

The Differentials of Three North American Species of *Libellula*.

BY PHILIP P. CALVERT.

In the NEWS for January, 1907, p. 30, was mentioned that, during our recent trip to Mexico, *Libellula flavida* (Hagen, not Ramb.), new to that country, was taken. This capture has led me to study this species, in order to include it in the Supplement to the Odonate part of the Biologia Centrali-Americana.

In a footnote to page 73 of Prof. J. B. Smith's List of the Insects of New Jersey (27th Annual Report, New Jersey State Board of Agriculture, Supplement, 1900), I stated, "I have examined Rambur's presumed type of *flavida* at Oxford, England. It is identical with *plumbea* Uhler, and therefore different from *flavida* Hagen, which latter will require a new name." For *flavida* Hagen (nec Rambur), I now propose ***Libellula comanche***.

The nearest allies of *Libellula comanche* are *L. flavida* Ramb. and *L. cyanea* Fabr. These three species agree in having the discoidal triangle of the hind wings cross-veined, supratrangular cross-veins usually present on the front wings, usually absent on the hind, one cubito-anal (submedian Selys*) cross-vein, a bicolored pterostigma, and abdominal segment 8 of the female perfoliate.

The differentials of these three species follow. Having before me 7 ♂, 4 ♀ each of *comanche* and of *flavida*, I have used the same number of *cyanea* for this comparison; all the available males of *comanche* are pruinose.

Character.	<i>L. comanche</i> , nom. nov. (<i>flavida</i> Hagen.)	<i>L. flavida</i> . (<i>plumbea</i> Uhler.)	<i>L. cyanea</i> . (<i>quadrupla</i> Say.)
Vertex at apex.	With a yellow or orange spot.	Without such a spot.	Without such a spot.
Frons	♂ Cream-yellow.	Bluish-black.	Greenish-brown (young) to bluish-black.
	♀ Cream-yellow to orange.	Reddish-yellow to greenish-brown.	Greenish-yellow to olive.

* The Comstock-Needham wing-vein nomenclature is here employed, the Selysian synonyms being added in parentheses.

Character.	<i>L. comanche</i> , nom. nov. (<i>flavida</i> Hagen.)	<i>L. flavida</i> . (<i>plumbea</i> Uhler.)	<i>L. cyanea</i> . (<i>quadrupla</i> Say.)
Nasus	♂ Pale greenish-yellow.	Olive to blackish-brown.	Brown to black.
	♀ Pale greenish-yellow.	Yellow to olive.	Greenish-yellow to olive.
Labrum	♂ Yellow.	Yellow to black, very narrowly orange on free edge.	Brownish, narrowly orange on free edge, to entirely black.
	♀ Yellow to orange.	Yellow.	Yellow to greenish-yellow.
Darker basal coloring of the wings.	Ochraceous extending distad halfway, more or less, to first antecubital, and halfway, more or less, to cubito-anal cross-vein (almost absent in the front wings of a Californian male.)	A dark ochraceous or blackish-brown subcostal streak to first, second or third antecubital; cubital (submedian) space ochraceous halfway to (front wing), or reaching distal to (hind wing), the cubito-anal cross-vein.	A blackish-brown subcostal streak extending to the first or second (front wing), to the second or third (hind wing), antecubital; cubital space ochraceous halfway to (front wing), or nearly reaching (hind wing), the cubito-anal cross-vein.
Subcostal space distal to the darker basal coloring.	♂ Uncolored.	Distinctly yellow.	Uncolored.
	♀ Pale yellow.	Distinctly yellow.	Yellow.
First and second series of postcubital spaces	With barely a trace of yellow (absent in a Californian male).	Yellow or ochraceous.	Pale yellow, more marked in the first series.
Brown at apex of wings of female reaching proximad	1.5 mm., halfway to distal end of stigma.	3-5 mm., to distal end, or to distal fourth, of stigma.	2-2.5 mm., two-thirds way to distal end of stigma.
Pterostigma.	♂. Proximal two-thirds cream-yellow, remainder blackish-brown.	♂, ♀. Proximal three-fourths to five-sixths, or almost entirely, ochre-yellow, remainder blackish-brown.	♂ ♀. Proximal half to three-fifths cream-yellow, remainder blackish brown.

