



A FOSSIL BUTTERFLY—CHLORIPPE WILMATTAE, CKLL.

The Canadian Entomologist.

VOL. XXXIX. LONDON, NOVEMBER, 1907.

No. 11.

A FOSSIL BUTTERFLY OF THE GENUS CHLORIPPE.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

Among the interesting specimens found in the miocene shales of Florissant, Colorado, is a well-preserved butterfly, collected by my wife. It shows the head and thorax, one antenna, and the anterior wings, all well preserved. The study of it has raised some questions as to the evolution of the markings and wing-form in *Chlorippe* and its allies, and I venture to hope that a statement of these may produce some fruitful discussion.

Chlorippe Wilmattæ, n. sp.

Expanse, 64 mm.; length of anterior wing, 30 mm.; antennæ about 13 mm., gradually broadening apically, the club not at all abrupt; about 4 mm. may be considered to be club, but it is hard to say where it begins. Palpi well developed, apparently as in *Chlorippe*. Thorax robust, dark. Wings with the outline about as in *C. alicia*, ♂, but the apical point between the radials is sharper and longer, being quite suggestive of that part in *Vanessa*, and exactly agreeing with the same structure in the South American *Chlorippe sultana* ♂; wing as preserved pale sepia brown, with whitish spots, these latter corresponding to those in *Chlorippe*, in a general way, but differing in the arrangement. In the apical field the spots are small and round; the three outer ones, instead of forming the corners of a triangle, are arranged in a line, which is slightly curved outwards, and parallel with the outer margin. On the other hand, the three inner ones, which in *Chlorippe* form a curved or oblique line or band, are so arranged that the two lower are close together, one above the other, while the third or upper is far basad, the interval between the upper and middle one being about the same as that between the middle inner and corresponding outer. The four large spots in the median interspaces are all very distinct, 2 mm. or over in diameter; none of them are ocelli. In modern *Chlorippe* the upper inner one is usually quite small, but in the fossil it is large like the lower, and is so placed that a line drawn through the two inner ones points almost accurately to the apex of the wing. Of the spots between the median and submedian veins, both are somewhat diffused, though distinct, and the outer is

placed directly beneath the lower outer one of the median interspaces, instead of basad of it as in modern *Chlorippe*. The inner is also shifted more apicad, forming a large patch beneath the inner lower one of the median interspaces. There is no pale marginal line or band. The venation agrees with that of *Chlorippe*, with the same open cell. The cell is about 16 mm. long, thus reaching beyond the middle of the wing.

Florissant, Station 21 (hill south of the sawmill), July, 1907 (W. P. Cockerell).

With regard to the wing-form, it is noteworthy that it resembles more that of *Vanessa* than that of the modern North American *Chlorippe*, but it agrees well with the South American *C. sultana*, Foetterle. The markings, however, are much nearer to those of the North American species. Modern *Chlorippe* shows a noteworthy sexual difference in wing-form, the males possibly approximating to the elder type, if we are justified in regarding the fossil as a representative of such.

Since the North and South American species of *Chlorippe* differ very strongly, we are naturally led to ask which is on the whole the older, and where did the genus originate? The fossil certainly is not decisive upon this point, and I do not pretend to offer a definite opinion. Assuming, however, that such a species as *C. sultana* represents an early type of *Chlorippe*, certain things follow in an interesting manner. Taking such a species as *Vanessa j-album*, we find that the markings of the anterior wings take the form of three oblique, parallel, more or less broken bands. These bands may be traced in many Nymphalidæ; thus, in *Junonia cania* the middle one is especially prominent. Now, in *Chlorippe sultana*, or rather in the variety or allied species, *favorita*, Foetterle, we find these bands all very distinctly represented by rows of white spots, the first and third by two each, the middle one by five. If this is a primitive condition, what has happened in the evolution of the North American species? The first or apical band remains unaltered, except that the lower spot is often an ocellus. The second is broken by the shifting of the three upper spots to form somewhat of a crescent, while the two lower spots are no longer oblique, but one above the other. Moreover, a new spot has appeared, just above the first of the two lower, and the three form a straight line parallel with the margin. The lowermost is usually an ocellus. The inner band is modified by the intrusion of the fulvous base of the wing, and has some additional spots.

In the fossil we find :

(1) The first band is parallel with the margin, not oblique, thus differing from the living forms.

(2) The second band has the uppermost spot shifted even more out of place than in the N. American species ; but the third spot is nearly over the fourth, so that the continuity of the band is fairly evident. The whole band, however, is not nearly so oblique as in *C. sultana*.

(3) The inner band consists of three spots, the middle large one being quite absent in *C. sultana*, but present in the N. American species.

(4) In the recent N. American species the small spot in the middle of the wing looks like part of the innermost band ; it is wholly absent in *C. sultana*. In *C. Wilmattæ*, however, it is very large, and entirely out of the line of the inner band ; appearing, on any theory of the derivation of the spots from three bands, as an extra and unexplained character. When, however, we turn to such a species as *Basilarchia Lorquini*, we find this spot coming in quite naturally as part of the great white transverse band ; and the breaking of this band to form the median oblique band is seen in *Heterochroa Californica*.

Among the fossil butterflies known from Fiorissant, *Chlorippe Wilmattæ* is most like *Lithopsyche styx*, Scudder. I compared it carefully with the type of the latter, in the Museum of Comparative Zoology, and they are evidently not closely allied. The markings of the *Lithopsyche* differ in many details.

THE COLLETIDÆ OF SOUTHERN MAINE.

BY JOHN H. LOVELL, WALDOBORO, MAINE.

Colletes compactus, Cr.

1868—*Colletes compacta*, Cr. ♀ ♂, Proc. Bost. Soc. Nat. Hist., 12:166.

1879—*Colletes compacta*, Patton. ♀ ♂, Proc. Bost. Soc. Nat. Hist., 20:142.

Female specimens taken on Solidago Sept. 7 to 18, and on Aster puniceus, Sept. 12. This species and *C. armatus* and *C. americanus* have been collected only late in August or in September.

November, 1907

Colletes inaequalis, Say.

1837—*Colletes inaequalis*, Say. ♀ ♂, Bost. Jour. Nat. Hist., 1:391.

1859—*Colletes inaequalis*, Leconte, ed. of Say's Writ., 2:770.

1868—*Colletes propinqua*, Cr. ♀ ♂, Proc. Bost. Soc. Nat. Hist., 12:165.

1879—*Colletes inaequalis*, Patton. Proc. Bost. Soc. Nat. Hist., 20:142.

One female specimen on *Salix*, May 7, 1905.

Colletes armatus, Patton.

1868—*Colletes inaequalis*, Cr. (not Say). ♀, Pr. Bost. Soc. N. H., 12:166.

1879—*Colletes armata*, Patton. ♀ ♂, Proc. Bost. Soc. Nat. Hist., 20:143.

1891—*Colletes spinosa*, Robt. ♀ ♂, Trans. Am. Ent. Soc., 18:60.
Female taken on *Solidago*, Aug. 25 to Sept. 3; male on *Solidago*, Aug. 20 to 28.

Colletes americanus, Cr.

1868—*Colletes americana*, Cr. ♀ ♂, Proc. Bost. Soc. Nat. Hist., 12:167.

