

EGGS AND LARVA OF ALSOPHILA POMETARIA, PECK.

The Canadian Entomologist.

VOL. XXXIII.

LONDON, JULY, 1901.

No. 7

NOTES ON THE LIFE-HISTORY OF ALSOPHILA POMETARIA, PECK.

(*Fall Cankerworm.*)

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The eggs of this insect were found on a small branch of golden willow in Beverly, Mass., March 14, 1900, in a nursery, close to fruit stock of various kinds. The mass, consisting of 220 eggs, was kept at the temperature of the laboratory, which was considerably higher than that outside. Notwithstanding this fact, none of the eggs hatched till April 23, within forty-eight hours of which time, however, all the larvæ had emerged.

Egg (Plate 4, Figs. 1 and 3).—Eggs placed close together in regular rows, forming a compact mass, in this case about twice as long as broad and in one layer. Egg about .6 mm. long and .45 mm. broad at top, which is nearly flat. Just inside the rounded edge of the top a brown ring encloses an area bright steely gray in colour, and containing a small brown depression in its centre; lateral surface of egg and rounded edge steely gray. Base of egg more rounded than top, and its diameter somewhat less, as the straight sides converge slightly toward the base, giving to the whole a resemblance to an inverted truncate cone with rounded basal edge. Eggs laid in an exposed position upon the tree, and quite firmly cemented together; placed in a somewhat slanting position lengthwise of the twig, so that the edge of one is a little higher or lower than the adjacent edge of the next in the row.

Larva.—Emergence.—When ready to emerge from the egg, the tiny larva makes its first meal upon the relatively thinner portion of the shell constituting the steely-gray area enclosed by the brown ring. Through the opening thus made in the top of the egg, the young larva gradually and laboriously works its way out. At this time the head is the largest segment, the body tapering very slightly from it to the tip of

the abdomen. The head and thorax are slowly worked up out of the shell until the legs can be of some assistance in pulling, after which the rest of the process is relatively easy and rapid. The length of time required to emerge after the central area of the shell has been completely removed varies from thirty minutes to one hour, after which the larva immediately starts off in search of food.

The larvæ were placed upon tender apple leaves, and commenced feeding at once. A slight jar caused many of them to spin down from the twig to the table, where they showed a decided tendency to travel toward the light.

Newly-hatched Larva (Plate 4, Fig. 2).—Length at rest, 1.5 mm.; width of head, .33 mm; average diameter of body, .25 mm. Head large, rounded, nearly as wide as high, of a uniform yellow colour, darker than rest of body; clypeus triangular, marked by brown sutures; mandibles tipped with black. Head sparsely clothed with comparatively long, white hairs having blunt extremities; antennæ comparatively long; head free, erect. Body nearly cylindrical, tapering very slightly posteriorly from head; annulations not very distinct; segments somewhat shorter than their diameter; prolegs present on abdominal segments 7 and 10, with vestiges of a pair upon sixth abdominal segment. Cervical shield prominent, of same colour as head, and with a light yellow border, which is set with ten spines (Fig. 7 A). Arrangement of the tubercles, as

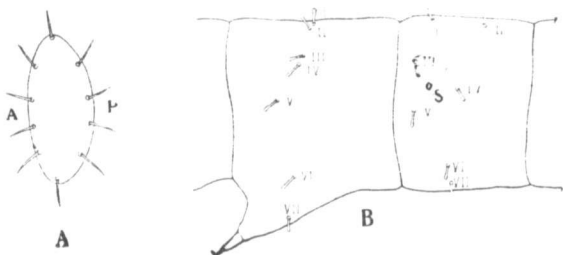


FIG. 7.—Arrangement of tubercles and spines upon the larva of *Anisopteryx pomietaria*, Harr., first instar. A: cervical shield on dorsum of prothorax; A, anterior side; P, posterior side. B: metathoracic and first abdominal segments; I-VII, tubercles and spines, according to Dyar's classification; s, spiracle.

shown in Fig. 7 B, differs upon the thorax from that prevailing upon the abdomen; tubercles on prothorax and 9th and 10th abdominal segments

not conforming to either arrangement. Upon meso- and metathorax, tubercle II. stands laterally close to tubercle I. upon the subdorsal line, and tubercles III. and IV. stand in similar relation upon the sublateral line; other tubercles upon these segments well separated and situated in nearly the same transverse line; upon the abdomen, with the exception of 9th and 10th segments, tubercles I. and II. stand longitudinally upon the subdorsal line, II. being slightly further from the dorsal line than I.; tubercles III., IV. and V. are separated, and form the apices of a triangle around the spiracle, which, upon the first abdominal segment, stands very near the centre of this triangle, but upon the other segments it stands in line with III. and IV., and midway between them; thus IV. is sub-postspiracular, while III. and V. are on the anterior third of the segment; tubercles VI. and VII. present.

Stripes much less distinct than in later stages; dorsal, lateral and stigmal stripes brownish gray, apparently due to numerous evenly-scattered pigment spots in the epidermis; intermediate stripes (subdorsal, sublateral and substigmatal) pale yellow. Stripes irregular in outline, of different widths, dorsal stripe widest. Upon the abdomen tubercles I. and II. stand between the dorsal and subdorsal, III. in the sublateral, and IV. and V. in the substigmatal stripe; tubercles light brown in colour, each bearing a short, white, blunt spine. Stripes become indistinct during this instar, which lasts four days.

Second Instar.—During the two or three days following the first moult the average length of larvæ at rest increases to about 7 mm., while at the end of this instar the average is about 8 mm.

Segmentation now fairly distinct. Head rounded, colour mottled light and dark greenish; mandibles serrate, tipped with reddish brown; clypeal sutures distinctly marked; antennæ and palpi tipped with brown.

General colour of body light green, with six longitudinal white stripes alternating with dark green ones; dorsal stripe dark, broadest and darkest upon the cervical shield. Tubercles I. and II. stand in edge of dark dorsal stripe, III. in upper edge of dark stigmal stripe; leg shields with a V-shaped dark marking.

General colour of under surface of abdomen light green. Pair of vestigial prolegs upon sixth abdominal segment more prominent than in first instar; each segment bearing no prolegs furnished with tubercles VI. and VII., as in previous instar.

Soon after hatching, the larvæ were divided into two lots, one of

which was kept under a bell jar, while the other was enclosed in a breeding cage. At the end of the second instar a marked difference was observed in the rapidity of development of the two lots. All the larvæ confined beneath the bell jar passed through the second ecdysis before one of those in the breeding cage had reached that point. The only observable difference in conditions was a greater abundance of moisture beneath the bell jar, which would naturally improve the food by keeping it fresh and tender. The second instar thus ranged from 5 to 7 days.

Third Instar.—The second ecdysis produced a marked change in colour in larvæ: the light green became dark green, and the light yellow stripes were much more conspicuous.

Two Days After Moulting.—Average length at rest about 12 mm.; form as before. General colour varied from dark brownish-green to as light green as in previous instar; in light-coloured specimens, however, the broad dorsal stripe is much darker than the other stripes, and also darker than it was in the second instar.

Clypeus and labrum usually lighter coloured than rest of head; head somewhat mottled with green; antennæ at their bases as light coloured as labrum; mandibles yellow, tipped with black.

Spines and stripes present as in previous instars; substigmatal white stripe has become broader, and tubercles IV. and V. stand therein; spiracles conspicuous, dark brown.

The third moult took place in about six days after the second, and produced a great change in the appearance of the larvæ. It required less than forty-five minutes to get rid of the old skin after it began to rupture around the throat.

