

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

Coloured covers/
Couverture de couleur

Coloured pages/
Pages de couleur

Covers damaged/
Couverture endommagée

Pages damaged/
Pages endommagées

Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée

Pages restored and/or laminated/
Pages restaurées et/ou pelliculées

Cover title missing/
Le titre de couverture manque

Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées

Coloured maps/
Cartes géographiques en couleur

Pages detached/
Pages détachées

Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)

Showthrough/
Transparence

Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur

Quality of print varies/
Qualité inégale de l'impression

Bound with other material/
Relié avec d'autres documents

Continuous pagination/
Pagination continue

Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure

Includes index(es)/
Comprend un (des) index

Title on header taken from: /
Le titre de l'en-tête provient:

Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

Title page of issue/
Page de titre de la livraison

Caption of issue/
Titre de départ de la livraison

Masthead/
Générique (périodiques) de la livraison

Additional comments: /
Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The Canadian Entomologist.

VOL. XXXI.

LONDON, JUNE, 1899.

No. 6.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

TORONTO BRANCH.

At the third annual meeting of the Toronto branch of the Entomological Society of Ontario, held in the Normal School Building, on Friday, April 7th, Vice-President Tyers in the chair, the officers were elected for the ensuing year as follows: President, Mr. Arthur Gibson; Vice-President, Mr. E. M. Walker; Secretary-Treasurer, Mr. G. M. Stewart (233 Beverley street); Librarian, Mr. H. C. Austen. Members of Council—Messrs. R. J. Crew and S. R. Carter. The retiring President's address, as read by the Secretary, contained some good suggestions, which, if carried out during the present year, will create more interest in the meetings and be of much benefit to the members.

QUEBEC BRANCH.

The second annual meeting of the Quebec branch was held on Saturday, April 15th, in Morrin College, under the presidency of the Rev. Dr. Fyles. There was a large attendance of members and several new ones were admitted to the branch, raising the number to upwards of forty. The Treasurer's report, which shows a good balance on the right side, was read and adopted.

After the President had delivered his annual address, which was full of interest, the election of officers for the ensuing year took place, and resulted as follows: President, Rev. T. W. Fyles, D. C. L.; Vice-President, Miss Macdonald; Secretary-Treasurer, Lt.-Col. Crawford Lindsay; Curator of Museum, Professor Walters. Council—Hon. Richard Turner, M. L. C., Mr. James Geggie and Mr. J. Eveleigh Treffry, Mrs. R. Turner, Miss Bickell, and Miss B. Winfield.

MONTREAL BRANCH.

The twenty-sixth annual meeting of the Montreal branch was held on May 9th, at 74 McTavish street. The President, Mr. Henry H. Lyman, occupied the chair, and ten members and one visitor were present.

The President submitted the annual report of the Council, which recorded with satisfaction the continued success of the branch, alluding to the successful celebration of its twenty-fifth anniversary in November last. Eight meetings had been held during the season and fourteen original papers read. Several of the members had again assisted the Natural History Society in its course of Saturday half-hour lectures to young people.

The Treasurer's report showed a substantial balance on hand, and, on motion, these reports were received and adopted.

Mr. Lyman then delivered his annual address, making it his valedictory, on retiring from the presidency. He reviewed in an interesting manner the past history of the branch, giving statistics to show the progress made and thanking the members for assistance in carrying on the work.

The election of officers was then proceeded with, with the following result: President, Mr. Albert F. Winn; Vice-President, Mr. Dwight Brainerd; Secretary-Treasurer, Mr. Lachlan Gibb (re-elected). Council—Messrs. Henry H. Lyman, G. C. Dunlop, and A. E. Norris.

The retiring President then vacated the chair, which was taken by the new President, who read an interesting paper on "Collecting by Electric Light."

After spending a half-hour pleasantly in the examination of the specimens exhibited by various members and in discussion, a very successful meeting was brought to a close.

FATAL TEMPERATURE FOR *DIASPIS AMYGDALI*, TRYON.