1879—*Colletes americana*, Patton. Proc. Bost. Soc. Nat. Hist., 20:142.

Female on *Aster puniceus*, Sept. 12; male on *Solidago*, Aug. 13, to 28, and *Eupatorium perfoliatum*, Aug. 24. A widely-distributed species. Reported also from Illinois and New Mexico.

Mr. Myron H. Swenk has kindly examined specimens of the species enumerated in this paper and furnished the following description:

Colletes mesocopus, Swenk, n. sp.—♀. Length, 8-9½ mm. Clypeus convex, shining, coarsely and irregularly striato-punctate. Front dull, crowded with coarse shallow punctures and thinly-clothed with short gray hair. Vertex closely double punctured, bare on sides, medially and the occiput with erect, grayish hair. Cheeks with sparse, coarse, but weak, punctures and thin ochreous-gray hair, except on extreme sides above, where it is thin and black. Malar space about one-fourth as long as broad. Antennæ short, wholly black, joint 3 decidedly exceeding 4, almost = 4 + 5. Prothoracic spine short, sharp and distinct. Mesothorax with small, sparse, rather weak punctures, coarser on posterior margin, the disk with a large polished impunctate area. Scutellum

coarsely closely punctured posteriorly, anteriorly sparsely so. Postscutellum finely roughened. Superior face of metathorax well defined, divided into subquadrate, shining, regular pits, the enclosure funnel-shaped, polished, the areas surrounding it opaque and weakly, irregularly rugose. Mesopleura punctured similarly to, but coarser than the dorsal surface, the tubercles impunctate and polished. Pubescence of thorax thin, erect, dull gray, strongly tinged with ochreous on dorsum. Wings darkened, the nervures and stigma black. Tegulae black. Legs rather stout, black, entirely clothed with stiff yellowish-white hair, very dense on inner surface of legs, the tarsal tufts reddish. Claws rufous, medially toothed. Tibial spurs very short, dark, quite simple. Anterior coxae with no indication of a spine. Abdomen short, oval, polished, the basal segment subimpunctate, following ones very finely, indistinctly punctured. Apical margins of segments 1-4 feebly depressed, of 1-5 with broad, loose, white fasciae. Basal segment with sparse, long, white hair, the disks of 2-6 with erect black bristles, very long and abundant on 3-5. Ventral segments 1 and 2 with a dense, erect, polleniferous scopa, concolorous with that of posterior legs, 3 and 4 with similar dense apical fringes, 5 and 6 with black bristles.

♂. Length, 8 mm. Clypeus covered with long, dense ochreous-gray hair, contrasting with the pure gray hair on rest of face, no black hair on cheeks; antennae long, joint 3 = 4, following joints one-third longer than wide; pubescence of thorax long and abundant, pure dull gray; basal abdominal segment sparsely, weakly punctured; segment 2 with long white hair, like on 1; 3-6 with black bristles, no ventral scopa; claws subapically cleft; no definite prothoracic spine. Otherwise essentially like the ♀.

Types.—Waldoboro, Maine, July 9, 1905, No. 3721, ♀; July 11, 1907, on *Kalmia angustifolia*, No. 4235, ♂. J. H. Lovell, collector.

Paratypes.—Waldoboro, Maine, July 9, 1905, No. 3724; July 5 on *Rosa humilis*, No. 1931, ♀; July, 1904, No. 2697, ♀.

This species is very distinct. Its nearest ally is *C. hyalinus*, Provancher, but it differs from that species in the punctuation of the mesothorax and other details. Mr. Lovell informs me that this bee is a frequent visitor of *Kalmia angustifolia*, but only rarely visits the rose.

NEW COCCIDÆ FROM CALIFORNIA.

BY O. E. BREMNER, SAN FRANCISCO, CAL.

Aspidiotus densifloræ, n. sp.—(Fig. 20.) Puparium of female snow-white in colour, varying in form from round to sub-oval, according to position on the leaf, and slightly convex. Exuviae situated a little to one side of the centre. First larval skin light yellow, second nearly white. Length, $1\frac{1}{2}$ to 2 mm.

Male puparium much smaller than the female (1 mm.), snow white in colour and oval in form.

Length of scale on slide, 1.3 mm. Two pair of well-developed lobes

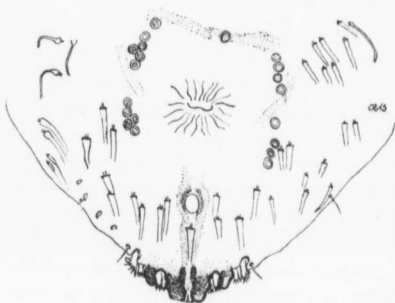


FIG. 20.—*Aspidiotus densifloræ*.

notched on the outer margin, both are similar in form, the median being half larger than the second pair. Median lobes thickened on inner edges with a chitinous extension to and surrounding the anal orifice. Plates prominent, extending to the end of lobes. A pair of trifurcate plates between median lobes. A pair of four-toothed furcate plates between median and lateral lobes. In the depression after the lateral lobes are three pairs of large plates with a number of teeth, the third is largest, and usually has six teeth. Very few spines; one at the base of each lobe, another shortly after the last plate, and one quite distant along the margin. Dorsal pores prominent. Five groups of circumgenital gland orifices; median one sometimes lacking; anterior laterals, 5 to 6; posterior laterals, 3 to 5. Anal orifice rather large and remote from the margin.

Larvæ pale yellow. Antennæ 5-jointed; 5th segment longer than all the others combined, ringed with a stout median bristle and three more at the tip; joint 2 equal to 3 + 4, 3 and four equal. Formula



FIG. 21.—Antenna of larva of *Asp. densifloræ*.

5, 2, 1 (3, 4). (Fig. 21.) A pair of well-developed lobes notched on the outer side; two very long hairs and two short spines between the lobes.

Collected by the author on the under side of leaves of *Quercus densiflora* in Mendocino County, California.

Aspidiotus yulupae, n. sp.—(Fig. 22.) Puparium of female round and quite convex. Black in colour, but often appearing gray when partly, or in some cases completely, covered by the epidermal tissues. Exuviae are in the centre of the scale, and are pink in colour, with a grayish central spot. Length of largest specimens, 1 mm. The males are not distinguishable from the females, having the same colour and form.

Length of scale on slide, .64 mm.; width, .46 mm. One pair of

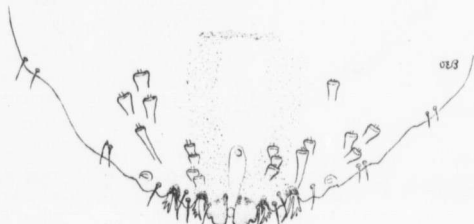


FIG. 22.—*Aspidiotus yulupae*.

well-developed lobes, with a deep notch on the outer side; second and third pairs of lobes rudimental, and showing no indications of chitin after boiling in K. O. H.; second with a groove on the outer side, and third with a groove in centre. Very few plates, a short curved one and a large one with four teeth between the first and second lobes; a long plate with branched end and a stout one with three teeth between the second and third lobes. Marginal spines quite prominent. One at the outer base of first lobe; one at the centre and one at the base, just below the notch of second lobe; one at centre, and just below the groove of the third lobe; one pair of spines near the middle of the segment, and one pair near the cephalic margin. Dorsal pores prominent, but not numerous. There are no groups of circumgenital gland orifices; anal orifice small and remote from the margin.