Fourth Instar.—*Two Days After the Moulting.*—Length at rest about 18 mm.; form cylindrical, segmentation distinct. Head equal in size to any following segment, rounded, mottled brown and light green in colour, darkest on sides of lobes; clypeus triangular, extending nearly to head, its vertex connected by a light-coloured depression, with vertex of a white triangular area lying on top of head between the lobes; antennæ and labrum light coloured. The wide variation between light and dark specimens noticed in last instar has disappeared, so that the coloration has become quite uniform in different individuals; body marked with dark brown and white stripes; dorsal stripe broad and dull blackish in colour; subdorsal white stripe clearly defined, quite narrow; lateral stripe, which was dark in previous instars, has become changed almost

entirely to light greenish-white, with slight traces of the old dark stripe remaining along its edges; sublateral white stripe narrow and distinct; stigmatal stripe nearly black and irregular in width, being narrowed between segments and broadened around stigmata; substigmatal stripe white, below this there is still another dark stripe which is interrupted between the segments; anal plate light coloured and set with numerous spines. Tubercles and spines upon body as in previous stages, but less conspicuous on account of darker colour of body; each tubercle terminated by a shining black ring around base of spine borne thereon; each stigma marked by a shining black, oval border, enclosing white area in centre.

Venter light green; thoracic legs somewhat yellowish, claws brownish; prolegs concolorous with venter or with slightly yellowish tinge; prolegs upon fifth abdominal segment vestigial in all stages, crotchets upon them arranged around end of leg in the form of a horse-shoe opening outwardly (Fig. 4); of the eight or nine little crotchets on each vestigial proleg, the three posterior ones are largest; each proleg of the two functional pairs bears crotchets arranged in two groups of from 7 to 9 each at the extremities of a crescentic or semicircular pad borne upon inner side of tip of proleg, with its convex edge inward (Fig. 5). The crotchets vary in length alternately, thus forming two rows of hooks; along the convex edge of pad between the two groups are vestiges of from 8 to 14 more crotchets. (Plate 4, Fig. 6.)

Moulting.—As the larva approached a moult, it ceased to feed, became quiet for a time, which was longest before the third moult, lasting then for nearly two days, and when fully ready to shed its skin, firmly attached its prolegs, let go with its thoracic legs, and stood out at an angle to its support. Successive contractions now took place in various parts of the body, the thoracic legs were withdrawn and the skin stretched backward, after which the skin began to rupture on the ventral side of the throat, and through this transverse opening the under side of the prothorax appeared, the rupture continuing around the throat thus severed the old head-covering entirely from the rest of the integument. The thorax was soon freed, and by successive expansions and contractions of the body running backward with a wavelike motion the skin was drawn back over most of the abdominal segments. When about half the length of the body had been thus freed, the old head integument, which had in the meantime remained attached to the head over the mouth-parts,

was seized between the fore legs, pulled off and cast aside. As soon as the first pair of functional prolegs were free, they were moved forward and attached to the support, and by a gentle pull the rest of the body was quickly withdrawn. The tender larva then moved on a short distance and stopped to rest before proceeding to feed.

During the fourth instar the larvæ fed very heartily, becoming large and fat, but toward the end of the instar they became sluggish and fed but little. In from nine to twelve days they entered the ground to pupate. After two days, two of the larvæ were dug up and examined. They had formed little ellipsoidal cases of particles of earth held together by a loose silken lining, and apparently also by some mucilaginous substance. The cocoons were quite tough, slightly less than half an inch in length, and within them the larvæ were doubled up, as they were about half as long again as the cocoons, but after five days they had not pupated.

On May 28 it became necessary to discontinue the observations, so the large flowerpot containing the pupæ—pupating larvæ—was set in the ground in a sheltered place where it would receive a normal amount of moisture, so that its top stood even with the surface of the ground. A fine wire screen was placed over the pot to prevent the escape of the adults when they should emerge.

During September and October frequent observations were made to determine at just what time the adults emerged, but as none appeared, an examination was finally made. Twenty-five cocoons were found at depths ranging from $1\frac{1}{2}$ to 4 inches, but the majority were not more than two inches deep. Each cocoon showed a small round hole through which some enemy had entered and destroyed the pupa. It is probable that the damage was done by small red ants (a species of *Monomorium*), as these were known to have destroyed other pupæ in the vicinity during the summer. The date of emergence of the adults could not, therefore, be determined, but this is a comparatively unimportant point, as it is well known that the majority of them emerge during the last part of October and the first of November.

EXPLANATION OF PLATE 4.

- Fig. 1.—Small group of eggs of *Alsophila pomataria*, Peck., 5/1.
Fig. 2.—Newly-hatched larva, 26/1.
Fig. 3.—Top view of eggs, 42/1.

Fig. 4.—Tip of vestigial proleg showing crotchets, much enlarged.

Fig. 5.—Crotchets of functional proleg, highly magnified.

Fig. 6.—Crotchets of functional proleg arranged in two groups, with vestigial bases of crotchets between them.

FURTHER ABOUT THE TYPES OF ACRONYCTA.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Prof. Smith's remarks in the May CANADIAN ENTOMOLOGIST contain two separate counts. He implies that I might be led by personal views to an improper treatment of the collection in my charge. This implication I indignantly repudiate, and leave Prof. Smith to explain his breach of etiquette as best he may. While Prof. Smith's lack of humour has led him to misunderstand my views, he has no right to imply that with any personal views whatever I would not properly conserve the National Collection. This collection, rapidly becoming the finest in the country, will continue to be conserved with the greatest care. As to the synonymy of the Acronyctas, Prof. Smith makes two assumptions. First, that the specimens now in the British Museum labeled as Guenée's types are still as labeled and described by him; second, that if so, they are properly types. As to the first assumption, I am not in a position at present to dispute it, though I think that some admixture or confusion might have easily arisen in transference, and considering the length of time that has passed. As to the second assumption, I regard it as debatable in the cases where Guenée described larvæ. In such cases, under the most favourable conditions, Guenée had before him Abbot's figure of a moth and larva and some specimens which Guenée himself thought to be the same species. Suppose in one of the cases under discussion that Guenée had before him Abbot's figure of the moth and larva of *subochrea* and also adult specimens of *afflicta*; that he regarded all as of one species and drew up a description under the name *hamamelis*. Now, if this description agrees with *subochrea*, and does not agree with *afflicta*, what is the type of Guenée's *hamamelis*? Clearly it is Abbot's drawing and not the specimens labeled by Guenée. Are we to be blindly led by a specimen labeled "type," which may be white, while the description is black? Is not what the author described and intended to count for something? I am a believer in types, and where they are certainly the specimens from which the author described, I would regard them as of high value. Walker's types are invaluable, and I never supposed that anyone would

think that I would seriously suggest their destruction. However, in Guenée's time the idea of types was not as fixed as now. Guenée saw no objection to describing a species from a figure. His descriptions of the larvæ of *hamamelis* and *brumosa* are clearly taken from figures, and why not those of the moths as well, since they correspond better with the species figured by Abbot than with the "types" as recently identified by Prof. Smith.

Finally, let it be clearly understood that I speak for myself, and that the National Museum is in no way responsible for my remarks.

A NEW VARIETY OF *LYCÆNA AMYNTULA*, WITH OTHER NOTES.

BY FORDYCE GRINNELL, JR., PASADENA, CAL.

Lycæna amyntula, var. *Herrii*, n. var.—♀ expanse, 1.25 in.; differs from typical *amyntula* by the replacement of the dark area of the primaries by a narrow black band about 1 mm. wide, and on the secondaries by only two red crescents instead of five as in typical *amyntula*. On the under side the markings are all much heavier.

♂ expanse, 1.00 in.; differs from ♂ of typical *amyntula* in having a black margin about 1 mm. wide, whereas there is none in typical *amyntula*, or, if any, a very slight trace. On the under side the markings are much more heavy. The male of this variety is also much smaller than the male of typical *amyntula*, and the tails seem more distinct in this variety.

Habitat: Cochise Co., Arizona.

Described from two males and two females in the collection of C. W. Herr and the writer, taken July, 1899, and September, 1900, by Mr. Poling.

Named in honour of Mr. C. W. Herr, my friend and fellow collector.

I have typical *amyntula* from San Francisco, Pasadena and Idlewild, San Diego Co., Calif.