In the CANADIAN ENTOMOLOGIST, Vol. XXX., pp. 78-80, the writer of this stated that a tree imported from Japan, and badly infested by this Coccid, had been transplanted to the insectary, but the other of the two trees mentioned was not, at that time, properly accounted for. It was planted outside, with a view of ascertaining the lowest degree of temperature that the *Diaspis* could withstand and not be destroyed. The lowest temperature reached in the winter of 1897-98 was -9° Fahr., but, notwithstanding this, the species wintered over in sufficient numbers to increase considerably over the previous year. During the winter of 1898-99, just passed, the temperature fell to -21° Fahr. during a single night and to from -12° to -18° Fahr. for several successive nights, with the result that the *Diaspis amygdali* appear to have every one succumbed, as not a single living individual can be found on the tree. F. M. WEBSTER.

TWO NEW COCCIDÆ OF THE SUBFAMILY LECANINÆ.

BY ADOLPH HEMPEL, S. PAULO, BRAZIL.

EDWALLIA, n. g.

Apparently related to *Farmairia*, Sign. ♀. Scale waxy, hard, brittle, cone-shaped with radial ridges and furrows. Antennæ five-jointed. Anal-plates curved; the two together forming a ring. Each plate is furnished with ten long hairs. Type, *E. rugosa*.

Edwallia rugosa, n. sp.

♀.—Scale white; wax hard and brittle, cone-shaped, having the appearance of a barnacle, and radially ridged or fluted like the shell of *Pecten*. The base is slightly oval in shape, being wider anteriorly than posteriorly; the anterior side is slightly convex, so that the top of the scale is caudad of the middle. A number of fine concentric rings run around the scale parallel to the base. The inside of the scale is shiny and quite smooth. Adult ♀ fills the entire scale. Derm smooth, lemon-yellow in colour. Around the margin of the body there is a row of about 210 small sharp conical spines, and near the margin on the dorsal surface there is a double row of minute hairs. The stigmatal areas are characterized by one large curved spine, with a round spot at the base; and by a group of from 13 to 19 small round glands. The caudal cleft is very short, each lobe bears a hair longer than the marginal spines. Anal orifice surrounded by a chitinous ring, within which is the anal ring bearing six long hairs. Anal plates curved, irregular, triangular, the dorsal side longer than the ventral side. Each plate bears 10 long hairs, two of which are straight and spinelike; the others are longer and more flexible. Three are situated on the dorsal surface and 7 on the ventral. The plates are so placed that they together form a second anal ring with 20 hairs. Just in front of the anal ring there is a group of about 20 small round spinnerets. Antennæ five-jointed, .12 mm. long. Joint 3 the longest; joints 1 and 5 are about equal in length; joint 4 is about half the length of 3; and joint 2 is the shortest. Formula 31542, or 3(15)42. All the joints bear hairs; joint 3 bears two, one of which is quite long; joint 5 has five hairs. Legs ordinary, coxa and trochanter each with a subterminal hair. Femur wide, with a short sharp spine near the distal end; tibia about as long as femur, the distal end enlarged and bearing one hair; tarsus and claw not quite as long as tibia, two hairs on

the extremity of the tarsus; claw small, curved. Tarsal digitules very long and slender, with expanded ends; digitules of claw about half as long as the others, ovate leaf-like. Mentum large, situated midway between the first and second pairs of legs; rostral loop reaching half way to the third pair of legs. Viviparous. ♀ Scale: height, 3.00 mm.; width, 1.50 mm.; length, 2.75 mm.

Larva, just hatched.—Light yellowish-brown, ovate, margin serrated; abdomen ending in two inconspicuous lobes, each bearing one long terminal hair. Anal ring with six long hairs; two short hairs are on the abdomen just in front of the anal ring. The two anal plates are indicated, each with about 6 small hairs. The prothorax and mesothorax each bear a short thick spine on each side of the body. Antennæ apparently five-jointed; joints 5 and 3 being about equal in length. All the joints bear hairs, joint 5 bearing six, one of which is as long as the antennæ. Legs long; trochanter with one long subterminal hair; all the other joints with two hairs or more; claw long and slender, digitules of unequal length, slightly expanded; digitules of tarsus very long, hair-like. Four or more longitudinal rows of short spines on the dorsum.

♂.—Scale white, very thin, Lecanid, elliptical, not very convex. Divided into plates, one dorsal, two lateral on each side, and one terminal at each end. The dorsal plate has a crest of broken wax. Length, 1.75 mm.; width, .75 mm.