Collected by the author on *Quercus lobata*, Yulupa Valley, Sonoma County, California.

Odonaspis graminis, n. sp.—(Fig. 23.) This coccid is found on the roots of grass, and is very easily detached from the host plant. It has much the appearance of a clam, ranging in form from mytiliform to round, and is dirty-white in colour, and 1 to 1½ mm. in size. The exuvia is at one side, and at the anterior extremity is glossy straw-coloured. The

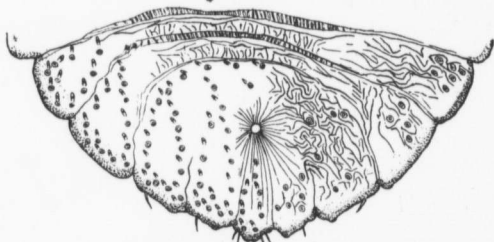


FIG. 23.—*Odonaspis graminis*.

ventral scale is nearly as well developed as the dorsal, and has what appears to be the ventral half of the exuvia at the anterior end. The scales may be pried apart much the same as you would open a clam.

The adult female is oval in form and yellow in colour. The segments are distinct and chitinized at the margins with groups of dorsal pores. There is a group of glands around each of the openings of the anterior spiracles. The pygidium is broad and strongly chitinized. The lobes are obsolete, and are represented by points in the centre of the suppressed segments. The rudimentary median lobe is more pronounced than the others, with a groove in the centre. There are two spines at each side of the median segment and one on each of the second and third suppressed segments. There are no groups of circumgenital gland orifices. The dorsal pores are numerous and regularly placed, a double line at the margin and a single line on each side of the segments. The anal aperture is situated at some distance from the extremity.

Habitat—This species was collected by E. M. Ehrhorn on the roots of grass from the Presidio Hills, San Francisco, California.

NOTES ON THE BREPHIDÆ.

BY JOHN B. SMITH, SC. D., NEW BRUNSWICK, N. J.

The family *Brephidæ* as it stands in our lists contains only five species in two genera, *Brephos*, Ochs., and *Leucobrephos*, Grt., the latter described by Mr. Grote in the CAN. ENT., XV, p. 55. 1883, although first used, without description, in the Buff. Bull., II, 53, nine years previously.

Of the species referred to *Brephos*, only one, *infans*, Moeschl., is known in collections; the two species, *melanis* and *californicus*, described by Boisduval in his *Lepidoptera of California* in the Ann. Soc. Ent. Belg., XII, 1869, have remained unknown up to this time. Mr. Grote (l. c.) suggests that they are really Arctians, and I am inclined to agree with him. I have tried to identify the species with specimens of *Leptarctia*, but my series is not sufficient to quite make it. In the hope that some of the readers of the CAN. ENT. may be better off in that genus, I present the following copies of the original descriptions, freely translated :

BREPHOS CALIFORNICUS, Bdv.

Primaries fusco-cinerous, with three obsolete white maculæ; secondaries fulvous, with two black bands.

This has the appearance of *notha* and *puella*, but is smaller. The primaries above are of a grayish-black, with three little white spots, of which one is on the costa; another, much less pronounced, is toward the apex, and the third forms a small lunule above the internal angle. The secondaries are yellow, a little fulvous, crossed toward the middle by a black band which is constricted and interrupted; and outwardly the border is larger, black, with the fringe yellow. Beneath all the wings are yellow, with two common black bands. The female does not differ from the male except that the antennæ are more slender.

Found in the spring in the clearings in woods.

BREPHOS MELANIS, Bdv.

Primaries grayish-fuscous, with two obsolete white marks; secondaries black, immaculate.

Size and form of the preceding. The primaries are of a grayish-black, with two spots of dirty white, of which one is on the costa and the other, a little smaller, toward the internal angle. The secondaries and the fringe are completely black. Beneath, the primaries are traversed by a broad yellow band. We have seen only males.

Lives in the woods.

November, 1907

The particular reason which induced me to look up this matter is that I found among specimens sent me for determination by my good friend and the prince of good fellows, Dr. James Fletcher, a specimen of what appeared to be an *Annaphila*, which fitted nowhere, and was sufficiently odd in appearance to induce me to examine it more closely. To my surprise I found it a Brephid, utterly unlike any other of our species, and because there is only one, and I know no other like it, I call it

BREPPOS FLETCHERI, n. sp.

Head and body totally black. Primaries sooty-black, with a vague trace of pale marginal and submarginal bands. The fringe is gray, with a black interline. Secondaries yellow, with a rather narrow black border, the inner margin of which is irregular, and a basal black area which extends from one-third the costal margin diagonally to the inner margin just above the anal angle, and does not quite join the outer black border. Beneath yellow; primaries with blackish marginal borders and an oblique black median fascia; secondaries with a minute black discal mark, a subbasal narrow blackish band and a narrow blackish terminal band much like that of upper side. Legs black, tarsi white-ringed at the joints; hair of under side grayish.

Expands: 1 inch = 25 mm.

Habitat: Coldstream, British Columbia, March 23; taken by Mr. E. M. Anderson. Numbered 1 and 13.

The interesting notes on the distribution of *Leucobrepbos Middendorfi* by Dr. Fletcher in the Ottawa Naturalist, induced me to inquire why *brepboides*, Wlk., was no longer found, though both Zeller and Grote had obtained (and redescribed) the species.

Dr. Fletcher's reference to the species was based on my determination, and my determination was based on Moeschler's work and his record in the Stett. Ent. Zeit., 1883, 117. I was in correspondence with Mr. Moeschler at that time, and he was good enough to send me an example of the Labrador material for study. Before I returned it I secured an excellent photograph, which for many years was the only representative of the species in my collection. Through Dr. Fletcher I finally secured an example of Mr. Criddle's capture from Aweme, and that might easily have been the original of the photograph made from Moeschler's example. It was *Middendorfi*, Moeschler, without doubt; but was it *Middendorfi*, Menetries? Moeschler in his work speaks positively enough: "Of this

interesting and in collections yet very rare species I received a clean ♀ from southern Labrador." But he makes no comparisons and no reference to Zeller's species described 20 years before in the same journal and figured.

I determined to make the comparison myself, and did so in the Academy of Natural Sciences at Philadelphia, where they have a copy of "Schrenk's Reise." Sure enough, as I had begun to fear, *Middendorfi*, Men, was not Moeschler's species, but a closely-allied representative; and on going further it became equally certain that all these references to *Middendorfi* really belonged to *brephoides*, Wlk., which is the only species thus far known to inhabit North America.

I am sorry, not because I made a blunder, for it is not the first one I have made, but because I have misled Dr. Fletcher and made him write *Middendorfi* instead of *brephoides*.