Lycæna sonorensis.—Mr. Herr captured on March 14 a male of the above species. On the right side of the secondaries there is a slight trace of a red spot, and on the under side of the secondaries on the left wing there is another very conspicuous red spot, whereas there are no such spots in typical *sonorensis*.

Mr. Herr and myself have caught along the beach a species of *Pamphila* resembling *P. panoquinoides* in shape and general colour, but it has the row of spots on upper side of primaries as in *panoquin*, which puzzles us. *Panoquin* and *panoquinoides* are known only from the Atlantic coast and Florida, and the species here may possibly be new.

THE COCCIDÆ OF BRITISH NORTH AMERICA.

BY GEO. B. KING, LAWRENCE, MASS.

*(Continued from page 180.)**Rippersia*, Sign.

Rippersia lasii, Ckll., 1896. (Native.) Originally described from ant-nests in Mass.; was found in an ants' nest (*Lasius Americanus*, Em.) at Toronto, Canada, in 1897, by Mr. R. J. Crew. It has been found infesting the roots of China asters in Mass.

Bib.—CAN. ENT., xxxi. (1899), 110.

Dactylopius, Costa.

Dactylopius longispinus, Targ. (Introduced.) The greenhouse Mealy bug, found throughout the civilized world, occurs in Canada in all the Provinces where greenhouse plants are grown; it is recorded from South Quebec.

Bib.—29th Annual Report, Ent. Soc., Ont., 1898, 43.

KERMESINÆ.

Kermes, Roitard.

Kermes Pettiti, Ehrh., 1899. (Native.) This scale was found at Jubilee Point, on Rice Lake, near Peterborough, Ontario, by Dr. Fletcher several years ago, on *Quercus rubra*. Up to 1899, the species was considered to be a form of *K. galliformis*, and was confused with that species up to that time. It is a very common species in the U. S., but seems to be rare in Canada.

Bib.—Psyche, ix. (1900), 81.

ORTHEZIINÆ.

Orthezia, Bosc.

Orthezia Americana, Walker, 1852. (Native.) Recorded from Grimsby, Ontario, on Golden-rod. Dr. Fletcher states that he has found it at Ottawa and in several other places.

Bib.—Rpt. U. S. Dep. Agr., 1880, p. 349; 32nd Ann. Rpt. Mass. Agr. Coll., 1895, p. 124.

ASTEROLECANIINÆ.

Asterolecanium, Targ.

Asterolecanium variolosum, Ratz., 1870. (Introduced.) Originally described as *Coccus variolosus*, and often cited as *Asterodiaspis quercicola*, *Asterolecanium quercicola*, *Asterodiaspis variolosus* and *Coccus quercicola*. I received this from by Dr. Fletcher, who found it last year on young oak trees at Ottawa, Canada, which were set out five or six years ago, and

came from a nursery in Pennsylvania. Judging from the appearance of the infested twigs sent, they must be quite destructive. It has also been destructive to oaks at Niagara Falls, Ontario. The species is common at Washington, D. C., and is found at New York, Conn., and Mass., also on oak. I have some from Germany, on oak, sent Prof. Cockerell. *Mytilaspis ulmi*, L., are on the same twigs.

LECANIINÆ.

Lecanium, Illig.

Lecanium hesperidum, L., 1758. (Introduced.) This occurs as a greenhouse species in Canada, in all the Provinces where greenhouse plants are grown. It is a very common pest in Europe and the U. S.

Lecanium pyri, Schr., 1781. (Introduced.) Found on apple on Prince Edward Island in 1894. It is not as yet a very common species. I have found it once in Mass. on pignut hickory.

Bib.—CAN. ENT., xxvi. (1894), 35.

Lecanium antennatum, Sign. var. (Native.) Recorded from Jubilee Point, Rice Lake, Ontario, on red oak, *Quercus rubra*.

Bib.—CAN. ENT., xxvii. (1895), 36.

Lecanium juglandis, Bouché. (Perhaps introduced.) This was received from Prof. Cockerell last year, marked on the label "on plum at Queenston, Ontario." There is a scale infesting the plum trees in New York, called *L. cerasifex*, Fitch. The one from Queenston is not that species.

Lecanium quercitronis, Fitch, 1856. (Native.) Found on *Quercus coccinea* at Ottawa, Canada. This is a common species throughout North America.

Bib.—CAN. ENT., xxv. (1893), 221.

Lecanium Fitchi, Sign., 1873. (Native.) Recorded from St. David's, Ontario, on Lawton blackberry. This seems to be a species not well defined, and will need further study when found on blackberry again.

Bib.—Insect Life, vii. (1894), 30.

Lecanium Fletcheri, Ckll., 1893. (Native.) Originally described from specimens found by Dr. Fletcher at Ottawa, abundant on a hedge of *Thuja occidentalis* and on trees of the same species at Stittsville, Ont., 15 miles from Ottawa. It was next found at New York by Mr. Pettit, and next by the present writer in 1898 on *Arbor vite*, at Lawrence, Mass. Last year, in February, I received some scales on *Thuja occidentalis* from Vienna, marked n. sp., which proved to be *L. Fletcheri*. It

was next found by me on August 13, 1900, at the Harvard botanical gardens, Cambridge, Mass., on *Thuja occidentalis* var. The lot described from, by Prof. Cockerell, were parasited by a *Chalcidid*. Those which Dr. Fletcher sent me were also parasitized.

For a record of the excessive abundance of parasites of this species, see L. O. Howard, Bull. VII., N. S., Div. Ent. U. S. Dep. Agr., 1897, p. 62-63.

Bib.—CAN. ENT., xxv. (1893), 221; 29th Ann. Rpt. Ent. Soc., Ontario (1898), 88; CAN. ENT., xxxii. (1899), 141; Psyche, viii. (1899), 349; Psyche, ix. (1901), 154.

Lecanium Canadense, Ckll., 1895. (Native.) Originally described from Stittsville, Ont., about 15 miles from Ottawa, on *Ulmus racemosa*; received also from Nappan, Nova Scotia, on *Ulmus Americana*. The scales from Stittsville were affected by a *Coccinellid* (*Scymnus punctatus*) and an *Eucyrtid* parasite. This species has proved a serious enemy of *Ulmus Americana* at Ottawa. Dr. Fletcher has received specimens also from Brandon, Man. The scale has since been found in Maine and Mass. The species was described as *L. caryæ*, var. *Canadense*, but by further study in 1898, Prof. Cockerell decided that it was a distinct species.

Bib.—CAN. ENT., xxvii. (1895), 253; xxx. (1898), 294; The Industrialist, April, 1899, p. 232.

Lecanium pseudhesperidum, Ckll., 1895. (Nativity unknown.) Described from specimens found in a greenhouse at Ottawa, Canada, Dec. 15, 1894, on a *Cattleya*. *Aulacaspis Boisduvalii* was found on the same plant.

Bib.—American Naturalist, April 1st, 1895, p. 381.

Lecanium macluratum, Ckll., 1898. (Native.) Described from material collected near Niagara, Ontario; rather abundant on twigs of Osage orange, June 17, 1898.

Bib.—CAN. ENT., xxx. (1898), 294; The Industrialist, April, 1899, 236.

Lecanium caryarum, Ckll., 1898. (Native.) Described from specimens found on *Carya alba*, at Niagara, Ontario, June 17, 1898, and said to be very abundant.

Bib.—CAN. ENT., xxx. (1898), 293; The Industrialist, April, 1899, p. 233.

Lecanium nigrofasciatum, Perg., 1898. (Native.) The Peach

Lecanium is found in Western Ontario, on *Acer saccharinum*. Just recently Dr. Fletcher sent me specimens on white maple (*A. dasycarpum*) from St. Catharines, Ontario. Although this is called the Peach Lecanium, it is by no means confined to peach trees, as it is found on various species of maple, plum, apple, *Crataegus*, sycamore, *Brumelia*, linden, olive and *Vaccinium*.

Bib.—Bull. No. 18, U. S. Dep. Agr., Div. Entom. (1898), p. 27 ; CAN. ENT., xxi. (1899), 141.

