. Antenodals of front wings 15-16, of hind wings 11-12; postnodals of front

wings 12-13, of hind wings 10-12; distal thickened antenodal the fifth in the four wings of the male and one hind wing of the female; in both front wings of the female it is the sixth, and in one hind wing it is the fourth.

The wings of both *tristani* and *sabaleticus* are narrower than in other species of the genus known to me. In plate I, fig. 4, *crotalinus* is figured for comparison with *sabaleticus*. The narrower wing results primarily from a reduction of the anal area with consequent modifications of distal posterior parts adjusting themselves to this reduction. In my male specimen of *tristani* there are in the hind wings 10 marginal cells between Cu_2 and A_1 ; in the male of *sabaleticus* there are 12 in one hind wing and 11 in the other, in the female there are 12 and 13.

The following general description of the living colors of the male was made as soon as the specimen could be safely removed from the cyanide bottle. Eyes above dark dull blue, gray beneath. Face dark brown, frons green. Thorax rich dark brown marked with brilliant grass-green. Abdominal segments 1 and 2 and base of 3 brown; apex of 3 and 4-6 black; dorsal markings 1-6 green; basal lateral spots 3-6 light gray or pearl, on 3 with a greenish cast; basal area of 7 pale green above, sides gray like preceding lateral spots; apical part of 7 dark brown, 8 paler, 9 still paler and 10 light reddish brown, narrowly black at apex.

Throughout the above description it has been assumed that the student had before him Calvert's figures, description and discussion of *Erpetogomphus tristani* (Entomological News, Vol. XXIII, July, 1912, plate XVII, pp. 289-295). In view of the close relationship of *tristani* and *sabaleticus*, Calvert's paper and the present article are in a sense complementary. The two species seem inseparable on any other character than

the male abdominal appendages. I sent my two Colombia specimens to Dr. Calvert for examination. He not only compared them with the original male and female of *tristani*, but kindly sent me, for my own collection, a second male of *tristani* which he had received from Professor Tristán. This specimen was taken at Nicoya, Guanacaste, Costa Rica, in February, 1912. Dr. Calvert's conclusion was that the Colombian and Costa Rican males were specifically distinct by their appendages, but he was unable to find any differences, other than the slight one of size, in the females. He compared the condition here found in *Erpetogomphus* to an analogous condition in the genus *Hetaerina* where the males of certain species are easily recognized while their respective females can not be distinguished.

Habitat: Colombia.

Type Specimens: One male, Cristalina, 28 kilometers on the railroad above Puerto Berrio, Department of Antioquia, February 19, 1917; 1 female, Maraquita, Department of Tolima, February 3, 1917; collected by J. H. and E. B. Williamson; in the collection of E. B. Williamson; the male the type of the species. The specific name refers to the beautiful little stream, the Quebrada Sabaleticus, where the male was taken.

Habits: I have elsewhere (*loc. cit.*) described the various localities in which we collected in Colombia. The female, here identified as *sabaleticus*, was taken along the upper San Juan near Maraquita. As I came out from a small gully into the stream bed it flew down from above the stream and alighted on a flat horizontal leaf a foot or two above the ground. It was the only *Erpetogomphus* seen about Maraquita. The male was taken along the Quebrada Sabaleticus and, like the female, in forest. I was stalking a large, handsome *Gomphoides* resting on the tip of a stick at one end of a small pool. It flew up

through the trees, a regular performance, as I attempted to approach, and at the same moment our mozo hissed and pointed to the bushes at my elbow. There, so close I had to move back a step to strike at it, resting on a flat leaf about five feet above the water, was this beautiful bright green and rich brown *Erpetogomphus*. The next day, when he had one of the elusive *Gomphoides* in his net, an *Erpetogomphus* alighted in the characteristic position near J. W., but flew before he could strike at it. We saw no other specimens of the genus in Colombia.