OUR SPECIES OF NYCTOBIA, HULST.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

Much confusion exists as to the status of the species, as now they are listed under this genus. In an endeavour to ascertain their true relationship, I have been gathering for some years a series which might be truly representative. The past year (1906) I captured a great number of forms in the Catskill Mts. from May 4 to 16, and have before me of both sexes, about evenly divided, 156 good examples. Beside these I have a small series taken by myself in Bronx Park, N. Y. Co., and another series of 16 from Lackawanna Co., Penn., through the kindness of Mr. Rothke, and one specimen taken on Long Island by Mr. Geo. Englehart, of the Children's Museum, Bedford Park, in this city. The group from the Catskills and those from Bronx Park all constitute one species, though their variations are endless, and come under the name *limitaria*, Walk. The other series from Pennsylvania and the single specimen from Long Island, are unquestionably the *anguilineata*, Grote, and are markedly different in arrangement of colour lines, presenting a bluish-black cast, not the brown and pale gray of *limitaria* and its varieties, and the texture of the wings is heavier, with apices more produced. They vary somewhat among themselves, but preserve their distinctive pattern, so that once known they are easily picked out among any number of the other species. The vertex and front are generally a chalky-white, with a black line crossing below

antennæ, as mentioned by Grote, and this prevails in all but one of my specimens, not dusky or dark brown, mixed with white, as in *limitaria*. When fresh they are washed and streaked with green, but not in the fantastic fashion of *limitaria*. From this latter a number of extreme forms may be selected, but they grade into one another in a large series. In his description of *L. vernata* (Mono., page 183), Dr. Packard speaks of the snow-white front with black hair-line below antennæ, clearly indicating by this and other similarities that he was describing a specimen of *anguilineata*. Yet he figures (Plate 8, fig. 13) a form of *limitaria*. Under his reference to *anguilineata* (page 184), which is very brief, he says "specimens may yet be found connecting *L. vernata* with this." To my mind there is no doubt they are the same, the older name of Grote taking precedence. The type of *anguilineata* came, I think, from Pennsylvania, and while single examples have been taken elsewhere, like the Massachusetts specimen, and my own from Long Island, its home centre seems to lie in the mountains of Pennsylvania. In the spring of 1906 I forwarded to Mr. Prout for comparison with Walker's types in the British Museum, a small lot of *limitaria*. He writes of them thus: "*Lobophorata*, Walk.; *fusifasciata*, Walk., and *longipennis*, Walk. (all in coll. of Brit. Mus.), are clearly forms of the variable species you call *limitaria*, Walk., and I shall accept your synonymy." I find also that Prof. Grote, writing in CAN. ENT., Vol. 8, p. 152, long ago reached the same conclusion, but at that time overlooked the older name of *limitaria*.

With abundant material before me, I therefore conclude that the species of *Nyctobia* should be listed as follows:

- limitaria, Walk.
 - = lobophorata, Walk.
 - = fusifasciata, Walk.
 - = longipennis, Walk.
 - = Cystiopteryx viridata, Grote (Hulst in error).
- anguilineata, Grote.
 - = vernata, Pack.
- nigroangulata, Strecker.
- viridata, Packard.
 - = Agra eborata, Hulst (in error).

A word as to *viridata*, Pack. This is the species upon which Dr. Hulst founded his genus *Agia*, making it his type. He says in closing: "Very close to *Nyctobia*, differing mostly in the presence of the

frenulum." Since the frenulum is also present in *Nyctobia*, there remains no difference whatever, except in its longer palpi, and this does not, in my opinion, warrant generic separation. In a recent List of Brit. Col. Lepidoptera (Dept. of Agric., B. C., 1906), Rev. G. W. Taylor places this species in the genus *Trichopteryx*, Hüb., but this is an error. The type of *Trichopteryx* is *carpinata*, Bork. (*lobulata*, Hüb.), in which vein 8 of hind wings is widely separate from cell, but joined to it by a cross bar at end.* In our species vein 8 anastomoses with cell its entire length.

A NEW PLATÆA, HER.-SCH.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

A recent paper on this genus by Rev. Geo. W. Taylor, defines correctly the status of our species, as I believe, and renders unnecessary the publication of a paper I had partially prepared, except as to the addition of the species described herein.

Platea lessaria, n. sp.

Expanse, 22 mm. Head, palpi, antennæ, thorax and fore wings a clear pale lavender, the latter with black scales, basally clustered, elsewhere scattering, strigate with brown along costa. The central band is composed of dark brown, nearly black, scales along outline, fading centrally to the ground colour, which surrounds the linear dark brown discal spot. Its inner margin starts from costa one-fourth out, runs outward across cell beyond the base of vein 2, then turns sharply backward and downward to a point half way between vein 1 and cell. Outer margin leaves costa two-thirds out, makes a short curve inward across it, then forms a short broad angle by an outward turn to vein 6, and with a long inward curve reaches a point half way between veins 1 and 2, opposite but a little lower than the inner line; bottom truncate. Around this irregular figure the ground colour is clearer, almost white, gradually darkening submarginally into a broad pale brown line, its outer margin darkest and sharply defined, commencing about one mm. from apex, reaching the anal angle in two broad inward curves, the upper shortest, its course parallel with the outer margin of central figure. Narrow submarginal space darkest toward margin. Marginal line rather broad, dark brown. A white line at base of fringe, which is outwardly checkered

*See Meyrick, Brit. Lep., page 180, 1895.

brown and white. Hind wings paler, with a yellowish cast, and a few scattered brown scales. Discal dots small, faint. No other markings. Marginal line faint brown; fringe as ground colour, not checkered. Beneath soiled white, with numerous brown scales, the fore wings somewhat yellowish, and having lavender scales distributed apically. Discal dots distinct on all wings. The central figure faintly reproduced, as is also the subterminal line, which is extended across hind wings in much the same pattern. Abdomen and legs slender, soiled white.

Type, one ♂ taken at San Diego, Calif., July 20, 1906, through my friend, Mr. H. W. Marsden.

The smallest of our species, and with the central figure well defined, while preserving the general outline of those of its congeners.

THE ARANEINA OF SANTA CLARA COUNTY, CALIFORNIA.

BY KARL R. COOLIDGE, PALO ALTO, CALIF.

The fact that so few local lists of Araneina have been published, and their distribution is so little known, except by those who have access to large collections and libraries, has induced the writer to publish the following list. That it is very incomplete, I fully realize, as I have many undetermined species in my collection, and many more will be found by careful collecting. To make the list as complete as possible, I have included a number of species which I have not taken myself, but which have been recorded by Banks* or are in the Stanford University collection. As the Santa Clara Valley Entomological Society is undertaking a study of the fauna of the salt marshes of San Francisco Bay, I have marked with a dagger those species which have been found there. An asterisk indicates type locality.

THERAPHOSIDÆ.

Actinoxia versicolor, Simon. -Black Mt. Rather common. †

Atypoides Riversi, Cambridge. Rare.

" *Californica*, Banks. Black Mt. October.*

Eurypelma Californica, Banks.

DRASSIDÆ.

Poecilochroa pacifica, Banks.*

CLUBIONIDÆ.

Givenna Californica. May.

Anyphæna sp. (immature); may be *gracilis*, Hentz.

*Banks, Proc. Cal. Acad. Soc., Vol. 13, 1904.
November, 1907

AGALENIDÆ.