Lecanium cerasifex, Fitch, 1856. (Native.) Said to have been found on plum at Queenston, Ontario, in 1894, and since that in many places in the fruit district extending from Niagara to Burlington, Ont.

Bib.—Rpt. Exp. Farm, 1895, p. 157 ; Trans. Royal Soc. Can., 1899-1900, p. 219.

Lecanium pruinatum, Coql., 1891. (Native.) This was found on peach at Niagara, Ontario. Received from Prof. Cockerell last year, sent to him by Dr. Fletcher.

Lecanium Websteri, Ckll. and King, 1901. (Native.) On black and red currant in Nova Scotia and at Ottawa, Canada. The species was for a long time supposed to be Fitch's *L. ribis*. It seems to be quite a general feeder, as will be seen when reference is made to the literature.

Bib.—CAN. ENT., xxxiii. (1901), 108.

Lecanium carya, Fitch, 1856. (Native.) This was found sparingly on peach at Niagara, Ontario, by Dr. Fletcher in 1898, and since that has been occasionally found by Mr. George E. Fisher on the same tree ; but never in abundance. It is the largest species of the subgenus *Eulecanium* found in North America. All that is known of the species will be found in the literature cited below.

Bib.—Entomological News, xii. (1901), 50-1.

Lecanium. Species probably new ; not sufficient for study ; was received with the above species ; also found at Niagara, Ontario, on peach.

Lecanium armeniaticum, Craw, 1892. (Native.) The apricot scale was found infesting orchards at Sherbrooke, Quebec, in 1899 ; it is common in California.

Bib.—Ann. Rpt. Exp. Farms, 1899, p. 160.

Lecanium cynosbati, Fitch, 1856. (Native.) Was received from Mr. John Dearness in 1900 ; found at London, Ontario, on honey locust. Dr. Fletcher states that he found this species abundant on honey-locust trees in the streets of Dundas, Ont., in 1898.

Pulvinaria, Targ.

Pulvinaria innumerabilis, Rathv., 1854. (Native.) The cottony maple scale. A common North American species. Recorded from grapevines and maple at London and other places in Western Ontario.

Bib.—15th Ann. Rpt. Ent. Soc., Ontario, 1884, p. 27; 29th *ibid*, 1898, p. 91.

Pulvinaria brassie, Ckll., 1895. (Nativity unknown.) Now considered identical with *P. floccifera*, Westw. Was found in a greenhouse at Ottawa, Canada, Dec. 15, 1894, on leaves of *Brassia verrucosa*. The plant is a native of Mexico, and was purchased from a New Jersey florist.

Bib.—CAN. ENT., xxvii. (1895), 135.

Pulvinaria occidentalis, Ckll., 1897. (Nativity uncertain.) Found infesting in a serious manner a whole plantation of red and white currant at Chilliwack, British Columbia, by Rev. G. W. Taylor, in the spring of 1899. In July (the same year) Dr. Fletcher visited the plantation and found these scales to be in enormous numbers, the white flocculent threads giving the bushes the same appearance as if a light fall of snow were upon them. It may turn out, however, that when we can get some of the European species of *P. ribesie* to compare with it, it may prove to be that species.

Bib.—Ann. Rpt. Exp. Farms, 1899, p. 203.

Eriopeltis, Sign.

Eriopeltis festuæ, Fonse, 1834. (Introduced.) The cottony grass scale. This was found by Mr. A. H. McKay, on grass, in large numbers in Cumberland Co., Nova Scotia, in 1889. It was cited as a new species of *Rhizococcus*, and is said to occur in Dakota, Indiana and Illinois, on timothy and red-top grass. It is parasited by a Dipteron, *Leucopis bellula*. It has occurred, in conspicuous numbers, several times in Nova Scotia and New Brunswick of late years.

Bib.—Insect Life, i. (1889), 385; *ib. ii.* (1890), 326; Report Exp. Farm, 1895, p. 145; Trans. Royal Soc., Canada, 1899-1900, p. 216.

DIASPINÆ.

Aspidiotus, Bouché.

Aspidiotus hederæ, Vall., 1829. (Introduced.) It is reported from British Columbia, and will be found in all the Provinces where greenhouse plants are grown. It is a common species on palms, *Cycas revoluta*, olive, ivy, etc. I have also received it on palm found in a house at London, Ontario, by Mr. John Dearness.

Aspidiotus Forbesi, Johnson, 1896. (Native.) The Forbes scale. This has been received from Mr. John Dearness, on beech (*Fagus Americana*), November, 1900, at London, Ontario; also on hawthorn, plum and apple in many parts of Ontario. It is recorded from Ottawa on fragrant currant (*Ribes*).

- Bib.—28 Ann. Rpt. Entom. Soc. Ont., 1897, p. 80.
 29 “ “ “ 1898, p. 86-88.
 30 “ “ “ 1899, p. 109.

Exp. Farm. Rpt., 1898, p. 205.

Trans. Royal Soc. of Can., 1899-1900, p. 219.

Aspidiotus ancylus, Putn., 1877. (Native.) The Putnam scale. It is recorded from Ottawa, on elm. I received it from Dr. Fletcher, April 10, 1900, on willow from Toronto, and just recently on plum from St. Catharines.

- Bib.—28 Ann. Rpt. Ent. Soc. Ont., 1897, p. 80.
 29 “ “ “ 1898, p. 86 and 88.
 30 “ “ “ 1899, p. 109.

Exp. Farm Rpt., 1898, p. 205.

Trans. Roy. Soc. Can., 1899-1900, p. 219.

Aspidiotus ostreaformis, Curtis, 1843. (Introduced.) The European orchard scale. Reported from Chilliwack, British Columbia. Is now received from Western Ontario and from St. Catharines, Ontario, on maple (*Acer dasycarpum*), sent by Dr. Fletcher, and found by Mr. George E. Fisher, April, 1901.

Bib.—Yearbook U. S. Dept. Agr., 1899, p. 746.

Trans. Roy. Soc. Can., 1899-1900, p. 219.

30 Ann. Rpt. Entom. Soc. Ont., 1899, p. 67 and 109.

Aspidiotus perniciosus, Comst., 1881. (Introduced.) The pernicious scale. This was first found near Kelowna, on Lake Okanagan, British Columbia, in 1894, and in 1897 it was reported as found in the Provinces of British Columbia and Ontario. The first lot received by the Government Entomologist was from an Ontario orchard near Chatham, in Kent Co., January, 1897, and soon after from Niagara and St. Catharines, and Kingsville in Essex Co. It has since been found on Vancouver Island (where it has been entirely eradicated); also at Guilds, south of Blenheim, Harwich, Belleville, London East, Chatham, Guelph, Winona, Burlington, Essex Centre and St. Thomas, Ont. Mr. John Dearness found a mite attacking this insect,

received from Mr. J. Gordon at Guilds, Kent Co., Ont., in 1899. Identified as *Tyroglyphus malus*. There is also a moniliform fungus found on specimens from plum.

Bib.—Farmer's Advocate, London, Ont., 1894.

CAN. ENTOM., Vol. 26, 1894, p. 355.

Entom. News, Vol. 9, 1898, p. 96.

28 Ann. Rept. Ent. Soc. Ont., 1897, p. 78.

29 " " " " 1898, p. 86.

30 " " " " 1899, p. 3.

31 " " " " 1900, p. 79-87.

Evid. of Dr. Fletcher before the House of Com., 1898, p. 1-12.

" " " " " 1899, p. 4-6.

" " " " " 1900, p. 1-7.

Trans. Roy. Soc. Can., 1899-1900, p. 218.

Ann. Rept. Exp. Farm, 1898, p. 204.

Aspidiotus (Targionia) Dearnessi, Ckll., 1898. This was found by Mr. John Dearness, August 20, 1898, on twigs of *Arctostaphylos uva-ursi* in the Ojibway Indian Reserve in Saugeen, in the Bruce Peninsula, on the sandy shore of a little bay of Lake Huron.

