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NOTES ON THE ENTOMOLOGY OF VANCOUVER ISLAND.

BY GEO. W. TAYLOR, VICTORIA, B. C.

Since I came to this island, a couple of seasons ago, I have made a practice of capturing any insects that came in my way, and I have sometimes made an expedition purposely in pursuit of such prey. The result is an accumulation of about one thousand species of all orders, which probably represents not more than five per cent. of our insect population.

As my favorite studies are in another department of Zoology, I have neither the inclination nor sufficient knowledge to work out all this material myself, but with the help of entomological friends, resident, alas! sadly, too far off, I am gradually making progress with the naming of my captures, and I propose, with your permission, to publish from time to time in the *CANADIAN ENTOMOLOGIST*, lists, with notes, of the species that have occurred to me. I hope that this will be both useful and interesting to Eastern entomologists, as I notice that hardly more than one half of the insects I have already identified are named in the recently published check list of Messrs. Brodie & White, and many of them will prove, I think, new to science.

This month, however, I will content myself with a few general and preliminary remarks. Our climate (I am speaking only of the south-eastern portion of Vancouver Island) is supposed to resemble that of the south of England, but I should call it decidedly milder. Our spring is warm and early, and the summer hot and dry, but with cool nights and copious dews. On the other hand, the winter is mild, and for about three months exceedingly wet. All kinds of vegetation are very luxuriant. The uncultivated lands are thickly covered with heavy timber, and the cultivated lands are at present few and far between, which makes it easier to combat the attacks of our noxious insects (and of these we have not a few). All our climatic conditions, except perhaps the wet winter, are favorable to abundant insect life, and this undoubtedly exists here. There are several points about our insect fauna that cannot fail to strike an observer. In the

first place the extreme abundance of Diurnal Lepidoptera must attract attention. Nearly 40 species may be marked *abundant*. A patch of blossom in May, covered with *Blues* and *Fritillaries*, with an occasional *Colias* and two or three magnificent species of *Papilio*, is a sight such as an English entomologist, at least, never sees at home, and later in the year the hundreds of *Vanessa*, *Chrysophanus*, *Pamphila* and *Limenitis* make a very different but not less beautiful picture.

The Orthoptera, too, intrude themselves upon our notice. Grasshoppers in thousands exist in some localities, and do considerable mischief, and large and gorgeous species, with red or yellow under wings, astonish the uninitiated by their sudden appearance or equally sudden vanishing. Two kinds of Cricket fill the air with music in early summer, and a couple of species of *Cicada* lend them most efficient aid. Of Hemiptera, Neuroptera and Diptera I have not collected many, perhaps only 200 species in all, but they include some remarkably fine kinds. Among the Coleoptera I am struck with the abundance of *Adephaga*, many of them, too, being of large size. The genera *Calosoma* (e. g. *tepidum* Lec.), *Cychrus* (*marginatus* Dej. and *angusticollis* Fischer), *Carabus* (*tadatus* Fabr.), *Omus* (*Dejeani* Reiche and *Audouini* Reiche), *Holciophorus*, *Promecognathus*, &c., being represented by very fine species. The Longicornes, too, are abundant, and most of them are absent from Brodie & White's list. The Elateridæ and Buprestidæ are also numerous; in fact all wood-feeding insects seem to abound, as do carrion feeders, while on the other hand, Lamellicornes are very scarce.

Our Hymenoptera are fine and interesting; the *Vespas* are in fact decidedly *too* fine. *V. maculata* Fab., *V. media* Oliv., and a supposed new species, being remarkably plentiful and pugnacious. Less plentiful, but no less conspicuous and interesting, are the Uroceridæ, my first five specimens proving to belong to as many different species.

Nearly one hundred species of Hymenoptera (about half my collection) have been identified for me through Mr. Brodie, of Toronto, and they are consequently most of them included in his check list. These shall form the subject of my next communication, and in concluding for the present, I may mention that my duplicates and the loan of my type specimens in any particular family or order will be accorded with very great pleasure to any specialist who will favor me with a request for the same.

NOTES ON THE TORTRICIDÆ.

BY PROF. C. H. FERNALD, STATE COLLEGE, ORONO, MAINE.

At the time when my Catalogue of the Tortricidæ was published, I was inclined to believe that *Cacœcia transiturana* Walk., and *C. obsoletana* Walk., were the same species, for they were taken in the same localities, and only females of the former and males of the latter species were to be found in collections.

Prof. Forbes has recently sent me two examples for determination, which he bred from two lots of leaf-rollers on the strawberry, in Illinois, and from each lot he obtained males and females, all the males being *obsoletana*, and all the females *transiturana*. We may, therefore, consider the question settled by Prof. Forbes, and these two insects are only the two sexes of our species, which should be known as *Cacœcia obsoletana* Walk.

