

JUNE, 1908
VOL. XXII, No. 3

THE OTTAWA NATURALIST

Published by The Ottawa Field-Naturalists' Club.

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THE OTTAWA NATURALIST

VOL. XXII.

OTTAWA, JUNE, 1908.

No. 2

THE DRAGONFLIES (ODONATA) OF THE OTTAWA DISTRICT.

By E. M. WALKER, B.A., M.B., Toronto.

(Continued from April Number)

Since the first part of this paper appeared Dr. Fletcher has sent me another small collection of Odonata made at Ottawa some years ago by Mr. T. J. Maclaughlin. The specimens are largely destroyed by museum pests, but are, for the most part, determinable, and among them are three genera and six species, which I had not seen before from this region. These, together with a specimen of *Lestes rectangularis*, which was overlooked in preparing the first part of the paper, increase the list of Ottawa Dragonflies from 47 to 54 species.

I have also received from Dr. Fletcher a copy of Vols. I-II of the Transactions of the Ottawa Field Naturalists' Club, which contains a paper by Mr. Maclaughlin on Ottawa Dragonflies (Vol. II, 1887, pp. 329-342). The species mentioned in this paper were determined by the Abbé Provancher, but it contains some obvious errors, which may be noted here.

The description of *Calopteryx virginica*, Drury, evidently refers to the female of *C. aequabilis*. *C. virginica* is in fact a synonym of *C. aequabilis*.

Of *Lestes* two species are mentioned, *unguiculata* and *eurina*. Two male *Lestes* in Maclaughlin's collection bearing these specific names respectively, both belong to *L. jorciatus*. A female of *L. uncatius* is the only other *Lestes* in the lot. His *Agrion Hageni* is evidently *Argia putrida*, while *Agrion putridum* refers to one of the smaller Agrionidae. *A. durum* and *civile* both now placed in *Enallagma* probably refer to other species of that genus, while *A. iners*, which is a synonym of *Ischnura Ramburii* is doubtless *I. verticalis*.

Genus *ISCHNURA*. Charpentier.

This genus is distinguished from *Enallagma* by the characters given under the latter.

Of the three species reported from eastern Canada, two are found at Ottawa.

15. *ISCHNURA POSITA* (Hagen), Needham.

Ottawa, 3 males, 3 females (pruinose) (Harrington, Taylor, Fletcher).

This little dragonfly may be known by its bronze-black color, and the interrupted antehumeral thoracic band, in the form of an !. The abdomen of the male is black with narrow yellow basal rings on most of the segments. The female is paler and the antehumeral stripe not always interrupted.

This is the first notice of its occurrence in Ontario, although it has been reported from Quebec and is common in many parts of the United States.

16. *ISCHNURA VERTICALIS* (Say), Selys.

Ottawa, 3 orange females (Harrington, Taylor); Mer Bleue, June 1st, 1903, 1 male (Gibson); Hull, July 13th, 1907, 1 male, 1 black female, 3 pruinose females (Gibson); July 17th, 1907, 1 pruinose female, 1 orange female (Létourneau).

A widely distributed and very common species, flying from spring until autumn.

The thorax of the male is yellowish-green, striped with black, the abdomen black with pale blue interrupted basal rings, and segments 8 and 9 azure blue with a black stripe on each side. A bifurcated process on the apical dorsal margin of segment 10, together with the venational characters given, will serve to distinguish it from certain species of *Enallagma*, which bear a slight resemblance to it in coloration.

The female appears in two color varieties, the 'black female,' colored like the male when young, and the 'orange female,' in which the ground color is reddish-orange banded with bronze-black. Both forms become pruinose when old, appearing then as though covered with a dull bluish dust. The orange female is the commoner form in the spring, the black in the summer. The latter seems to become pruinose very soon after maturity.

APPENDIX TO THE ZYGOPTERA.

17. *LESTES FORCIPATUS* Rambur.

2 males (MacLaughlin).

These are the first Canadian specimens I have seen, although it has been recorded from Grimsby, Ont., and various parts of British Columbia.

The characters by which it is separated from the closely allied *L. disjunctus* have been given under that species.

18. *LESTES RECTANGULARIS* Say. Fig. 2.

Ottawa, 1 female (Harrington).

This specimen, which is damaged, was included in *L. unguiculatus* in the first part of this paper.

General color metallic brown, the face and under parts pale yellow or greenish. The humeral stripe is rather broad and there are narrow interrupted yellow rings at the bases of most of the abdominal segments. The abdomen of the male is extremely attenuated.

Sub-order. ANISOPTERA.

Family AESHNIDAE.

Antecubitals of first and second series not coincident (except the first and one other); inner end of the pterostigma supported by an oblique vein (Fig. 1).

There are three subfamilies, all of which are represented in the Ottawa collections. These are the Gomphinae, Cordulegasterinae and Aeshninae.

In the Gomphinae the eyes are widely separated and the abdomen is without lateral carinae, that of the male being more or less dilated apically. The coloration shews relatively little variation, being usually black or brown with yellow or green bands and spots. They are more local in distribution than most of our dragonflies, but are often exceedingly numerous where they occur.

The Cordulegasterinae much resemble the Gomphinae in appearance being black insects conspicuously spotted with yellow, but the eyes are larger and are separated above by a very narrow space or meet at a point. The abdomen is slightly or not at all dilated apically.

In the Aeshninae the eyes are larger and meet for some distance on the top of the head. Lateral carinae are present on the abdomen, which is not at all dilated posteriorly.

Sub-family GOMPHINAE.

