

## NOTES ON INDIANA DRAGONFLIES.

BY

E. B. WILLIAMSON.

A list of the species of dragonflies of Indiana was published June 5, 1917, as Miscellaneous Publications No. 2 of the University of Michigan, Museum of Zoology. In that paper are included all records up to the end of the year 1916.

In this paper another species is recorded, bringing the Indiana list to 126 species, and captures, during 1917-1920 inclusive, of species in new localities or at different seasons are added. The order and numbers used in the list published in 1917, referred to above, are followed here.

1. *Agrion acquabile* Say. Allen Co., July 6, 1919.
6. *Lestes congener* Hagen. Near Wolf Lake, Noble Co., Sept. 23, 1917.
12. *Lestes uncatatus* Kirby. Along the Aboite River, at Devil's Hollow, Allen Co., July 6, 1919, a female of this species was taken flying in couple with a male of *Argia tibialis*.
13. *Lestes unguiculatus* Hagen. Round Lake, Whitley County, Sept. 23, 1917.
14. *Lestes vigilax* Hagen. Near Wolf Lake, Noble Co., Sept. 23, 1917.
18. *Argia tibialis* Rambur. See note under 12. *Lestes uncatatus*.
23. *Enallagma calverti* Morse. This species reappeared at the Van-Emon Swamp, near Bluffton, in 1920. On June 6 and 13 it was very abundant associated with the much rarer *E. cyathigerum*.
24. *Enallagma carunculatum* Morse. Round Lake, Whitley Co., Sept. 23, 1917.
26. *Enallagma cyathigerum* Charpentier. See note under 23. *Enallagma calverti*.
27. *Enallagma divagans* Selys. Outlet of Webster Lake, Kosciusko Co., July 4, 1917.
28. *Enallagma chrysum* Hagen. Tri Lakes, Whitley Co., June 15, 1919.
30. *Enallagma geminatum* Kellicott. Swamp and creek five miles east of Lagrange, Lagrange Co., June 20, 1920.
31. *Enallagma hageni* Walsh. Swamp and creek five miles east of Lagrange, Lagrange Co., June 20, and 27, 1920.
33. *Enallagma vesperum* Calvert. Dr. Calvert has recently shown that the widely distributed species we have been calling *Enallagma pollutum* Hagen is really not that species, and he has named it *vesperum*. Swamp and creek five miles east of Lagrange, Lagrange Co., June 20, 1920.
34. *Enallagma signatum* Hagen. Swamp and creek five miles east of Lagrange, Lagrange Co., June 20, 1920.
35. *Enallagma traviatum* Selys. Swamp and creek five miles east of Lagrange, Lagrange Co., June 20, 1920.
38. *Amphiagrion saucium* Burmeister. Swale near creek at Indian Village, Noble Co., July 4, 1917.
39. *Chromagrion conditum* Hagen. Swamp and creek five miles east of Lagrange, Lagrange Co., June 20 and 27, 1920.
40. *Ichnura kellicotti* Williamson. Round Lake, Whitley Co., Sept. 16, 1917; and June 15, 1919; lake at Indian Village, Noble Co., July 4, 1917.