When I was examining these insects, I was struck by the close resemblance which the males bore to *Cacœcia zapulata* Robs. Of this species only two examples, both males, are at present known; one, the type, taken in Illinois, and the other, now in Prof. Riley's collection, taken in Missouri. *C. zapulata* is considerably larger than *obsoletana*. It is hoped that Prof. Forbes will be able to settle the question whether these two are distinct from each other or not. He will undoubtedly give us the early stages of *obsoletana* in his report.

In the Bulletin of the Entomological Commission, No. 6, page 82, Prof. Riley expresses the opinion that *Teras oxycoccana* Pack., *T. cinderella* Riley, *T. malivorana* LeBaron, and *T. vacciniivorana* Pack., are dimorphic forms of one species. At the time when my Catalogue went to press, I thought it better to allow them to appear as distinct, but made the statement in a foot-note that "surely *oxycoccana* Pack. must be distinct." I had the type of *oxycoccana*, and did not feel prepared to admit that an insect so unlike the others could be the same thing.

During last summer Mr. J. B. Smith collected and raised a large number of the so-called cranberry worms in New Jersey, and many were sent to the Department of Agriculture and bred there, so that there seems to be no doubt that Mr. Smith and Prof. Riley have proved the dimorphism of the insect. Mr. Smith had the kindness to send me a considerable number for examination, but they were all the slate-colored form, or *T. cinderella* Riley. I therefore wrote to Prof. Riley, who sent me a gener-

ous supply of all the forms bred. There were the plain slate-colored form, the slate-colored with red scales mixed in, and the orange-colored form, the *malivorana* of LeBaron, which, without much doubt, is identical with *vacciniivorana*, though the type of the latter is lost, and we now have only a brief description to determine it by. Now, what greatly surprised me in the examination was to observe at once that the orange forms were *Teras minuta* Robs, which was re-described by Zeller as *Teras variolana*. I have, for several years past, taken a *Teras* here in considerable numbers, late in September, which I have sent to several correspondents in Europe, who have written me that they were quite unlike anything there. These proved to be like the slate-colored and red mixed form mentioned above, except considerably larger; I can see no difference except in size. There is no cranberry growing where these are found, but other related plants, as blueberry, upon which they might have fed. My impression is that they hibernate in the imago state, but of this I am not sure. A few years ago I received several specimens from Mr. G. M. Dodge, of Glencoe, Neb., "bred on wild rose," which are so like those taken here that I could separate them only by their greater depth of coloring and their much larger size, for they are as much larger than those taken here, as these are larger than those from Prof. Riley, and others from Texas. I received *T. minuta* from Mr. Dodge, and also from Mr. Morrison, taken in Nevada, and they were also unusually large. I am, therefore, inclined to believe them all the same species, but I am not yet ready to concede that *oxycoccana* is the same thing. It will be better to allow it to remain separate till it can be proved to be the same, rather than to unite them now, and have to separate them later, should they prove distinct.

The synonymy is as follows:

Teras minuta.

Tortrix minuta, Robs., 1869.

Tortrix malivorana, LeBaron, 1870.

Tortrix vacciniivorana, Pack., 1870.

Teras variolana, Zell., 1875.

The above are the orange forms.

Tortrix cinderella, Riley, 1872.

Riley's name may be used to indicate the slate-colored form.

Robinson's *T. minuta* was published in February, 1869, and Packard's *T. oxycoccana* not until April, 1869.

In December, 1878, I visited Prof. P. C. Zeller, and examined the

types of his N. A. Tortricids. At the time, I did not feel satisfied that *Sericoris argyralana* Zell., was distinct from *S. coruscana* Clem., but allowed both names to remain. After Prof. Zeller's death, his collection passed into the hands of Lord Walsingham, and I wrote to him about the matter. He made an examination and wrote me that they were identical, and that Prof. Zeller had evidently reached that conclusion, for he had placed them together in his collection.

I have recently examined a large number of examples of the European and American *Phoxopterus comptana* Frol., and compared them critically with *Phoxopterus fragariae* Walsh & Riley, and I am convinced that they are the same thing. They are structurally identical, and my European specimens shade off into cinnamon-colored forms, so that I can find no line of distinction between them. The insect must, therefore, be known hereafter as *Phoxopterus comptana* Frol.

SOME FRAGMENTS OF INSECT STATISTICS.

BY THOS. E. BEAN, GALENA, ILLS.

* PUPAL TERM OF ARCTIA NAIS.

♀ found June 16, 1875, laying eggs in a depression in ground recently dug. Total number of eggs obtained about 500, 16th to 19th of June.

Larvæ began to appear June 24th. They were fed chiefly on *Polygonum acre*, and one or two species nearest allied to *acre*, partly on *Polygonum aviculare*, var. *erectum*, and partly on red clover.