Hab. Sao Paulo, Brazil. On the small twigs of *Eugenia jaboticaba*, a tree found in the Brazilian forests, and cultivated for its fruit. I am indebted to Mr. Gustav Edwall for this species. He first found it and called my attention to it. It is not abundant.

PULVINELLA, n. s. g.

Like *Pulvinaria*, except that the ovisac is secreted below the insect, instead of behind it. The ovisac is cone-shaped, and when it is completed, the insect rests upon it like on a cushion.

Type *Pulvinaria* (*Pulvinella*) *pulchella*, n. sp.

Pulvinaria (*Pulvinella*) *pulchella*, n. sp.

♀ *Adult*.—Shiny, hard, elliptical, dorsum not very convex; ground-colour dirty white, marbled with black on the ridges near the margin. Derm irregularly transversely wrinkled; one prominent ridge extends across the dorsum, slightly anterior of the middle. Beneath, chocolate-

brown, except a narrow marginal stripe of dirty white. Caudal cleft about 1 mm. long. Boiled in a solution of KOH, it colours the liquid a dark amber. Antennæ 8-jointed, .48 mm. long. Joint 3 the longest; joints 4 and 5 considerably shorter; joints 1 and 2 about half as long as 3, and the other joints shorter. Formula 3(45)12867. All joints except joint 3 bear hairs. Legs ordinary, coxa with several hairs, and one short, sharp spine near the proximal end; trochanter with one very long apical hair and two short ones; femur stout; tibia not quite so long as femur; tarsus half as long as femur; claw long, stout, curved. Tarsal digitules very long, slender, with knobbed ends; digitules of claw not twice the length of claw, stout with expanded ends. Mentum situated between the fore legs; rostral loop long, reaching half way to the insertion of the last pair of legs. Anal ring with ten long hairs. There is a single marginal row of rather long, slender hairs. Stigmatal spines three, one long, slightly curved, two short and stout. A group of about 50 small round spinnerets is situated around each stigmatal area. Numerous filiform glands are scattered over the ventral surface. Anal plates small, both lateral sides being of equal length. Height, 2 mm.; width, 4.50 mm.; length, 6 mm.

Ovisac cone-shaped, longitudinally fluted with about 16 ridges. The anterior part is secreted faster than the posterior part, so that the anterior edge becomes convex, and when it is completed the insect rests upon it in an oblique position. The ridges are closer together on the posterior edge than on the anterior. The colour is white with a faint creamy tinge. Length, 5 mm.; width, 3.75 mm.; height, 7 mm.

Larva, just hatched.—Light brown, elliptical. Margin of body finely serrated; a short hair is situated on each side of the body at each abdominal segment; eight short hairs on the anterior margin between the antennæ. The body is terminated posteriorly by two long setæ and several small hairs. The prothorax and mesothorax each bear a long, straight spine, on the margin, on each side of the body. Antennæ long, six-jointed, three the longest, and six the next; the other joints subequal in length. Legs ordinary, tarsal digitules long, slender, with slightly expanded ends; one of them as long as tarsus. Claw long, curved; digitules of claw slender, with expanded ends. Rostral loop long, reaching to the anal cleft.

Hab.—Ypiranga, State of Sao Paulo, Brazil. On small twigs of *Baccharis*, sp. Not common.

SOUTHERN NOCTUIDS AT RYE, N. Y.

BY HENRY BIRD, RYE, N. Y.

Remarks in a recent issue of this magazine concerning "A Southerner arrested in Canada" recall some of the additions made to my local list during the summer of 1898. In this instance also some stragglers from a lower latitude were welcomed among my catch. Not only a few Noctuids but some of the birds also bore a Southern aspect (I cannot be expected to pass the birds unnoticed), most unusual among the latter being the appearance of several blue herons that frequented the salt marshes here for the better part of the summer. These waders are more at home in the swamps of Florida, although this is not the limit of their northern migrations by any means, yet they are considered great rarities here by the local sportsmen.

Whether the climatic conditions were such as to induce the visitations, or whether the great quantity of gunpowder that was burned down South caused them to be in evidence, I will not attempt to explain.