43. *Ischnura verticalis* Say. Tri Lakes, Whitley Co., August 25, 1918.
45. *Tachopteryx thoreyi* Hagen. In deep sandstone ravine in sec. 1, Union Township, Perry Co., about fifteen miles northeast of Tell City, June 23, 1918, a single male, collected by Chas. C. Deam, who also collected the only other specimen taken in the state, in Montgomery Co.
48. *Cordulegaster obliquus* Say. Forest Reserve, Clark Co., June 18, 1920, a single female collected by Chas. C. Deam. We have had no record for the state except Say's statement "inhabits Indiana", published now over 80 years ago.
49. *Progomphus obscurus* Rambur. Creek at Indian Village, Noble Co., July 4, 1917; Salamonie River, Huntington Co., August 5, 1917, several caught and others seen, many had wings darkly stained with crude oil; Wabash River, Bluffton, Wells Co., August 26, 1917, only one seen, a male with oil stained wings. At this time there was no crude oil along the Wabash River near Bluffton, and I think the Wabash River specimen was undoubtedly a stray from the Salamonie about twenty miles away.
50. *Hagenius brevistylus* Selys. Bluffton, Wells Co., June 21, 1919, a single female, which alighted on John W. Carnall and was captured by him as he stood at his office door in the center of the business part of town; Aboite River, Devils Hollow, Allen Co., July 13, 1919.
51. *Ophiogomphus rapinulensis* Walsh. Creek at Indian Village, Noble Co., July 4, 1917. On this date this rare species was flying with *Gomphus dilatatus*, *Heidus* and *fuscifer*, a remarkable Gomphine assemblage.
53. *Gomphus crassus* Hagen. In June, 1919 and 1920, this species was abundant about ripples in the Wabash River near Bluffton. During their years of abundance it is no rare thing to see *G. crassus*, *fraternus* and *graslinellus* hawking their way over the asphalt streets in the business part of town, and at such times they are not infrequently captured clinging to screen doors or similar supports, but they rarely if ever enter houses, in marked contrast to *Epiacantha heros* which is more rarely seen abroad, but is often taken indoors.
54. *Gomphus dilatatus* Rambur. Creek at Indian Village, Noble Co., July 4, 1917.
55. *Gomphus exilis* Selys. On June 15, 1919, along the east end of the south side of Shriner Lake, Whitley Co., this species and *G. spicatus* were common. Both species rested on blue grass heads, and on the leaves of low maples not over two feet high; *exilis* also rested on dead weed stems and the windrow of debris along the lake, and *spicatus* often rested on the ground. One *spicatus* male had a serious old healed injury to the throax at the base of the right front wing so the wing movement was greatly restricted, but before capture nothing unusual in its actions was noticed. *Exilis* was also taken at a creek and swamp five miles east of Lagrange, Lagrange Co., June 20 and 27, 1920.
56. *Gomphus fraternus* Say. See under 53. *Gomphus crassus*.
57. *Gomphus fuscifer* Hagen. Creek at Indian Village, Noble Co., July 4, 1917; Round Lake, Whitley Co., June 15, 1919.
58. *Gomphus graslinellus* Walsh. Aboite River, Devil's Hollow, Allen Co., July 13, 1919; Eel River, Allen Co., July 6, 1919. See under 53. *Gomphus crassus*.

61. *Gomphus spicatus* Hagen. See under 55, *Gomphus exilis*.

66a. *Gomphus viridifrons* Hine. A single male was taken June 17, 1917, about three miles east of Ontario and two and one-half miles west of Mongo, Lagrange Co. The day was cold and windy and the dragonfly was resting on the low, broad leaf of an aster at the edge of a woods about a quarter of a mile south of Pidgeon River. The species has been taken in Ohio and Pennsylvania; this is the first Indiana record.

69. *Dromogomphus spoliatus* Hagen. At a bayou about two miles west of Merom, Sullivan Co., July 23, 1918. This species has not been seen along the Wabash near Bluffton since 1917 when it was observed but in smaller numbers than in former years. It frequents more sluggish streams with mud bottoms, and the Wabash has apparently become a stream more suitable for it than for *D. spinosus* which prefers clear, rapid water, clean bottomed streams. *D. spinosus* formerly occurred on the Wabash but I have not seen it there now for many years. What has caused the more recent ebb in *D. spoliatus* I do not know. A few years may see it back again in undiminished numbers: *spinosus* almost certainly will never return.

70. *Boyeria vinosa* Say. Shriner Lake, Whitley Co., Sept. 16, 1917; small stream near Merriam, Noble Co., Sept. 23, 1917.

7. *Basiaeschna janata* Say. Border of tamarack swamp along Pidgeon River, one mile east of Mongo, Lagrange Co., June 17, 1917.

72. *Anax junius* Drury. On April 14, 1917, a male was dashed to the street in Bluffton by a heavy rain; on April 20, 1917, a male was taken in a store room in Bluffton, and on the same date a female *Epiaeschna heros* was taken in a nearby store. In April, 1919, a female of *Anax junius* was taken in a house in Bluffton on the third of the month, and on the fifth a male and a female were taken in two other houses; on the fifth, eighth and ninth, specimens were hawking in my home yard. On August 23, 1919, and at least a few evenings before and after that date *junius* was flying in great numbers from 6 to 7 p. m. standard time (7 to 8 p. m. fast time), along a road between woods and a corn field and over adjacent fields in low creek bottom one and a half miles east and one and a fourth miles north of Bluffton. They were feeding voraciously and the flight was very erratic, suggesting *Gynacantha*s but more erratic than the larger species of *Gynacantha*. Posey Co., April 21, 1919 (Chas. C. Deam).