Pupation began July 23rd, and continued daily to August 8th, inclusive; a few more pupæ formed to the 16th inclusive, when pupation practically ceased. Only 5 pupations occurred later; two about 20th of August, one about 1st of October, and two in the last ten days of October.

After losses from larval mortality and escapes, there remained August 16th nearly 200 larvæ, almost mature. These shortly made final moult and early in September almost ceased feeding. The hybernating disposition took possession of them, and out of nearly 200 mature larvae remaining Sept. 1st., not more than three formed pupa before winter.

* Gladly giving some attention again to entomology, after several years neglect, I find a few of my former notes, which, as far as they extend, were carefully made, and may be of some use in supplementing other records, or for comparison of localities.

Pupal mortality, none.

Pupal hybernation, none.

Of the outcome from the pupae thus obtained previous to winter, the sex was noted of 196, 115 being males, 81 females.

The pupal term and mature sex of 165 were carefully recorded, summing up as follows:—

Pupal term nearest 10 days, 2 males, 8 females.

" " 11 " 14 " 34 "

" " 12 " 40 " 21 "

" " 13 " 37 " 3 "

" " 14 " 6 " no "

Average pupal term of 99 males, closely 12 $\frac{1}{3}$ days.

" " 66 females, " 11 $\frac{1}{3}$ "

The pupations of early dates produced a large excess of males. The earliest 10 pupae, July 23rd and 24th, gave 9 males and 1 female. From 43 pupations dating July 23rd to 27th inclusive, resulted 32 males and 11 females.

Pupae of intermediate dates, especially from July 28th to August 3rd inclusive, gave about equal numbers of both sexes.

In the later dates the males were again considerably in excess.

In spring of 1876 two *Arctia nais* larvae were collected; one gave pupa May 18th and male imago May 31st—pupal term 13 days; the other pupated June 15th, and female moth emerged June 27th—pupal term 12 days.

HYBERNATION OF *SPILOSOMA ACRÆA*.

This moth was rare in vicinity of Galena in 1875. Three larvae collected Sept. 19th and one Oct. 21st.

One made pupa Oct. 8th, the others Oct. 23rd to 25th. Moths appeared the following April, 17th to 26th, 2 males, 2 females.

The larvae showed no disposition to hibernate, although reaching mature stage so late in the season.

SPILOSOMA VIRGINICA.

Larvæ collected in September, 1875, spun up late in Sept. and during Oct., and moths emerged the next spring in cool room April 24th to May 9th. No observable tendency to larval hybernation.

Extreme color-variation found among the larvæ; from pale yellow to dark red-brown.

SPILOSOMA ISABELLA.

About 70 eggs were found June 7, 1876, in a compact group on a leaf of *Triticum repens*. The larvæ were fed on *Polygonums* and native asters. Record made July 12th of several larvæ of sizes from 1 inch to $1\frac{3}{4}$ inch, which differed from the ordinary pattern by being almost entirely black, and thus nearly lacking the red-brown area usually seen on the intermediate group of segments.

Nine pupæ were carefully recorded, with dates from July 15th to August 3rd:—

Pupal term 11 days—one.

" 12 " three.

" 13 " three.

" 14 " two.

Average pupal term, $12\frac{2}{3}$ days.

The remaining larvæ were apparently all mature by August 1st, and on September 3rd there were still 22—none having pupated since August 3rd. Only one more pupation occurred before winter, dating Sept. 12th, and imago was disclosed not long after.

CATOCALA GRYNÆA.

Larva found June 1st, 1876. Began forming pupa the same day. Moth emerged June 24th.

Another larva found June 11th, pupa formed June 12th, imago disclosed June 30th.

Another pupa dated July 1st, imago July 17th. Pupal terms approximately 16, 18 and 22 days.

CATOCALA ULTRONIA.

Larva found on apple-tree trunk June 5, 1876; began forming pupa June 6; imago appeared June 27.

Another larva was taken on native plum tree in garden; pupa formed June 9; imago appeared July 2.

Pupal terms approximately 20 and 23 days.

HYDROECIA SERA.

Larva found June 11, 1876, on native anemone, *Anemone pennsylvanica*, or closely allied species.

Pupa June 15; imago June 28.

MAMESTRA ADJUNCTA.

Larva, half inch long, found Sept. 16, 1875, on Celeriac. Was fed up partly on Celeriac and partly on *Weigelia rosea*. Pupated about Oct. 5, and imago appeared about 6th of following May.

Another larva was taken on *Weigelia rosea*, Oct. 4, 1875, being then $1\frac{1}{4}$ inch long. Pupated Oct. 13, and the moth appeared May 14, 1876.

VANESSA ANTIOPA.

