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THE ODONATA OF THE PRAIRIE PROVINCES OF CANADA.

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With the exception of the short lists of captures in the Entomological Record, published in the Annual Reports of the Entomological Society of Ontario, and a few other isolated records, no information appears to be extant on the Odonata of the vast territory between Ontario and British Columbia. Before the section on the Odonata of the new Catalogue of Canadian Insects is issued, it seems, therefore, desirable to place on record in detailed form all the information we have been able to obtain on the distribution of the dragonflies of this region.

The source of this information is mainly to be found in the collections made by Messrs. J. B. Wallis, N. Criddle, T. N. Willing and N. B. Sanson, and to these gentlemen the writer wishes to express his sincere thanks for the privilege he has enjoyed of retaining specimens for study for an indefinite length of time, or permanently for his collection. The list is of a preliminary nature, and no doubt many species will be added to it in the future.

In looking over almost any collection of dragonflies from the prairie country one is apt to be struck with the large preponderance in individuals of the genera *Lestes*, *Sympetrum*, *Enallagma* and *Aeshna*. These genera are also best represented in number of species, *Leucorrhinia* coming fifth. The latter genus is probably nowhere better developed in North America than here. There are doubtless also more species of *Somatochlora* from this region than appear in the present list, particularly in the less explored northern parts. Apart from this genus, the *Corduliinae* are apparently poorly developed. The absence of *Agrioninae* (*Calopteryginae* Auctt.) and *Cordulegasterinae* is probably also due to insufficient exploration. The occurrence of two species of the genus *Coenagrion* (*Agrion* Auctt.) is of much interest, one of the species being almost identical with the Palearctic *C. lunulatum*. Finally, attention may be drawn to the fact that if we include *Aeshna caerulea septentrionalis*, which has been

taken at Fort Resolution, Great Slave Lake, and doubtless occurs also in Northern Saskatchewan and Alberta, the list includes all the species of dragonflies that are common to the Palæarctic and Nearctic Regions, except the essentially tropical *Fantala flavescens*. These species are *Enallagma cyathigerum*, *Anax junius*, *Æshna cærulea*, *Æshna juncea*, *Æshna palmata*, *Sympetrum scoticum* and *Libellula quadrimaculata*. The only genera not represented in the Palæarctic region are *Argia*, *Amphiagrion* and *Tetragoneuria*.

In the following list the names of the collectors, Messrs. Wallis, Criddle, Willing, Sanson and the late Dr. Fletcher, are abbreviated: Ws, C, Wg, S and F, respectively.

LIST.

1. *Lestes congener* Hagen.

MANITOBA.—Aweme, Aug. 29, 1907, 1 ♂; July 10, 1909, 1 ♀ (C). Westbourne, July 27, 1908, 3 ♀s; Aug. 1, 1908, 1 ♂; Aug. 20, 1908, 2 ♂s, 1 ♀; Aug. 26, 1908, 2 ♂s, 2 ♀s (Ws).

This species ranges across the continent, and is apparently most abundant in the Canadian Zone.

2. *Lestes unguiculatus* Hagen.

MANITOBA.—Aweme, Aug. 5, 6, 1907, 2 ♂s; July 10, 1909, 1 ♀ (C). Westbourne, July 27, 1908, 2 ♂s, one teneral; July 29, 2 ♂s, 1 ♀, incl. pair in cop.; Aug. 10, 14, 2 ♂s (Ws). Winnipeg, July 9, 1908, 2 ♂s, 1 ♀ (Ws).

SASKATCHEWAN.—Regina, 3 ♀s (Wg); Aug. 7, 1903, 2 ♂s (F). Goose Lake, July 20, 1907, 1 ♂, 2 ♀s, teneral (Wg). Davidson, Aug. 21, 1907, 1 ♀ (Wg). Radisson, July 29, 1907, 2 ♂s, 2 ♀s (Wg, F). Lumsden, Sept. 10, 1906, 1 ♂ (W. J. Alexander).

ALBERTA.—Near Waterton Lake, Aug. 5, 1908, 1 ♂; Aug. 10, 1908, 1 ♂, 2 ♀s (E. V. Cowdry).

A transcontinental form, inhabiting chiefly the Transition and Upper Austral Zones.

3. *Lestes uncatatus* Kirby.

MANITOBA.—Aweme, Aug. 18, 30, 1907, 2 ♀s (C). Westbourne, July 27, 1908, 2 ♂s, 2 ♀s, incl. pair in cop.; July 29, 1908, 1 ♂; Aug. 10, 1908, 1 ♂ (Ws). Winnipeg, July 24, 1908, 1 ♂, 1 ♀ (Ws).

SASKATCHEWAN.—Regina, July 17, 1907, 1 ♂, 1 ♀ (F);
 June 19, 1908, 1 ♀ (Wg). Goose Lake, July 19, 20, 1907, 3 ♂s,
 5 ♀s (F).

Another transcontinental species. Very common on the Canadian prairies.

4. *Lestes disjunctus* Selys.

MANITOBA.—Aweme, Aug. 5, 1905, 1 ♂ (C). Westbourne,
 July 27, 1908, 6 ♂s; July 29, 1908, 1 ♂, 2 ♀s; Aug. 10, 1908,
 1 ♂; Aug. 29, 1908, 1 ♀ (W-). Winnipeg, July 4, 1908, 4 ♂s, 2
 ♀s (Ws).

SASKATCHEWAN.—Regina, July 17, 1907, 1 ♀ (F), 1 ♀
 (Wg). Duck Lake, July 22, 1907, 10 ♂s, 9 ♀s (F, Wg).

ALBERTA.—Banff, July 11, 18, 1908, 3 ♀s (S).

This is probably the commonest Canadian *Lestes*, and like the other species listed here, is widely distributed, occurring from Nova Scotia to British Columbia.

5. *Argia vivida* Hagen.

ALBERTA.—Banff, swamp off Hot Springs Road, June 21,
 1908, 1 ♂, teneral (S).

This species has already been reported from this locality and from Glacier, B. C., by Osburn (Ent. News, XVI, 1905, p. 187). It probably does not belong to the prairie fauna.

6. *Nehalennia irene* Hagen.

MANITOBA.—Aweme, July 25, 1908, 2 ♀s; July 4, 1909,
 1 ♀ (C). Westbourne, July 27, 29, 1908, 1 ♂, 2 ♀s (Ws). Win-
 nipeg, July 7, 1908, 1 ♂, 1 ♀ (Ws). Winnipeg Beach, Lake
 Winnipeg, June 19, 1909, 3 ♂s, 4 ♀s (Ws).

These are the most-westerly records for this species in Canada.

7. *Amphiagrion saucium* Burm.

MANITOBA.—Aweme, June, 1911, 1 ♀, teneral (E. Criddle).

This species is known also from Quebec, Ontario and British Columbia, but appears to be very local in Canada.

8. *Coenagrion resolutum* Hagen. (Pl. IX, figs. 1, 1a.)

Though the males of this species are readily distinguished by the peculiar form of the abdominal appendages, it may be worth while to record a description of the colour-pattern of both sexes, as I have

before me some excellently preserved alcoholic specimens, received from Mr. T. N. Willing, of Regina, Sask.

Male: Head bronze-black above, postocular spots blue, posterior margin of occiput yellowish green. Eyes pale green, dark olivaceous above. Face, including a broad front margin of the frons, pale green or greenish yellow, except the nasus, which is bronze-black. Pronotum bronze-black, the anterior and lateral lobes, a marginal line along the sides of the posterior lobe and a spot on each side mesad of the lateral lobes, black. Thorax bronze-black, the humeral bands pale green to bluish green, slightly curved, rounded at both ends, widest in front, more or less constricted towards the posterior end. Pleura pale bluish to yellowish green, becoming more yellowish beneath. Abdomen pale blue above, yellowish green beneath, marked with bronze-black as follows: Segs. 1-3 as in fig. 1; slightly more than apical half of 4 and 5; 6 and 7, except a very narrow interrupted basal line; 10 dorsally, except a greenish median spot at the posterior margin. The superior appendages black, their slender inferior processes and the inferior appendages black-tipped.

Female: Colour variable, the pale markings being sometimes blue above, as in the male, but varying to wholly greenish yellow. Markings of head and thorax similar to those of the male, but the postocular spots are larger, and the posterior pale marginal line of the pronotum is entire or barely interrupted. Abdominal segments marked above with dark bronze as follows: Segs. 1-3 as in figure 1a; 4-6 except a basal interrupted line; 7 except a basal interrupted line and a bluish apical line; 8 and 9 except a bluish apical band; 10 with a subtriangular dorsal spot.

MANITOBA.—Winnipeg, July 7, 1908, 1 ♂ (Ws). Winnipeg Beach, Lake Winnipeg, June 19, 1909, 12 ♂s, 1 ♀ (Ws).

SASKATCHEWAN.—(Locality not given.) June 20, 1908, 5 ♂s, 3 ♀s.

A widely-distributed boreal species, occurring locally also in the Transition Zone.