- Agalena pacifica, Banks. Black Mt. July.*
 " Californica, Banks. Black Mt. October.*
 Tegenaria Derhanii, Scopoli.
 " Californica, Banks.*

DICTYNIDÆ.

- Dictyna sublata, Hentz. Common in July. †
 " volucripes, Keys. Also common. †
 Dictyolathys Californica, Banks.*
 Amaurobius severus, Simon. Rare.

THERIDIIDÆ.

- Theridium placens, Keys. July.
 " differens, Emerton. Rather common.
 " fordum, Keys.
 Linyphia diana, Keys. Rare.
 " phrygiana, Koch. Common.
 " communis, Hentz. Not rare. †

- Latrodectus mactans, Koch.
 Bathyphantes sp. (pallidula? Banks).

MIMETIDÆ.

- Mimetus intersector, Hentz.

EPEIRIDÆ.

- Epeira gemma, McCook. Abundant.
 " pacifica, McCook.
 " trifolium, Hentz.
 " labyrinthica, Hentz. Fairly common. †
 " displicata, Hentz. Plentiful in July. †
 " oacensis, Keys.
 " aculeata, Emerton. Not rare.
 " strix, Hentz. Very common. †
 " vulgaris, Hentz. Rather rare.
 " pegnia.
 Zilla Californica, Banks. October and November.*
 Cyclosa conica, Pallas. Rare.
 Crytophora Californiensis, Keys. Rather common. †
 Argiope argentata, Fabr. Rare.
 " transversa, Emerson (trifasciata, Fors.).
 Gasteracantha hexacantha, Fabr.

TETRAGNATHIDÆ.

- Tetragnatha extensa, Linn.
 " laboriosa, Hentz. Rare.
 Hyptiotes cavatus, Hentz. Scarce.

THOMISIDÆ.

- Nysticus Californicus, Keys. May. Uncommon.
 Coriarachne versicolor, Keys.
 Misumena vatia, Clerk.
 " importuna, Keys.
 " very.
 " pictilis, Banks.*
 Tibellus Duttonii, Hentz. July.
 " oblongus, Walk. Fairly common in September.†
 Philodromus rufus, Walck. Rather common.†
 " mæstus, Banks.*
 " Californicus, Keys. Rare.

LYCOSIDÆ.

- Lycosa brunneiventris, Banks.
 Pardosa Californica, Keys. July.
 " stemalis? Thor. Common.†

OXYOPIDÆ.

- Oxyopes salticus, Hentz.
 " rufipes, Banks.

ATTIDÆ.

- Phiddipus Johnsoni, Packham. Rather abundant.†
 " opifex, McCook.
 Dendryphantes octavus, Hentz. Frequent.†
 " seneolus, Curtis. Several specimens.
 Epiblemum palpilis, Banks.*

CATOCALA TITANIA, Dodge.—Mr. W. Beutenmuller informs me that the moth I have hitherto sent to friends as *Catocala praclara*, G. and R., is not that species, but *C. titania*, Dodge. As in a long series I am unable to detect any variation, and I do not find the silky lustre on the fore wings which is characteristic of *C. praclara*, I conclude that this species does not occur here.—E. FIRMSTONE HEATH, The Hermitage, Cartwright, Manitoba.

GEOMETRID NOTES, WITH DESCRIPTIONS OF NEW SPECIES.

BY L. W. SWETT, BEDFORD, MASS.

Eupithecia Taylorata, nov. sp.—Expands 22–23 mm. Discal spots on all wings black and distinct. Palpi rather long with black scales, antennæ ringed minutely with black. Fore wings ash-gray with darker shadings, five dark gray costal patches somewhat diffuse, from which as many wavy lines run across the wing to inner margin; lines are white towards outer margin, shaded heavily with black scales towards body, the first and second basally run in waves to inner margin, the third almost touches black costal spot, broader than the other two, and runs irregularly to inner margin; extra-discal line is heaviest, and is strongly angled beneath costa, where it bends back and runs irregularly to inner margin, beyond this the fifth and last band is bordered on outside by a white zigzag line further in from outer margin than usual in the *Eupithecias*. The margin of wing is pale ash, fringe pale ash, with dark patches at veins, and shorter than *interruptofasciata*, its nearest ally. Hind wings have five pale ash bands with darker shadings, extra-discal is most prominent.

Beneath: fore wings have three prominent bands, the basal shaded with fuscous to body, extra-discal strongly angled below costa, less waved than above and fainter, runs to inner margin, the marginal band corresponds to white zigzag line on upper side, but white shows only faintly beneath, and is not zigzag, rounded to inner margin. Hind wings have four wavy lines—two intra-discal, two extra-discal, heaviest on inner margin, very wavy between veins, dark patch at end of veins in fringe. This resembles superficially *interruptofasciata*, but is very distinct in its five whitish lines with black shadings and white zig-zag line well in from outer margin. I name this species in honour of my friend, the Rev. G. W. Taylor, who has done so much work in this difficult genus.

Type.—♂, May 29, 1901, Sherborn, Mass.; ♀, June 20, 1906, Monmouth, Me.

Eupithecia Frostiata, nov. sp.—Expands 15–18 mm. Discal spots black and distinct. Palpi moderate brown-scaled, wings of a reddish-brown cast. Four prominent costal patches, from which as many lines run to inner margin: first line, basal, rounded to inner margin; second parallel to it; third costal patch has white patch bordering it towards outer margin of wing, angled strongly below costa, then continuing in

broken minute dots on veins to inner margin; then a pale reddish-brown band, outer edge of which is shaded heavily to outer margin of wing, a pale white line runs near outer margin zigzag, but hardly discernible. Fringe rather long and cinereous, with patches at end of veins. Hind wings lighter basally, with four or five lines broken into dots on veins, rounded across wings, discal spot much smaller and fainter than on fore wings, where it is large and rounded, fringe checkered as on fore wings.

Beneath: fore wings paler brown than above, extra-discal bands most noticeable, bent in curves and not dotted on veins as above. Hind wings have three dotted lines, one basal, the other two extra-discal, the marginal one being faintest.

This species may be known by its long narrow wings, reddish-brown cast on costa and patches, with large, round discal spot on fore wings.

I name this species in honour of Mr. C. A. Frost, who has done much in collecting material from Maine for my New England faunal list of Geometridæ, which I hope to publish shortly.

Type. — ♂, New Windsor, N. Y. Coll. of G. W. Taylor. ♀, New Windsor, N. Y., April 25, 1895.

Co-types.—July 3, Newark, N. Y., W. H. Broadwell; May 18, 1896, New Windsor, N. Y., Miss Morton.

I find, in examining the types of Packard's collection, that *Eucymatoge Strattonata* is not *anticaria* at all, but is a distinct species and is a *Eupithecia*, so it will stand as *Eup. Strattonata* in our lists. *Miserulata* was evidently unknown to Packard, as he has many species so listed under that name.

In studying his collection, I advise all to read over the original descriptions, as many of his labels have been changed, and in some cases the specimens are missing.