Seven larvæ, nearly mature, were taken from a poplar tree late in June, 1875.

Two pupated June 30th, the other five July 1st; all disclosed imago July 12.

Pupal term of two, 12 days; of five, 11 days.

CHRYSOPHANUS THOE.

Female taken June 25, 1876. Placed with twigs of dock, *Rumex crispus*, one twig having a flower panicle, and upon the flowers the eggs were chiefly deposited.

Eggs laid by 28th June, and larvæ began to appear by 4th July.

Earliest pupations July 16th, others to July 21st inclusive, 29 in all.

Imagines appeared from July 24th to August 1st inclusive, 16 males, 13 females.

Pupations of earlier dates gave chiefly males; later dates gave an excess of females.

Pupal term:—

Term	8 days,	3 pupæ,	produced	3 males.
"	9 "	16 "	"	11 " 5 females.
"	10 "	9 "	"	1 " 8 "
"	11 "	1 "	"	1 "

BOOK NOTICES.

Notes on the Rearing of Silk-producing Bombyces, in 1883, by Alfred Wailly. From the Journal of the Society of Arts, 8vo., 6 pp.

Mr. Wailly has devoted much attention for the last ten years to the rearing and study of the various silk-producing Bombyces of China, Japan, India and America, with much success, the recent results of which are given in this report. The American species he has experimented with are *Telea polyphemus*, *Actias luna*, *Samia promethea*, *Platysamia cecropia*, and *Hyperchiria io*.

NOTES ON PEGOMYIA BICOLOR (WIEDEMANN), A LEAF-MINING FLY NEW TO CANADA.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

Egg laid on the under side of the leaf of the Dock (*Rumex obtusifolius*). Newly hatched larva bites through to the upper surface of the parenchyma, and works under the epidermis, until the leaf presents a blistered appearance. Sometimes three or four larvæ are found in one leaf.

Full-grown larva, four-tenths of an inch long, white, semi-transparent. Segments marked with greenish yellow. Head retractile, furnished with a snout-like process, the apparent use of which is to raise the epidermis as the creature feeds. Mouth set back. Alimentary canal visible under the microscope, also two ducts terminating in spout-like organs protruding from what appears to be the *upper* edge of the somewhat truncated last segment of the larva. The tuberculose spiracles on the second segment very conspicuous; on the third, less so, and so on diminishing.

The insect left the leaf and pupated on the 22nd of September. Whilst undergoing the change it assumed a leaden-blue color.

Pupa, two and a half tenths of an inch in length; chestnut-brown; ovate. Segments slightly marked. Two considerable prominences at the head. The anal protuberances, as above described, hardened and conspicuous.

Perfect insect appeared in a warm room early in April. It presents a bristly appearance. Head, large. Front, white. Palpi, red. Eyes, full, madder brown in color. Large joint of antennæ sienna-colored, infuscated. Thorax, large and rounded, rich dark brown. Legs, sienna-colored. Wings medium sized. Costal margin thickly set with short hairs. Veins broadly marked, dark brown. Wing-sockets furnished beneath with a white fibrous edging. Halteres small and light-colored. Abdomen small compared with head and thorax, and long as compared with its own diameter, cylindrical, truncated, sienna-colored, set with long brown bristles.

I am indebted for the identification of this insect to Mr. Meade, who says: "I believe that this species has not been recorded as an inhabitant of North America, but it is very common in the north of Europe. I have bred numerous specimens from the leaves of both *Rumex obtusifolius* and *R. crispus*. Zetterstedt says it is equally common in the north of

Scandinavia as it is in England. There was no specimen of this species in the collection of American Anthomyidæ which I received some years ago from the Museum at Cambridge, Mass.

"Your specimen exactly corresponds with some of the English ones which I possess. It is rather a variable species; the 1st and 2nd joints of the antennæ are sometimes nearly black, when it has been named *A. mitis* by Meigen; but they are mostly rufous. One characteristic point is that the palpi should be entirely yellow or red, *not* black at the tips as in *Pegomyia nigritarsis* Zett., a species which also mines the leaves of the Dock, in the larva state. I have bred both species from the same leaf of *R. obtusifolius*."

ADDITIONS TO CANADIAN LISTS OF COLEOPTERA.

BY W. HAGUE, HARRINGTON, OTTAWA.

(Continued from page 47.)

CORRECTION.—Page 46, line 9, for "Uhler" read Ulke.

ELATERIDÆ.

Fornax badius, Mels. One specimen. The only list in which I have found this species recorded is that by Mr. Schwarz, of Florida Coleoptera.

Hornii Bv. One specimen.

Hypocoelus frontosus, Say. One specimen (given to Dr. LeConte).

