

NOTES AND DESCRIPTIONS OF NAIADS BELONGING TO
THE DRAGONFLY GENUS HELOCORDULIA.

By CLARENCE HAMILTON KENNEDY,
Ohio State University, Columbus, Ohio.

The writer saw his first and only living *Helocordulia selysii* (Hagen) one bright March day, when Prof. Simon Marion and he were taking an early spring tramp through the woods of the Raleigh (N. C.) Country Club. Vegetation was beginning to develop a little green here and there, but the shrubs and trees were still bare. Early flies and beetles were out enjoying the spring sunshine, but the writer was not expecting to find Odonata. Suddenly a dragonfly arose from the forest path and flew leisurely down into a neighboring hollow—apparently an extra early *Tetragoneuria*. On capturing it the writer felt a glow of satisfaction as it had the speckled wings of the rare *Tetragoneuria petechialis*, a little-known southern species, though its black and yellow coloration struck the writer as being odd for that genus. Later in the laboratory the true worth of the catch was disclosed when the specimen was identified as the very rare *Helocordulia selysii*.

Professor Marion and the writer continued their steps 50 yards farther, down a gentle slope to the shore of the artificial pond of the Country Club grounds, and on the side of a small boathouse found a single Odonate exuvium. It was identified later as a *Helocordulia*, but not the species *uhleri* found in the Northeastern States. No other Odonate was seen, so it was concluded that the teneral specimen caught in the woods was probably the individual that had emerged from this exuvium.

Helocordulia selysii is one of our rarest American Odonata. Probably few more than a dozen specimens exist in collections. C. S. Brimley, who has collected Odonata continuously for 20 years in various parts of North Carolina, has recorded¹ less than 12 captures. Because of this extreme rarity our knowledge of its

¹ Brimley, North Carolina Records of Odonata in 1903, Ent. News, March, 1904, pp. 100-102.

Brimley, North Carolina Records of Odonata in 1904 and 1905, Ent. News, March, 1906, pp. 91-92.

Brimley, Records of North Carolina Odonata from 1908-1917.

habits is practically nothing. Mr. Brimley has said to the writer that his captures were usually made in open sunny glades of the woods, sometimes long distances from water. Two individuals appear, from the records, to be the largest number seen at one time. Mr. Brimley's captures range in season from March 18 to April 17. My finding of this single exuvium at the Country Club lake shows that a muddy, warm pond is one of the places possible for the naiad and that the female willingly uses such a place for oviposition, for there were several woods streams of various sizes in the neighborhood which might have been chosen, if she had been partial to streams.

Helocordulia selysii is one of several rare North American dragonflies that have an early spring season. Those of this early spring group which the writer has studied appear to be very primitive. In some instances, as in this, the genus is small in number of species and is primitive as a whole; in other instances the early spring species is primitive in its genus, which may be large and have other more modern and more highly specialized species which come later in the season. Examples of primitive species in large genera are *Ischnura posita*, *Aeschna matuta*, *Libellula jesseana*, etc. One wonders why these are so illy adjusted to our present seasons. Apparently our longest warm season is not long enough for them to mature a brood. Are they left overs from that pre-Miocene time, when the warm season was practically continuous throughout the year? The other explanation of this early spring emergence is that these may be specialized, that emergence so early gives the adult an uncrowded habitat. This latter explanation does not agree with the writer's observations, which are that few, if any, dragonfly habitats ever suffer from lack of food for the adult. Crowding may occur among the naiads as they are confined to specific bodies of water, but the season of the adult would not seem to be related to this.

Of the two species of *Helocordulia selysii* and *uhleri*, *selysii* has the more generalized appendages. These curiously enough are almost identical with those found in another primitive Corduline, *Didymops*, which, however, Needham² and Williamson³ as well as Martin⁴ place in a different division of the subfamily Cordulinae. Perhaps *Helocordulia* and *Didymops* are each more primitive in their respective groups than has been suspected by systematists.⁵

² Needham, Critical Notes on the Classification of the Cordulinae, Ann. Ent. Soc. Amer., vol. 1, pp. 273-280. 1908.

³ Williamson, A new Dragonfly belonging to the Cordulinae, and a Revision of the Classification of the Subfamily, Ent. News, vol. 19, pp. 428-434.