Of the several genera represented in the eastern provinces, only one, *Gomphus*, with 4 species, has been met with at Ottawa. Other species of this genus as well as a few belonging to allied genera will be almost sure to reward the efforts of the industrious collector in this district, and among these may be mentioned the following: *Hagenius brevistylus* Selys, *Ophiogomphus rupinulensis* (Walsh), Hagen, *Dromogomphus spinosus* Selys, *Gomphus sculleri* Selys, *G. spicatus* Hagen and *G. sordidus* Hagen.

Genus GOMPHUS, Leach.

This large genus may be known from the allied genera mentioned by the following group of characters: Triangles without cross-veins, thorax green or yellow with conspicuous brown or black bands, hind femora with numerous small spines, but no large ones.

19. *GOMPHUS VASTUS* (Walsh). Fig. 3.

Hull, June 29th, 1886, 3 females (Fletcher).

Face transversely banded with black, dorsum of thorax with a pair of narrow equal divergent yellow bands, each forming below an acute angle with a shorter transverse band and uniting above with a narrow complete antehumeral band. Segments 7-9 remarkably dilated, especially in the male.

This species is said to frequent the shores of the Great Lakes and larger streams. I have never met with it in the field.

One of the above specimens was recorded under the name *G. adelphus* in the Entomological Record, Ann. Rep. Ent. Soc. of Ont., 1906, p. 104.

20. *GOMPHUS BREVIS* (Hagen). Figs. 4, 5.

Ottawa, 1 male; Hull, June 29th, 1886, 1 female (Fletcher); Cumberland, June 16th, 1900, 1 male (Gibson).

Face transversely banded with black, dorsum of thorax, with a pair of broad green or greenish yellow bands widening below. Antehumeral bands interrupted above. Segments 7-9 only moderately dilated.

This short, thick-set species is rather common in Ontario, frequenting well aerated waters, such as rapid streams and the exposed shores of large lakes.

21. *GOMPHUS EXILIS*, Selys. Figs. 6, 7.

Ottawa, 1 male, 1 female (Harrington); Hull, July 13th and 17th, 1907, 3 males, 1 female (Gibson).

Face entirely yellow, length under 45 mm., dull brown banded with greenish yellow, segments 7-9 but little dilated, superior appendages of male with a blunt low inferior process.

This is our commonest Gomphus, frequenting the shores of lakes and streams, especially the more sheltered parts. It is exceedingly abundant on Georgian Bay.

G. spicatus and *G. sordidus* are often associated with *G. exilis*, and both closely resemble the latter in form and coloration. They are larger species (48-50 mm.) and differ from *exilis* further in the structure of the genitalia.

22. *GOMPHUS CORNUTUS*, Tough. Figs. 8, 9.

Ottawa, Mer Bleue, June 18th, 1907, 1 male (Fletcher).

Face entirely yellow: length (male) 57 mm.; dorsum of

thorax yellowish green with a narrow brown streak on each side of the middle line; superior appendages of the male bifurcated, the inferior appendage prolonged into a pair of widely divergent curved processes.

This is the first notice of this remarkable *Gomphus* from Canada. It has also been taken in Illinois and Iowa.

Sub-family CORDULEGASTERINAE.

Genus CORDULEGASTER Leach.

We have several species of this genus, inhabitants of small creeks and runways from springs. Owing to the nature of their habitat they are local in distribution though *C. maculatus* is sometimes abundant where it occurs.

24. CORDULEGASTER DIASTATOPS Selys.

One male, segs. 6-10 wanting (Maclaughlin).

This species may be known from others of the genus by the eyes not being contiguous above and the abdomen being marked with yellow lateral somewhat triangular spots, their apices directed backwards.

It has also been taken at Port Sidney, Muskoka, with *C. maculatus*. According to Needham the nymph inhabits upland spring bogs.

Sub-family AESHNINÆ.

Genus ANAX, Leach.

23. ANAX JUNIUS (Drury), Selys.

Ottawa, May 6th, 1899, 1 male in cop.; June 24th, 1899, 1 male (Fletcher).

This is one of our largest and swiftest dragonflies, and its great size, bright green thorax and blue abdomen render it quite unmistakable for any other species. The blue color, however, is seldom seen in dried specimens and even in life does not develop for some time after the green color of the thorax has been assumed.

It is the first dragonfly to appear in the spring, being on the wing in the vicinity of Toronto as early as the second week in April. It flies throughout May and June, but is seldom seen in July and August, appearing again however in September.

Genus AESHNA, Fabricius.

The members of this genus are the large blue- or green-spotted forms which are often so numerous in late summer and early autumn. The genus is distinguished from the other genera of Aeshninae mentioned here by the fact that the sub-nodal sector is apically forked, the fork being unsymmetrical.

The North American species are now undergoing a revision by the writer and it has been found necessary to alter the

nomenclature of several species. Until the revision is published it seems best not to make use here of the new names proposed, so that most of the species listed below are indicated only by letters, the names by which they are commonly known being also given. These letters are the same as those used by Williamson in his paper "A collecting trip north of Sault Ste. Marie, Ontario." (Ohio Naturalist, VII, pp. 130-148, 1907).

Several other species besides those listed will almost certainly be found to inhabit the Ottawa district.

25. *AESHNA CONSTRICTA*, Say.

Ottawa, July 26th, 1900, 1 female (Fletcher); 1 female (Harrington).

Anal triangle of male 3-celled; superior appendages of male with a prominent ventral spine near the tip; no black line across the face; first lateral thoracic band rather broad, its anterior margin sinuate, not bordered with black; abdomen of male with large blue spots; appendages of female, 7 mm. long, 2 mm. broad.

A fairly common species in southern Ontario, but apparently does not properly belong to the Boreal Zone.

26. *AESHNA Z.*

Ottawa, August 17th, 1907, 1 female (Fletcher); Hull, beaver meadow, September 14th, 1907, 1 male (Létourneau).

Closely allied to *Ae. constricta* and widely quoted under the latter name, but distinct structurally as well as in coloration.