9. *Coenagrion angulatum*, sp. nov. (Pl. IX, figs. 2, 2a, 2b, 2c.)

Closely allied to *C. lunulatum*, from which it differs somewhat in the form of the abdominal appendages of the male.

The pale terminal tubercle of the superior appendages is shorter and more broadly rounded, and the angle between it and the inferior

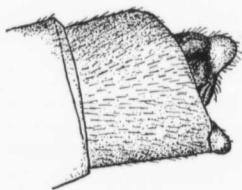
process is shallower; the apices of the inferior appendage are much smaller and do not project beyond the latter process, as in *lunulatum*; while the inferior process of the inferior appendage is shorter, broader and blunter than in *lunulatum*.

Male: Azure blue above, greenish yellow beneath. Head black above, postocular spots blue, rather large; eyes pale green, dark olivaceous dorsally. Face pale green; nasus and a line between rhinarium and labrum black, middle lobe of labrum pale bluish. Pronotum black, anterior lobe blue, lateral lobes pale yellowish green. Thorax bronze-black, the blue humeral bands about as broad as the black bands laterad of them, straight or but feebly curved, the margins subparallel; pleura blue, fading beneath into pale yellowish. Legs pale yellow, outer surfaces of femora and inner surfaces of tibiae and whole of tarsi black. Abdomen blue above, yellowish beneath, marked above with bronze-black as follows: Seg. 1 with a transverse basal spot; 2 with a narrow transverse angular spot and an apical transverse band; 3 except the basal two sevenths; 4 except the basal fifth; 5 except a pair of spots on the basal sixth; 6 and 7 except a narrow interrupted basal line; dorsum of 10, or a laterally constricted spot upon it. Superior appendages black, with a pale terminal tubercle, inferior appendages pale, the sides and apices black.

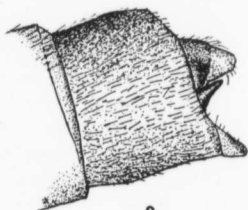
The female resembles that of *C. resolutum*, differing as follows: The posterior margin of the pronotum is slightly trilobate, the middle portion arcuate as seen from behind (not at all trilobate in *resolutum*), the pale posterior margin is narrower and sometimes confined to this middle lobe; the thoracic bands, as in the male, are straighter, somewhat broader and the sides more nearly parallel. The abdomen is marked similarly to that of *C. resolutum*, but the dark areas are somewhat more extensive on segs. 1-3, and on 7 there is a basal interrupted pale band, which is absent in the latter species. The dorsum of 10 is entirely dark, except a narrow posterior marginal line.

The two alcoholic specimens which I have are pale yellowish, with a reddish tinge on the thorax, the transverse bands on 7 and 8 faintly bluish.

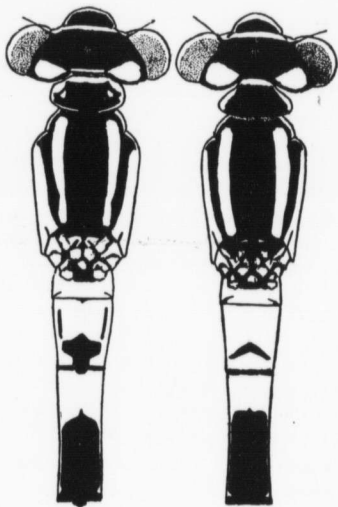
Length of body, ♂, 29-31 mm., ♀, 28-30 mm.; abdomen, ♂, 22-23.5 mm., ♀, 22-23.5 mm.; hind wing, ♂, 16-17 mm., ♀, 18-18.7 mm.



2a

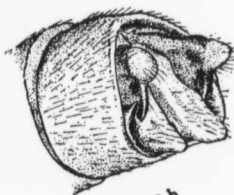


3



1

2



2b



1a



2c

THE ODONATA OF WESTERN CANADA

Types.—♂, Carnduff, Sask., July 16, 1900 (Wg).

Cotypes: MANITOBA.—Aweme, July 4, 1905, 1 ♀ (C).
Winnipeg Beach, Lake Winnipeg, June 19, 1909, 4 ♂s (Ws).

SASKATCHEWAN.—Prince Albert, June 18, 1905, 1 ♀. Also
1 ♂, 3 ♀s from Saskatchewan without further data (Wg).

To Mr. Kenneth J. Morton is due the credit of first recognizing
the close relationship between this species and *C. lunulatum*.

Can this be the *Agrion interrogatum* Selys, described from the
female only, from Saskatchewan? (Bull. Acad. Belg. (2) 41, p.
1254, 1876).

10. *Enallagma cyathigerum* Charpentier.

SASKATCHEWAN.—Prince Albert, June 18, 1905, 1 ♂ (Wg).
Kinistino, July 22, 1 ♂ (F). Duck Lake, July 22, 1907, 6 ♂s
(Wg, F).

ALBERTA.—Lethbridge, July 5, 9, 1907, 2 ♀s (Ws). Calgary,
July 10, 1903 (Wg). Near Waterton Lake, Aug. 10, 1908, 1 ♂
(Cowdry).

I am unable to distinguish the females of this species from the
following, and therefore have not included them in the above list.
Females probably of both species have been received from the fol-
lowing localities: Aweme, Man., July 1, 1909, 1 ♀ (C). Winni-
peg Beach, Man., June 19, 1909, 5 ♀s (Ws). Abernethy, Sask.,
June 27, 1903, 1 ♀ (Wg). Duck Lake, July 22, 1907, 18 ♀s (Wg,
F). Lethbridge, Alta., July 5, 9, 2 ♀s (Ws). Banff, Alta., June 17,
1908, 2 ♀s (S). Near Waterton Lake, Aug. 5, 1908, 1 ♀ (Cowdry).

This circumpolar species doubtless occurs also in Manitoba, as I
have taken it in Northwestern Ontario (Nipigon).

11. *Enallagma calverti* Morse.

MANITOBA.—Aweme, June 24, 1909, 1 ♂; July 4, 1909, 2
♂s (C). Winnipeg Beach, Lake Winnipeg, June 19, 1909, 2 ♂s (Ws).

SASKATCHEWAN.—Prince Albert, June 19, 1905, 1 ♂ (F).
Duck Lake, July 22, 1907, 2 ♂s (Wg, F).

ALBERTA.—Medicine Hat, June 29, 1904, 1 ♂ (Wg).
Lethbridge, July 5, 9, 2 ♂s (Ws). Banff, June 17, 1908, 1 ♂ (S).
Laggan, 1 ♂ (J. E. Bean).

The females, as stated above, are listed with the preceding
species, from which they are apparently inseparable.

These two closely-allied boreal species seem to be the commonest *Enallagma*s of the prairies. I believe that they are one and the same species, as I have seen males which could be placed about equally well in either species.

12. *Enallagma hageni* Walsh.
 MANITOBA.—Westbourne, July 27, 1908, 2 ♂s, 1 ♀ (Ws).
 SASKATCHEWAN.—Regina, July 17, 1907, 1 ♀? (F).
 Apparently rarer than in Ontario, where it is by far the commonest *Enallagma*, except, perhaps, in the far north.
 The record from Regina is quite doubtful, as the females of this species are difficult to separate with certainty from certain allied species.
13. *Enallagma ebrium* Hagen.
 MANITOBA.—Westbourne, July 27, 29, 1908, 3 ♂s, 5 ♀s (Ws). Winnipeg, July 7, 1908, 1 ♀; July 24, 1908, 2 ♂s (Ws).
 SASKATCHEWAN.—Carnduff, July 16, 1900, 2 ♂s (Wg).
 This species is not known in Canada west of Saskatchewan.
14. *Enallagma civile* Hagen.
 MANITOBA.—Winnipeg, July 9, 1908, 1 ♂; July 28, 1908, 1 ♀ (Ws).
 This is the northern limit of this species as far as known.
15. *Ophiogomphus rupinsulensis* Walsh.
 MANITOBA.—Aweme, June 30, 1907, 2 ♂s; July 19, 1910, 2 ♀s (C).
 SASKATCHEWAN.—Saskatoon, July, 1907, 1 ♂ (Wg).
 The dark markings of the thorax are less distinct than in specimens from Algonquin Park, Ont.
 The females were quoted doubtfully in the Entomological Record for 1911 as *O. severus* Hag.
16. *Ophiogomphus severus* Hagen.
 ALBERTA.—Lethbridge, July 8, 1909, 1 ♂ (Ws).
 This specimen was compared with specimens of *O. severus* in the Hagen collection (Museum of Comparative Zoology, Cambridge, Mass.).
17. *Gomphus externus* Hagen.
 MANITOBA.—Aweme, June 30, 1907, 1 ♀; July 22, 1909, 1 ♂; July 9, 1910, 1 ♂ (C, Ws). Winnipeg, June 25, 1910, 1 ♂, 1 ♀ (C).

18. *Gomphus notatus* Rambur.

MANITOBA.—Aweme, July 19, 1910, 4 ♂s, 3 ♀s (C, Ws).

This species was determined by Mr. E. B. Williamson, as I had never met with it before. It has also been recorded from the Province of Quebec.