Eupithecia Grossbeckiata, sp. nov.—Expands 16 to 18 mm.; palpi about 1 mm., extending well beyond head; rough scaled, antennæ strongly ciliated beneath. Colour of fore wings light fawn gray. A basal line very faint, but showing plainly by spot on costa, then intra-discal line very plain on costa, fading as it approaches inner margin on vein 2, separated as if broken off, then runs to inner margin. Discal spots prominent, somewhat linear and black. Extra-discal line represented by large spot on costa, then elbows out towards outer margin at vein 9. and bends back in gradual curve to vein 2, marked strongly on the veins as dashes; from vein 2 it runs in two scallops to inner margin. Beyond

extra-discal line is a pale broad luteous band, strongly elbowed outwards below costa, running straight to inner margin. This band is bordered on outside by a darker gray band, which has a white finely-scalloped line in middle. Fringe short, gray, with intervenular dots.

Hind wings same colour as fore wings, prominent black discal spot, beneath this is a broad confused black line, forming a deep sinus as it runs towards outer margin, the basal line is hardly visible; the outer margin of wing is dusky-gray. Beneath lighter than above; three prominent costal spots the beginnings of lines, the extra-discal line being very black and confused, outside this the pale yellow band shows very prominently. Discal spots on all wings plain as above. Markings on hind wings same as above.

This species may be known from all others by its strongly-ciliated antennæ, pale yellowish extra-discal band, black, broad discal band and dark brown band on middle of abdomen, also white geminate spots on outer margin.

Types.—Two ♂'s, July 11 and 14, 1906, Framingham, Mass., Mr. C. Frost.

I take pleasure in naming this distinct and easily-recognized species after Mr. J. W. Grossbeck, who has done so much to help us in regard to the Hulst types.

Chlorochlamys inveterascaria, nov. sp.—Expands 20 mm. Antennæ bipectinate, but much shorter and stouter than in *chloroleucaria*; palpi moderate, a little longer and stouter than usual, rose-tipped; hind tibia one spur, hair-pencil. Fore wings long, rather pointed, somewhat resembling *Nemoria pistaciata*. Hind wings rounded. Colour olive-green, basal line on fore wings runs from costa to inner margin, same as *chloroleucaria*, extra-discal line whitish, irregular, deep indentation at vein 2, bent back at an angle on costa. Hind wings same colour as fore wings; a whitish band extends across middle of wing, rather more rounded than in *chloroleucaria*. Beneath pale ochraceous-white, no markings discernible, discal dots wanting. Fringe not so long as in *chloroleucaria*.

This species seems to be nearest *volantaria*, Pearsall, but differs in antennal structure, and the extra-discal line is not rounded outwardly, but is bent at an angle at costa; also, it is not waved, but irregular. It may be told at a glance by the short stout pectinations on the antennæ and the extra-discal line.

Hab.—Tucson, Arizona, May 11, 1905. Type, one male.

LEMONIAS QUINO (BEHR), SCUDDER: ITS SYNONYMY AND ACTUAL STATUS.

BY FORDYCE GRINNELL, JR., PASADENA, CALIF.

Lemonias Quino (Behr), Scudder, was described in the Proceedings of the California Academy of Science, Vol. III, p. 90-91, 1863. Since that time it has been interpreted in every possible way but the correct one. By some curious process of reasoning, the locality was changed to Mendocino county, evidently on the authority of Henry Edwards, and subsequent authors have adopted this conclusion, and tried to identify this species from that locality. Henry Edwards, in describing *Melitæa Baroni* and *rubicunda*, compares the latter with *Quino*, and thinks it might be only a variety of that species; but W. H. Edwards, in the "Butterflies of North America," 3rd series, 1897, says of this, as follows: "*Rubicunda* was originally described by Mr. Henry Edwards as possibly but a variety or form of *M. Quino*, Behr. Curiously enough, no one, not even Dr. Behr himself, knows what *Quino* is, or was intended to be. The types were lost, and the published description fits no known species or variety. *It certainly was not what Mr. Edwards understood it to be** when he compared both *Baroni* and *rubicunda* with it. He says of the latter that 'red is the prevailing tint, and the submarginal bands of secondaries are simply bands of red.'"

It seems strange that anyone could get the idea that *Quino* was distinguished by its black or dark coloration. Mr. W. G. Wright adopts this in his book, when by a cursory reading of the original description this is *not* the case, but the very opposite, it is even not as dark as *chalcodon*.

I have had slight suspicions in regard to *Quino*, but last spring when speaking with Mrs. Katherine Brandege, of Berkeley, who has studied quite fully what she took to be *Lemonias augusta*, Edwards, in the vicinity of San Diego, on the authority of some eastern men, the question of the proper name of the San Diego form came up—whether it was *augusta* or *Quino*; I then resolved to look into this matter fully, and try, if possible, to set students on the right track. Mrs. Brandege, being occupied with botanical questions, has no time to look into entomological work, but expressed herself as much interested in the true answer to the question.

*Italics are mine.—F. G.

November, 1907

Having had some correspondence with Mr. Wm. S. Wright, of San Diego, I obtained a good, lengthy series of *Lemonias augusta*, or what he seemed to be pretty well convinced was such a species, evidently on the same authority as that of Mrs. Brandegee.

As I said before, a cursory reading of the original description cannot possibly make out *Quino*, as understood by Hy. Edwards or Wright; and as I do not think that Behr's description can be improved on, and it has been neglected so long, I will quote it entirely.

"3. *M. Quino*, Behr, n. sp.

"*M. chalcodonti* similis sed antennæ clava discolor, fusca nec concolor antennæ reliquæ aurantiacæ.

"Alæ supra ut in *M. chalcodonte* sed series macularum submarginalium in anticis rubra et marginalium in posticis flava rubro tincta. Series quarta in anticis bifida, fere tota rubra, tertia in posticis omnino rubra.

"Alæ inferiores subtus ut in *M. chalcodonte* sed fascia flava prope radicem in maculæ sex dissecta maculaque flava discalis puncto ejusdem coloris extus aucta.

"*Melitæa Quino* may at once be distinguished by the entirely different and much *gayer coloration* of the upper side, which much more resembles that of *M. anicia* than *M. chalcodon*. To the latter species it comes the nearest in the peculiar shape of the wings, so characteristically different in the two sexes. In *M. anicia* this difference exists, but not to the same degree. *The yellow part of the under side of the hind wings is much paler than in M. chalcodon and M. anicia.* The yellow radical band is dissolved into six distinct but nearly connected maculæ. In *M. chalcodon* the band is not interrupted, and only the sixth macula is separated, making part of the yellow coloration of the anal side of the wing. *From M. anicia it differs besides in the under side of the fore wings being nearly all of a reddish brown colour, with scarcely any indication of the markings of the upper side, closely resembling M. chalcodon. From both species M. Quino differs in the coloration of the club of the antennæ.**

"This species I received from Dr. Cooper, formerly of the State Geological Survey, who collected several specimens near San Diego. I have called it *Quino* in remembrance of the Californian pioneer, Padre Quino, the first European that ever succeeded in erecting a permanent

*Italics in the above description are mine.—F. G.

settlement in California, and at the same time contributed very considerably by his learned writings to a more exact knowledge of these then scarcely discovered regions."