Anal triangle of male 3-celled; appendages of male as in *constricta*, no black line across the face; lateral thoracic stripes narrower, straight, more or less distinctly bordered with black; spots of male abdomen mostly small and greenish; appendages of female 6-7 mm. long, 1-1.2 mm. broad.

A very common species of wide range, frequenting small streams and pools in the vicinity of woods.

27. *AESHNA Y.*

Ottawa, July 8th, 1899, 1 male (Gibson); 1 male, 1 female (Harrington); Hull, July 17th, 1907, 1 male (Gibson).

Anal triangle of male 2-celled; superior appendages of male with a dorsal carina which bears a few denticles near the apex, the latter acute and bent downwards; no black line across the face; first lateral thoracic band green or blue, strongly sinuate in front and widened below; appendages of female about 5 mm. long, 1 mm. broad.

An abundant species in the Boreal and Transition Zones, appearing early in July and common about lakes and slow streams. It has been hitherto recorded as *Ae. clepsydra*, Say.

28. AESHNA W.

Meach Lake, July 21st, 1907, 1 female (Gibson).

Anal triangle of male 2-celled, superior appendages of male resembling those of *A. Y.*, but the apices usually rounded and the denticles less conspicuous; a black line across the face; lateral thoracic bands each divided into 2 spots.

This species has also been quoted as *A. clepsydra*. It seems to be practically restricted to the Boreal Zone east of the Great Plains.

Genus EPIÆSCHNA, Selys.

29. EPIÆSCHNA HEROS (Fabricius) Hagen.

1 female, fragmentary (Maclaughlin).

This immense Dragonfly is rather a rarity in Canada, though commoner farther south. Its huge size (hind wing, male 56, female 60 mm.), and the symmetrically forked sub-nodal sector render it recognizable at a glance.

Genus BASIÆSCHNA, Selys.

30. BASIÆSCHNA JANATA (Say), Selys.

Ottawa, June 11th, 1907, 1 female (Young); Clark's Bush, May 2nd, 1902, 1 female (Gibson); Hull, July 13th, 1907, 1 male (Gibson).

This insect closely resembles the *Aeshna*, but the sub-nodal sector is not forked at the apex. There are two straight oblique yellow bands on each side of the thorax, a brown spot at the base of each wing, and the abdomen is brown, spotted with light blue.

It appears early in the spring and its season is about over when the first *Aeshna* are abroad. It frequents lakes and rivers, flying up and down the edge of the shore in a regular beat.

Genus BOYERIA, MacLachlan.

Our species are easily known by the 2 roundish spots on the sides of the thorax and the dull brownish or greyish coloration.

Until recently, but one North American species has been recognized, but Williamson has described a second very closely allied form, *B. grafiana*, of which a specimen has been received from Ottawa. *B. vinosa* (Say), MacLachlan, is also certain to be met with there, as it is common everywhere in wooded districts along the shores of lakes and streams.

In *B. vinosa* the wings are brownish and there is a distinct dark brown spot at the base of each; the two round spots on the sides of the thorax are yellow and the abdomen is brownish with small obscure pale spots. The appendages of the female are about $1\frac{1}{2}$ times the length of seg. 10.

31. BOYERIA GRAFIANA, Williamson.

Ottawa, 1 female (Harrington).

A somewhat more robust insect than *B. vinosa*; wings hyaline with only a trace of the basal brown spots of *vinosa*; lateral thoracic spots pale blue, the first sometimes partly yellowish; abdominal spots blue, larger than in *vinosa*; segments 9-10 of male greenish blue (in *vinosa* 10 is fulvous, 9 brownish); appendages of female about as long as seg. 10.

Family LIBELLULIDÆ.

Antecubitals of first and second series mostly coincident, inner end of pterostigma not supported by an oblique vein.

Sub-family CORDULINÆ.

Hind margin of eyes with a small tubercle, males with an auricle (ear-like projection) on each side of seg. 2, and the anal margin of the hind wing excavated.

The Cordulinæ generally exhibit metallic coloration to a greater or less degree and the wings are seldom spotted beyond the arculus. They are for the most part admirable fliers, and are comparatively seldom seen at rest.

In addition to the species here listed, the following may be expected in the Ottawa district: *Somatochlora elongata* (Scudder) Selys, *S. Williamsoni* Walker, *S. Walshii* (Scudder) Selys, *S. forcipata* (Scudder) Selys and *Cordulia Shurtleffi* Scudder
Genus DIDYMOPS, Rambur.

32. DIDYMOPS TRANSVERSA (Say), Hagen.

Ottawa, July 14th, 1899, 1 male (Gibson); July 9th, 1907, 1 female (Young); 1 male (Harrington); Meach Lake, July 21st, 1907, 1 female (Gibson).

This species, the sole member of the genus, is fairly common in wooded districts, flying along the margins of lakes and woodland streams, much after the manner of *Basiaeschna janata* with which it is often associated.

It is a dull brown, long-legged insect, readily recognized by the single oblique yellowish band on the sides of the thorax and the dull yellow basal spots upon the upper side of the abdomen. These spots, however, are apt to disappear completely in dried specimens. The abdomen of the male is distinctly club-shaped.

Genus MACROMIA, Rambur.

33. MACROMIA ILLINOIENSIS, Walsh.

Hull, June 29th, 1886, 1 male (Fletcher).

A fine large dragonfly with clear or flavescent wings and a slender abdomen, club-shaped in the male. Thorax dark metallic green and blue, clothed with pale greyish hairs; a single oblique yellow stripe on each side. Abdomen dark brown, more

or less spotted with yellow and with a large basal yellow spot on the dorsum of seg. 7.