Remarks: In Dr. Calvert's discussion of *tristani*, so frequently referred to above, he points out that Costa Rica marks the southern range of the genus *Erpetogomphus* as then known. However, only two species are recorded from Costa Rica and there is an absence of records in the large area intervening between Costa Rica and Guatemala, the latter country being in 1905 the southern known range of the genus. The discovery of this new species six hundred miles or more up the Magdalena River in Colombia is a wide extension of the known range of the genus; and the close relationship of the Costa Rican and Colombian species calls attention again to the South American affinities of the Costa Rican fauna.

Ischnogomphus, new genus

Description: Slender, dull colored, belonging to the legion *Gomphus* of de Selys, and to that small group of genera in the legion in which the cross-veins between M_{1-3} and M_4 are numerous and unspecialized. Its closest ally is *Cyanogomphus*³ from which it is separated by the anal area of the front wings being one cell wide, instead of two or more, and by the absence of an anal triangle in the male.

³ Williamson, E. B. Entomological News, Vol. XXVII, April, 1916, plates VIII and IX, pp. 167-172.

Type: *Ischnogomphus jessei*, new species.

Remarks: The group of genera of the legion Gomphus of de Selys, which is separated from the other genera of the legion by the possession of numerous cross-veins between M_{1-3} and M_4 , includes *Agriogomphus*,⁴ *Cyanogomphus*, *Epigomphus*, *Ischnogomphus*, *Leptogomphus*, *Macrogomphus* and *Microgomphus*.

Distribution of Characters Within the Group

1. Stigma with a weak brace-vein: *Cyanogomphus*, *Ischnogomphus*.
- 1a. Stigma without brace-vein: *Agriogomphus*, *Epigomphus*, *Leptogomphus*, *Macrogomphus*, *Microgomphus*.
2. Basal antenodal of second series present: *Cyanogomphus*, *Epigomphus*, *Ischnogomphus*, *Leptogomphus*, *Macrogomphus*.
- 2a. Basal antenodal of second series not present: *Agriogomphus*, *Leptogomphus*, *Microgomphus*.
3. Distal thickened antenodal the fifth: *Agriogomphus*, *Cyanogomphus*, *Ischnogomphus*, *Microgomphus*.
- 3a. Distal thickened antenodal the sixth or more distal: *Epigomphus*, *Leptogomphus*, *Macrogomphus*.
4. One cubito-anal cross-vein in addition to the inner side of the subtriangle: *Agriogomphus*, *Cyanogomphus*, *Ischnogomphus*, *Leptogomphus*, *Macrogomphus*, *Microgomphus*.
- 4a. Two cubito-anal cross-veins in addition to the inner side of the subtriangle: *Epigomphus*, *Macrogomphus*, *Microgomphus*.
5. One row of postrigonal cells in the front wings: *Agriogomphus*.
- 5a. Two rows of postrigonal cells in the front wings: *Cyanogomphus*, *Epigomphus*, *Ischnogomphus*, *Leptogomphus*, *Macrogomphus*, *Microgomphus*.
6. One row of postrigonal cells in the hind wings: *Agriogomphus*, *Cyanogomphus*, *Epigomphus*.
- 6a. Two rows of postrigonal cells in the hind wings: *Cyanogomphus*, *Epigomphus*, *Ischnogomphus*, *Leptogomphus*, *Macrogomphus*, *Microgomphus*.

⁴ *Agriogomphus* as used in this paper is equivalent to *Agriogomphus* as used by Needham, A Geneologic Study of Dragonfly Wing Venation, Proc. U. S. National Museum, Vol. XXVI, fig. 27, page 738, and Ris, Odonatenfauna von Argentina, Mem. Soc. Ent. Belgique, Vol. XXII, p. 72.