19. *Aeshna sitchensis* Hagen.

MANITOBA.—Winnipeg Beach, Lake Winnipeg, Sept. 6, 1909,

1 ♂ (Ws). Westbourne, Aug. 19, 1908, 1 ♂ (Ws).

SASKATCHEWAN.—2 ♂s, 1 ♀. (Exact locality not given. Scudder, Museum of Comparative Zoology.)

This boreal species ranges from Newfoundland to Alaska.

20. *Aeshna juncea* Linné.

ALBERTA.—Banff, July 17, 1902, 2 ♀s (R. C. Osburn, S).

Circumpolar and common in the Boreal Region of North America.

21. *Aeshna subarctica* E. M. Walker.

MANITOBA.—Winnipeg, Sept. 9, 1909, 1 ♀ (Ws).

This is the western limit of this species so far as known.

22. *Aeshna interrupta lineata* E. M. Walker.

MANITOBA.—Aweme, July 20, 1906, Aug. 10, 1907, Aug. 16, 1908, 2 ♂s, 2 ♀s (C). Winnipeg, July 6-24, Sept. 7, 1908, 5 ♂s, 5 ♀s (Ws). Winnipeg Beach, Lake Winnipeg, Aug.-Sept. 6, 1909, 2 ♂s, 3 ♀s (Ws). Westbourne, July, 1907, Aug. 19, 1908, 2 ♂s, 2 ♀s (C). Swan River, Sept. 8, 1906, 1 ♀ (W. J. Alexander).

SASKATCHEWAN.—Meota, July 8, 1907, 1 ♂, 1 ♀ (Wg). Carlton, July 28, 1900, July 22, 1907, 3 ♂s (F. Wg). Duck Lake, July 22, 1907, 2 ♂s, teneral (F, Wg). Goose Lake, July 21, 1907, 1 ♂ (Wg). Parkside, July 24, 1907, 1 ♂, teneral (Wg). Regina, July 18, 1905, 4 ♂s, 2 ♀s (Wg). Moose Jaw, Aug. 24, 1908, 1 ♀ (Caudell).

ALBERTA.—Banff, Aug. 4, 1906, Aug. 16, 1908, 1 ♂, 1 ♀ (Currie, S). Waterton Lake, Aug. 7-10, 1908, 2 ♂s, 3 ♀s (E. V. Cowdry).

I have also 1 ♂, 2 ♀s from Banff, taken Sept. 6, 1906, and Sept. 1, 10, 1908 (S), which approach the race *interna* Walk. Similar intermediates are found in British Columbia. In the prairies country only the pure *lineata* occurs.

This is the most characteristic dragonfly of the Great Plains in Canada.

23. *Aeshna eremita* Scudder.
 MANITOBA.—Husavick, July 8, 1910, 1 ♂ (Ws).
 SASKATCHEWAN.—(Without definite locality.) 6 ♂s, 3 ♀s
 (Kennicott).
 ALBERTA.—Banff, 1 ♂ (S).
 This is the most generally distributed *Aeshna* of the Boreal
 Region, and is very common in the wooded parts of the north.
24. *Aeshna canadensis* E. M. Walker.
 MANITOBA.—Westbourne, Aug. 24, 1908, 1 ♂ (Ws).
 Abundant in the Canadian Zone in the Eastern Provinces, and
 occurring also in British Columbia and Washington.
25. *Aeshna palmata* Hagen.
 ALBERTA.—Near Waterton Lake, 4,100 ft., 3 ♂s, (Cowdry).
 Banff, July 10, Aug. 6, 1908, 2 ♂s, 1 ♀ (S). Laggan, July 22, 1901,
 1 ♂ (Osburn).
 These are the extreme eastern limits of this species, which is
 abundant on the Pacific Coast.
26. *Aeshna umbrosa* E. M. Walker.
 MANITOBA.—Winnipeg Beach, Lake Winnipeg, Sept. 6, 1909,
 1 ♂ (Ws). Hilton and Treesbank, July 28, 1910, 2 ♂s (Ws).
 These specimens belong very decidedly to the eastern race
umbrosa. The western form, *occidentalis*, occurs in British Columbia,
 and will very likely turn up in the Rockies of Alberta.
27. *Aeshna constricta* Say.
 MANITOBA.—Westbourne, Aug. 26, 29, 1908, 2 ♂s, 1 ♀
 (Ws).
 This eastern species is not likely to be found in Saskatchewan or
 Alberta. There is, however, a single record from British Columbia,
 which needs confirmation.
28. *Anax junius* Drury.
 MANITOBA.—Aweme, Sept. 9, 1906, 1 ♀ (C).
29. *Tetragoneuria spinigera* Selys.
 MANITOBA.—Winnipeg, June 17, 19, 1910, 3 ♀s (Ws, C).
 Aweme, June 11, 1905, 1 ♂; June 30, 1907, 1 ♂ (C).
 This species occurs commonly also in British Columbia and
 Ontario. It is the most northern species of the genus.

30. *Dorocordulia lintneri* Hagen.

MANITOBA.—Lake Winnipeg (Hagen).

31. *Somatochlora semicircularis* Selys.

ALBERTA.—Banff, July 7, 15, 18, 1908, 1 ♂, 2 ♀s (S).

Also recorded from Laggan by Osburn. It occurs in abundance in British Columbia, and although recorded from Maine, I consider it very doubtful whether the latter record belongs to the same species.

32. *Somatochlora macrotona* Williamson.

MANITOBA.—Winnipeg Beach, June 19, 1909, 3 ♀s (Ws).
Winnipeg, June 16, 19, 1910, 2 ♂s, 4 ♀s (Ws). Husavick, Aug. 17, 1910, 1 ♀ (Ws).

In one of the males of this beautiful insect the wings are slightly tinged with yellow, in the other there is a clear yellow patch on the basal half of the wings, most distinct on the hind pair. Of the females, the wings vary considerably in the amount of flavescence. In one of the Winnipeg specimens, e.g., the basal half of both pairs is only slightly tinged with yellowish, the rest clear; in others the basal half to three-fifths is yellowish brown, while in the specimen from Husavick the wings are wholly suffused with a rather dark yellowish brown.

A male of this species was sent to Mr. Williamson for determination. It was hitherto known only from Duluth, Minn.

33. *Somatochlora albicincta* Burmeister.

MANITOBA.—Aweme, June 11, 1909, 1 ♀ (C).

ALBERTA.—Banff, July 7, 1908, 1 ♀ (S).

A species of the north, probably distributed through almost the entire Boreal Region, except the Arctic Zone.

34. *Somatochlora* sp.

I have also examined a female *Somatochlora* from Banff, Alta. (S), which I was unable to determine.

35. *Libellula quadrimaculata* Linné.

MANITOBA.—Aweme, July 12, 1906, 1 ♂; July 9, 1907, 1 ♂
Winnipeg, July 8, 9, 1908, 2 ♂s (Ws).

SASKATCHEWN.—Duck Lake, July 22, 1907, 1 ♀ (F).

Circumpolar and very generally distributed. It is common in the Eastern Provinces and in British Columbia.

36. *Libellula pulchella* Drury.

MANITOBA.—Aweme, July 9, 13, 1910, 2 ♂s (C). Husavick, July 11, 1910, 1 ♂, 1 ♀ (Ws).

These are the most northwesterly records for this common eastern species.

37. *Sympetrum scoticum* Donovan.

MANITOBA.—Aweme, Sept. 3, 1907, 2 ♀s; Aug. 10, 23, 1908, 4 ♂s, 1 ♀ (C); Aug. 28, 1908, 1 ♂ (E. Criddle). Winnipeg, Sept. 7, 1908, 1 ♂, 1 ♀ (Ws). Westbourne, July 27, 29, 1908, 4 ♂s, 6 ♀s; Aug. 1, 1908, 1 ♂, 1 ♀ (Ws); Aug. 20, 29, 1908, 14 ♂s, 12 ♀s (Ws). Grandview, Sept. 18, 1906, 2 ♂s, 1 ♀ (W. J. Alexander).

SASKATCHEWAN.—Regina, Sept., 1908, 1 ♂ (Wg). Moosomin, Sept. 13, 1906, 1 ♂ (Alexander).

ALBERTA.—Banff, July 24, 30, 1908, 1 ♂, 2 ♀s; Aug. 28, 1908, 1 ♂ (S). Beaver Lake, 1907 (A. Halkett).

Circumpolar and generally common in the Canadian Zone.

38. *Sympetrum costiferum* Hagen.

MANITOBA.—Aweme, Sept. 7, 1907, 1 ♀; Sept. 1, 1908, 1 ♂, 1 ♀ (C). Westbourne, July 24, 29, 1908, 2 ♂s, 4 ♀s; Aug. 5, 1908 (gravel pit), 3 ♂s, 5 ♀s; Aug. 14, 24, 1908, 6 ♂s, 5 ♀s (Ws). Winnipeg, Sept. 7, 1908, 1 ♂, 1 ♀ (Ws). Carberry, Sept. 6, 1906, 2 small ♀s (Alexander).