This insect frequents woodland paths and glades in the neighbourhood of large lakes and rapid streams, coursing swiftly back and forth over its chosen path with almost tireless energy. It appears about the end of June or first week in July and remains until the latter part of August.

Genus *NEUROCORDULIA*, Selys. Fig. 10.

34. *NEUROCORDULIA YAMASKANENSIS* (Prov.), Selys.

Ottawa, 1 male (Harrington).

A dull brown dragonfly about 53 mm. long, the hind wings having an amber-colored basal patch with dark-brown veins, extending as far as the arculus. The short sector and upper sector of the triangle in the fore wing are parallel, or slightly divergent, a character which distinguishes it from our other *Cordulinae* in which they are more or less convergent.

This insect appears to be common in the region of lakes between Georgian Bay and Ottawa. It frequents large lakes or rivers and is unique among our dragonflies in its habit of flying only after sunset, when the mayflies upon which it feeds are abroad.

Genus *EPICORDULIA*, Selys.

35. *EPICORDULIA PRINCEPS* (Hagen) Selys.

1 male, fragmentary (Maclaughlin).

This large insect (hind wing, male 41, female 44 mm.), is marked like certain species of *Libellula*, having a large dark-brown triangular patch at the base of the hind wings, and sometimes a smaller basal spot on the fore wings, a nodal and an apical spot. The nodal spot is often absent in the males in northern latitudes, and the apical spot much reduced, and such examples closely resemble an immense *Tetragoncuria*.

It is a swift, restless species which is abroad during July in the vicinity of lakes, often flying at a considerable height, and frequently met with over water some distance from the shore.

Genus *TETRAGONEURIA*, Hagen.

Dragonflies of moderate size with more or less black at the base of the hind wings; only 4 antecubitals in the latter. Abdomen depressed with a row of dull yellow dorsal spots along the margins. The metallic coloration of the thorax is largely obscured by a dense growth of grayish hairs.

36. *TETRAGONEURIA CYNOSURA* (Say), Selys. Figs. 11, 12.

Ottawa, May 30th, 1899, 1 female (Gibson); June 5th, 1903, 1 male (Fletcher); Hull, June 29th, 1886, 1 male (Fletcher).

These specimens all belong to the variety called *semiaquea* in which the black patch at the base of the hind wings reaches beyond the triangle, sometimes as far as the nodus. The typical *cynosura* is found at Toronto with *semiaquea*, but the latter seems to be the only form found in the north. It is exceedingly abundant there, however, occurring in myriads about all the lakes and larger streams during June and July. It is an insect of splendid aerial powers and on sunny days is seldom seen to rest.

The males of this species may be separated from those of *T. spinigera* and *T. canis* by the absence of spines from the superior appendages.

37. TETRAGONEURIA SPINIGERA (Selys) Selys.

1 male, 1 female (Maclaughlin).

This species is generally larger than *cynosura*, and has very little black at the base of the hind wings. The superior appendages of the male bear a small inferior spine.

It is common in the northern parts of Ontario.

38. TETRAGONEURIA CANIS Maclaughlin Figs. 13, 14.

Ottawa, 1 male (Harrington); Chelsea Road, Ottawa, May 27th, 1886. (Fletcher); Hull, June 2nd and 7th, 1903. 3 males (Harrington).

These are the only Canadian specimens I have seen of this species. The males may be known by the form of the superior appendages, which are curved downwards and bear a stout dorsal spine.

This species was recorded by me in the Entomological Record, Ann. Rep. Ent. Soc. of Ont., 1906, as *T. spinosa*, Selys, a closely allied species with which it has apparently been confounded by several writers. The determination *T. canis* was confirmed by Dr. Calvert.

Genus HELOCORDULIA, Needham.

39. HELOCORDULIA UHLERI (Selys). Needham. Figs. 15, 16.

Buckingham, P.Q., May 31st, 1 female (Fletcher).

A rather small Corduline (abd. 29 mm.), olivaceous with a blackish abdomen. Hind wings with a black spot at base extending as far as the first antecubital. Just beyond this is a yellow spot and a few small black ones marking some of the antecubitals.

This dragonfly, which appears in early summer, will probably prove to be fairly common about the lakes and streams of the Laurentian area.

Genus DOROCORDULIA, Needham.

40. *DOROCORDULIA LIBERA* (Selys), Needham. Fig. 17.
Ottawa, July 7th, 1907, 1 male (Young).

This is the daintiest and most beautiful of our Cordulinae. It is about 40 mm. long, bronze-green with bright green eyes. Segments 3 to 5 are very slender, especially in the male, while 6 to 9 are considerably dilated. The undivided triangle of the fore wings and the form of the male appendages will serve to distinguish it from certain species of an allied genus, *Somatochlora*, representatives of which are sure to be found about Ottawa.

D. libera is found about the marshy borders of lakes in early summer.

Sub-family LIBELLULINÆ.

Hind margin of eyes without a tubercle, males without auricles on segment 2, anal margin of hind wings not excavated.

Most of our familiar dragonflies belong here and are to be found flitting about every pond and marsh.

Among the species not recorded below which may be looked for in the vicinity of Ottawa are *Nannothemis bella* (Uhler) Brauer, *Leucorhinia proxima* Calvert, *L. frigida* Hagen, *L. glacialis* Hagen, *Sympetrum scoticum* (Donovan) Newman, and *Celithemis elisa* (Hagen) Walsh.

Genus LEUCORHINIA, Brittinger.

The species of this northern genus resemble those of *Sympetrum* in form and size, but differ in certain structural details and in coloration. The pterostigma is shorter than in *Sympetrum*, being only about twice as long as broad; the face is pure white, and there is always a few black markings at the base of the wings.

The species appear in the spring or early summer and have for the most part disappeared by the time the *Sympetra* make their appearance.