In the case of the heron the gunpowder suggestion might have a little weight, but the freshness of my Noctuids points rather to a permanent residence on their part.

Worthy of especial mention among these is *Eucalyptera bipuncta*, Morr.

In the only previous reference to this species in former volumes (Vol. XV., 230) the insect is discussed concerning its position generically and is compared with *Scolecocampa liburna* and *Doryodes acutaria*. As one unfamiliar with the species could get but a poor conception from these associations, and as the literature is in no way burdened with references to this insect, I will mention a few points descriptive of its general appearance.

In my specimen, a male, the form is very slight, palpi prominent projecting forward and upward, the antennæ show extremely fine pectinations under a pocket magnifier. The colour is light smoky gray, the secondaries a trifle the darker. The transverse posterior line is the only conspicuous marking of the primaries, is strongly indicated, smoky brown, and curves well outwardly near the costa, but does not in my specimen reach the costal vein.

Two small, black dots, suggestive of the name, are noticeable, one—the larger—indicating the orbicular, and the other, very minute, equi-

distant between it and the t. p. line. The secondaries are without markings. The insect expands twenty-two millimeters, and was taken at light, Aug. 10th.

Another species of perhaps rarer occurrence was *Atethmia rectifascia*, Grt. My acquisition of the latter was in this wise: While assisting a lady friend, who had just begun collecting, in naming a very fair two-months' catch one evening last August, our attention was drawn to a small moth that had flown in at the open window and was resting on the window shade. The question, "Oh! what is that one?" was too much for the oracle, and with an apologetic hint that it was something very good, I was presented with the specimen for further deliberations.

Here was another instance of the good luck that generally befalls beginners in having rarities come their way. I have noticed it repeatedly and recall my only capture of *Eutelia pulcherrima*, Grt., in the earliest days of my entomological experience.

How it is that the specimen which I still possess has passed through the vicissitudes of the "cigar-box" collection, the ornamental display case on the wall, and lastly the transference from an unusually large, common pin, is more than can be imagined. And yet it stands a very passable example in my collection, antennæ-less and leg-less to be sure, but for all that the most prized specimen that I have.

Through the last ten years, since knowing what species it represents, a constant lookout for others has been kept, but without success, and I have begun to wonder if it will be necessary for me to begin all over again in order to secure another example.

Regarding *rectifascia*, a word as to appearance may not be amiss, as no mention of the species has thus far been made in the CANADIAN ENTOMOLOGIST. Since its description in 1874, the generic position has been twice changed by Prof. J. B. Smith, to whom I am indebted for the identification of my example. This species is of rather slight build, with wings full and normally developed, having a thin, silky vestiture that at first suggested to me (very wrongly) that it might have a position somewhere *Acontia*-ward. The antennæ are simple, eyes and palpi prominent, the latter projecting upward. The primaries are a pale, shining olivaceous, crossed by three lines or fasciæ, as in the case of *Chloridea rhexia*, S. & A. The first of these, which is nearer the middle of the wing than usual for the transverse anterior line, is about at right angles

with the inner margin. The second or transverse posterior line is more oblique, bending outward near the costa and with a more pronounced sweep than the following. The third or subterminal is margined inwardly with a faintly darker shade of the ground-colour. The extreme outer margin and fringes show a golden lustre. The reniform is indicated by a straight mark of the same pale shade as the lines, and is at right angles with, though not touching, the costa. At the outer margin, near, but not on, veins three and four are two minute black dots. In a description of this insect in *Trans. Am. Ent. Soc.*, X., 247, no mention is made of these dots and they may be perhaps a sexual characteristic.

The secondaries are lighter, discoloured white, of the same lustrous sheen, shading darker at the outer margin, but with fringes less golden than primaries. Expanse, twenty-four millimeters.

Other captures, referable generally to a more southern fauna, are *Polygrammate hebraicum*, Hbn.; *Laphygma frugiperda*, S. & A.; *Prodenia eudiopta*, Gn.; *Plusia basigera*, Walk.; *Schinia lynx*, Gn.; *S. Thoreaui*, G. & R.

WINTER BREEDING OF DIABROTICA VITTATA IN FORCING HOUSES.