SASKATCHEWAN.—Regina, Aug. 8, 10, 1886, 1 ♂, 2 ♀s (F); Sept., 1908, 1 ♀ (Wg). Moosomin, Sept. 13, 1906, 7 ♂s, rather large (Alexander).

39. *Sympetrum madidum* Hagen

SASKATCHEWAN.—Battleford, July 2, 1907, 1 ♂ (Wg).

The two rows of cells between R_3 and R_{3+1} are imperfectly developed in this specimen.

S. madidum is also known from British Columbia.

40. *Sympetrum rubicundulum decisum* Hagen.

MANITOBA.—Aweme, Aug. 5, 1907, 1 ♂, 1 ♀, teneral; Aug. 19, 1908, 1 ♀ (C). Treesbank, July 20, 1908, 1 ♂ (Ws). Winnipeg, July 6, 1908, 1 ♂ (Ws). Westbourne, July 27, 31, 1908, 3 ♂s, 7 ♀s; Aug. 10, 20, 1908, 1 ♂, 3 ♀s (Ws). Deloraine, July 6 (F). Grandview, Sept. 18, 1906, 1 ♀ (Alexander).

SASKATCHEWAN—Indian Head, July 22, 1903, 1 ♀ (Wg). Regina, Aug. 10, 1886, 2 ♂s, 4 ♀s (F); Aug. 7, 1903, 1 ♂, 1 ♀ (Wg). Lumsden, Sept 10, 1906, 1 worn ♂ (Alexander). Davidson, Aug. 21, 1907, 1 ♀ (Wg). Goose Lake, July 19, 20, 1907, 2 ♂s, 2 ♀s (F, Wg). Saskatoon, July 16, 1906, 1 ♂ (Wg). Duck Lake, July 22, 1907, 1 ♂, 2 ♀s (F). Kinistino, July 23, 1907, 4 ♂s, 2 ♀s (F, Wg). Birch Hills, July 25, 1907, 3 ♀s (Wg). Carlton, 1 ♀ (F).

ALBERTA.—Cardston, July 23, 1900, 1 ♀ (Wg). Beaver Lake, 1907, 4 ♀s (D. Halkett). Banff, July 21, 1908, 3 ♂s; Aug. 3, 1908, 1 ♂; Aug. 10, 1908 (summit of Sulphur Mt.), 1 ♀; Aug. 24, 1908, 1 ♀ (S). Near Waterton Lake, Aug. 10, 24, 1908, 4 ♂s, 4 ♀s (Cowdry).

This is perhaps the commonest dragonfly of the prairie region.

41. *Sympetrum obtrusum obtrusum* Hagen.

MANITOBA.—Westbourne, July 27, 1908, 1 ♂; Aug. 10, 26 4 ♂s, 1 ♀ (Ws). Swan River, Sept. 8, 1906, 3 ♂s, 1 ♀ (Alexander).

42. *Sympetrum obtrusum morrisoni* Ris.

ALBERTA.—Near Waterton Lake, Aug. 5, 1908, 1 ♀ (Cowdry).

A pale specimen, the femora pale in the basal half.

43. *Sympetrum corruptum* Hagen.

MANITOBA.—Aweme, Sept. 15, 1907, 1 ♂; Sept. 8, 1908, 2 ♀s (Ws). Winnipeg, July 8, 1908, 1 ♀; Sept. 7, 1908, 2 ♀s, teneral (Ws)

SASKATCHEWAN.—Regina, Aug. 10, 1886, 1 ♀ (F).

ALBERTA.—Lethbridge, July 7, 1909, 1 ♀ (Ws). Banff, Sept. 13, 1897, 1 ♂, 1 ♀; July 15, 1908, 1 ♂; July 27, 1908 (trail above Hot Springs), 1 ♀ (S). Laggan, 1 ♀ (J. E. Bean).

This species appears to be very much commoner in the Western Provinces than in Ontario, where it is very local.

44. *Leucorrhinia borealis* Hagen,

MANITOBA.—Bird's Hill, June 5, 1909, 3 ♂s, 2 ♀s (Ws). Aweme, July 15, 1907, 1 ♀, somewhat teneral; June 4, 9, 1909, 2 ♀s (C).

ALBERTA.—Banff, June 17, 1908, 1 ♂ (S).

Except the original record from Hudson's Bay, these are the only localities for this species known to me.

45. *Leucorrhinia proxima* Calvert.
 MANITOBA.—Winnipeg Beach, Lake Winnipeg, June 19, 1909, 1 ♂ (Ws).
 Occurs in the Canadian Zone across the continent.
46. *Leucorrhinia glacialis* Hagen.
 MANITOBA.—Aweme, June 11, 1911, 1 ♀ (C).
47. *Leucorrhinia hudsonica* Selys.
 MANITOBA.—Winnipeg, July 27, 1908, 1 ♀ (Ws). Winnipeg Beach, June 19, 1909, 1 ♂, 2 ♀s (Ws).
 ALBERTA.—Laggan, 1 ♂ (J. E. Bean).
 A transcontinental species of the Boreal Region.
48. *Leucorrhinia intacta* Hagen.
 MANITOBA.—Aweme, June 21, 24, 1911, 2 ♀s, teneral; July 9, 1910, 1 ♀ (Criddle). Winnipeg, July 9, 1908, 1 ♂, 2 ♀s (Ws).
 Winnipeg Beach, June 19, 1909, 2 ♂s (Ws).
 This last record is the most northerly for this species.
49. *Pantala hymenaa* Say.
 MANITOBA.—Husavick, July 8, 1910, 1 ♂ (Ws).
 The capture of this southern species in Manitoba was wholly unexpected. It has since been taken on Pelee Island, Ont., by F. M. Roct.

EXPLANATION OF PLATE IX.

Fig. 1.—*Coenagrion resolutum* (♂), dorsal view of head, thorax and abd. segs. 1-3; 1a (♀), dorsal view of segs. 8-10.

Fig. 2.—*Coenagrion angulatum* (♂), dorsal view of head, thorax and abd. segs. 1-3; 2a (♂), lateral view of seg. 10 and appendages; 2b, same, viewed obliquely from behind; 2c (♀), dorsal view of segs. 8-10.

Fig. 3.—*Coenagrion lunulatum* (♂), lateral view of seg. 10 and appendages. (Specimen from Jena.)

Dr. C. Gordon Hewitt, Dominion Entomologist, left for England on July 26th to represent Canada at the International Congress of Entomology, which was held at Oxford from August 5th to 10th.

Subsequently he attended a conference which the Secretary of State for the Colonies arranged at the Colonial Office for the purpose of working out a scheme for Imperial co-ordination in the prevention of the spread of insect pests and the more extended investigation of the noxious insects which occur in the different parts of the Empire.

PROVINCIAL ENTOMOLOGIST FOR ONTARIO.

The Ontario Department of Agriculture has appointed Mr. Lawson Cæsar, B. A. and B. S. A (University of Toronto), Provincial Entomologist for Ontario. Mr Cæsar will have charge of all the Inspection work throughout the Province and will carry out investigations concerning the depredations of insects and injuries caused by plant diseases. He will continue his connection as Lecturer in the Department of Entomology at the Ontario Agricultural College, during the winter months. This is the first appointment of the kind to be made in Canada and will it is hoped be followed by some of the other Provinces before very long. Mr. Cæsar is well known as an economic entomologist and as a Lecturer to Farmer's Institutes and Meetings of Fruit Growers. He is also the writer of Bulletins on the Lime-Sulphur Wash, The Cooling Moth, Little Peach Disease and a Spraying Calendar.

THE DIVISION OF ENTOMOLOGY, OTTAWA.

It has been suggested that an account of the recent work and developments of the Division of Entomology of the Dominion Department of Agriculture would be of interest to the readers of THE CANADIAN ENTOMOLOGIST. Believing this to be the case, the following notes have been written for our entomological friends.

The most important development of the activities of the Division is the extension of the field work by means of field laboratories or stations. It is obvious that work on the more serious insect pests occurring in different parts of Canada could only be carried out in the regions where such pests occur. The method of carrying on all investigations at the Central Experimental Farm, Ottawa, where the Division of Entomology is located, not only had serious limitations but the results might not be applicable to local conditions. The Brown-tail Moth and its parasites must be studied in the regions where the insect occurs; so also in the case of such pests as the Apple Maggot, the Bud moth and other pests.

During the present season six field stations have been established. In three cases the laboratory consists of a two-roomed portable cottage, in one case the Ontario Department of Agriculture has given us the use of a room in the Jordan Harbour Experiment Station and in the other two cases temporary quarters at farm houses are being used. The stations and work are distributed as follows:

In Nova Scotia, Mr. G. E. Sanders occupies an entomological laboratory located at Bridgetown, N.S., from which he is directing the work of San José Scale inspection pending the appointment of a provincial entomologist. The San José Scale was discovered in Nova Scotia by Mr. Sanders during the Brown-tail Moth work. Investigations are also being made on the Bud-moths (*Tmetocera ocellana*), Green Apple-Worm (*Xylina* sp.) and the Brown-tail Moth, special attention being devoted to parasitic work. For experimental work in the control of the Bud-moth a ten-acre orchard has been placed at the disposal of the Division of Entomology by Mr. R. S. Eaton at Kentville, N. S. where spraying experiments are being carried on.