I have a large series of specimens of *Lemonias Quino*, about twenty-five specimens, received from Mr. W. S. Wright, of San Diego, taken near that place. These all agree exactly with the above description, and I have very little to add to Dr. Behr's excellent diagnosis of *Quino*, beyond emphasizing the italicized parts. Mr. H. C. Fall has specimens taken on Mt. Roubidoux, near Riverside; while Mr. Wright figures his *augusta* from specimens taken near San Bernardino. The types described by Edwards were taken in the foothills near San Bernardino. *Augusta* is a synonym of *Quino*. My specimens were collected mostly on March 16 of this year (1907). Dr. Behr's specimens were probably collected along with *Synchlœ Cooperi*, which is a spring species, at San Diego, so his description refers to the spring form. I have not seen specimens of later generations, which Mr. Wright refers to as different. Dr. J. G. Cooper, Zoologist of the State Geological Survey of California, under J. D. Whitney, from 1860-1864, explored different parts of California, and was at San Diego 1861-1862, making most of his observations and collections during March and April, 1862.

Grinnell & Grinnell, in the Journal of the New York Entomological Society, March, 1907, p. 42, list *Lemonias augusta* from the San Bernardino Mountains; that is an error, the species is *Lemonias anicia* (Doubl. & Hewits.), or a very close form thereto. The specimens seem to be typical *anicia*, and agree exactly with Dr. Behr's comparisons in the above description; it is interesting with *Cupido Hilda* and *Incisalia eryphon* in showing the close faunal relations of the high San Bernardino mountains and the high central Sierras. It is very peculiar that W. G. Wright does not figure or describe *anicia* from California, as it occurs within a couple of days' trip from his home, instead of giving a figure of a Colorado form which is not quite typical; he even goes so far as to say that he does not know it from the "West Coast Territory," when California is the type locality!

Lemonias Quino is intermediate between *anicia* and *chalcedon*, as can be inferred from Dr. Behr's description. It is related to *anicia* by the prevailing red colour, while both *chalcedon* and *anicia* have the entire antennæ yellow, including the club; while in *Quino* the club is mostly

black, and remainder of the antennæ red-brown. W. H. Edwards, in his description of *augusta*, says, as follows: "belongs to *chalcon* group, but is as conspicuously red as the species of *chalcon* is black." Dr. Behr says practically the same thing of his *Quino*; a comparative description like that of Dr. Behr is, to me, of much more use than one that attempts to describe all the complicated markings of these insects.

The synonymy, etc., stands thus:

Lemonias Quino (Behr), Scudder. Proc. Cal. Acad. of Sci., III, p. 90, 1863.

Melitea augusta (Edwards), CAN. ENT., XXII, 21, 1890.

Melitea augusta (Wright), Butt. of the West Coast, p. 153, pl. XIX, 1905.

Melitea augustina (Wright), loc. cit., p. 154. (This is only an individual variation.)

Melitea augusta (Holland). Butterfly Book, p. 141, pl. XVI, 1899 (a very lightly marked specimen).

Type locality: San Diego, California.

Distribution: Lower Sonoran Zone of the San Diegan Faunal District.

Food plant: *Plantago patagonica* (Mrs. Brandegee).

Lemonias Quino is, so far as known, limited to the southern half of the San Diegan Faunal District, and extends into Upper Sonoran.

Lemonias anicia is an Upper Transition species, while *Lemonias chalcon* extends from Lower Sonoran to Lower Transition.

ACKNOWLEDGMENT.—The Curator, on behalf of the Entomological Society of Ontario, desires to offer its very grateful thanks to MR. F. H. WOLLEY DOD, of Millarville, Alberta, for his handsome gift of over two hundred specimens of Lepidoptera. These are for the most part North-western species that were unrepresented in the Society's collection, and are therefore very welcome and useful accessions.

Also to MR. CHARLES R. ELY, of Washington, D. C., for a generous gift of fifty specimens of Lepidoptera from Connecticut, which are of much value in filling gaps in the Society's cabinets.

DESCRIPTION OF *EUPITHECIA FLETCHERATA*, A GEOMETRID MOTH FROM OTTAWA, NEW TO SCIENCE.

BY GEO. W. TAYLOR, WELLINGTON, B. C.*

This is one of the broad-winged, medium-sized species of *Eupithecia*, in wing shape much like *Eupithecia latipennis*, Hulst (which is quite common in Ottawa in the month of June), but is a trifle smaller. Expanse, 21 mm.

Palpi of moderate length, rather bushy, very dark (nearly black), with the extreme tips white. Front dark gray, with a fine black transverse line in front of the base of the antennæ.

Thorax gray, darker in front; a small white posterior tuft. Abdomen dark smoky-gray; last segment darker, but in the male with a tuft of snow-white hairs seen only when the last segment is exerted; dorsal tufts black; a black lateral line.

Beneath the pectus is white; the abdomen pale except the last segment, which is dark gray; the legs are pale except the tibiæ and tarsi of the first pair, which are dark, with pale rings. Fore wings rather dark gray, with blackish cross-lines enlarged on the costal margin.

The basal and intra-discal lines, with at least two intervening lines, are parallel to each other; they leave the costa at a sharp angle, turning at right angles when they reach the cell, and running in an almost straight line to the inner margin; they are all farther from the base at the inner margin than at the costa.

The median line, which is double, takes much the same direction, including in its angle the distinct, oval, black, discal spot, and continuing in a wavy line to the inner margin.

The extra-discal line appears as a large blotch on the costa; it then runs in a regular curve to vein 3, then parallel to the median line to the inner margin; this line is emphasized by a series of eight black dashes on the veins.

Between the extra-discal and the submarginal lines are three dark lines, showing only as spots on the costa.

The submarginal line is faint, white, showing most plainly in a white dot between veins 3 and 4, and another between 1 and 2. Marginal line faint, black, broken at the veins. Fringe, basal half darker; dusky spots at the ends of the veins.

*Reprinted by request from *The Ottawa Naturalist*, Vol. XX, No. 10, pp. 200-202, January, 1907.

Hind wings dark gray; the lines indistinct, but apparently all the lines of the fore wings are continuous, the most evident being the extra-discal and the submarginal; the first-named consists of black dashes on the veins (as on the fore wing), and so appears broader than the other lines.

Discal dot black, distinct. Fringe as on the fore wings. Beneath, fore wings bright gray. Costa with black marks showing the commencements of basal, median and extra-discal lines, and with another dark blotch in advance of the faint white submarginal line.

The extra-discal line and a dark gray shade beyond it are traceable across the wing to the inner margin, but the other lines can only be followed for a very short distance from the costa.

Marginal line distinct; base of fringe pale, otherwise as above.

Hind wings pale, with three intra-discal lines marked on the costa and again on the inner margin.

There are also two extra-discal lines composed of distinct dots on the veins.

The outermost of these is parallel to the outer margin; the other runs in a straight line from the inner margin, in the direction of the discal dot, to vein 3, then in a regular curve to the costa. These two lines are, therefore, not parallel, being rather close together on the costa and farthest apart on vein 3. This is a peculiarity that I have not noticed in any other eastern *Eupithecia*. Three or four dots on the veins indicate another line between the two just mentioned.

Discal dots distinct on all wings.