In the "Journal of the New York Entomological Society" for June, 1896 (Vol. IV., No. 2, p. 68), the present writer recorded the occurrence, on December 28, 1895, of adults, and larvæ from one-half to two-thirds grown, of *Diabrotica vittata*, in a greenhouse near Cincinnati, Ohio, that was being used for growing cucumbers for winter market. The injuries inflicted upon the young cucumber plants were very serious, and resulted in a nearly total destruction of the plants. On March 25, 1899, serious injuries were again reported by the proprietors of these same greenhouses, and the complaint was accompanied by specimens of what, to all appearances, were the larvæ of this same species. These larvæ were placed on the roots of a squash plant growing in the insectary, and on the morning of April 24th the adults made their appearance, thus showing that, under proper conditions, the species will continue to reproduce the year round, whereas out of doors, and under normal conditions, the insect hibernates in the adult stage. F. M. WEBSTER.

DR. A. FENYES, of Pasadena, California, has set forth on a collecting tour in Mexico, Texas, New Mexico and Colorado, and expects to be absent for five months.

THE SYNHALONIA OF CALIFORNIA.

BY CARROLL FOWLER, BERKELEY, CAL.

The material for this study was collected by Mr. H. O. Woodworth and myself during the spring and early summer of 1898. At Berkeley the collecting was carried on in a systematic manner, so that the number of each species taken gives a fair representation of their relative abundance. *S. albicans* and *S. Edwardsii* are the only species heretofore recorded from California. The species may be readily recognized by means of the following synopsis :

Abdomen with distinct, white bands.

Small, not more than .25 in. in length..... *albicans*.

At least .40 in. in length.

Thorax with white pubescence, rather thin on

disc..... *californica*, ♀.

Thorax with dense, reddish-brown pubescence... *speciosa*, ♀.

Abdomen not distinctly banded.

Pale pubescence of the abdomen confined to the first segment.

Thorax with dense, brownish pubescence..... *acerba*.

Thorax with rather thin white pubescence..... *albopilosa*, ♂.

Pale pubescence extending more or less upon second abdominal segment.

Third joint of the antennæ shorter than the first..... *Edwardsii*, ♂.

Third joint as long as the first and second combined... *intrudens*, ♂.

1. *Synhalonia albicans*, Prov. San Gabriel, Cal. (H. O. Woodworth), June 23. Twelve specimens.

2. *Synhalonia californica*, n. sp.

11 mm. Clothed with ashy pubescence, abdomen with white bands.

♀.—Head black, clothed with ashy pubescence; clypeus nude, coarsely punctured; antennæ entirely black. Thorax black, opaque, very finely punctured, clothed with ashy pubescence, a little thinner on the disc; tegulæ reddish-yellow; wings very slightly clouded; legs clothed with white pubescence, dense on posterior tibiæ and tarsi, more or less yellowish on tarsi beneath; apical joints of tarsi brownish. Abdomen black, very finely punctured, narrow apical margins of the segments brownish; first segment clothed with erect pale hairs, on base of second indistinct and sometimes wanting, and on apical margins of 2-5 a band of white appressed pubescence, brownish on middle of fifth. Ventral segments fringed with white hairs.

Habitat.—Berkeley, Cal., May 1 and 9. Thirteen specimens.

3. *Synhalonia speciosa*, Cress. Berkeley, Cal., April 26 to May 1. Two females. Previously recorded from Colorado.

4. *Synhalonia acerba*, Cress. ♀.

♂.—Differs from ♀ in having the clypeus and labrum yellow, the antennæ reaching back to the second abdominal segment and crenulated toward tips (third joint is shorter than the first), and the legs clothed with pale pubescence. The pubescence of the thorax, as in some females, is strongly tinged with fulvous. The male is readily distinguished from *Edwardsii* by having no pale pubescence on the second abdominal segment.

Berkeley, Cal., six specimens; and San Mateo Co., Cal., two specimens. April and May. Collected upon *Brassica campestris* and *Ranunculus californicus*. Previously recorded from Nevada.

5. *Synhalonia albopilosa*, n. sp.

13 mm. Thorax small, clothed with white pubescence; abdomen large, oval.