Bib.—CANADIAN ENTOMOLOGIST, Vol. 30, 1898, p. 266.

Aspidiotus diffinis, Newst., 1893. (Prob. introduced.) This is found in the woods on basswood (*Tilia americana*). I have received examples from Mr. Dearness, found in the woods at several places in Western Ontario, 1900, and am of the opinion that it may yet be proved to be a variety of *diffinis*.

Bib.—Entomological News, xi. (1900), p. 425.

Chrysomphalus, Ashm.

Chrysomphalus dictyospermi, Morg., 1889. (Introduced.) Dr. Fletcher sent this to me on leaves of cinnamon found in a greenhouse at Ottawa, April, 1900. It is found in hothouses in the United States.

Aulacaspis, Ckll.

Aulacaspis Boisduvalii, Sign., 1869. (Introduced.) Found in a greenhouse at Ottawa, Canada, on *Cattleya*, Dec. 15, 1894.

Bib.—American Naturalist, 1895, p. 381.

Aulacaspis rosæ, Bouché, 1833. (Introduced.) Often cited as *Diaspis rosæ*. This was received from Dr. Fletcher, January of this year. Found at Vancouver, British Columbia, out of doors, on rose bushes; also from Niagara, Ont., on outdoor roses.

Chionaspis, Sign.

Chionaspis pinifoliae, Fitch, 1855. (Native.) A common species in North America. Recorded from Toronto, Ottawa, etc., Ontario, and found in British Columbia, in 1897, on *Abies grandis*. In Quebec Province found very abundantly on *Picea alba*, at Metis, Que., by Dr. B. J. Harrington (Fletcher).

Bib.—Spec. Bull. Mass. Agr. Coll., August 10, 1899, p. 22.

Chionaspis Lintneri, Comst., 1883. (Native.) Apparently quite common on wild alder (*Alnus incana*) and birch (*Betula papyrifera*), at St. John, New Brunswick; Charlottetown, and many other places in Prince Edward Island; Chateauguay, P. Q., and Ottawa, Ont.

Bib.—CAN. ENT., Vol. 27, 1895, p. 33.

“ “ “ “ 30, 1898, p. 85.

Spec. Bull. Mass. Agr. Coll., 1899, p. 28.

Chionaspis furfurus, Fitch, 1856. (Native.) The scurfy bark-louse. This is another common scale found on apple. It is recorded from Leamington, Ontario; Nova Scotia, New Brunswick, and Prince Edward Island. Mr. Dearness sent it to me on hawthorn in 1898.

Bib.—28 Ann. Rpt. Ent. Soc. Ont., 1897, p. 16.

29 “ “ “ “ 1898, p. 86.

30 “ “ “ “ 1899, p. 68.

CAN. ENT., Vol. 26, 1894, p. 354.

Spec. Bull. Mass. Agr. Coll., 1899, p. 28.

Psyche, Vol. 8, 1899, p. 336.

Chionaspis salicis-nigræ, Walsh, 1867. (Native.) Recorded from Leamington, Kingsville and Kingston, Ontario.

Bib.—Spec. Bull. Mass. Agr. Coll., 1899, p. 20.

Hemichionaspis, Ckll.

Hemichionaspis aspidistræ, Sign., 1869. (Introduced.) Originally described as a *Chionaspis*. I received this from Dr. Fletcher, on a fern (*Pteris serrulata*) found in a greenhouse at Ottawa, Canada, December 16, 1900. It is found in California, Washington, D. C., and Mass.

Mytilaspis, Sign.

Mytilaspis ulmi, L., 1758. (Introduced.) The oyster-shell bark-louse of the apple, heretofore recorded as *Alytilaspis pomorum*, Bouché. It is well established throughout Canada, and recorded from Ottawa on red and black currant, lilac, Spiræa, ash, dogwood, mountain ash, and hawthorn. I have it from Mr. John Dearness, found at London, Ontario, 1900, on apple. *Aspidiotus perniciosus*, Comst., are on the same twigs.

Bib.—CAN. ENT., Vol. 26, 1894, p. 354.

Exp. Farm Rpt., 1898, p. 205.

Evid. of Dr. Fletcher before the Com. of House of Comm.,

1898, p. 18; *ibid*, 1900, p. 12.

28 Ann. Rept. Ent. Soc. Ont., 1897, p. 16.

29 “ “ “ “ 1898, p. 88.

30 “ “ “ “ 1899, p. 12 and 67.

THE XIPHIDIINI OF THE PACIFIC COAST.

BY A. P. MORSE, WELLESLEY, MASS.

In the summer of 1897 I devoted several weeks to a rapid Orthopterological reconnaissance of the Pacific Coast, collecting material at various points from Yuma to Victoria, B. C., and the following paper is based upon the specimens secured at that time. At the request of Mr. Scudder, to whose collection and mine the types belong, I have studied the material, with the results given below.

So far as I am aware, no species of this group has hitherto been recorded from west of the Rocky Mountains, although it is exceedingly improbable that specimens are not to be found in entomological collections from that region. In the following paper, four well-defined species are noted, one of them extending entirely across the continent. Two others are of especial interest, from the great variation presented by them according to locality, and students of the group will do well to collect material in considerable series.

Orchelimum agile, DeGeer.

One ♀, Sisson, Calif., Sept. 3. Identical with New England examples; taken among the grasses and sedges of a springy meadow.

Xiphidium spinosum, sp. nov.

Fastigium of vertex of moderate width, rather more than one-third of the width between the eyes, the sides divergent when viewed from in front. Pronotum with the hind margin convex, the lateral lobes as deep as long, their posterior margin nearly straight, a distinct sinus at the shoulder. Tegmina narrow at tip, passing the hind femora 1 to 2 mm. and exceeded by the wings by about the same amount. Fore tibiæ with 5 or 6 pairs of spines. Hind femora bearing on the under side from 2 to 5 (usually 4) strong black spines, the genicular lobes distinctly bispinose. Subgenital plate of the male truncate, the cerci of moderate length, straight, bearing the usual inwardly-directed tooth at the basal third, the distal two-thirds broad, with subparallel sides, the apex blunt and strongly depressed from above.

Testaceous, with a dark median band on top of head and pronotum, reaching tip of the fastigium. Antennæ rather short, brownish fuscous. Femora and tibial spines black, or nearly so.

Antenna: 35-40. Pronotum: 3. Ovipositor: 7-8. Cerci of ♂: 1.5-2. Body: ♂, ♀, 13-14. Post. fem.: ♂, 10.5-11.5; ♀, 11.5-12. Teg.: ♂, 13.3-15; ♀, 15-16 mm.

Three ♂, 2 ♀, 1 immature ♀, Coronado, Calif., July 24, on salt-marsh; collected by A. P. Morse.

Xiphidium occidentale, sp. nov.

Fastigium of vertex very broad, at least one-half as wide as the distance between the eyes, blunt, convexly rounded in front; viewed from before, as wide as deep, the sides very strongly divergent. Lateral lobes of the pronotum usually longer than deep, the hind margin straight or nearly so, passing into the hind margin of the posterior process with but a slight sinuosity. Dorsum of the pronotum with the front and hind margins truncate or slightly convex, the front margin sometimes slightly excavate. Tegmina of the male covering two-thirds or three-fourths of the abdomen, rarely all but the cerci, of moderate width, rounded at the apex; those of the female covering about one-half of the abdomen, in var. *camurum* reaching apex of the hind femora, the distal portion wide, with well-rounded apex. Wings equalling tegmina except in *camurum*, in which they exceed them about 2 mm. Spines of the fore tibiae 5 or 6 pairs. The hind femora unspined, the genicular lobes pointed, scarcely spinose.

Cerci of the male long, stout, the apex regularly tapering, acuminate and very slightly depressed at tip, the lateral outlines slightly sinuous, the usual stout, inwardly-directed tooth present near the base. Ovipositor of the female two-thirds to seven-eighths as long as the hind femora, slightly curved upward in both margins, tapering very gradually to the slender tip.