Sarpedon scabrosus, Bv. One specimen of this very rare species was taken by me while beating shrubbery (June, 1880), and another was captured about the same time and given to me by Mr. Fletcher. Both were ♀, this sex having been previously unknown. They are now in the respective collections of Drs. LeConte and Horn.

Elater nigrinus, Payk. One specimen. Recorded from Michigan and Lake Superior.

**Megapenthes stigmosus*, Lec. This species is by no means rare, yet I do not find it in any of the lists which I have at hand, except that of Lake Superior species.

Agriotes oblongicollis, Mels. Rare; same localities.

Limonius aeger, Lec. Rare. A Lake Superior species.

**Corymbites vernalis* Hentz. This pretty species is some seasons quite common on the flowers of Choke-cherry, and is also found on those of Hawthorn.

**fallax* Say. Captured by beating oak, etc. Occurs with *Oxygonus obesus*, which it much resembles, but which may be readily distinguished by the elytra being spinose at tip.

**cruciatus* Linn. (= *pulcher* Lec.) This handsome beetle is taken occasionally upon Beech, and it is probable that the larvæ live in the decaying trees.

BUPRESTIDÆ.

The species of this family, as of the preceding one, are well represented here, and the individuals of some of them are very abundant.

**Anthaxia inornata* Rand. I find no record of this species in any of my lists, so that it must be rare. Three or four specimens have been taken here, but unlike *viridicornis* and *viridifrons* (which occur abundantly on various trees in June and July), it appears early in the spring, and is found on such flowers as Trillium.

Chrysobothris floricola Gory. One specimen. The species is recorded from Buffalo, Lake Superior and Florida (rare), so that it is widely distributed.

pusilla Lap. The only mention I find of this pretty little species is in LeConte's "Revision of the Buprestidæ of the United States," 1859, where it is given as from the "Middle and Southern States. Rare." Only one specimen taken by me; date not recorded.

* *Sexsignata* Say. Rare.

* *Agrilus interruptus* Lec. Rare. Occurs at Buffalo.

putillus Say. One specimen of this diminutive species, which I find also recorded from Michigan.

Sp. ? A specimen easily distinguished from any other small species by its less elongated form. I was informed by Dr. Leconte that it was unknown to him, and Dr. Horn states that the species is not in his cabinet.

LAMPYRIDÆ.

Podabrus nothoides Lec. ? My determination of this species is by Dr. Leconte's "Synopsis of the Lampyridæ of the United States," where it is described as a new species, occurring in Mass. and at Lake Superior. Rare.

MALACHIDÆ.

Malachius Ulkei Horn. Three ♂ specimens captured while beating bushes. Dr. Leconte, on seeing these beetles, considered them to belong to a new species, but Dr. Horn, on examining one, immediately recognized it as belonging to the above species, which was founded by him upon a specimen from Dakota, loaned by Mr. Ulke, in whose collection it now is. With the exception of *M. æneus* Linn. (an introduced species in the Eastern States) the members of this genus were formerly considered peculiar to the Western fauna, being found chiefly in California. I now find that there is a specimen in the collection of the late Mr. Billings, labelled "*Anthocomus lateralis*," making four specimens (♂) from this locality. The female yet remains to be discovered.

PTINIDÆ.

Hemiptychus punctatus Lec. Rare.

Dinoderus punctatus Say. Rare.

SCARABÆIDÆ.

The species of this interesting family are not numerous in these northern latitudes, nor are the individuals, except of the commoner species, in any way abundant.

Aphodius hyperboreus Lec. A dead specimen (♀) found floating on the South Nation River at Casselman. The species was described by Leconte in Agass. Lake Sup., p. 225, and occurs from Lake Sup. to Oregon.

CERAMBYCIDÆ.

Phymatodes thoracicus Muls. I am indebted to Mr. Fletcher for a pair of these longicorns, which I believe are an introduced European species. Mr. Fletcher was fortunate enough to obtain several of them from an old wine-cask.

Callidium aereum Newm. I am also indebted to Mr. Fletcher for a fine specimen of this beetle taken upon pine at Hull.

* *Purpuricenus humeralis* Fab. This handsome beetle is already recorded from Canada, but from what localities I have not been able to find out. In the classification of Leconte and Horn it is stated to occur in the Middle and Western States. None of the lists which I have contain it, so that it must be comparatively rare. I was

therefore much pleased to capture a pair last summer. The ♂ was taken near Rideau Hall on 27th June; the ♀ on Sparks Street in the centre of the city, on 11th July.

Microclytus gazellula Hald. is also a species belonging to the Middle States, and is given in my Michigan and Buffalo lists. It is an elegant little beetle with the ant-like form and movements of *Cyrtophorus verrucosus*, which it closely resembles. Only three specimens found, on Hickory and on Sumac flowers in July.

Leptura saucia Lec. This *Leptura* occurs on flowering shrubs, and is the smallest species which I have taken. It is rare here, and is not given in any of my lists.