An entomological field station is located at Fredericton, N.B., in the grounds of the University of New Brunswick. Mr. J. D. Tohill, who is in charge of the Brown-tail Moth work in New Brunswick is in charge and is devoting his attention chiefly to the breeding of the predaceous enemy of the Brown-tail and Gypsy Moths, the *Calosoma* Beetles, and their colonisation, and the study of Tachinid parasites. Through the kind co-operation of Dr. L. O. Howard and Mr. A. F. Burgess, of the United States Bureau of Entomology, we have been able to procure a supply of the European *Calosomas* and Tachinids (*Compsilura concinnata*) colonized in Massachusetts and we are now endeavouring to establish these enemies of the Brown-tail and Gypsy Moths in New Brunswick where the Brown-tail Moth was found during the last winter's scouting work, to have spread over a very large area and the intensity of the infestation will undoubtedly increase. Mr. Tohill recently visited Massachusetts for the purpose of collecting parasitised material. Studies are also being made on other insects as opportunities occur.

Mr. C. E. Petch has been recently appointed a field officer of the Division and placed in charge of the field station at Covey Hill, Quebec, where he will study chiefly insects affecting the apple, namely, Apple Maggot, Apple Curculios and the Capsid or other bugs injuring fruit. The unusual prevalence of these pests in the locality where the entomological station has been placed will afford splendid opportunities for useful work.

From the office of the Division at Jordan Harbour, Ontario, Mr. W. A. Ross is carrying on a very thorough study of the Apple Maggot or Railroad Worm which he began to investigate last year when employed by the Ontario Department of Agriculture. At St. Ives, in Middlesex County,

Ontario, Mr. H. F. Hudson is conducting an investigation on an outbreak of the Chinch Bug which proved very destructive to grass land last year. He is also making observations on Wireworm and White Grub.

In British Columbia Mr. R. C. Treherne, in addition to studying certain more serious apple pests, is investigating the Strawberry Weevils, chiefly *Otiorynchus sulcatus*, which are responsible for serious losses to strawberry growers not only in British Columbia but also in other regions. With a view to studying similar conditions elsewhere he is visiting the States of Oregon and Washington. For the present season the field laboratory is located at Hatzic, B. C.

Although no field work is being carried out in the Western or Prairie Provinces it is hoped that work will be commenced there in the near future, as there are several insect pests affecting cereals and field crops demanding attention.

Since his appointment as Assistant Entomologist, Mr. J. M. Swaine has made an excellent start in the Division's work on forest insects. In May he visited the Riding Mountain Forest Reserve in Manitoba for the purpose of liberating the parasites of the Larch Sawfly, which were imported from England, and also to study the native Bark-beetles. Other parts of Eastern Canada are being visited during the present season.

Mr. Gibson has been continuing his work on Cutworms, studying especially species from Alberta where Cutworms have been responsible for very considerable losses in certain sections of Southern Alberta where growing grain was completely destroyed. He also superintended the work on Root-Maggot control, this being the third season during which these experiments have been carried on.

The distribution of Ticks in Western Canada, with especial reference to the Rocky Mountain Spotted Fever Tick, *Dermacentor venustus* is being studied with interesting results. In the campaign against the House-fly which is now in full swing in various cities, especially in Eastern Canada, the Division is continuing to provide much powder and shot.

It is, we hope, hardly necessary to add that any assistance which local entomologists are able to render us in the various branches of work outlined above will be most welcome. This is especially the case where we are working out the distribution of certain insects, The territory which we have to cover is so great in extent that we wish to enlist all the co-operation possible. *

C. G. H.

NOTES ON TAYLOR'S TYPES OF GEOMETRIDÆ.

BY WM. BARNES, M.D., AND J. H. MCDUNNOUGH, PH.D., DECATUR, ILL.

Recently Dr. Barnes has acquired by purchase the whole of the Taylor collection of Geometridæ including the types and cotypes of about 65 species described as new. Most of these types have the type-label attached but in some few instances the author, probably due to the poor condition of his health, has neglected to affix more than a small written label with the name of the species on one of the specimens, even when the original description states that several specimens were present. As however in the original descriptions he has been very careful to give full detail regarding localities and dates we have in nearly every case been able to recognize these other specimens and have considered ourselves justified in affixing "type" or "cotype" labels as the case might be. In order to account for the fact that these labels are not in Taylor's handwriting, and to give workers on the *Geometridæ* accurate knowledge concerning these types, we publish in the present article a full list of the Taylor types contained in the Barnes collection together with such notes on the same as are necessary.

Rachela pulcherraria.—One ♂ with type label in Taylor's handwriting attached, dated Oct. 11th, '06, but without locality label. According to the original description the locality is Tacku River, B. C.

Eupithecia insignificata.—One ♂, type label attached, labelled "W. 15.4.04". A second specimen from Regina was apparently included under this name but to us appears to be different.

Eupithecia sublineata.—One specimen with hand-printed type label attached, labelled "W. 18.4.04". Four other specimens from Wellington, B. C. (2); Vancouver, B. C.; and Field, B. C. (Dod), are contained in the series but are not cotypes.

Eupithecia obumbrata.—Two ♀ types with printed labels "Type" and "Type 2", from Gold Stream, B. C. "10.5.03." Four other specimens taken early in May and labelled "Vancouver Is., G. W. Taylor" are also present in the series.

Eupithecia modesta.—The original description calls for both ♂ and ♀ types; the ♂ however only bears the label "*T. modesta*" in Taylor's handwriting in addition to the locality label "Vanc., 6.6.05". We have affixed to this a type label. The ♀ type with printed label is almost totally destroyed, portions of the wings being pinned under the label.

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Eupithecia minorata.—Type label in Taylor's handwriting attached; there is no locality label but the round date label "22 4.05"; characteristic of material from Kaslo, B.C. sent out by Mr. Cockle, is affixed to the specimen.

Eupithecia packardata.—Type label in Taylor's handwriting on specimen labelled "Ottawa, Can., 7, VIII, 1906., C. H. Young". The series contains 5 other specimens; 2 from Montreal (A. F. Winn); 1 from Trenton (Evans); 1 from Catskill Mts.; and 1 without locality label.

Eupithecia grata.—Type label in Taylor's hand on specimen labelled "Ottawa, Can., 5 VI. 1906, C. H. Young".

Eupithecia lagganata.—1 ♂ in fair condition only, labelled type in Taylor's hand; locality "Laggan, Alta. (Dod)".

Eupithecia compactata.—The single ♀ type with label in Taylor's hand; locality "Windermere, Upper Columbia River, B. C. (Dod) 13 VII. 07".

Eupithecia spaldingi.—The specimen labelled type in Taylor's hand is very poor and almost unrecognizable. We doubt if the median band mentioned in the original description will appear so prominently in fresh specimens. The locality label is "Stockton, Ut. (Spalding), IX., 2, 03".

Eupithecia dyarata.—A hand printed type label was present but not attached to any specimen. The original description specifies as type a ♀ from Kaslo (Cockle) dated "24 IV. 06." A specimen without abdomen but apparently a ♀ is contained in the series and labelled "J. W. Cockle, 24 IV. 02." This agrees well with the original description and also with topotypes received from Mr. Cockle; we imagine that the "06" is therefore either a printer's error or an oversight and have placed the label on this specimen.

Eupithecia scolestata.—This species was described from four specimens labelled Kaslo, B. C., and dated respectively 21st April, 2nd and 3rd May, 1903 and 4th May 1905. All these specimens are in the series but only the specimen dated 2nd May, 1903, which, by the way, is the poorest specimen of the lot, bears a type label. We have affixed cotype labels to the other three specimens.

Eupithecia winnata.—A ♀ in rather poor condition has a type label in Taylor's handwriting. There should be two cotypes in Mr. Winn's collection.

Eupithecia alberta.—Both specimens mentioned in the description are present with hand printed type labels "Type 1" and "Type 2".

Eupithecia regina.—Type and 3 cotypes with hand printed labels attached; the fourth cotype mentioned dated "Aug. 2nd, 1903" is missing.

Eupithecia youngata.—Type and 2 cotypes with printed labels. The type specimen from Ottawa has only two wings left but the cotypes from Catskill Mts. are in good condition.

Eupithecia dodata.—Type specimens labelled "Type 1" and "Type 2" present.

Eupithecia adornata.—Type specimen with printed label "From Calgary, Alta., 10.VI. 95". Four cotypes are also labelled, the fifth one (of the date June 14th) being missing.

Eupithecia olivacea.—Both specimens which served for the original description are present, correctly labelled.

Eupithecia terminata.—Two specimens present both labelled "cotype" in Taylor's handwriting.

Eupithecia helena.—A single somewhat faded specimen with printed type label attached.