Character.	<i>L. comanche</i> , nom. nov. (<i>flavida</i> Hagen.)	<i>L. flavida</i> . (<i>plumbea</i> Uhler.)	<i>L. cyanea</i> . (<i>quadrupla</i> Say.)
Pterostigma.	♀. Proximal half ochraceous, remainder blackish brown.	.	.
Number of cells in internal triangle, front wing.	8-4 (6 and 5 equally the more frequent).	7-4 (5 most frequent).	5-3 (3 most frequent).
Posttriangular rows to level of separation of M ₁ (principal sector), and M ₃ (median sector), front wing.	4	4-3 (3 most frequent).	3
Do., hind wing.	3	3-2 (2 followed by 3 most frequent).	2-2 followed by 3 (2 most frequent)
Number of rows of cells between M ₄ (short sector) and supplement next below, hind wings.	2	2-1 (1 most frequent).	1
Length, in mm.			
Abdomen	{ ♂ 36-32. ♀ 34-31.	31.5-28. 31-27.	30-27.5. 27-25.
Hind wing	{ ♂ 42.5-37. ♀ 41-40.	38-36. 40-36.	36-33. 35-33.
Costal edge of stigma, front wing.	{ ♂ 5-3.5. ♀ 6-5.5.	6-5.5. 6-5.5.	5-4.5. 5-4.5.
Width of hind wing at right angles to costa at level of posterior angle of discoidal triangle.	{ ♂ 11-10. ♀ 12-10.5.	10.5-8.5 10-9	9 10.5-9.3.
Maximum width of head	{ ♂ 8-7. ♀ 7.7-7.5.	7-6.7. 7	6.8-6.25. 6.3
Maximum width of thorax.	{ ♂ 8-6. ♀ 7-6.7.	6-5.5. 6 4-5.	6-5.5. 5.7-5.2.

	<i>L. comanche</i> , nom. nov. (<i>flavida</i> Hagen.)	<i>L. flavida</i> . (<i>plumbea</i> Uhler.)	<i>L. cyanea</i> . (<i>quadrupla</i> Say.)
Distribution :	Montana; Yellowstone; Ontario in California (July, 1 ♂, Snodgrass); Dallas, Waco, Round Mountain (June, Schaupp, 4 ♂, 4 ♀), and Pecos River, Texas; Santa Rosalia Springs (August, Calvert, 2 ♂), in Chihuahua, Mex.	N. Jersey to Georgia. (I have studied 3 ♂, 1 ♀, Haddonfield, August, Rhoads, and 1 ♂, Lakehurst, July, Davis, in N. J., 1 ♂, vicinity of Philadelphia?; 1 ♀, Mitchell Co., N. C., July, Skinner; 2 ♂, 2 ♀, Greenville, S. C., Patterson and Calvert.)	Manchester, New Hampshire to Greenville, South Carolina, west to Indiana.

Notes on some species of Geometrids.

By HARRISON G. DYAR, Washington, D. C.

In the April number of ENTOMOLOGICAL NEWS, Mr. John A. Grossbeck has some notes on some of Hulst's types of *Geometridae*, which takes the form of a criticism of my own notes on these types. Mr. Grossbeck has been studying the material at his convenience, and it is not surprising if he has been able to correct my own more hurried notes. I am, however, disposed to maintain my original position in respect to some of the determinations.

Hydriomene curvilinea Hulst.

I cannot concur in Mr. Grossbeck's separation of *curvilinea* and *occidens*. I have a good series of the species from the northwest, and the differential characters noted come within the range of variation.

Hydriomene amorata Hulst.

Mr. Grossbeck admits that one of the types is *Petrophora defensaria* Guen., but would hold the name on the other type.