Monohammus maculosus Hald. A fine ♂ of this species was captured late in September three or four years ago. As it resembles pretty closely the very common beetle, *M. confusor*, I thought I might have overlooked specimens previously, but a careful watch since then has not revealed any. It is recorded from Lake Superior.

Goes pulverulentus Hald. This fine insect is rare on Hickory during July. Occurs also at Buffalo.

Leptostylus parvus Lec. One specimen of this rare beetle.

Liopus punctatus Hald. Rare, only three captured. Neither this nor the preceding species is included in any lists to which I have referred.

Saperda nutica Say. On the 15th July, 1882, I captured a pair of these prettily marked beetles on decaying willows. It is recorded from Buffalo.

(To be Continued.)

THE SURVIVAL OF THE FITTEST AMONG CERTAIN SPECIES OF PTEROSTICHUS AS DEDUCED FROM THEIR HABITS.

BY JOHN HAMILTON, ALLEGHENY, PA.

The ultimate extinction of many species of Coleoptera in the vicinity of large cities is unquestionable, especially of the larger Carabidæ. The conditions of life with some are such as admit of no adaptation to the methods of civilization, and for them no refuge from the encroachments of agriculture will eventually remain. They are now retiring, retiring, and

in time the last goal will be reached. In localities where the population is becoming dense, and all land available placed under cultivation, many fine species that once were common are now rarities and others fast becoming so. It is less than half a century since Mr. Randall described eighty-four species from localities in Maine and Massachusetts, most of them common; but, according to Mr. Austin, in the same places several of these species are now extinct and many of them have become rare. The Coleopterist of Cincinnati, or of Buffalo, of a couple of hundred years hence, who shall be fortunate enough to possess one of Mr. Dury's, or Mr. Reinecke's lists of local Coleoptera, will no doubt have occasion to mourn over the absence from his Fauna of many of the choice forms there registered. And, by the way, the value of local catalogues would be greatly enhanced by indicating the comparative abundance of the individuals and other matters, as is done by Mr. Schwartz in his "List of Species Collected in Florida."

The foregoing is preliminary to a consideration of the probable future of several species of *Pterostichus* of wide distribution occurring here, as deduced from their respective habits of life and powers of adaptation. The references are to this locality only.

1. *P. adoxus* Say occurs commonly eastwardly of the Mississippi and northwardly from Tennessee and Carolina. Here it is moderately abundant, being usually found under the bark of fallen timber, or under chips and stones in its vicinity. The larvæ probably live about decaying wood. This species is not likely to become entirely extinct.

2. *P. rostratus* Newm. has the same range as *adoxus*, extending further south. It is much less abundant. It seems to have similar habits. Here it is about extinct, only three specimens having been taken in ten years; but fifty miles south-east, along the base of the Allegheny Mountains, it is not uncommon.

3. *P. diligendus* Chand. occurs from Virginia to Canada, eastward of the Mississippi. It is very abundant here, and, from its habits, will likely survive. It is found in many of the ravines on hill sides formed by springs, following them to their origin, and when found on low ground it is owing to their having been brought down in freshets. It is a moisture lover and is never found in dry places. Its larvæ live in the banks of these hillside rivulets in ground that is constantly damp.

4. *P. honestus* Say is not often found here, and then either under the bark of fallen timber in wet places, where it probably feeds on small

cryptogams, or in certain kinds of woody fungus. Not much can be said about it, but it will probably become extremely rare.

5. *P. obscurus* Say is now a rarity. It appears to be a delicate species, totally incapable of any adaptability to change of surroundings. It is found in the woods under stones, near the top of hills, in places where the soil is light and friable. It must soon disappear from this Fauna.

6. *P. stygicus* Say will be a beetle of the future, having adapted itself to a great variety of conditions. It is equally at home in field or forest, in the river flats, or on the mountain tops. It is common in nearly all the Northern States.

7. *P. relictus* Newm. is not a common nor an abundant species. It occurs occasionally in the valleys among the hills, in wild places, under chips or stones, but more frequently on the rugged, sloping banks of ravines, where the soil is light and friable without much moisture. From the nature of its habitat it may long exist as a rarity, unless the beetle hunters of the future should become so numerous as to destroy the plant.

8. *P. moestus*. This large and graceful species is now moderately common, being usually found in open woodland about wood in process of conversion into humus, in which it probably oviposits. In time it can scarcely fail to become rare, as its beauty will cause it to be much sought for, and its habitat become more and more limited. Those who desire to have it with the rich purple of its elytra intact, should never place it in æther or in alcohol, which transmute this color to black.