Eupithecia perbrunneata.—There are no specimens labelled type; one specimen from Kaslo "31.V. 07" is labelled in Taylor's hand "E. perbrunneata Tayl = laricata Dyar, not Freyer, three types". Two of the specimens mentioned in the original description we have found in the series, viz those labelled Kaslo, May 23rd, and June 2nd; these we have made type and cotype respectively. The Victoria specimen mentioned is not to be found.

Eupithecia placidata.—A single ♀ specimen labelled "cotype" in Taylor's hand is present.

Eupithecia sloanata.—The ♂ and ♀ mentioned in the original description are present, both labelled "cotype".

Eupithecia fletcherata.—One type, "Ottawa, Can., 3. VIII. 06"; type label in Taylor's handwriting.

Eupithecia bryanti.—The type ♀ alone has printed label attached; of the six cotypes mentioned in the description we have discovered four, all in poor condition, viz. those dated 27th (2), 28th and 29th July; to these we have affixed cotype labels.

Eupithecia harveyata.—Both specimens present with printed labels "Type" and "Type 2".

Eupithecia hanhami.—One of the two specimens mentioned by Taylor in the description, one labelled "Victoria, B. C., 5. VI. 03" has a type label affixed; the second specimen dated 25th June, 02 (not 05 as stated), simply bears a label in Taylor's hand "*Eupithecia hanhami*".

Eupithecia indistincta.—Single type with two written type labels affixed.

Eupithecia gibsonata.—The specimen with type label is dated "9.4. 03, No. 94" not "9. VI." as stated in description. A second specimen "4.4.03" is also present.

Eupithecia fasciata.—Two types with labels; type 1 from Ottawa, type 2 with no locality label; a very poor specimen, presumably the one mentioned as having been received from Mr. Kearfott.

Eupithecia quebecata.—Two specimens with written type labels; "Type 1" from Kamouraski 26.8. 98; type 2 from Biddeford, 23. 7.99.

Eupithecia fumata.—A single type specimen labelled in Taylor's handwriting; locality as stated in description.

Eucymatoge rectilineata.—A written type label attached to a very worn specimen; locality as stated in description.

Eucymatoge vancouverata.—The single type is a ♀ with handprinted type label attached; the collection contains a splendid series of both sexes.

Entephria takuata.—Of the four specimens which served for the original description only three were in the collection and none marked as types; one however is labelled "Mesoleuca takuata T." in Taylor's hand and this we have made the type; it is ♀, dated 4th Aug., 06 and in good condition; the other two specimens which bear date labels agreeing with the dates of original description, we have made cotypes.

Entephria lagganata.—No type labels affixed but all four type specimens can be identified by the dates. A specimen labelled "Laggan, Alta., 9. VIII. 00, 5700 ft." and marked in Taylor's handwriting "Mesoleuca lagganata T." we have made type, the others becoming cotypes.

Eustroma harveyata.—Single type specimen as stated in description type label attached.

Zenophleps victoria.—The single ♀ type is labelled; one wing is damaged. A second ♀, also from Victoria, B.C., is present.

Mesoleuca hulstata.—No type labels attached. Five specimens labelled "Claremont, Cal. Baker" as stated in description were present; one of those bore the label "Mesoleuca hulstata Taylor" in Taylor's hand; this

we have made the type, the others cotypes. All are in rather poor condition.

Mesoleuca occidentata.—Both types present with labels in Taylor's handwriting.

Mesoleuca occidentata, var. *mutata*.—No type labels; the three specimens mentioned in the description are present, one labelled "var. *mutata*" in Taylor's hand. On this we have placed a type label, on the other two cotype labels.

Mesoleuca hersiliata var. *mirandata*.—Type with label attached.

Mesoleuca boreata.—Two specimens with written type labels, both in very rubbed condition. They appear to us nothing but an extreme form of var. *mutata* and it is even possible that the lack of orange scales is due to the poor condition of the specimens. We have several specimens from Victoria and Duncans, B.C., which show only traces of orange scaling.

Mesoleuca casloata.—Of the three specimens mentioned in the description only two are present, one with label "M. casloata Taylor". This we have made the type, the other cotype.

Mesoleuca decorata.—Three types present as stated.

Hydriomena multipunctata.—The single type with written type label; the species is very close to *indefinita* Grossbeck.

Hydriomena manzanita.—Type with handprinted label attached.

Hydriomena autumnalis, var. *columbiata*.—Of the four specimens mentioned in the description only three are present, one bearing a handprinted type label; the other two dated respectively May 23rd and 27th we have made cotypes.

Hydriomena magnificata.—One ♀ type with written type label.

Petrophora fossaria.—The specimen from Mt. Cheam, B.C., bears a type label; the other specimens mentioned from Laggan, B.C., we have also found and to these affixed cotype labels.

Petrophora pontiaria.—One ♀ type as stated in description; the other three specimens mentioned are present and have received cotype labels.

Petrophora circumvallaria.—No type labels; the four specimens mentioned as types are present and we have labelled them so. The species cannot be distinguished from the European *turbata*.

Petrophora planata.—A pair from New Brighton, Pa., have type labels attached; the name falls before *iduata* Gn. as pointed out by Dr. Dyar.

Leptomeris subfuscata.—1 ♂ from Goldstream, B.C., only bears a type label; the ♀ type mentioned is present and to this we have affixed a type label. Of the other species referred to in the description we have found the three from Vernon, B.C., and 1 ♂ from Goldstream, B.C., and on these have affixed cotype labels. Concerning the three specimens from Victoria, B.C., there are two labelled "Victoria" without date, and 1 specimen with date "30 V" but no locality; we have refrained from making these cotypes as they cannot be definitely identified.

Aplodes unilinearis.—One ♂ type with written label.

Aplodes hudsonaria.—Two types, one with handprinted, the other with written label.

Delinea bryantaria.—One ♂ type with printed label in rather poor condition.

Sciagraphia purcellata.—Type and cotype with written labels; type in good condition, other specimen poor.

Diastictis hulstiaris.—A type label unaffixed is present; there is evidently no type specimen, the name being merely *nom. nov.*

Macaria quadrifasciaria.—The one damaged type specimen as stated in description.

Enemera simularis.—♂ and ♀ types with written labels, both specimens in wretched condition.

Enypia packardata.—A single ♂ bears a printed type label; the other five specimens mentioned are not clearly enough indicated to warrant type labels being affixed.

Gabriola dyari.—Taylor states that four specimens, all dated "August 1903" served for the description. The type label however is on a specimen dated "28.VII.03". The three other specimens dated "19th and 21st Aug." are present and to these we have affixed cotype labels.

Sabulodes costinotata.—The two cotypes present are from Prescott, Ariz., not Phoenix as stated in the description.

Sabulodes arizonata.—Two cotypes with written labels are in the collection.

Besides the above the following types were contained in the collection:—*Eupithecia latipennis* Hulst.; *Eupithecia frostiata* Swett; *Eupithecia kootenaiata* Dyar (cotype); *Eupithecia niphadophilata* Dyar (cotype); *Anthelia taylorata* Hulst. (one side broken off); *Phigalia denticulata* Hulst.; *Euclæna abnormalis* Hulst. (without much doubt a suffused aberration of one of the other species, possibly *pectinaria*)

SOME CANADIAN SAWFLIES COLLECTED BY FREDERICK KNAB.

BY S. A. ROHWER, WASHINGTON, D. C.

In June, 1907, Mr. Frederick Knab spent some time in the Oxbow region at Saskatchewan, where he collected a number of insects. The sawflies which were collected have been given to the United States National Museum, and have been determined and placed in the collection. As some of the species are new to Canada, and as nearly all the records will add to the distribution of the species, a list of them is now presented, as it may be useful to those who are editing "Insects of Canada."

The following were collected at Oxbow, Saskatchewan, which is a prairie region with a number of small ponds, around which various willows grow.

Pamphilius (Pamphilius) nigritibialis Rohwer.

Arge spp.

Cimbex americana, var. *decemmaculata* Urban.—Female.

Zaraca inflata Norton.—June 15, Female.

Dolerus agristus MacGillivray.—June 11 to 18, 1907. Three typically-coloured females. Four females which have the venter and the terminal dorsal segments blackish.

Macrophya succincta Cresson.—Female, June 17, 1907.

Tenthredella erythromera (Provancher).—Female, June 18, 1907.

Empria maculata (Norton).—Female, June 19, 1907. A small specimen with a narrow sheath.

Hoplocampa xantha Rohwer.—Three females, June 15, 1907.

Lycaota spissipes (Cresson).—Females, June 17 and 21; male, June 15.

Paracharatus rudis (Norton).—Female, June 15, 1907.

Paracharatus nigrisoma Rohwer.—June 21, 1907.

Monophadnus truncatus Rohwer.—June 1, 1907.

Amauronematus lincolnensis Rohwer.—Two females, June 1, 1907, not typical.

Amauronematus semirufus (Kirby).—May 30, 1907. Differs in a few minor points.

Amauronematus knabi Rohwer.—June 15 and 19, 1907.