7. Anal area of the front wings one cell wide: *Agriogomphus*, *Ischnogomphus*, *Microgomphus*.
- 7a. Anal area of the front wings two or more cells wide: *Cyanogomphus*, *Epigomphus*, *Leptogomphus*, *Macrogomphus*.
8. Two postanal cells in the hind wings: *Agriogomphus*, *Cyanogomphus*, *Ischnogomphus*, *Microgomphus*.
- 8a. Three postanal cells in the hind wings: *Cyanogomphus*, *Epigomphus*, *Leptogomphus*.
- 8b. Four postanal cells in the hind wings: *Leptogomphus*, *Macrogomphus*.
9. Anal area in hind wings, distal to the postanal cells, two cells wide: *Agriogomphus*, *Cyanogomphus*, *Ischnogomphus*, *Microgomphus*.
- 9a. Anal area in hind wings, distal to the postanal cells, three cells wide: *Epigomphus*, *Cyanogomphus*, *Leptogomphus*.
- 9b. Anal area in hind wings, distal to the postanal cells, four or more cells wide: *Macrogomphus*.
10. Anal triangle present in the male: *Cyanogomphus*, *Leptogomphus*, *Macrogomphus*.
- 10a. Anal triangle not present in the male: *Agriogomphus*, *Epigomphus*, *Ischnogomphus*, *Microgomphus*.

An Artificial Key to the Genera of the Group

- a. Basal antenodal of second series not present.
 - b. One row of postrigonal cells in the front wings, *Agriogomphus*.
 - bb. Two rows of postrigonal cells in the front wings.
 - c. Anal area in the front wings one cell wide, in the hind wings two cells wide.....*Microgomphus*.
 - cc. Anal area in the front wings two or more cells wide, in the hind wings three cells wide.....*Leptogomphus*.
- aa. Basal antenodal of second series present.
 - b. Anal area in the front wings one cell wide....*Ischnogomphus*.
 - bb. Anal area in the front wings two or more cells wide.
 - c. Distal thickened antenodal the fifth.....*Cyanogomphus*.
 - cc. Distal thickened antenodal the sixth or more distal.
 - d. Anal area in the hind wings three cells wide.
 - e. One cubito-anal cross-vein in addition to the inner side of the subtriangle...*Leptogomphus*.
 - ee. Two cubito-anal cross-veins in addition to the inner side of the subtriangle....*Epigomphus*.
 - dd. Anal area in the hind wings four or more cells wide*Macrogomphus*.

Only the discovery of more specimens can tell how valuable as a character for erecting a genus, distinct from *Cyanogomphus*, the front wing anal area of one cell width may prove. In the group of genera to which this proposed new genus belongs venational specialization has not been carried as far as in other genera in the legion Gomphus, a fact which weakens this character for purposes of generic definition.

It may be noticed by comparing the descriptions and figures of the second hamules of the males of *Cyanogomphus waltheri*, *C. conchinus*, and *Ischnogomphus jessei* that in the first two there are apical tufts of hairs which are entirely lacking in the third. But against this, one may set the peculiar first hamule which is very much alike in *C. waltheri* and *I. jessei*. The form of the tibiae of *I. jessei* is a striking character. In dragonflies generally the tibiae are roughly triangular or semi-circular in cross section, but in *I. jessei* they are on all three legs rectangular in cross section, being nearly square, and the four sides are flat and the angles well defined. The third tibiae of *C. conchinus* show this character less perfectly, but in *I. jessei* it is equally well developed in all the tibiae. The inferior abdominal appendage of the male is very similar in *C. waltheri* and *C. conchinus*, and very different in *I. jessei*. Moreover the apex of segment 10 is much more nearly the usual form in *I. jessei*, while segment 9 has the dorsum strongly produced apically (or the sides apically excavated), in marked contrast to segment 9 in the two species of *Cyanogomphus* where the segment is of the usual form. When *Cyanogomphus tumens* is better known it may be found to belong to another genus. I believe such will prove to be the case and it is not improbable that it will be found to more resemble *Ischnogomphus* than the eastern South American *Cyanogomphus*.

Ischnogomphus jessei, new species

Description: Abdomen, male 32.5 mm.; hind wing, male 24 mm.

Male.—Rear of head and mouth parts pale gray, irregular dark areas and mottlings about the foramen and a small spot against the eye about the lower level of the foramen; face and frons leaden gray; the labrum and frons more bluish with the enclosed parts more greenish, labrum with a black basal triangular spot, the apex of which just fails to meet a broad transverse bar of black across the apex of the labrum, this bar carried narrowly up the sides of the labrum for about half its length; apex of labrum broadly concave; head above, excepting frons, brown with ill defined pale areas in front of the lateral ocelli; keel behind the lateral ocelli two-lobed, concave in the median line; occiput posteriorly straight, without a posterior keel or edge, but rounded off, with short, scarcely discernible hair; rear of head swollen as described for *Cyanogomphus tumens* and *C. conchinus*; antenna with the third joint very small, scarcely half the length of the second.