41. *LEUCORHINIA HUDSONICA* (Selys) Hagen. Figs. 18, 19.

Hull, June 29th, 1886, 1 female (Fletcher); Eastman's Springs, Ont., May 15th, 1903, 1 female (Fletcher).

This small species is widely distributed in Canada in the Boreal Zone. It is black with irregular yellow blotches on the sides of the thorax and a row of dorsal abdominal spots on segments 2 to 7 or 8. There are two black dashes at the base of the fore wings, another at the base of the hind wings, and behind this is a larger triangular basal spot. The form of the male appendages and vulvar lamina of the female is characteristic.

42. *LEUCORHINIA INTACTA* (Hagen), Hagen. Figs. 20, 21.
Ottawa, May 24th, 1903, 1 male (Gibson); May 28th, 1904,

1 male (Gibson); 1 male (Taylor); July 5th, 1907, 1 male, 1 female (Young); Hull, June 29th, 1886, 1 male, 1 female.

A blackish insect, segments 2-7 having a row of dorsal yellow spots, which, with exception of the one on 7, disappear in old individuals. Inferior appendage of male deeply bifurcated.

L. intacta is extremely common in southern Ontario where it is the sole representative of the genus. Farther north it is replaced by several others, all of which are characteristic of the Boreal Zone.

Genus SYMPETRUM.

To this genus belongs a number of small red, yellow or brownish dragonflies, mostly with clear unspotted wings, some of which are exceedingly plentiful in late summer and autumn. The pterostigma in our species is three or more times as long as broad, and the base of the wings is without black markings.

43. SYMPETRUM COSTIFERUM (Hagen), Kirby, 1887, (Fletcher).

Ottawa, 1885. (T. J. McLaughlin); Experimental Farm, Ottawa, (det Provancher).

Femora and tibiae yellow with black on the sides; wings flavescens at the extreme base and usually along the costal margin; superior appendages of male without a prominent inferior tooth; vulvar lamina of female not cleft.

A somewhat local but not uncommon species.

44. SYMPETRUM VICINUM (Hagen), Kirby. Fig. 22.

Ottawa, August 23rd, 1899, 1 female (Gibson).

Femora and tibiae wholly yellow, wings flavescens only at the extreme base, otherwise it agrees with *costiferum* in the characters given.

S. vicinum is one of our latest dragonflies to disappear and is characteristic of late summer and autumn. It is yellow at first, but later becomes bright red.

45. SYMPETRUM SEMICINCTUM (Say), Kirby.

Ottawa, August 20th, 1885, 1 female; August 27th, 1902, 1 male (Fletcher).

Basal half of the wings brownish yellow, superior appendages of male without a prominent inferior tooth, vulvar lamina of female not cleft.

This pretty little dragon is rather local but sometimes common where it occurs.

46. SYMPETRUM RUBICUNDULUM (Say), Kirby. Figs. 23, 24, 25.

Ottawa, July 14th and 18th, 1899, 2 females (Gibson); Clark's Bush, July 16th, 1907, 1 male (Létourneau).

Wings hyaline or in the so-called variety *assimilatum* (Uhler) more or less flavescent; legs black; superior appendages of male with a prominent inferior tooth; vulvar lamina of female cleft in the middle; genital hamule of male (ventral surface of seg. 2) of the form shewn in figure.

An exceedingly abundant species, flying from early July until November. Young individuals are yellowish, but later become red.

47. *SYMPETRUM OBTRUSUM* (Hagen), Kirby. Fig. 26.

Ottawa, July 16th and 30th, 1907, 2 females (Gibson); August 9th, 1907, 1 male (Létourneau); 1 male, 1 female (Harrington).

Another very common *Sympetrum* which apparently has not yet become quite distinct from *rubicundulum*. Generally, however, there is no difficulty in separating the males by the form of the genital hamules. The face too is paler than in *rubicundulum*, being almost as white as that of a *Leucorhinia*; and the size usually a little smaller.

Genus *ERYTHEMIS*, Hagen.

48. *ERYTHEMIS SIMPLICICOLLIS* (Say), Calvert.

Ottawa, July 19th, 1907, 1 male, 1 female (Young).

A beautiful grass-green dragonfly about 43 mm. long, without thoracic markings, or with only the sutures black; the abdomen mostly brown or black in its apical half. Wings hyaline, pterostigma elongate, pale brown. Old males are pale greyish blue, the thorax and abdomen becoming entirely pruinose.

This species, though common in southern Ontario, will probably not be found in large numbers at Ottawa. It frequents marshy lakes and swamps.

Genus *LIBELLULA*, Linné.

This genus consists of large stout-bodied forms in most of which the wings are more or less conspicuously spotted or banded. The triangle of the fore wings is narrow and very much elongated posteriorly, and is generally crossed by two or more parallel veins. The sexes are alike in wing pattern and the male is without the ventral hooks on the first abdominal segment, which characterize the next genus.

Some of the species are among our most familiar dragonflies and may be seen flitting about every stagnant pond or ditch in midsummer.

49. *LIBELLULA INCESTA*, Hagen.

1 male, 1 female, fragmentary (Maclaughlin).

This *Libellula* is exceptional among Canadian species in having no wing markings except the black pterostigma and an indistinct brownish spot at the extreme apex. The abdomen is more elongate than in the other species. Both sexes become almost entirely bluish pruinose with age.

We have taken this Dragonfly at Point Pelee and at Go Home, Georgian Bay, but it seems to be somewhat rare.

50. *LIBELLULA EXUSTA*, Say.

Ottawa, July 21st, 1907, 1 female (Young); Meach Lake, July 21st, 1907, 1 male, 1 female (Gibson).