Brown above, with brown or green sides, and usually with a broad dark-brown median band on head and pronotum (often also on exposed portion of abdomen of female), bordered on each side by a pale yellowish stripe; the dorsum of abdomen of young with a broad fuscous band.

Antenna: ♂, 19-37; ♀, 27-35. Pronotum: ♂, ♀, 3.5-4. Teg.: ♂, 6-8.5; ♀, 4-7. Body: ♂, 10-15.5; ♀, 13-15. Post. fem.: ♂, 9.5-14; ♀, 10-15. Ovip.: 8-13, usually 9-10 mm.

68 ♂, 59 ♀, 3 young. Aug. 3 to Sept. 4, at Tehachapi, Ahwanee, Wawona, Yosemite Valley, Berkeley, Sisson, Gazelle, Calif.; Sept. 7 to 15, at Ashland, Grant's Pass, Roseburg, and Corvallis, Or.; collected by A. P. Morse; also 1 ♂, 1 ♀, Sisson, Calif., in cab. S. H. Scudder.

X. occidentale camurum, var. nov.

1 ♀, Ashland, Or., Sept. 7, taken by A. P. Morse. This specimen is apparently a long-winged form of the species here described, differing from it only in the complete development of the tegmina and wings, the former

being 16 mm. long, and the latter passing them 2 mm., exceeding the end of the hind femora 1.5 mm.

X. occidentale caudatum, var. nov.

1 ♂, 2 ♀, Mt. Shasta district, July, Hy. Edwds, No. 165 (coll. S. H. Scudder). In these specimens the ovipositor of the females is exceptionally long, even relatively to the hind femora, the usual proportions of the two being reversed, thus: Post. fem., 10-10.5; ovip., 13.5-14.5 mm. Nevertheless, in the absence of other evidence, I am disposed to regard them as belonging to this species.

In this connection it is of interest to note that specimens from the Mt. Shasta region (Sisson, Gazelle), not only of this species, but of the following (*vicinum*), have the ovipositor of exceptional length, as the accompanying measurements will show:

	Roseburg and Grant's Pass.	Berkeley.	Ahwanee.	Wawona.	Yosemite Val.
P. fem.	14 13.5	12.3	12	13.6 12.5	15 14
Ovip.	9 9.5	8	8.3	10 10.3	12 13
	Gazelle.		Sisson.		var. <i>caudatum</i> .
	13 11.5	11.7	11.5 10.5 10	10 10.5	
	11.5 10	9.5 10	9 9	13.5 14.5	

Compare also the relative proportions of the specimens from Roseburg and Grant's Pass with those of the Yosemite Valley.

Xiphidium vicinum, sp. nov.

Very similar in colour, size and structure to *X. fasciatum* of the east, but with the ovipositor almost constantly longer, both actually and in proportion to the hind femora, in long-winged females reaching the end of the wings; wings and tegmina dimorphic, in long-winged examples passing the apex of the hind femora 4-6 mm.; in general, however, falling short of their tip by 2-3 mm. The male often indistinguishable from *fasciatum*, but with cerci showing a tendency toward greater breadth across the basal part of the apical portion (just distad of the tooth), and a less sinuous externo-lateral margin.

In a considerable series of *fasciatum* before me, the ovipositor ranges in length from 50 to 69% of the length of the hind femora. In *vicinum* the range is from 67 to 95%, and the actual measurements are as follows:

Ovip.	H. fem.	Ovip.	H. fem.
7	9.3	10	11.4-12.5
8	9.3-12	11	12-14
9.5	10-11	13	13.7-14.5

In general, specimens from the south are larger, and have the ovipositor actually and proportionally longer than those from the north or the coast, but, as noted above under *occidentale*, those from the Shasta region have relatively long ovipositors.

This variation in size and proportions is very noticeable when material is arranged in series according to locality, in the examples before me there being less range of variation from the same locality than in specimens of *fasciatum* from New England. Owing to this and to the difference between the southern and the coastwise and northern examples, there appears to be a tendency toward the formation of local races. Some idea of these differences may be gained from the following measurements of the hind femora and ovipositor of the material from various localities:

	West Berkeley.	Mill Valley.	Tenino.	Divide.	Drain.
H. fem. . .	10.5-12	9.5	11.5-12	11-12.3	9.3-10.7
Ovip . . .	8-9	8	8-9	7.5-8.5	7.5-8
	Gazelle.	Sisson.	San Bernardino.	Colton.	Palm Springs.
H. fem. . .	9.3	10.6-11.5	13.3-14	12-14.5	11.3-14
Ovip . . .	8	9-9.7	11-13	10-13	10-13

The long-winged examples consist of 6 ♂, 5 ♀, from Palm Springs, San Bernardino, Colton and Kern City, in California, and of 4 ♂ from Ashland and Glendale, Or.; in two of the latter, however, the wings exceed the hind femora but little. For this form, especially as found in the south, I propose the name *productum*. It resembles *fasciatum* from the south-eastern States very closely except for the much longer ovipositor.

61 ♂, 59 ♀, California, from July 10 to Sept. 4, at Palm Springs, San Bernardino, Colton, Los Angeles, Kern City, Lathrop, West Berkeley, Mill Valley, Sisson, and Gazelle; Oregon, from Sept. 7 to 12, at Ashland, Glendale, Drain, and Divide; Washington, Sept. 24, at Tenino; in grass and sedge along streams; collected by A. P. Morse.

KEY TO SPECIES.

Stouter species; ovipositor of female strongly curved, stout; subgenital plate of male triangularly excavate *Orchelimum agile*.

Slenderer species; ovipositor of female slender, straight or but little up curved; subgenital plate of male truncate.

Hind femora spinose on under side. *Xiphidium spinosum*.

Hind femora unspined.

Vertex very broad and blunt, one-half as wide or wider than the distance between the eyes; tegmina and wings usually abbreviated; cerci of male long, acuminate at tip. *Xiphidium occidentale*.

Vertex less than half as wide as distance between eyes; tegmina and wings variable, but covering whole of abdomen or more; cerci of male short, strongly depressed at tip. *Xiphidium vicinum*.

MORE ABOUT THE RED-WINGED CATOCALÆ.

BY G. H. FRENCH, CARBONDALE, ILL.

At the time of writing my article* on the "Red Wing" species of Catocalæ I was in doubt about a few forms, as there were some I had not seen. Since writing that, Mr. O. C. Poling, of Quincy, Ill., kindly sent me for examination some of these, and many others from his large collection; besides enriching my cabinet with several species it did not before contain. To bring the "Red Wings" into what seems to be their proper relationship my last article needs a revision, which I will here make before taking up the "Yellow Wing" forms.

Marmorata should probably precede *Concumbens*, where it may be found in this series. Mr. Poling's new species, *Frenchii*, should follow *Californica* and its varieties. Mr. Henry Edwards described both *Jessica* and *Portia* as related to *Californica*. These, with Mr. Poling's species, *Hippolyta* and *Luciana*, it seems to me should constitute what might be called the *Californica* group.

Next I would place the *Junctura* group, from 32 to 38. This group has been a puzzle to all students of the genus from the time Mr. Grote began working on it to the present. From a careful study of Mr. Poling's large series, what my own cabinet contains, and some from the cabinet of Supt. A. J. Snyder, of Belvidere, Ill., I believe I have identified the forms so far as names are concerned. As to their value as species, that can not be decided definitely without breeding, nor can breeding decide the question unless we know what forms a brood make after they are bred. I have bred one of these, *Stretchii*, and have in my series a good representation of its variations. I would place *Cassandra Walshii* here for more than twenty years, and Walker's description of *Junctura* does not fit any specimen I have ever taken. It seems to me

* CAN. ENT., XXXIII., 12 (Jan., 1901).

to be as much entitled to specific rank as any of the group. *Aspasia* is a Colorado form that extends very little outside that State. *Babayaga* and *Arizona* are both to be found in Arizona. The general tone of the first is reddish gray, that of the second bluish gray. A specimen before me from Texas differs from all the others in the group in having a greenish tint and in being larger than the others. Mr. Dodge, of Louisiana, Mo., has another specimen from the same locality that is like this. It may be that when more material is obtained of this and of *Arizona* they may be sufficiently distinct to merit a name.