⁴ Martin, Les Cordulines, in "Collections de Selys."

⁵ The writer believes that the male appendages should be considered as a check on venation in any study of the phylogeny of this subfamily. That such curious things as *Cordulephya* and *Synthemis* are apical specializations and not as primitive as some of their venational characters would suggest.

The identity of this *Helocordulia* exuvium is fairly certain, first, because of the circumstances under which it was found; second, because it is nearly identical with Needham's description⁶ of the naiad of *uhleri* and with specimens of the latter sent the writer by Doctor Walker; third, it differs in the same characters from the known *Somatochlora* naiads (*elongata*,⁷ *tenebrosa*, and *semicircularis*) as does *uhleri*. The *Helocordulia* naiads have the lateral spines on abdominal segment 9 approximately as long as the dorsum of the same segment, while in the three *Somatochlores* they are distinctly less.

The following description of the naiad of *selysii* has been drawn to parallel that of *uhleri* by Needham.⁸ The latter species has been so well described that it is needless to redescribe it here. Figures of the *uhleri* naiad are given for comparison with those of *selysi*. The exuvium of *selysii* as well as two of *uhleri* have been deposited in the United States National Museum.

DESCRIPTION OF THE NAIAD OF HELOCORDULIA SELYSII (Hagen).

Color completely obscured by a thin but complete incrustation of mud. Total length, 20 mm.; abdomen, 12 mm.; hind femur, 6.5 mm. Width of head 5.5 mm. and of abdomen 7 mm. (See pl. 1, figs. 6-12.)

Head nearly twice as wide as long. Eyes small and not prominent, their front contour continuous with the front contour of the head. Frons broadly angulate anteriorly, occiput slightly incurved, the sides of the head sloping rapidly toward the occipital angles. Each occipital prominence with a lateral and a dorsal row of long spine-like hairs.

Antennae with segments about equal in length, segments 1 and 2 being heavy while 3-7 are slender. (See fig. 11.)

Labium reaching caudad to between the bases of the middle legs, the sternal sulcus which houses the base of the labium being fringed behind by a sinuate row of long hairs between the middle coxae. Labium as broad as long with the middle lobe a right angle and its edges minutely crenulate and armed with numerous short spines. (See figs. 7 and 8.) The mental setae 13-14 in number, of which the outer 8 are very long, while the inner 5-6 are minute. The lateral setae are 7 in number and have parallel to their bases a row of short stiff spines along the dorsal edge of the lateral lobe. Movable hook slender and 2-3 times as long as the depth of its insertion. 8-9 crenulate teeth on the lateral lobe, each tooth with a graduated series of 3-5 long, slender, sharp spines, the longest of these in each series being half the length of the movable hook.

⁶ Needham, Aquatic Insects in the Adirondacks, New York State Museum, Bull. 47, p. 497, 1901.

⁷ Needham's description (N. Y. State Mus., Bull. 47, p. 500) may not be *elongata* as the individual described does not appear from the text to have been reared.

⁸ See footnote 6.