This is our smallest *Libellula* and can be distinguished at a glance from our other species by the markings of the wings, in which it resembles a *Leucorhinia*. There is a pair of dark brown streaks at the base of the fore wings, and an anterior streak and posterior triangular spot at the base of the hind wings. The general color is reddish brown, but in old males the dorsum of the thorax and basal third of the abdomen is bluish-white pruinose.

This is an exceedingly abundant insect about the lakes in the Georgian Bay region and probably throughout a large part of the province, but I have not found it about the small ponds and pools frequented by other *Libellule*.

51. *LIBELLULA LUCTUOSA*, Burm.

Ottawa, July 19th, 1907, 1 male (Young).

A striking species in which the basal third or half of the wings is dark brown, the brown area sometimes margined with white in the males. The apices of the wings are also sometimes brownish.

This species is not uncommon in southern Ontario, but the Ottawa specimen is the only one seen by the writer from the country north of Lake Simcoe.

It is more generally known as *L. basalis*, Say.

52. *LIBELLULA PULCHELLA*, Drury.

Ottawa, July 14th, 1899, 1 female (Gibson); 1 female (Harrington).

Our largest and handsomest *Libellula*, and one of the most familiar of dragonflies.

On each wing there are three dark brown patches, one at the apex, another at the nodus and a longer basal one reaching out to the triangle or a little beyond it. In old males there is a white spot on each side of the nodal spot, giving the insect a striking appearance in the sunlight.

The only insect that might be mistaken for *L. pulchella* is the female of *Plathemis lydia*, which is smaller (hind wing of *lydia* female, 35 mm., of *pulchella* female, 41 mm.), and in which the hind femur is about as long as the tibia, while in *pulchella* it is a little longer.

53. *LIBELLULA QUADRIMACULATA*, Linné.

Ottawa, May 28th, 1900, 1 male (Gibson); July 18th, 1907, 1 male (Létourneau).

Another familiar dragonfly of unmistakable appearance. Yellowish brown or olivaceous; wings yellow at base and generally along the front margin; a small black nodal spot and a larger triangular black spot at the base of the hind wings.

L. quadrimaculata is a northern species and is circumpolar in distribution, being a common species in Europe and Asia as well as North America.

Genus *PLATHEMIS*, Hagen.

54. *PLATHEMIS LYDIA* (Drury), Hagen.

Ottawa, July 21st, 1907, 1 female (Young); Mer Bleue, June 18th, 1907, 1 male (Fletcher).

This is one of the commonest of the larger Libellulidæ in central and southern Ontario, but is scarcer northward.

It exhibits a remarkable sexual dimorphism, the wings of the two sexes being very different in their markings. In the female these are nearly identical with those of *Libellula pulchella*, but in the male the nodal and apical spots are substituted by a single broad band crossing the wing from about the nodus to the pterostigma, the apices being clear. In old males there is a triangular white patch behind the basal stripe of the hind wings and the abdomen is pruinose white.

In habits and flight *P. lydia* is quite like the *Libellula*.

EXPLANATION OF PLATE.

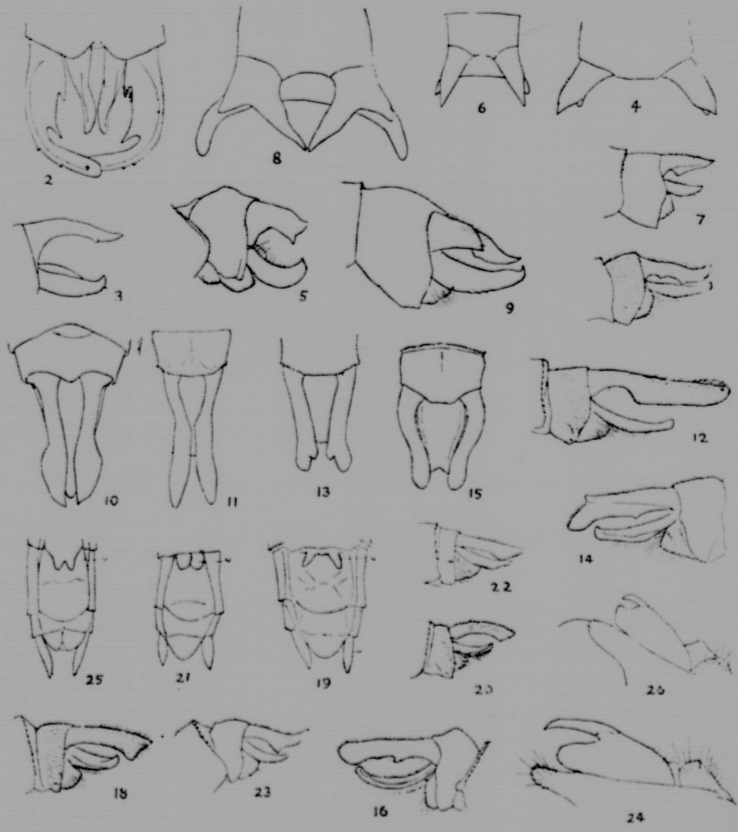
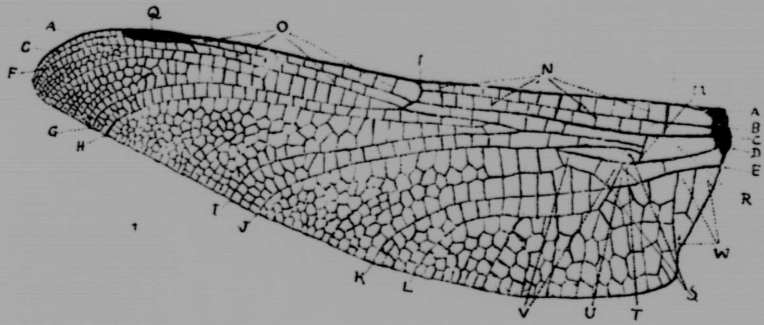
(Fig. 1 is on a smaller scale, Figs. 2, 24 and 26 on a larger scale than the others).