♂.—Head black, punctured, clothed with griseous pubescence, thin on clypeus; clypeus, except upper margin, and labrum, yellow; antennæ entirely black, reaching slightly beyond the second abdominal segment, crenulated toward tips, third joint shorter than the first. Thorax black, finely punctured, not as broad as abdomen, clothed with rather long, white pubescence, not entirely concealing the surface; tegula black in front, brownish behind; wings hyaline; legs clothed with pale pubescence, apical joints of the tarsi brownish, intermediate tarsi long and slender. Abdomen oval, broader than the thorax, black, shining, finely punctured, apical margins of the segments pale brown; first segment with thin, erect, white hair, 2-5 with short, thin, black pubescence, a very little white on the sides of the second, and that on 6-7 dark brown. Venter almost nude, otherwise as above.

Habitat.—Berkeley, Cal., April 18. One specimen, collected upon *Ranunculus californicus*.

6. *Synhalonia Edwardsii*, Cress. Berkeley, Cal., March 15 to May 9. Sixteen males, collected upon *Brassica campestris*, *Ranunculus californicus*, and *Malvastrum capense*, in botanic garden.

7. *Synhalonia intrudens*, Cress. Berkeley, Cal. March, fourteen males; and April 26, one male. Tulare, Cal. (H. O. Woodworth), May 10, three males. Collected chiefly upon *Brassica campestris*. Previously recorded from Nevada.

CONTRIBUTIONS TO THE KNOWLEDGE OF MASSACHUSETTS COCCIDÆ.—II.

BY GEO. B. KING, LAWRENCE, MASS.

Ortheziinæ.

- (21)
- Orthezia insignis*
- , Dougl.; 1887-1892. I.

Found at Amherst and Cambridge, Mass., in greenhouses. A very general feeder on greenhouse plants. It is recorded from New York, Pennsylvania, and California.

Lecaniinæ.

- (22)
- Kermes galliformis*
- , Riley; 1881-1897. N.

A very abundant species at Lawrence, Methuen, Andover, Haverhill, and Dracot, Mass., on white, black, red, and scrub oaks. It is recorded from Ohio, Colorado, New Mexico, New York, and Oklahoma. In Massachusetts it is attacked by a Lepidopterous larva, *Euclimensia bussettella*, and a new species of *Encyrtus* has been reared from it in large numbers. It is attended by a number of species of ants, the following already observed: *Formica subsericea*, Say.; *F. obscuripes*, For.; *Camponotus pennsylvanica*, Deg.; *Cremastogaster lineolata*, Say.; and *Lasius americanus*, Em. In the spring of 1898 one adult female was found under a stone in a nest of *Formica subsericea*, Say, at Andover, Mass.

- (23)
- Kermes pubescens*
- , Bogue; 1898-1898. N.

This is found to be quite destructive to young white oaks at Lawrence, Andover, and Methuen, Mass. It is parasited by *Microterys cincticornis*, Ashm. The coccid was first described from Kansas.

- (24)
- Kermes nivalis*
- , King and Ckll.; 1898-1898. N.

A very pretty species and comparatively rare. Covered with a snow-like meal which soon disappears after the young begin to move about. It is found on *Quercus alba* at Lawrence, Mass.

- (25)
- Kermes Kingii*
- , Ckll.; 1898-1898. N.

Like the above, quite rare and handsome. Found at Lawrence, Mass., on red oak. Prof. Gillette has sent Prof. Cockerell specimens collected in Delaware.

- (26)
- Lecanopsis lineolata*
- , King and Ckll.; 1897-1897. N.

Found in the nest of *Cremastogaster lineolata*, Say, at Lawrence, Mass.

- (27) *Lecanium hesperidum*, L.; 1758-1828. I. Described as *Coccus hesperidum*.

Very common in greenhouses, and a pest not only in greenhouses, but also to many plants in dwelling houses at Lawrence, Mass.; on ferns, palms, ivy, and many other plants not yet identified; recorded from Utah, Ohio, California, Florida, Georgia, New York, New Jersey, and Washington, D. C.

- (28) *Lecanium coffea*, Walk.; -1896. I. Syn. *hemisphericum*, Targ.

A first-class pest on greenhouse plants at Lawrence, Mass.; on ferns and several other plants not determined. It is reported from Cambridge, Maine, New Jersey, New Mexico, California, Pennsylvania, and Washington, D. C., on Orange, Diospyros, Oleander, Chrysophyllum, Sago palm, and *Croton variegatum*.