9. *P. Hamiltoni* Horn occurs usually on plateaus on the sides of hills, where there is a dry friable soil with herbage and timber. It is mostly found under flat stones, generally from two to four together, and makes little effort to escape capture. It has only been discovered here in two limited localities; and its annihilation is only a question of time. Forty miles south it appears to be abundant, probably extending along the base of the Alleghenies into Maryland.

10. *P. Sayi* Brulle, living as it does in low ground and among rank vegetation in places subject to inundation, will survive.

11. *P. Lucublandus* Say is ubiquitous. Having, like *stygicus*, great powers of adaptation, its future is assured.

12. *P. luctuosus* Dej. oviposits under drift on alluvia along rivers and their influents, and will probably continue more or less abundant. This, and species with a similar habitat, can scarcely be altogether exterminated,

for, should they disappear for a time, re-colonization by river transportation can scarcely fail to occur.

13. *P. corvinus* Dej. The mature insect is found under rubbish and decaying vegetation in and around swampy places. The larvæ live in the swamp and may be found full grown about the beginning of June. They are entirely luteus except the mandibles, which are brown and very powerful. The head is as large as the first thoracic segment, and the outline of the larva is fusiform. Each abdominal segment has at the sides three long appendages. As there are only a few swampy places in this vicinity, and these all susceptible to drainage, extinction is a matter of course.

14. *P. purpuratus* Lec. This handsome species is common here, though generally it must be rare, being always in demand. Its habitat is plateaus on hill-sides and along the base of rugged elevations, where there is a dry light soil and some low vegetation, as *Nepeta glechoma*, *Stellaria*, *Claytonia*, *Dielytra Canadensis*, etc. Agriculture is its enemy, and its beauty will induce the beetle hunters of the future to pursue it to extermination in the few places to which it must finally retreat. Alcohol changes the purple of its elytra to black.

15. *P. mutus* Say will survive. It seems to be a progressive insect; though preferring its native woods, it is becoming, so to speak, domesticated, gradually accommodating itself to cultivated places. There is a marked difference between those bred in fields, for, presumably, four or five years, and those taken in their native haunts. The former are on the average larger, have the base of the thorax more coarsely and densely punctured, and the elytra more deeply striate and less polished. So different in appearance are the extremes, that, by destroying intermediate forms, they might be separated into species.

16. *P. erythropus* Dej. is a hardy species, though not very abundant; and, as it inhabits in high or low ground, whether cultivated or in a state of nature, it is likely to be long a survivor. The individuals found here have the feet piceous black, while those of New Jersey and Massachusetts have them bright ferruginous, the typical color; otherwise no difference is observable.

The sixteen species above mentioned are all of the genus now occurring here. Their survival in this Fauna, as deduced from the foregoing, may be thus summed up. Four must soon become extinct. Six may

possibly exist in the future as rarities. Four (*diligendus*, *Sayi*, *luctuosus*, *mutus*) will occur not uncommonly, while two (*stygicus* and *lucublandus*) will remain, as now, common.

It may not be out of place to remark that with two exceptions, the individuals of these species do not vary notably from a certain type belonging to each; and that these two, namely, *stygicus* and *lucublandus*, are the ones that possess the greatest power of accommodation. *Adoxus* varies in regard to the posterior angles of the thorax, but all the individuals of each locality conform to one type, so far as observed.

So far as known, none of them are in any way injurious to man, or to vegetation; and in the absence of such a record, may be set down as beneficial, owing to the carnivorous habits of the larvæ. In fact, except as to their mere existence and the mode of distinguishing them by external anatomical differentiation, entomological literature is silent.

THE ENTOMOLOGY OF VANCOUVER ISLAND.

*Notes on Eighty Species of Hymenoptera Collected near Victoria,
Vancouver Island, in 1882.*

BY GEORGE W. TAYLOR, VICTORIA, B. C.

All the insects mentioned in the following notes were captured by myself during the season of 1882, which was my first year in this island, and were taken for the most part on flowers in the course of my rambles. Some of the Ichneumons, however, were bred from the pupæ of Lepidoptera, and a few species were taken at rest, at light, or in other more or less usual ways.

The eighty species here enumerated have been examined and determined for me by Mr. W. Brodie, of Toronto (to whom I am much indebted for this and other kindnesses), and they are therefore nearly all of them included in the check list issued last year by the Natural History Society of Toronto. In fact, the only names that I do not find in that list are *Halictus leucipennis* and *Eurra albitarsis*, but they may perhaps be there under other names which in my ignorance of synonymy I fail to recognise.

Both species and specimens of Hymenoptera appear to be very numerous here, and a large collection might soon be amassed by any one with time and inclination to work at it; but as I stated in a previous paper, I do not possess either of these qualifications, and my labors in British Columbian entomology will be probably confined, I fear, to the laying of a very slender foundation on which future workers may build.