FIG. 1. Hind wing of one of the Anisoptera, *Hagenius brevistylus*.

- | | |
|---|---|
| A. Costa. | O. Postcubitals (13 in the first series, 11 in the second). |
| B. Subcosta. | P. Nodus. |
| C. Median Vein. | Q. Pterostigma. |
| D. Submedian Vein. | R. Basilar space. |
| E. Postcosta. | S. Supra-triangular space. |
| F. Principal Sector. | T. Median space. |
| G. Nodal Sector. | U. Internal triangle. |
| H. Subnodal Sector. | V. Triangle. |
| I. Median Sector. | W. Anal Triangle. |
| J. Short Sector. | |
| K. Upper Sector of the triangle. | |
| L. Lower Sector of the triangle. | |
| M. Arculus. | |
| N. Antecubitals (14 in the first series, 13 in the second, the first and seventh of the former coincident respectively with the first and sixth of the latter). | |

FIG. 2. *Lestes rectangularis* male, abdominal appendages, dorsal view.

- | | | |
|---|-----|---------------|
| 3. <i>Gomphus vastus</i> , male, | " " | lateral view. |
| (after Kellicott). | | |
| 4. <i>Gomphus brevis</i> , male, | " " | dorsal view. |
| 5. " " male, | " " | lateral view. |
| 6. " <i>exilis</i> , male, | " " | dorsal view. |
| 7. " " male, | " " | lateral view. |
| 8. " <i>cornutus</i> , male, | " " | dorsal view. |
| 9. " " male, | " " | lateral view. |
| 10. <i>Neurocordulia yamaskanensis</i> , male, abdominal appendages, dorsal view. | | |
| 11. <i>Tetragoneuria cynosura</i> , male, | " " | dorsal view. |
| 12. " " male, | " " | lateral view. |
| 13. " <i>canis</i> , male, | " " | dorsal view. |
| 14. " " male, | " " | lateral view. |
| 15. <i>Helocordulia Uhleri</i> , male, | " " | dorsal view |
| (after Martin). | | |
| 16. <i>Helocordulia Uhleri</i> , male, | " " | lateral view. |
| (after Martin). | | |
| 17. <i>Dorocordulia libera</i> , male, | " " | lateral view |
| 18. <i>Leucorhinia intacta</i> , male, | " " | lateral view. |
| 19. " <i>intacta</i> , female, terminal segments of abdomen from below, showing vulvar lamina (v.). | | |
| 20. <i>Leucorhinia hudsonica</i> , male, abdominal appendages, lateral view. | | |
| 21. " <i>hudsonica</i> , female, vulvar lamina (v.). | | |
| 22. <i>Sympetrum vicinum</i> , male, abdominal appendages, lateral view. | | |
| 23. " <i>rubicundulum</i> , male, abdominal appendages, lateral view. | | |
| 24. <i>Sympetrum rubicundulum</i> , male, left genital hamule. | | |
| 25. " " female, vulvar lamina (v.). | | |
| 26. " <i>obtrusum</i> , male, left genital hamule. | | |



THE DRAGONFLIES OF THE OTTAWA DISTRICT.

WINTER BIRDS OF THE COBALT REGION.

March 14th to 26th of this year the writer spent in New Ontario in the towns along the New Ontario and Temiskaming Railway. Although I did not go there for the purpose that visitors to this region usually go there for, yet it was no vacation tour, but on the contrary, a very busy time for me. Every free moment, however, I spent in looking at the things in nature; especially was I curious to see what birds could be met with here at this time. Whenever I could, I went into the fringe of the woods, mostly dense stands of small black spruce, tamarack and quaking aspen. The tamarack had also here as elsewhere been all killed by the insect that did so much damage a few years before, but some new growth was also seen.

The birds here are few and far between in winter. But since faunal lists from this region are rare, I submit the following list. Unless otherwise noted, they are winter birds, or permanent residents of the region, for, although migration is in progress further south, it was practically the middle of winter here. On March 16th the temperature at Englehart was 6° in day time, but the wind, from north, was certainly much below zero, as it must have been also during the night. The lengthening days were the only token of approaching spring, there was no thawing of snow and ice as yet. The following birds were seen:—

Raven (*Corvus corax principalis*), one, March 16th at Englehart. Reported as rather common at Larder Lake.

Chickadee (*Parus atricapillus*), 5-6 in some pines, exposed to the icy blasts, at Englehart, as lively and satisfied as usual; one singing their sweet: *Peabody*. Seen also in two to three other places; 10-15 on way from Brentha to Heaslip.

Hairy Woodpecker (*Dryobates villosus*), one near Heaslip.

Snowflake (*Passerius nivalis*), flock of about 25 on Lake Temiskaming at Haileybury.

English Sparrow (*Passer domesticus*), abundant at Cobalt, less so at Haileybury. None seen at Englehart and northward.

Canada Jay (*Perisoreus canadensis*), 4-5 seen at Brentha P. O.

I had a very amusing experience with one of these birds, showing their tameness or fearlessness, to which they are probably driven by hunger. A Swiss farmer at Brentha told me, that he had a tame "meatbird" at his place, which would, when called, *Hobie*, fly on his hand and eat out of it. I told him I would come the next morning and

take a picture of it. He remarked it might be too shy for that, or perhaps not come at all in the presence of a stranger. When I arrived there the next morning, the farmer was just out; I entered his little rough log cabin and got some rolled oats or wheat. This I held out in my left hand calling the bird, which had already appeared in a small poplar, sweetly singing all the time. Imagine my surprise, when it flew right straight on my hand, eyed me for a minute, and then commenced eating with all his might. He was so fearless, that I could take a picture of him, manipulating the camera with my right hand. He came repeatedly. Afterwards I also took pictures of him on the farmer's hand. The pictures of the bird on my hand, however, did not turn out well. The object was too near for a snapshot.