The following species were collected at White River, Ontario, which is in the forest region to the north of Lake Superior :

Dolerus dysporus MacGillivray.—June 24, 1907.

Nematus erichsoni (Hartig).—June 24, 1907.

Monsoma inferntia (Norton).—Female, June 25, 1907.

COLLECTING BEES AT GUALAN, GUATEMALA.

BY WILMATTE P. COCKERELL, BOULDER, COLORADO.

In going from Quirigua to Guatemala City, we passed through a desert region—a place of curious forms of cacti, but especially interesting because of the trees and shrubs, at that time of the year, late February, covered with splendid blossoms, and usually without leaves. One tree (*Gliricidia maculata* H. B. K.) was very common and with its delicate pink flowers reminded one of the peach of the temperate zone, but inspection showed it to have a papilionaceous flower. This, I thought, would be a wonderland for bees, since bees are peculiarly adapted to desert areas.

When we returned to Quirigua, I determined to spend two or three days at Gualan, and I anxiously inquired of every one whether there was some one in the village who would befriend me, a missionary perhaps, a priest, an American who owned a coffee finca or a hotel-keeper who spoke English; and at last I found a young man who sometimes went to Gualan to buy cattle for the commissary of the United Fruit Company, and he said there was a hotel and that the negro-French proprietor did speak English, but that the place was usually full of drunken natives and was absolutely impossible for an American lady. That settled the hotel question, but I could at least go up between trains, though even for so short a time it was not considered wise for me to go alone, and Mr. Earl Morris was detailed to go with me. There was much joking about the biological altar needing a sacrifice, for my friends at Quirigua were archaeologists and were uncovering one of the wonderful old Maya temple cities, and bees looked very small to eyes focused for forty feet doorways. But Mr. Morris was a splendid assistant, and helped in every way, even if in his heart he was sighing for sculptured walls and ornate pottery. The train left Quirigua at ten o'clock and arrived at Gualan at eleven-thirty, the down train picked us up at two-thirty. It was a wonderful three hours! The lovely pink and white blossoms of *Gliricidia maculata* were visited by great Carpenter bees (*Xylocopa*), but unfortunately the flowers were so high, and the bees flew so swiftly that I secured only a few specimens.

The best catch of that day was a very small bee belonging to the genus *Perdita*, and if you saw it I am afraid you would agree with the Indians who said, "So small bugs can be of no use." The *Perditas* are among the smallest of bees, and yet the finding of one on *Cordia alba*, a yellow flowered tree, at Gualan, was a distinctly dramatic and interesting thing to me. Years ago my husband described seventy of these small bees which he had collected in New

Mexico, and half a dozen have been found in Northern Mexico, and I had often wondered whether the little bees were in Central America if some one who was interested in finding them would only look. And there it was, a new species that extended the distribution of the genus *Perdita* a thousand and more miles, and I had added a tiny fact to the everlasting why of the universe.

A few hundred yards below the village there was a number of trees covered with cardinal flowers, and I was especially anxious to collect from them, but we were beguiled into chasing butterflies, and the yellow-flowered trees had other bees than the *Perdita tropicalis*, so that it was time for the train, and we had seen only the glow of the cardinal tree from a distance.

Another trip was imperative, and on that day I had an amusing experience. The conductor of the train, a rather interesting Guatemaltecan brought me a Ladies' Home Journal and a little note which said that if I were English he would lend me the magazine; what did I do with my veil (net) and did I, like other strangers, think them savages to be conquered?

Judging that he wrote English better than he spoke it, and read better than he understood, I wrote that I was grateful for the magazine (and really, even the Ladies' Home Journal looked good to me; that I had the net to catch bees, because my husband studied bees from all parts of the world. He answered: "Thanks. Good for him and the world. Hope that he finds the Bee that carries the strength of life—like they do honey. So that the wise live long to be learned, and the fools long enough to learn."

There was more correspondence about the duty of one nation to another, the books that would give a Guatemaltecan an idea of the United States, all of which is too lengthy to record here, but just before we reached Gualan he wrote: "Guess I tire you, I like to write English to get acquainted with. Excuse me—My wish that the bees won't bite you while searching for flowers. That they sometimes on the mountains sing you a chorus. Remembering you of God, the father of all peoples."

When we reached Gualan, we went at once to the Cardinal Tree, and found it even more wonderful than we had thought. Imagine a great tree, fifty to seventy-five feet high, with branches literally covered with fragrant cardinal flowers, and the flowers swarming with wasps and bees, and on the branches great gaily colored birds assembled to eat the insects. I too wanted to collect insects, but the lowest branches were just out of reach. Mr. Morris offered to climb up and collect for me. Many Indians gathered in the path just below us, and called out to Mr. Morris

that the tree was full of 'serpents,' and that the branches would break and dash him to destruction, but he climbed on. Soon he began to beat himself, and I knew that the ants, the little guardians of the tree, were after him. Then, too, he had been obliged to crawl over some of the curious flat cactus that grows along the trunks of trees in that country, and when I added my voice to the Indians cry, "Come down," Mr. Morris said that he thought he would. We made a pile of stones and boxes, and so were able to get a few wasps and bees, but I shall never cease to envy the birds so gracefully collecting from the beautiful Guacamaya. With wings I might have secured a dozen forms new to science. I carried home a flower covered branch, and later Mr. Morris secured leaves and pods from the same tree, and great was my surprise and delight when Captain John Donnell Smith, of Baltimore, said that the tree itself was new !*

The excavations at the ruins became daily more interesting, and I could not ask Mr. Morris to spend more time with me, but most fortunately I learned that the station agent's wife spoke English, and she generously kept me at her house one night, thus, giving me the better part of two days for collecting.

I found the walls around one of the patios, here a place for chickens and turkey-buzzards instead of ferns and orchids as in Guatemala City, alive with red woolly *Centris* (*C. tarsata* Smith) nesting—there were literally thousands of them, and I spent the most of one afternoon getting specimens of these bees—and the bees (*Mesochaira bicolor* Fabr.) that were parasitic in their nests.

Then, too, there were some *Megachiles* (*M. gualanensis* n. sp.), leaf-cutting bees, nesting in the same wall, and they had interesting parasites (*Coelioxys sanguinosus* n. sp.). Dozens of small Indian boys watched me, and occasionally begged to be allowed to use the net. Some native teachers came out to drive the boys into school, but stayed to watch the strange 'Inglese' catching 'musca.'

"For what does she want the little bugs," they inquired of my hostess. "Does she make medicine of them?" Not such a strange supposition, since they grind up all sorts of insects and use them as medicine.

"The Senora does not gather them for medicine," they were told, but the fame of the medicine-maker spread, and a woman brought a little child with a terrible sore on his neck, and begged me to give her the fly that could cure her baby. It was pitiful !

**Phyllocarpus* n. sp.; the genus previously known only from a single species occurring in Brazil.

A more amusing incident followed. A larger boy asked which made the best medicine, and I begged Senora Caldero to explain that the bees were for study. "How can you explain that to such ignorance," she asked, but I begged her to try, and the boy said that he understood, but a few minutes later he was telling a young girl that the little black bees were for pains in the stomach—the red ones for pains in the legs. When reproached, he excused himself by saying: "The other is much too difficult for a girl to know." The inferiority of woman serves its purpose the world over.

My adventures did not end with the day, for in the middle of the night I was awakened by a great ringing of bells, and the light from a burning house lighted my room. "Get up! Get up!" my hostess called, "there is a terrible fire. Do not try to save anything but come quickly." Fortunately I had lain down with my clothes on, so that I was ready in a minute, carrying with me my precious box of bees. I found my hostess and her children wrapped in blankets, and we all hurried out into the street. The fire was only a few doors from our house, and with a brisk wind blowing it looked as though nothing could save any house in the village. Some way in the crowd I was separated from Senora Caldero and her family, and I found myself in the middle of the road surrounded by people wailing and crying to the saints. It was a weird moment! The men had formed a chain from the fountain and passed water in every sort of jar and pan, but they worked effectively, and I soon saw that the fire would be conquered. I thought I would be safer in the house, for I did not like being in the midst of that excited crowd, so I crept back into the dark house, still holding jealously my little box of bees,

It was not long before my host came up from the office where he slept, and the family was brought home. There was much embracing and much excited talk, and more wine and whiskey offered to everyone in the good Latin-American fashion, and the daylight was almost upon us before the village became quiet again.

The next morning a horse and a moso were ordered for seven o'clock, and came at eight, the usual custom of the country. Until two o'clock I rode along the river collecting here and there, and enjoying the bright-hued birds, and the beautiful plants. Two plants stand out in the memory of that forenoon; *Antigonon guatemalense* Meissn., a vine with great racemes of most exquisite pink flowers; the other (*Adenocalymna macrocarpum* Donn. Smith?)* a bush with great violet-purple bells, like a glorified pentstemon,

*Capt. Donnell Smith wrote that he was not quite sure of the species of *Adenocalymna*. More material is needed. The plant belongs to the *Bignoniaceae*.

but with a dreadful odor. The little moso who carried my press could hardly be induced to carry a piece. He made me understand that it would give me diseases unnumbered, but I insisted, and so far not a single disease has resulted.