75. *Aeshua constricta* Say. Near Wolf Lake, Noble Co., Sept. 23, 1917; backwater of Webster Lake, Kosciusko Co., August 31, 1919.

76. *Aeshua mutata* Hagen. VanEmon Swamp near Bluffton, June 13, 1920, a single male seen and captured. This is the first appearance of *mutata* at this swamp since 1914.

78. *Aeshua umbrosa* Walker. Creek at Shriner Lake, Whitley Co., Sept. 16, 1917; creek at Indian Village, Kosciusko Co., Sept. 1, 1919; creek and swamp five miles east of Lagrange, Lagrange Co., October 10, 1920.

79. *Aeshua verticalis* Hagen. Creek at Indian Village, Kosciusko Co., Sept. 1, 1919.

80. *Nasiaeschna pentacantha* Rambur. This rare species was taken along the Aboite River, Devil's Hollow, Allen Co., July 6 and 13, 1919.

81. *Epiaeschna heros* Fabricius. A male was taken in a downtown office

in Muncie, Delaware Co., July 25, 1916; a female was taken hawking just before sundown in my home yard in Bluffton on August 1, 1917, and a male was taken August 15 early in the morning clinging to vines in the same yard; April 12, 1919, a male was taken in the Union Savings and Trust Company, Bluffton; a number were taken in stores and houses in Bluffton in April, May and June, 1920.

83. *Macromia illinoensis* Walsh. Salamonie River, Huntington Co., August 5, 1917; on June 4, 1918, a female was caught on a window screen at the Wells County Bank building, Bluffton.

84. *Macromia pacifica* Hagen. On August 26, 1917, two friends and myself hunted *Macromias* along the Wabash River above Bluffton. It was a cool windy day, altogether unfavorable for *Macromias* but we took an even dozen—eight of *pacifica*, two of *wabashensis* and two of *illinoensis*. One or two identified on the wing as *taenioiata* were not captured. One *pacifica* was found crippled and unable to fly in the weeds along the river; one hind wing was broken at its base in the thorax and the body juices were exuding. Another of the same species was floating alive on the water with the front wing broken off near the base. It is probable both injuries were caused by birds. At Howe, Lagrange Co., on Sept. 3, 1916, I was asked to identify the birds which had nested in a blue bird box in the hotel yard during that year. A description of the birds by my informants left no doubt that they were great crested flycatchers. The birds were new to the parties observing them and the feeding of the young was especially interesting. They reported that they never saw the old birds carry in any other food than large dragonflies. An examination of the nest showed a quantity of bits of dragonfly wings and legs. I was able to identify a bit of wing of *Libellula pulchella* but the bulk of the material was parts of *Macromias*. There is no doubt that dozens of these insects had gone to supply this one nest. Martins are very numerous in boxes placed for them in Bluffton. The birds spend many hours over the river and the abandoned adjacent quarries near Bluffton. That they feed on large dragonflies is no question though I have been able to certainly identify only *Libellula pulchella*. But in many years' collecting along the Wabash I have seen only one *Macromia* near Bluffton. On the other hand, *Gomphus* occurs within the city limits in apparently as large numbers as elsewhere. But the *Gomphi* have a relatively short seasonal range, they burst their exuviae by hundreds or thousands almost simultaneously, and their eggs are laid and their aerial life ended before their predaceous enemies could gather in numbers to attack them. The longer seasonal range of *Macromias*, by reason of which the brooding mother bird and later her offspring, from hatching to leaving the nest, could be fed on this one species of insect, obviously invites danger. The pair of great crested flycatchers at Howe doubtless became expert *Macromia* catchers by the time their offspring took wing.

85. *Macromia taenioiata* Rambur. At a bayou two miles west of Merom, Sullivan Co., July 23, 1918, one male captured and one or two more seen. Later, on August 3, we found the species in numbers at the Tennessee River ferry between Jasper and Chattanooga, Tennessee.