Described from two specimens collected by Mr. C. H. Young, and labelled respectively Ottawa, 3, viii, '06, and 10, ix, '06, and named in honour of Dr. James Fletcher, of Ottawa.

One of these specimens is in my cabinet, thanks to the generosity of Mr. Young; the other is retained in his own collection.

PRACTICAL AND POPULAR ENTOMOLOGY.—No. 24.

SUGARING FOR MOTHS IN THE AUTUMN.

BY JOHN A. MORDEN, HYDE PARK CORNERS, ONT.

It may be interesting to Lepidopterists to know what success I had during the late autumn of last year in sugaring for moths, especially those of the genus *Scopelosoma*.

Having read the highly-interesting article by Mr. Henry Engel, of Pittsburg, Pa., on collecting moths in autumn, and winter (CAN. ENT.,

Vol. XXXVII, page 102), I determined to follow his example during the autumn of 1905. After many weary visits to baited trees, and finding nothing more desirable than *Orthosia ferruginoides*, *Agrotis ypsilon*, *Peridroma saucia*, *Xylina antennata*, and *Plathypena scabra*, I abandoned the undertaking early in October, with the conclusion that there were no *Scopelosomas* in this locality, and certainly no such variety of moths as Mr. Engel met with. This proved to be a mistake as far as *Scopelosomas* were concerned, for during the following maple-sugar season I took over one hundred specimens that were feeding upon sap which oozed from wounds in the maple-trees caused by the common Sapsucker—the yellow-bellied Woodpecker (*Sphyrapicus varius*). In the sugar woods where the trees were tapped for syrup, many had become drowned in the sap-pails. I found that submerged specimens were spoiled, but those floating and not saturated were fit for mounting.

Subsequently I read Mr. Engel's article again, and noticed that he did not mention any captures of *Scopelosoma* before October 21st. I had received the impression when first reading it that he had taken specimens of this genus much earlier, and others, perhaps, have made the same mistake. Accordingly, last autumn (1906) I baited a number of trees, and continued to visit them early in the evenings without meeting any particularly desirable specimens until October 26th, when one *Scopelosoma* was captured. On the next evening, which was rainy, I took seventeen specimens, on Nov. 3rd twenty-two, Nov. 10th fifteen, Nov. 17th seventy-one, Nov. 26th thirty-two, and there were other dates when I took from four to six examples. These moths do not come to feed at the bait to any extent upon evenings which follow warm, sunny days; they prefer to feed just before, or during, a shower of rain and when there is a thaw after frost. On Nov. 3rd there was enough snow in the woods to give the ground a speckled appearance, and yet I took over a score of these moths. Favourable weather seemed to occur every seventh day till Nov. 17th. The following are the species taken: *Scopelosoma Morrisoni*, *Grafiana*, *Walkeri*, *sidus*, and some others yet to be determined. After rejecting imperfect specimens, I pinned no less than one hundred and fifty-two examples of this genus.

I may add that during September of this year—from the 12th to the 23rd—I have taken 104 specimens of *Catocala*, forty being *concombens*, 22 *unijuga*, 8 *habilis*, 6 each of *cara* and *innubens*, and lesser numbers of *parta*, *briseis*, *amatrix*, *bianca*, *neogama* and *piatrix*.

BOOK NOTICES.

FARM WEEDS OF CANADA, by George H. Clark, B. S. A., and James Fletcher, L.L.D., F. R. S. C., F. L. S., with illustrations by Norman Criddle. Published by direction of the Minister of Agriculture, Ottawa, 1906, 4to, pp. 103.

It is seldom indeed in this country that so beautiful and useful a book as this is published by a Government Department, and we may therefore all the more heartily congratulate Dr. Fletcher on being enabled to produce this admirable volume. The name of Mr. Clark appears upon the title-page as copied above, but his share in the authorship seems to be limited to a single introductory page. To Dr. Fletcher is evidently due the entire credit for the literary and scientific part of the work, and to Mr. Criddle for the exquisite coloured plates, 52 of weeds and 4 of seeds.

At the outset of the volume an account is given of the losses to farmers caused by weeds, and full and clear instructions for their extermination are provided; weeds are defined and classified, and a clear explanation is given of the botanical terms necessarily employed in the work. The rest of the volume is taken up with descriptions of all the important weeds that trouble the farmers, especially in the newer Provinces of the West; the common English as well as the scientific names are first given in each case, then follow a list of the Provinces it infests, a description of the plant, time of flowering, method of propagation, situations in which it occurs, the injury it causes, and the best remedy to be adopted for its eradication. In the great majority of cases clean farming and a short rotation of crops are the remedies recommended, but where carelessness has allowed the land to be seriously infested special methods have to be resorted to.

With this work to refer to, no intelligent farmer should have any difficulty in identifying the weeds with which he has to contend, nor should he be at a loss to know in what manner he can successfully wage war upon them. With the plates alone, so beautifully true to nature are they and so artistic as well, any ordinary weed can be identified, and reference may then be made to the description that accompanies them.

Whether the work is for sale to the public, or is to be obtained only by application to the Ottawa Department of Agriculture, is not stated. No doubt every one who farms many acres will wish for and should have a copy. Weeds allowed to go to seed are not only an injury to the man in whose fields they occur, but are a menace to his neighbours in all

directions. Their eradication is consequently a public necessity, and all farmers should know what to do and be compelled to do it.

INSECTS INJURIOUS TO VEGETABLES, by F. H. Chittenden, Sc. D., U. S. Department of Agriculture. New York: Orange Judd Company, 439-441 Lafayette Street; 262 pages, 163 illustrations. (Price \$1.50)

The author of this excellent manual is so well known as a thoroughly skilled economic Entomologist from the numerous Bulletins that he has written, that it is hardly necessary to say a word regarding the accuracy, clearness and practical character of the book. All the insects that any vegetable grower is likely to meet with are described and figured, and plain, simple methods of control are given. The first four chapters give a brief account of the various orders of insects, the natural elements that control them, prevention by farming and mechanical methods, and the most approved insecticides, with directions for making and using them. The remaining chapters give full information respecting a great number of insects arranged under the vegetables that they attack. A list of publications on Economic Entomology and a copious index complete the work. Everyone who possesses a garden and tries to grow vegetables, should have this volume at hand for speedy reference when any insect foe attacks his crops; all the information needed for identifying the enemy and waging successful warfare against him can at once be found, and with little difficulty be put in practice. Students in Agricultural Colleges and teachers of Nature Study will also find much assistance in their work from the perusal of this volume, and will continue to regard it as a mine of useful information.

ONTARIO BULLETINS.

The Ontario Agricultural College, Guelph, has recently issued the following useful Bulletins on Economic Entomology. They can be procured on application to the Ontario Department of Agriculture, Toronto, by whom they are published:

INSECTICIDES AND FUNGICIDES (Bulletin 154), by Professor R. Harcourt and H. L. Fulmer, of the Chemical Department; 32 pages.

REMEDIES FOR THE SAN JOSE SCALE and the San Jose Scale Act (Bulletin 157); 12 pages.

INSECTS AFFECTING FRUIT TREES (Bulletin 158), by Professor C. J. S. Bethune; 36 pages, 50 illustrations.

Mailed November 5th, 1907.