- (29) *Lecanium quercifex*, Fitch. 1856-1898. N.

On white oak at Lawrence, Mass. Parasited by a new species of *Coccophagus*. Originally described from New York.

- (30) *Lecanium quercifex*, Fitch, var.; 1898. N.

At Methuen, Mass.; on cork oak and an ornamental shrub. It is parasited by *Aphycus lecanii*, How.

- (31) *Lecanium filicum*, Boisd.; 1868-1869. I.

According to Dr. Packard it has been found in greenhouses frequently. Prof. Cockerell informs me that this is only a variety of *L. coffea*.

- (32) *Lecanium corylifex*, Fitch; 1856-1898. N.

A very common species at Lawrence, Andover, and Methuen, Mass.; on hazelnut, *Corylus americana*, and is attended by *Cremastogaster lineolata*, Say. It is parasited by *Aphycus lecanii*, How., *Cornys fusca*, How., *Microterys*, sp. A new genus, near *Chrysoplatycerus*, and a *Tetrastichus*, sp. (Hyperparasite), were found with one lot. The Coccid was originally described from New York.

- (33) *Lecanium cynosbati*, Fitch; 1856-1898. N. Syn. *Caryæ*, Sign.

From Methuen, Mass.; on three-thorned locust, *Gleditschia triacanthos*. It is attended by *Formica subsericea*, Say. Originally described from New York.

- (34) *Lecanium tessellatum*, Sign; 1873-1898. I.

Found by Mr. J. W. Folsom in the botanic gardens at Cambridge, Mass. (Ckll. in litt.).

- (35) *Lecanium Kingii*, Ckll.; 1898-1898. N.

Quite frequently found on high-bush blueberry, *Vaccinium corymbosum*, L.; at Lawrence, Mass.

- (36) *Lecanium tarsale*, Sign.; 1873, var. 1898. N.

On dogwood, *Cornus alternifolia*, at Lawrence, Methuen, and Andover, Mass. Generally found on the trunk of the trees, seldom on the limbs. It is parasitized by *Blastothrix longipennis*, How.

- (37) *Lecanium Fletcheri*, Ckll.; 1893-1898. N.

At Lawrence, Mass., on *Arbor vitæ*. It is found at New York by Mr. Pettit and was described from Ottawa, Canada. Found there by Dr. Fletcher on cedar.

- (38) *Lecanium nigrofasciatum*, Perg.; 1898-1897. N.

Found at Methuen, Boston, Springfield, Holyoke, and Deerfield, Mass., on *Acer rubrum* and *Acer saccharinum*; also found at Washington, D. C.; Maryland, Georgia, Tennessee, Pennsylvania, New Jersey, New York, Delaware, Ohio, Missouri, Illinois, and Florida. It is parasitized by *Aphycus flaviceps*, How. Dr. Howard, who has had all the parasites reared by me for study, reports to me (in litt.) that these specimens were badly shrivelled, so he could not make the determination with absolute certainty, and that the parasite has been previously reared from *Lecanium* by Prof. W. G. Johnson at Champaign, Ill. Dr. Dimmock informs me that some of the trees were very badly infested by this scale, which has been nearly exterminated at Springfield by a parasite. The food plants in other localities are olive, *vaccinium*, plum, apple, peach, birch, maple, *Bumelia* and *Lindera benzoin*. It also occurs in Western Ontario, Canada, on maple.

- (39) *Lecanium pallidior*, Ckll. and King; 1899-1898. N.

On a young native white cedar, *Chamæcypris thyoides*, at Methuen, Mass.

- (40) *Lecanium caryæ*, Fitch; 1856-1898. N.

At Lawrence and Methuen, Mass.; on pignut hickory and wild red cherry. The writer has endeavored to find the original type of Fitch's species. At present it looks as though there are none to be found. Prof. Cockerell will in the near future redescribe the species, as it is very much confused with many others, owing to the very short and incomplete description by Fitch. The unrecognized *Lecanium platycerii* described by Dr. Packard in 1869, said to be common in greenhouses in Massachusetts, was probably *Lecanium coffeæ*, Walk.