The plants collected were all kindly identified by Capt. Donnell Smith. The following list of Gualan bees has been prepared by my husband. The new species are in course of publication in the Annals and Magazine of Natural History.

BEEES OF GUALAN.

- (1.) *Prosopis quadratifera* n. sp. At flowers of *Iresine paniculata* (L.).
- (2.) *Prosopis gualanica* n. sp. One male.
- (3.) *Halictus hesperus* Smith. 27 females. One at flowers of *Cordia alba*; five at flowers of *Phyllocarpus* n. sp.; the rest at *Vernonia aschenborniana* Schauer, collecting the white pollen.
- (4.) *Halictus townsendi* Ckll. One female, Feb. 23, at flowers of *Tithonia diversifolia* A. Gray.
- (5.) *Augochlora binghami* Ckll. One female.
- (6.) *Augochlora* sp. 1 female.
- (7.) *Augochlora cordiaefloris* Ckll. One female, Feb. 23, at flowers of *Calopogonium cæruleum* Desv.
- (8.) *Agapostemon nasutus* Smith. Seven males, seven females. Six of the males and six females at *Vernonia aschenborniana*; one male at *Calopogonium cæruleum*; one female at *Tithonia diversifolia*.
- (9.) *Agapostemon nasutus gualanensis* n. var. Four males.
- (10.) *Perdita tropicalis* n. sp. At *Cordia alba*.
- (11.) *Centris totonaca* Cresson. One female, "at flowers of yellow vine."
- (12.) *Centris tarsata* Smith. Eleven males. One from flowers of *Iresine paniculata*.
- (13.) *Centris inermis gualanensis* n. subsp. At flowers of *Calopogonium cæruleum*. Also at Quirigua.
- (14.) *Leptergatis toluca* (Cresson). One male at flowers of *Cordia alba*.
- (15.) *Mesoplia azurea guatemalensis* n. subsp. At flowers of *Calopogonium cæruleum*.
- (16.) *Mesocheira bicolor* (Fabr.). Two females.
- (17.) *Exomalopsis callura* n. sp. At flowers of *Vernonia aschenborniana*.
- (18.) *Exomalopsis similis* Cresson. One female at flowers of *Cordia alba*.

- (19.) *Xylocopa wilmattæ gualanensis* n. subsp.
 (20.) *Xylocopa fimbriata motaguensis* n. var.
 (21.) *Xylocopa barbata* (Fabr.). At flowers of *Calopogonium*
cæruleum.
 (22.) *Ceratina nauvlana* Ckll. One female, at flowers of *Vernonia*
aschenborniana.
 (23.) *Ceratina virescens* Friese. One male.
 (24.) *Ceratina regalis* n. sp.
 (25.) *Ceratina xanthostoma* n. sp.
 (26.) *Ceratina xanthostoma rufipennis* n. var.
 (27.) *Coelioxys sanguinosus* n. sp.
 (28.) *Megachile gualanensis*. Both sexes.
 (29.) *Dianthidium gualanense* n. sp.
 (30.) *Euglossa cordata* (L.). One male at flowers of *Arthrostemma*
fragile Lindl.
 (31.) *Melipona fulvipes* Guér. One male.
 (32.) *Trigona zexmenie* n. sp. At flowers of *Vernonia aschenborn-*
iana. Also found at Quirigua.
 (33.) *Trigona mellaria* Smith. One at flowers of *Calopogonium*
cæruleum.
 (34.) *Trigona cupira* Smith. Twelve workers, eleven at *Vernonia*
aschenborniana.
 (35.) *Trigona amalthea* Oliv. Two workers at *Calopogonium*
cæruleum.

All these bees are new to the fauna of Guatemala. The bees recorded from Guatemala up to the beginning of 1912 are : *Halictus providens* Smith, *Augochlora chryseis* Smith, *A. radians* Vachal, *A. nigromarginata* Spinola, *Agapostemon brachycerus* Vachal, *Emphoropsis fulva* (Smith), *Centris clypeata* Friese, *C. labrosa* Friese, *Tetrapedia moesta* Cresson, *T. maura* Cresson, *Bombus lateralis* Smith, *B. unifasciatus* Smith (*mexicanus* Cresson) *Melipona nigripes* Friese, *Trigona fuscipennis* Friese, *T. schulthessi* Friese, *T. flaveola* Friese.

BOOK NOTICE.

WOODLAND IDYLS. By W. S. Blatchley. The Nature Publishing Company, Indianapolis. Price \$1.25, post-paid.

In this little book are recorded the observations and reflections of one who pitched his tent, and spent his summer vacation, apart from the haunts of men, living, in gipsy style, upon squirrels, berries, and other woodland supplies.

The author has contrived, by an unusual construction of his sentences, to give an air of quaintness to his work—as in:—

"The prunella, favourite of my summer blossoms, did I find on yesterday," page 86.

"Tiny the stream, yet this broad valley has it carved," p. 87.

"The writing off my mind, squirrels and marmots do I seek," p. 167.

One passage, at least, in *Woodland Idyls*, will be of interest to entomologists. It is that in which the author tells that he saw an ichneumon light upon a spider, *which a wasp was carrying off*, and deposit an egg in it (pp. 206—9). Does not this afford us a glimpse into the life-histories of such insects as Zabriskie's *prædator*, in Ashmead's genus, *Sphecochagus*?

A few brief quotations from the book under consideration will set the author's style and trend of ideas fairly before the readers of the Canadian Entomologist.

The author's descriptive powers:—

"I saw a skeedoodlum of a wren, his feathers half gone from moulting, his body not bigger than thirty seconds, yet with his head in air he was rolling forth sound enough for a cardinal or other bird ten times his size. 'Cher-whitty—cher-whitty.'" * * * "A cheery little cuss is he, who would sing were his tail on fire." (p. 42).

"Fuzzy gnats dance in rhythmic mazes before my eyes, while their cousin, a slender reddish-gray mosquito, probes my flesh, I do not feel him until his body is red and gored with my blood. After swatting him the itch begins. Niches they fill in the great scheme of nature. Organs they have for performing all the duties of life. Those duties are but few—to eat, grow and reproduce their kind. Lowly creatures we call them, yet "lowly" only because we esteem ourselves "high." (p. 79).

The author as a botanist:—

"The densely flowered spikes of the vervain before me, some of them two feet in length, have but an inch or two in blossom at a time. The seed pods or fruit of the past are below, the unopened buds of the future above. The flowers are now close to the top, the fruiting portion long, the budding part short, for its season is near the close. Life, present work, is now in the flowering part; duty performed, finished work, in the seed part; promises or hopes for the future in the buds. Only the present blooming part, that which is active, is beautiful. That is the part attractive to the human eye, in the plant as well as in the human. What are you doing? Be up and at work. Live not upon a past reputation. Chance not your happiness upon the budding un-lived future, which may be seared by a night's hoar frost into something dull and dead." (pp. 46-7).

The author as a Darwinian:—

(The Red-headed Woodpecker). "In a century from now the bills of his descendants will be broader, their eyes keener, their throats wider, and they will be part swallow, part woodpecker, creatures better adapted to the life they have adopted. For he is slowly changing from a simon-pure woodpecker, where the struggle for life grows ever more bitter, as the forests grow fewer, into a cleaver of the air, a swallower on the wing, a contortionist who can rise and fall, twist and turn in rapid flight after his oft-times elusive prey." (p. 203).

The author's philosophy:—

"Long may, and doubtless long will, the world wag on without me. My turn at the wheel has ended. Content am I to sit in the shade and practice shooting at a marmot's head." (p. 171).

The author's religious opinions:—

"Great oaks like these were most worthy to be the Gods of the Druids. As much right to worship them had they as I the sun. I revere or worship only that which I *know* exists—that which is the highest, most powerful of all things known to me. Back of or above the sun there may be somewhere—but where we know not, nor shall we ever know—a power higher than the sun, master of him, and of all other suns—the Overlord of all. Until I know, which I shall never do, that there is such an Overlord, until then I worship, if you may call it worship, that highest power, that ruler which my senses ken." * * * * "Then let the oak tree my Sabbath temple be, let the sun be the God unto whom this morn my reverence is due, and this spot of mother earth the altar at which I kneel to do homage unto him." (pp. 228 and 229).

The "God-gifted organ-voice of England," telling of other devotions, breathes a different spirit from that expressed in the last quotation. It says:—

"Thou sun, of this great world both eye and soul,
Acknowledge HIM thy greater; sound His praise
In thy eternal course, both when thou climb'st
And when high noon hast gain'd, and when thou fall'st."

—Adam's Prayer in *Paradise Lost*.

The writer of this article ventures to express an earnest hope that the author of *Woodland Idyls* may attain unto the higher knowledge—the knowledge spoken of by the "MASTER," in His address to His Father Almighty:—"This is life eternal that they might *know* thee the only true God, and Jesus Christ whom thou hast sent."—St. John XVII.: 3.

T. W. F.

Mailed September 18, 1912.