It will be noticed that some common Eastern species are also abundant here, for instance, *Vespa maculata*, the three ants, *Trichosoma triangulum*, the two *Pimplas*, and some dozen others, but, as might be expected, the majority of our Vancouver insects are of a distinctly Western type.

It would perhaps have been wiser to have waited until I could have identified all my captures, as I have now over two hundred species, and have published a more complete list and with fuller notes, the present being little more than a list of names; but on the other hand, facts in science cannot very well be put on record too soon, and if we wait to perfect our work, we may have to wait a very long time.

I have sent to Mr. Saunders, for the Ontario Entomological Society's Collection, a box containing duplicates of some of the under-mentioned species, and in process of time will, all being well, forward others. In this way I hope that the insects will come under the eyes of many entomologists learned in this particular branch, and if any such gentleman should detect error in their naming, I shall be exceedingly obliged if he will communicate his corrections to me.

The arrangement followed in these notes is that of the Check List alluded to above.

HYMENOPTERA.

Apidæ.

1. *Apis mellifica* Linn. Abundant in the usual domesticated state.
2. *Bombus centralis* Cress. Only one specimen captured, but it may nevertheless be common.
3. " *Vancouverensis* Cress. Very common.
4. " *occidentalis* Greene. "
5. " *lacustris* Cress. "
6. " nov. sp.? A few specimens were taken of a *Bombus* which Mr. Brodie considers probably new. I will, however, defer description until after further investigation.

7. *Apathus elatus* Fab. Not rare.

Andrenidae.

8. *Andrena hilaris* Smith. A few only, on flowers.
 9. " *hirticeps* Smith. " "
 10. " *miserabilis* Cress. Abundant.
 11. *Halictus coriaseus* Smith. A few only.
 12. " *ligatus* Say. Common.
 13. " *discus* Smith. Common.
 14. " *albitarsis* Cress. Common.
 15. " *laevipennis*. This name does not appear in the Check List, but the insect so named by Mr. B. is remarkably abundant. There are numerous other species of *Andrena* and *Halictus* not yet determined, some of them being very plentiful.
 16. *Colletes thoracica* Smith. Not common.
 17. *Osmia lignicola* Prov. Not common.
 18. *Megachile brevis* Say. Abundant, resting very often in the burrows made by *Buprestis lauta* Lec.
 19. " *mendica* Cress. Also very common.
 20. *Ceratina tejonensis* Cress. Rare.

Vespidae.

21. *Vespa maculata* Fab. Only too numerous, building enormous nests of more than a foot in diameter. I suppose it is equally abundant in the eastern provinces.
 22. " *media* Oliv. Common. The suspended nests of this wasp are very noticeable in early spring.
 23. " sp. A species which Mr. Brodie could not determine. It is of the size of *V. media*.
 24. " sp. Another *Vespa* which may be a new species. It is exceedingly abundant and remarkably savage. The sting, too, is more than ordinarily painful. Its nests are subterranean, and the racoons evidently consider the comb a favorite morsel. These animals probably destroy the greater number of nests before the close of the season, and if it were not for this check, I am afraid the insects would soon become an intolerable pest. Being so common here, I shall be pleased to send a long series to any Hymenopterist who will send me a box.

Eumenidæ.

25. *Odynerus blandus* Sauss. Very common.
 26. *Eumenes globulosus*, Sauss. "

Crabronidæ.

Owing to my desultory mode of collecting, I have not taken many species of this family. The only one I have named is

27. *Cerceris deserta* Say., which is not uncommon.

Nyssonidæ.

28. *Gorytes laticinctus* Prov. Common.

(To be Continued.)

CORRESPONDENCE.

AN INSECT ATTACK ON AN IULUS.

Dear Sir: A friend—a careful observer of insects and their ways, although not an entomologist—has communicated to me the following statement:—

“Once, and once only, and that many years ago, I saw what seemed to my uneducated eye, a swarm of minute gnats making an Iulus unhappy. He was hastening as fast as his numerous legs could carry him across a wood road—they hovering over him, darting on him, and he stopping and biting at them angrily, and then moving on. It seemed to me that they were puncturing him. Were they ichneumons? If not, what were they?”

I would be glad to learn if any similar occurrence has ever been observed, or if any plausible explanation can be offered for so singular an insect demonstration. I am not aware that parasites ever make a combined attack in the manner above described.

Albany, May 13, 1884.

J. A. LINTNER.

CHANGE OF ADDRESS.—W. F. Kirby, from 5 Union Road, Tynnell Park, London, N., England, to 2 Burlington Gardens, Chiswick, London, W.

A. W. Putman Cramer, 51 Douglas St., Brooklyn, N. Y., wishes to exchange Canadian Noctuidæ and Geometridæ for Lepidoptera of the world, and would be glad to correspond with any one desirous of making such exchanges.

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