Prothorax brown, obscure, the middle lobe the palest and the hind lobe the darkest, an obscure median pale spot on the latter; front border very narrowly grayish white.

Dorsum of thorax and, on either side, the mesepimeron dull blue; posterior to the mesepimeron slightly paler and with a greenish cast; a middorsal black stripe; a broad interrupted black stripe parallel to the median stripe and about midway between the latter stripe and the humeral suture; a narrow antehumeral stripe wider above, and a narrow posthumeral stripe wider below; an extensive ill defined dull area at the first lateral suture, and restricted obscure markings on the metepimeron; under parts greenish or bluish white.

Abdomen slender; seen from above, basal half of 1 brown, apical half dull blue, the same color as the dorsum of the thorax; 2 black, with a median dagger-shaped pale dull blue spot, the point of the dagger at the apex of the segment; 3-6 black with a pale dull blue basal transverse narrow ring; 3 with a median longitudinal light brown or yellowish dorsal stripe the entire length of the segment; 4 has this reduced to a line, often interrupted but discernible at the apex as well as the base of the segment; basal half of 7 dull leaden blue; apical half of 7 and 8-10 black. In side view 1 has the lower half, beginning at the level of the lateral apical tubercle, pale greenish blue, the same color as the metepimeron; 2 with the pale area duller and bluer, and reaching dorsad to a slightly higher level than on 1, with some fairly defined black areas near or along the inferior border; 3-6 with extensive pale basal areas joined basally with the basal rings, occupying the basal half of 3, two-fifths of 4, and third of 5 and 6; basal half of 7 pale dull blue, continuous with the dorsal color but apparently of a different shade; 8 and 9 with ill defined restricted pale basal areas at the extreme lower border; 10 entirely black. Appendages dark brown or black basally, shading out to yellowish, the acute apex of the superiors and the apex of the dorsal subapical spine of each branch of the inferior tipped with black.

Stigma black, covering 4, or a little more than 4, cells; brace vein scarcely developed. Wings hyaline, venation black; antenodals of the front wings 12-14, of the hind wings 9-11; postnodals of the front wings 9, of the hind wings 8-9; 5 spines or small plates on the posterior border of the wing basally to the anal angle, the basal one the smallest and placed distal to the basal cross-vein, the apical one on the anal angle; the left hind wing with a cross-vein in the supertriangle; the

distal thickened antenodal the fourth in the right front wing and in the left hind wing, if the antenodals of the first series alone are counted; if the second series are counted the distal thickened antenodal is always the fifth, the basal antenodal of the second series, proximal to the proximal thickened antenodal, not being counted in any case.

Femora dark above, for the full length on the first, for the apical three-fourths or more on the second, and the apical half or less on the third, shading out basally on the second and third; first femora beneath yellowish or greenish, second and third beneath and above basally leaden blue; ventral surface of all femora with similar numerous small black spines, uniformly distributed but not forming transverse or longitudinal lines; all the tibiae sharply four-angled in cross section, the ventral (inner) surface sharply black, the color surrounding the row of relatively long spines along each edge bounding the ventral surface; the other three surfaces of the tibiae pale greenish or yellowish, the angles marked by closely set minute black spines; tarsi black, the second joint of the tarsi of the third legs with the dorsal (outer) surface yellow; claws similar to *Cyanogomphus conchinus*.

First hamule black; second hamule greenish, a constricted black bar across it at about one-third its length; the apical fourth black, darkest at apex, shading out basally; seminal vesicle black. On the second hamule there are short hairs only on the basal half and no hairs or tufts on the bare apical half as contrasted with *Cyanogomphus*.⁵ On the posterior and inner surface of the auricle, not visible in a lateral view, are six or seven small black denticles in two rows.