Circe is another species of which some doubt has been felt. For this reason I placed it as a variety of *Coccinata* in my former article. I have occasionally taken the form here, and have seen it in other cabinets, and it has always been *Circe*, without any variation toward *Coccinata*. The late Henry Edwards expressed the opinion that it was a valid species. I will here follow what has been my own conviction as to the form, and place it in the list as a distinct species. Beginning with *Cara*, I would group the species as follows :

- | | |
|----------------------------------|----------------------------------|
| 22. <i>Cara</i> , Guenée. | 34. <i>Aspasia</i> , Strecker. |
| var. <i>Sylvia</i> , Hy. Edw. | var. <i>Sara</i> , French. |
| var. <i>Carissima</i> , Hulst. | 35. <i>Walshii</i> , Edw. |
| 23. <i>Amatrix</i> , Hubner. | 36. <i>Junctura</i> , Walker. |
| var. <i>Nurus</i> , Walker. | 37. <i>Cassandra</i> , Hy. Edw. |
| 24. <i>Marmorata</i> , Edw. | 38. <i>Stretchii</i> , Behr. |
| 25. <i>Concumbens</i> , Walker. | 39. <i>Augusta</i> , Hy. Edw. |
| var. <i>Diana</i> , Hy. Edw. | 40. <i>Rosalinda</i> , Hy. Edw. |
| var. <i>Hillii</i> , Grote. | 41. <i>Pura</i> , Hulst. |
| 26. <i>Californica</i> , Edw. | 42. <i>Semirelicta</i> , Grote. |
| var. <i>Perdita</i> , Hy. Edw. | 43. <i>Unijuga</i> , Walker. |
| var. <i>Cleopatra</i> , Hy. Edw. | 44. <i>Beaniana</i> , Grote. |
| 27. <i>Frenchii</i> , Poling. | 45. <i>Meskei</i> , Grote. |
| 28. <i>Jessica</i> , Hy. Edw. | 46. <i>Mariana</i> , Hy. Edw. |
| 29. <i>Hippolyta</i> , Hy. Edw. | var. <i>Francesca</i> , Hy. Edw. |
| 30. <i>Portia</i> , Hy. Edw. | 47. <i>Grotiana</i> , Bailey. |
| 31. <i>Luciana</i> , Hy. Edw. | 48. <i>Hermia</i> , Hy. Edw. |
| <i>Nebraska</i> , Dodge. | 49. <i>Briseis</i> , Edw. |
| var. <i>Somnus</i> , Dodge. | 50. <i>Faustina</i> , Strecker. |
| 32. <i>Babayaga</i> , Strecker. | var. <i>Zillah</i> , Strecker. |
| 33. <i>Arizona</i> , Grote. | var. <i>Verecunda</i> , Hulst. |

- var. *Allusa*, Hulst.
51. *Irene*, Behr.
var. *Virgilia*, Hy. Edw.
var. *Volumnia*, Hy. Edw.
var. *Veleria*, Hy. Edw.
52. *Parta*, Guenée.
var. *Perplexa*, Strecker.
var. *Petulans*, Hulst.
53. *Coccinata*, Grote.
var. *Sinuosa*, Grote.
54. *Circe*, Strecker.
55. *Aholibah*, Strecker.
56. *Chiricahua*, Poling.
57. *Violenta*, Hy. Edw.
58. *Verilliana*, Grote.
- var. *Ophelia*, Hy. Edw.
var. *Votiva*, Hulst.
59. *Ultronia*, Hubner.
var. *Celia*, Hy. Edw.
var. *Mopsa*, Hy. Edw.
var. *Adriana*, Hy. Edw.
var. *Herodias*, Strecker.
60. *Ilia*, Cramer.
var. *Zoe*, Behr.
var. *Uxor*, Guenée.
var. *Osculata*, Hulst.
61. *Innubens*, Guenée.
var. *Flavidalis*, Grote.
var. *Hinda*, French.
var. *Scintillans*, Grote.

ON LABELING INSECTS.

There is a great lack of uniformity in labeling insects; owing to which it is often impossible to distinguish the name of the locality from that of the collector; and with reference to the date of capture, it is impossible to discover what is meant (when the day of capture is less than the 13th), on account of some collectors placing the day of the month first, and others the month.

For instance, a specimen taken on May 10, 1901, would by some be labeled 10, 5, 1901, and by others (chiefly amongst Americans) 5, 10, 1901. On passing from one collection to another, the recipient would be undecided as to whether the figures referred to May 10 or Oct. 5.

Again, now that exchange abroad is much more common than formerly, it is insufficient to give simply the village or wood in which the insect is taken.

The province or county should also be given, in full if possible, unless the name of the country be also added, when both the latter may be abbreviated; as for example: "Bradford, Yorks., Eng.," or "Shovel Mount, Burnet Co., Tex."

It must be remembered that there are counties of Middlesex, Surrey and Cornwall in Jamaica; that there are similar instances everywhere, and hosts of towns with well-known English names in the United States, in Canada and other colonies; so that specimens so ambiguously labeled

as "London," "Victoria," etc., might give rise to much confusion in general collections.

I have the honour, therefore, to propose the following system of labeling all insects :

1st. The exact locality is to be given in full, invariably including county (or province) also, such as "Bognor, Sussex," "Admont, Styria," "Palm Beach, Florida"; or if the county's name be abbreviated, the country also to be added, as "Bradford, Yorks., Eng."

2nd. The date to be invariably given in the following order: Day, month, year; and to further avoid misunderstanding, the month to be given in Roman numerals, thus: May 10, 1901, should read 10, v, 1901.

3rd. The collector's name (if added) to be always placed sideways to the rest of the inscription, and the ticket to be attached to the insect so that it may be read from the right-hand side of the specimen.

Examples :

BRUNETTI.	New Forest, Hants, Eng. 16, vi, 1901.
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CROSBY.	Lake Keuka, New York, 14, viii, 1901.
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The scientific value of collections thus uniformly labeled would, I think, be increased, and reference, at least, much facilitated.

E. BRUNETTI, London, England.

BRITISH MUSEUM COLLECTIONS.

The national collection of Lepidoptera located in the National History Museum at South Kensington has recently been greatly enriched by the addition thereto of the almost unique collection of butterflies from Europe and Central and Eastern Asia, together with the collection of European moths, formed by the late Mr. John Henry Leech, of Hurdcott House, Salisbury. Arrangements had been made during Mr. Leech's lifetime, under which the Museum became possessed of his Eastern Asian moths, and now the same public institution has acquired the still more important accessions adverted to, through the munificence of his mother, Mrs. Leech, of Kensington Palace-gardens. Of Rhopalocera there are rather more than 18,000 specimens. This collection of Palearctic butterflies is very rich in Chinese and Japanese species, and in local forms and aberrations of European species. The European Heterocera number about 23,000 specimens.—*Daily Telegraph*, London, England.

NEW COCCIDÆ FROM NEW MEXICO.

BY T. D. A. COCKERELL.

Orthezia lasiorum, n. sp.—♀. About 2 millim. long; pale orange; ovisac (in specimen seen) not very long; two very long median white caudal lamellæ, about two-thirds length of body, curving over ovisac, but not attached to it. Dorsum covered with waxy secretion, but it is so easily deciduous that I have never found an adult with it sufficiently in place to describe. Middle leg with femur + trochanter 300 μ , tibia 240, tarsus (without claw) 180. Antennæ 7-jointed, the last joint with a terminal spine; joints measuring in μ : (1.)75-90. (2.)72-75. (3.)84-95. (4.)60. (5.)48. (6.)45. (7.)120-129. I have never found one with 8 joints, though I should expect such to occur.