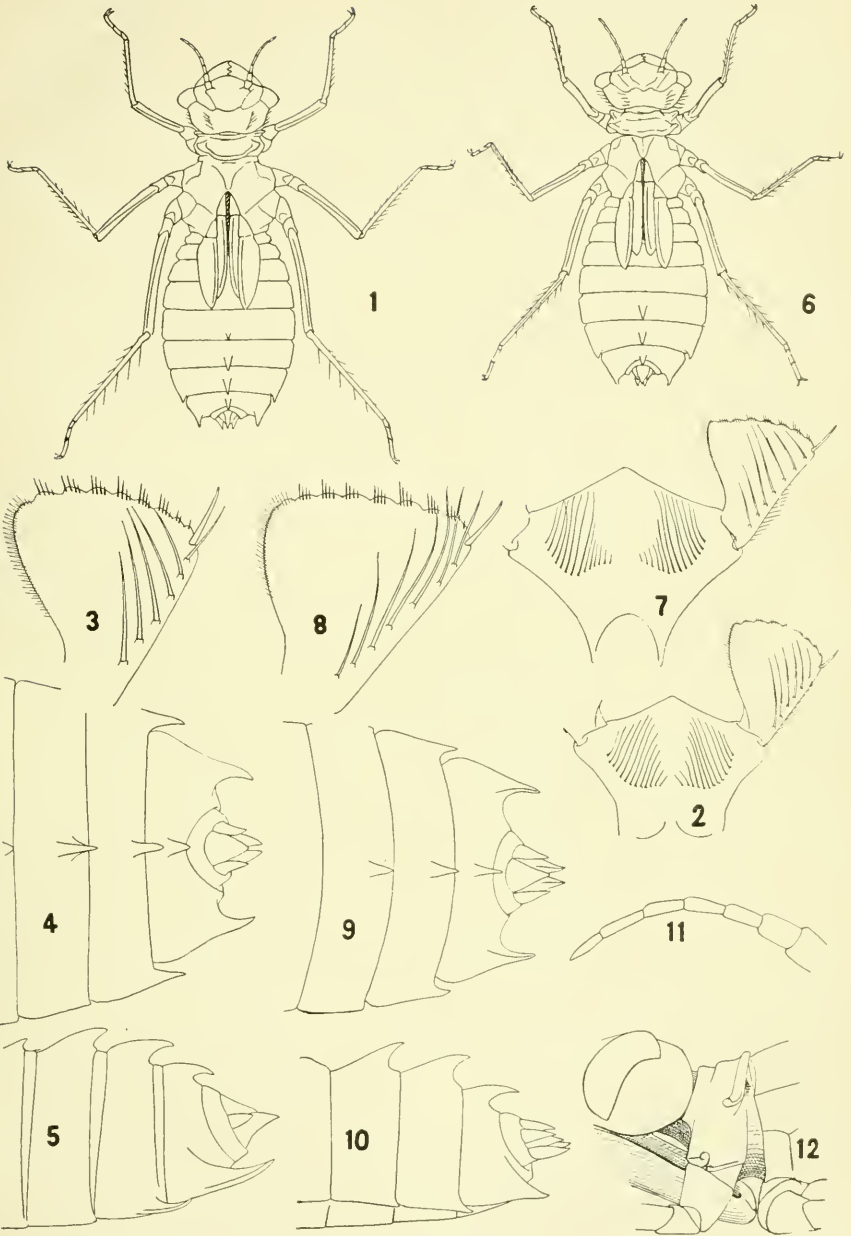
Prothorax with a sharp lateral, dorsal lobe and a large anterior, supracoxal process. (See fig. 12.) Wing pads reaching to segments 5 and 6 of the abdomen. Legs straight and slender with the tibia hairy and armed with two well-developed rows of long slender spines—a tibial armature remarkably like that of a Zygopterid imago. Tarsal claws simple.

Abdomen elliptical, widest at about segment 6, tapering regularly to segment 2 in front and to segment 9 behind. Segment 10 a narrow ring inserted into the posterior concavity of segment 9. (See figs. 9 and 10.) Large dorsal hooks on segments 7-9. A mere suggestion of a tubercle on segment 6, which was not visible until the incrusting mud had been scraped away. Segments 8 and 9 with lateral hooks, which are small on 8 but on 9 are longer than half the length of the segment. The lateral hooks slightly incurved and reaching nearly to the apex of the abdominal appendages. Segment 10 a ring whose dorsal length is about one-third of that of segment 9. Middle appendage broadly conical and more than three times as long as segment 10. Superior appendages subequal to the middle appendage, their apices acute and decurved. Inferior appendages slightly longer than the others, their apices acute but less decurved than those of the superiors.

EXPLANATION OF THE PLATE.

The drawings are by the author.

- FIGS. 1-5. *Helocordulia uhleri*. 1, mature naiad; 2, mentum and lateral lobe of labium; 3, lateral lobe of labium; 4, dorsal aspect of abdominal segments 7-10; 5, lateral aspect of abdominal segments 7-10.
- 6-12. *Helocordulia selysii*. 6, naiad; 7, labium; 8, labial lobe; 9 and 10, segments 7-10 of abdomen; 11, antenna; 12, prothorax.



NAIADS OF THE DRAGONFLY GENUS *HELOCORDULIA*.

FOR EXPLANATION OF PLATE SEE PAGE 4.