Superior appendages in dorsal view simple, concealing the inferior, similar in outline to the same parts in ventral view.

⁵ Entomological News, Vol. XXVII, April, 1916, plates VIII and IX, pp. 167-172.

Superior appendages and branches of the inferior minutely tuberculate, each tubercle with a moderate bristle, longest on the ventral and posterior parts of the branches of the inferior; ventral branch of the superiors smooth and shining, terminating in a point slightly more obtuse than the apex of the superiors. The two branches reach, but do not overlap, the broad flat plate which makes the basal part of the inferior; at the extreme apex they are slightly divergent and directed about cephalad.

The following general color description was made from the recently killed specimen: eyes above light blue, beneath gray. Thoracic dorsum blue-gray, pale, marked black, the dark stripes, on either side of the median black area, interrupted and brown in color below the interruption; sides about the same color as the pale color of the dorsum, becoming slightly greenish below and behind. Abdomen black, marked with pale blue gray, including the basal half of 7.

Habitat: Colombia.

Type Specimen: Quebrada La Camelia, near Cristalina, Department Antioquia, February 18, 1917, one male, J. H. and E. B. Williamson, collection of E. B. Williamson. Named for Jesse H. Williamson, whose daily companionship and assistance in Colombia made our trip both pleasant and successful.

Habits: The small streams or quebradas where we collected near Cristalina have been referred to before.⁶ We reached the Quebrada La Camelia, on our visit to it, just where it issued from the forest to flow across a brushy pasture. Two or three hundred yards above this point, when approaching a short pool with a small patch of exposed sand, I saw an ob-

⁶ A Collecting Trip to Colombia, South America, Miscellaneous Publications, Museum of Zoology, University of Michigan, No. 3, February, 1918.

scurely colored dragonfly fly from the sand or near it to rest on the leaf of a bush growing on the very steep creek bank. In attempting to ascend the bank to come within striking distance, I frightened it, and it flew up through the forest, being lost sight of at once. I continued my way up the quebrada but thoughts of the peculiar and unidentified dragonfly I had seen remained with me. Twenty minutes or half an hour later I retraced my steps. I approached the little sand bar in the pool very slowly and scrutinized it carefully for a resting dragonfly, but detected nothing. At the next step, however, it again raised, as nearly as I could tell, from the sand, and alighted as before, on the horizontal leaf of a bush, fortunately this time at a lower elevation. A moment later it was in my net with a mass of leaves and twigs which I mowed from the bush in my anxiety to make the capture of the dragonfly certain. The next day on the Quebrada Sabaleticus I saw two dragonflies with identical habits, both rising from little sand banks which I had previously inspected and alighting on horizontal leaves of trees or bushes. In one case I had a good view of the insect on the leaf, but both flew before I could get within striking distance. I am fairly certain both were *Ischnogomphus jessei*. No others were seen by us. If its habits, as far as we saw them, are typical, this species must be carefully searched for if the collector is to find it. In the prevalent patchy sunlight on the sand bars they must be very well concealed indeed. One who has collected fairly conspicuous gomphines in a similar habitat knows how well "marked down" an individual must be, if it is to be readily detected. The flight of *Ischnogomphus jessei* moreover is swift and direct, and it alights without any pause or fluttering. Add to this its apparent timidity and the difficulty of its capture is evident.

PLATE I

Figures 1-4. Wing photographs. Fig 1, *Ischnogomphus jessci*, type male; 2, *Cyanogomphus tumens*, type female; 3, *Erpetogomphus sabaleticus*, type male; 4, *Erpetogomphus crotalinus*, male, Durango, Mexico, Biol. Cent. Am., p. 165. Magnification in fig. 2 greater than in the others, where it is equal.

Notice the slender abdomens of *Ischnogomphus jessci* and *Cyanogomphus tumens* as compared with *Erpetogomphus sabaleticus*. The male of *C. tumens* is doubtless more slender than the female figured.

Figures 1, 3 and 4, photographs by C. H. Kennedy, Department of Entomology, Cornell University; fig. 2 from Dr. Calvert.