Young.—Length of body about 1 millim.; body yellowish-pink, thickly covered with waxy lamellæ, no bare areas; long caudal lamellæ; antennæ and legs black or almost. There is a groove down the middle of the back, with no triangular plates (such as occur in *O. occidentalis*); the anterior lateral lamellæ are about $1\frac{1}{2}$ as long as broad, the posterior ones about $2\frac{1}{2}$ as long as broad. The caudal lamellæ make a very conspicuous tail.

Hab.—Abundant in nests of *Lasius Americanus*, Las Vegas and Trout Springs, N. M. Easily known by the orange colour and long tail. *O. occidentalis* also occurs at Trout Springs; its secretion is hard to remove, not at all easily brushed off as in *lasiorum*. Although *O. lasiorum* is so abundant, I have never seen it except in nests of *Lasius*. The ♀ with ovisac was first found by my wife, April 25.

Dactylopius Neomexicanus, var. *indecisus*, n. var.—♀. $1\frac{2}{3}$ millim. long. Pink, varying to pale sage green; mealy; no lateral or caudal tufts; no well-defined ovisac; legs and antennæ very pale. Middle leg, with femur and trochanter, 174 μ ; tibia 108; tarsus (without claw) 60. Antennæ 8-jointed, varying to 7; one ♀ full of eggs had one antenna with 8 joints, the other with 7. Formulæ: 812(37)(56)4 and 821(37)6(45). Measurements of joints in μ : (1.)36-45. (2.)36-40. (3.)24-25. (4.)15. (5.)15-18. (6.)18-21. (7.)24. (8.)63-69. Seven-jointed form: (1.)45. (2.)45. (3.)30. (4.)36. (5.)24. (6.)27. (7.)63.

Hab.—In nests of *Lasius Americanus*, Las Vegas, N. M., April 22 (*W. P. Cockerell*). I thought this might be merely a summer form of *D. Neomexicanus*, but the types of the latter, with very different ovisacs, were collected in summer.

Eriococcus Tinsleyi, var. *cryptus*, n. var.—♀. When boiled in potash becomes bright red; dermal spines fairly numerous, about $24\ \mu$ long; middle leg with femur + trochanter $150\ \mu$, tibia 90 , tarsus (without claw) 100 . Antennæ (in females full of eggs) 6-jointed. Formulæ: 31(26)45; 321(46)5. Measurements of joints in μ : (1.)30. (2.)27-36. (3.)87-90. (4.)24. (5.)21. (6.)24-27.

Hab.—Under rocks, Las Vegas, N. M., April 19th, etc. (*Wilmatte P. Cockerelli*). I believe the roots it lives on are those of *Gutierrezia*. This is probably a distinct species.

Pseudolecanium Californicum (Ehrhorn).—This is to be added to the fauna of New Mexico; it was found in Las Vegas, on grass, by my wife and myself. It was determined by Mr. Parrott.

BOOK NOTICES.

MOSQUITOES: How they live; How they carry disease; How they are classified; How they may be destroyed.—By L. O. Howard, Ph. D. New York: McClure, Phillips & Co., 1901. I. Vol., 12 mo., pp. xv. + 241. (Price, \$1.50; postpaid, \$1.64.)

For nearly ten years Dr. Howard has applied himself to the study of the life-history and classification of North American mosquitoes, and to practical experiments for their destruction. His success in the latter direction has become widely known to the general public, while his scientific work has caused him to be looked upon by entomologists as our chief authority regarding these obnoxious insects. In the work before us he has embodied in popular form the results of his observations and investigations, and furnishes a most interesting and valuable handbook, written in attractive style and presenting in a clear and concise manner all that is known at the present time on this subject. The title of the volume gives an epitome of its contents, and shows at a glance how completely it covers the ground and how full of useful information it evidently is. We commend its perusal to all who suffer the tortures inflicted by these tiny creatures—that is, to almost every inhabitant of this continent—for the mosquito is ubiquitous and her attacks are often serious.

In the older settled parts of Ontario we are happily almost entirely free from annoyance by mosquitoes, but there are many localities where life on a warm summer's night is rendered almost unendurable by these tormentors. The author shows how this plague may, in most cases, be

got rid of with a little combined effort and without any very great expense. It is first necessary to acquire the knowledge that this book provides of the life-history and habits of the insect, and then to carry out carefully the remedial measures that have proved effective in a variety of instances. It is surprising to learn how successful intelligent efforts for the abolition of mosquitoes have proved in many places, and how comparatively easy it would be to adopt similar measures almost anywhere in mosquito-infested neighbourhoods.

One of the most interesting parts of the book is that on malaria, yellow-fever and other diseases which it is now proved are transmitted by the bites of mosquitoes. This is a subject of the deepest interest to the medical profession, and of the utmost importance to dwellers in tropical and sub-tropical regions. The author gives a concise account of the researches that have been made in various parts of the world, and the positive conclusions that have been arrived at; he also furnishes a complete life-history of *Anopheles maculipennis*, and points out the best methods of dealing with it and other disease-bearing species.

Enough has now been said to show the absorbing interest of the work and its value not only to those who live in mosquito-infested regions, but also to the medical profession in particular and to all who are attracted by the study of nature in any of its aspects, or who wish to know the results of the latest researches regarding a subject of great scientific and world-wide importance.

C. J. S. B.

REPORTS OF THE EXPERIMENTAL FARMS OF THE DOMINION FOR 1900.—
Ottawa: S. E. Dawson, 1901. One Vol., 8vo., pp. 494.

In these annual volumes, which are growing in size and value from year to year, may be found a vast fund of information on every variety of topic that can be of use or interest to the farmer, fruit-grower, gardener, stock-raiser or poultry-breeder in any part of the Dominion of Canada. They contain also much that is of value to those engaged in scientific work, especially to the chemist, the botanist, and the entomologist. The attention of the last mentioned we may draw to Dr. Fletcher's portion of the Report for 1900 (pages 195 to 249), in which he describes a number of the most serious insect attacks of the year, and relates the remedial measures that can be recommended in each case. The outbreak of the Hessian fly in Western Ontario is fully dealt with; this is followed by accounts of injury to wheat in the Northwest by the wheat-stem sawfly

(*Cephus pygmaeus*), by cutworms and grasshoppers in Manitoba, and by excessive heat and drought over a large area of the Northwest last summer. The pea weevil and the pea aphid are described as very injurious, and growers are instructed how to deal with them; many pages are then employed in describing the variegated and spotted cutworms, their natural enemies and parasites, and the best methods of repressing their attacks. The San José scale and a variety of other insects are also discussed, and a list is given of a large number that have been injurious to fodder crops, roots and vegetables, and fruits. Honeybees have a chapter devoted to them, and this section of the Report is concluded with a description of the successful experiments made for destroying wild mustard by spraying with a solution of copper sulphate. C. J. S. B.

CORRESPONDENCE.

THE CODLING MOTH.

STR.—Prof. Gillette, of the State Agricultural College, Colorado, is trying to clear up some of the lacking information concerning that terrible pest of the fruit-grower, the Codling Moth, and I think some of our members may do very valuable work for horticulture in North America by co-operating with him and sending him accurate and careful observations, with exact dates, upon the points mentioned in the following extract:

Prof. Gillette says: "I am anxious for further information from some northern parts. I particularly want to know the date when larvæ of the first brood begin to leave the apples to spin, and what proportion of the larvæ taken about the middle of July or a little later will transform to moths the same season. To determine the first point, a few bands could be placed about bearing trees, and frequently examined for worms after the last week in June until the worms appeared. To determine the second point, a good number of the worms or pupæ could be taken when they are rather abundant under bands, probably about the end of July, and placed in boxes for rearing. I should be very glad to receive a number of larvæ taken any time in July from any place in Canada."

Prof. Gillette has done and is doing such excellent work in practical entomology that I feel sure some of our members who have an opportunity, without much trouble, to help in this important investigation will do so. The results will be given to the world, and all fruit-growers and fruit consumers will benefit.

J. FLETCHER, Ottawa.

Mailed June 29th, 1901.