90. *Tetragoneuria simulans* Muttkowski. Case Lake, east of Howe,

Lagrange Co., June 17, 1917; outlet of Webster Lake, Kosciusko Co., July 4, 1917.

94. *Somatochlora linearis* Hagen. This rare species was taken along Flat Creek in Wells County again in 1919, on July 9. *S. charadraca*, formerly taken on the same creek, seems to have disappeared as it has not been seen since 1913.

95. *Somatochlora tenebrosa* Say. This, like *Cordulegaster obliquus*, is another species which has not been taken in Indiana since Say's time till it was taken on July 6, 1919, at Devil's Hollow, Aboite River, Allen County. The two males seen and captured were hovering and flying about little pools in a very small creek flowing in the dense shade of small timber. This little creek, about eighteen inches wide, evidently spring fed, is a right hand tributary of the Aboite River, near the upper end of Devil's Hollow.

96. *Libellula cyanea* Fabricius. Creek and swamp five miles east of Lagrange, Lagrange Co., June 27, 1920.

99. *Libellula luctuosa* Burmeister. Shriner Lake, Whitley Co., Sept. 16, 1917.

101. *Libellula quadrimaculata* Linné. Three miles east of Ontario, Lagrange Co., June 17, 1917.

104. *Plathemis lydia* Drury. Devil's Hollow, Aboite River, Allen Co., July 13, 1919; creek and swamp five miles east of Lagrange, Lagrange Co., June 27, 1920.

105. *Perithemis tenera* Say. Round Lake, Whitley Co., August 25, 1918.

112. *Sympetrum rubicundulum* Say. Salamonie River, Huntington Co., August 5, 1917. Along the interurban railroad north of Bluffton, between the Wabash River and the Clover Leaf railroad, is a long shallow pond formed by excavations along the interurban grade. About this pond occur numbers of the yellow-winged form of *rubicundulum*, once regarded as a species under the name *assimilatum*. On Sept. 13, 1914, the following four species of *Sympetrum* were flying at this pond: *ambiguum*, *obtrusum*, *rubicundulum* and *vicinum*. *Obtrusum* and *rubicundulum* were about in equal numbers and were much more numerous than the other two. Of fifteen males and two females of *rubicundulum* taken, all but one male were of the yellow-winged form. On Sept. 2, 1917, ten males and three females were taken at this same pond. Of these males two had clear wings, five were yellow winged and three were intermediates. All the females were yellow-winged. At some deep partially shaded gravel pits about a quarter of a mile distant, four males taken the same date were all clear winged. I have noticed at other places than this interurban pond that the yellow-winged form occurred about shallow warm pools or was seen late in the season when ponds were at low water stage, and I believe there is some relation between light or warmth, or both, in producing this color form.

115. *Pachydiptar longipennis* Burmeister. Creek and swamp five miles east of Lagrange, Lagrange Co., June 27, 1920.

117. *Leucorhinia intacta* Hagen. Creek and swamp five miles east of Lagrange, Lagrange Co., June 20 and 27, 1920.

119. *Celithemis cponina* Drury. One male and one female of this species and a single female of *C. elisa*, all the specimens seen, were taken along the Wabash River in Wells County, August 26, 1917. The day was very windy

and specimens of both species were doubtless strays as neither has been seen on the Wabash at any other time. Both species were taken at Round Lake, Whitley Co., on August 25, 1918. Teneral were flying at the same lake on June 15, 1919.

122. *Pantala hymenaea* Say. Wabash River, Wells Co., August 26, 1917, a single female, the only one seen, hawking back and forth over a small island. Several years ago there were heavy rains resulting in flooded fields in the creek bottoms in Wells County at the time corn in these fields was just beginning to tassel out. The high waters did not subside for several days and the corn died and the stalks fell over into the water. These flooded cornfields were visited by large numbers of ovipositing *Trameus* and *Pantala*s and by a smaller number of *Sympetrum corruptum* all of which appeared as by magic to avail themselves of this new and virgin dragonfly habitat. Of course every egg perished, but the incident afforded an example of the quick response of certain dragonflies to avail themselves of a new habitat where their enemies and competitors had not yet established themselves.

123. *Tramea carolina* Linne. Vanemon swamp, Wells Co., June 6, 1920.