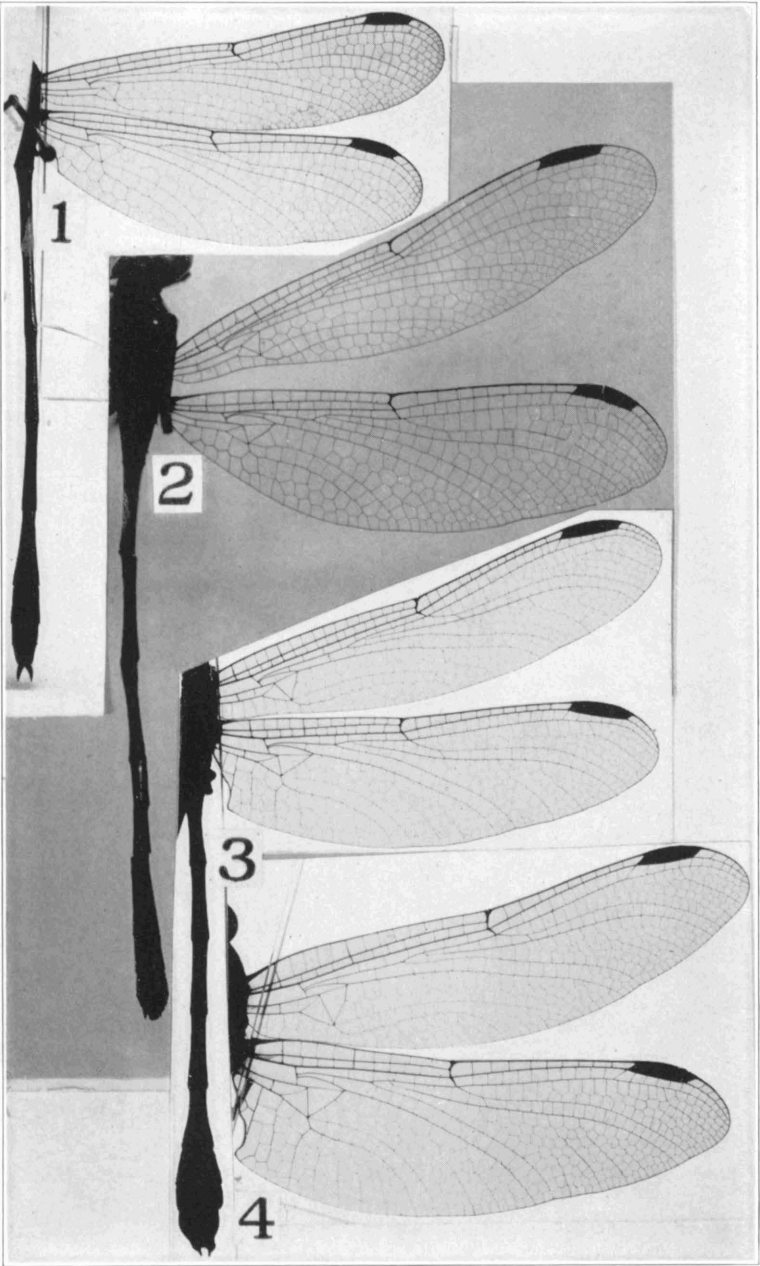


PLATE II

Figures 5, 6, 7 and 8, *Ischnogomphus jessei*, type male; 5, diagram of thoracic color pattern; 6, abdominal segment 2 with its genitalia, in profile; 7, abdominal segments 9 and 10 and the appendages, in profile; 8, postero-ventral view of the abdominal appendages and segment 10.

Figures 9, 10 and 11, *Erpetogomphus sabaleticus*, type male; 9, diagram of thoracic color pattern; 10, abdominal segment 10 and the appendages, in profile; 11, abdominal appendages, dorsal view.

Figures 6, 7 and 8 slightly greater magnification than 10 and 11; the former figures drawn to about the same magnification as figures 7-10, plate IX, Entomological News, Vol. XXVII, April, 1916; the latter figures to about the same magnification as those in plate XVII, Entomological News, Vol. XXIII, July, 1912.