Redpoll (*Acanthis linaria*), a flock of 10-15 at Latchford, March 26th.

The following were undoubtedly the first migrants: Am. Golden-eye, (*Clangula americana*) three, one male and two females seen in a ripple in the Montreal River, near the railway bridge at Latchford.

Crow (*Corvus brachyshaichus*), 5 seen at New Liskeard, March 24th, flying straight north. I had seen crows already at North Bay, March 14th, but these at New Liskeard were undoubtedly the first arrivals of their kind in this section.

A person with snowshoes might have seen besides these the ruffed grouse (partridge) and the spruce partridge; also the three-toed woodpeckers, but not many more.

G. EIFRIG.

Ottawa, May 8th, 1908.

REVIEW OF DR. J. M. CLARKE'S GEOLOGY OF A
PORTION OF GASPE PENINSULA, QUE.

By H. M. AMI.

"Early Devonian History of North-Eastern North America." Memoir 9. New York State Museum, New York State Education Department, 366 pp., 48 plates, sections, diagrams, maps, etc. Albany, 1908, by J. M. Clarke, State Geologist and Director of the New York State Museum.

In this magnificent Memoir, with its princely plates and exquisite illustrations, the State of New York has once more shewn the world how far science and art has reached towards a realization of satisfactory results in describing and illustrating the hard facts of Geology in an orderly and delightful manner.

To the student of palæontology and stratigraphical geology, this handsome contribution to the history of early Devonian times will be most welcome. It fills a long-felt want, and serves to tie together a number of faunas and formations with others in the State of New York, as well as beyond. Science, and geology especially, knows no political boundaries. As Dr. Clarke very aptly puts it, "The New York series of formations spreads away from its typical region to all points of the compass, and in all these directions, however far it extends, light is to be sought for the explanation of past geologic conditions in New York." "Nevertheless, the State . . . does not and never can in itself afford the solution of its own problems." Prof. James Hall, for the sixty-three years that he was in office at Albany had shewn that the New York series extended beyond the limits of New York State. The standard laid down by the fathers of geology in North-Eastern America, Hall, Logan, Dana, Billings, Emmons and many others, were to be kept high and to the fore.

The subject matter dealt by the distinguished successor to James Hall in the Memoir before me was obtained by Dr. Clarke in the Peninsula of Gaspé, in South-Eastern Quebec. After describing the general distribution of the "Early Devonian of New York" and pointing out their extension north and east, then sets to the task of giving the geology of the region covered by the Memoir. The geology of the Forillon, of Percé, (a brief sketch of which had appeared in 1903 in advance sheets from the report of the Palæontologist, 1904, and in Bulletin 107, Geological Papers, Albany, 1907), the Gaspé sandstones, etc., are followed by descriptions of the various faunas. Three distinct faunas are noticed, and their rich harvest of forms, new to science, or recorded afresh, constitute the bulk of the material on which the Memoir is based. They are as follows:—

- I. Fauna of the St. Alban beds. Forty-eight species.
- II. Fauna of the Cape Bon Ami beds. Of this fauna eleven species are recorded.
- III. Fauna of the Grande Grève limestones. One hundred and sixty species.

Observations on the Dalmanites of the early Devonian are introduced in the text which throw light upon race character-

istics, debility, as exemplified in ornamentation of different parts of the organism *Gaspelichas Forillonia*, a new species, is indeed "the most extravagant instance of the development of spines among the trilobites."

This monumental work by Dr. Clark only serves to enhance his deserved fame as a distinguished palæozoic palæontologist. The plates are all that can be desired, the text likewise so satisfactory, both as to quality and precision. References are made to the good work done in the peninsula by Logan, Billings, Ells, Low and others whom the author does not forget in bestowing names on the new forms met with. Nor does he forget those intrepid missionaries and early French explorers like Lejeune, Jumeau, Lescarbot, Leclercq and de Thune, and the Jerseymen and other settlers of the district, all who have in any measure contributed to the history and development of Gaspé.

The geology of the "Forillon" with map, is given in which the Gaspé sandstones, the Grande Grève limestones, the Cape Bon Ami beds and the St. Alban beds are separated on palæontological and stratigraphical grounds. This remarkable point juts out into the Gulf of St. Lawrence "like an index finger," from the broad fist of Rosier Cape and Cove, and two of the four geological formations constitute the narrower portion of the slender point, with Cape Gaspé to the north and Shiphead to the south. The vertical distribution of species, the faunas of the different formations and their mode of occurrence, together with a special chapter on the "Geology of Percé," in which a geological map in detail, is presented giving the succession of the strata, including formations from the Carboniferous down to the Lower Silurian. They comprise the Bonaventure conglomerate (Carboniferous and Devonian in age), the "Percé massive" (Lower Devonian), the Cap Barré massive, (Lowest Devonian), Mt. Joli massive, north flank, (Upper Silurian), Mt. Joli massive, south flank, (Lower Silurian), Cape Canon massive, including limekiln beds, (Lower Silurian). The faults noted by Dr. Clarke appear to be of the same character as those of the "Quebec Group" and "Appalachian" folded region, a series of thrust faults, very much like those movements so characteristically described by Lugeon of Switzerland, where strata seem to play leap-frog one over the other. Their reproduction of a number of old historic maps and early illustrations of this most interesting and picturesque, as well as easily reached region, forms no inconspicuous portion of the volume, nor can the delightful water-colour reproduction of Percé rock, forming the frontispiece, go unnoticed. The excellent drawings by Barkentin illustrating the extinct faunas are exquisitely reproduced.

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