(41) *Lecanium (Saissetia) anthurii*, Boisduval; 1868, var.

This insect was referred to Mr. Cockerell, who supplies the following remarks:

"Length 2, breadth $1\frac{1}{2}$, height little over $\frac{1}{2}$ mm.; pale reddish-brown to brownish ochreous, broad oval in outline, fairly convex, shiny; with weak ridges forming an H, as in the *oleæ* group; these ridges marked, as in *Beaumontiæ*, by rows of waxen or glossy patches. Dermal structure as in *coffææ*, and exactly as Signoret figures for *anthurii*. Marginal bristles of two sizes, about 24 and 39 μ . Legs a little larger than *coffææ*; coxa 150, femur with trochanter 180, tibia 135, tarsus 84, claw 20, claw-digitules 30, tarsal digitules 52 μ . Tarsal digitules filiform, with a small knob. Claw strongly curved, its digitules bulbous at base, and with large round knobs at the end. Antennæ practically as in *coffææ*; segments, (1.)39, (2.)42, (3.)54, (4.)42, (5.)39, (6.)30, (7.)24, (8.)36 μ . Formula: 3(24)(15)867. This is evidently very close to *L. coffææ*, but the specimens seen to be adult, and in that case they cannot belong to that species. They very nearly agree with *anthurii* as described by Signoret, but are half a mm. shorter, and very much flatter; the tibia also is not twice as long as the tarsus, as it should be in *anthurii*. In many respects the insect is very like *L. Beaumontiæ*, as described by Douglas, but the description is very inadequate. The present insect was found by Mr. King on grass in a greenhouse, so its native country is uncertain. On the whole, it seems more discreet to leave it as '*anthurii*, var.' than to give a new specific name." (Cockerell, litt., March 23, 1899.) Originally found on Anthurium (Ckll. in litt.).

(42) *Pulvinaria innumerabilis*, Rathv.; 1854-1869. N. Syn. *Aceri-corticis*, Fitch.

Quite frequently found through the State on maples and perhaps on other food plants, and is preyed upon by *Hyperaspis signatus* and *Chilocorus bivulnerus*; an *Encyrtus* sp., *Aphycus* sp., and *Chiloneurus albicornis*, How., have been reared from it. Recorded from Washington, D. C.; Virginia, New Jersey, New York, Maryland, Pennsylvania, Georgia, Indiana, Illinois, Colorado, Washington, Utah, Oregon, Ohio, Florida, Kansas, Missouri, Michigan, New Mexico, Nebraska, and Western Nevada, on box elder, maple, locust, elm, woodbine, currant, gooseberry, plum, peach, hawthorn, mountain ash, Lombardy poplar, weeping willow, upland willow, swamp willow, flowering currant, osage orange, oak, linden, rose, hackberry, sycamore, spindle tree, beech, and

sumac. There is much doubt about the identity of the species on all of the above food plants. The only way to be sure about these *Pulvinaria* spp. will be to get a large number, say 25 or 50, of each and measure all the antennæ and legs. (Ckll. in litt.)

(43) *Pulvinaria innumerabilis*, var. *tiliæ*; King and Ckll.; 1898-1898.

A variety readily recognized from *innumerabilis* by the colour of the female scale, which is gray with several black spots, giving it a mottled appearance. Found at Methuen and Lawrence, Mass., on *Tilia americana*, white oak, and elm.

(44) *Pulvinaria Maclureæ*, Kennicott in Fitch; 1855-1898. N.

What I take to be this species is found on Sumac. It is the largest of the *Pulvinaria* type found here, and not very often found. It has been recorded from New York, New Mexico, and Pennsylvania, on Osage orange.

(45) *Lichtensia viburni*, Sign.; 1873-1898. I.

The species is new to America and was found at Lawrence, Andover, and Methuen, Mass., on leaves of *Spiræa salicifolia*, L., and *Prinos verticillatus*. It is parasitized by *Aphycus Lounsburyi*, How. Dr. Howard, who has so kindly determined all the parasites of my rearing from coccids, also says (in litt.) that he agrees with me that the supposed *Pulvinaria innumerabilis* from different localities and food plants needs further study.

THE MEDITERRANEAN FLOUR MOTH AGAIN.

BY PROF. W. G. JOHNSON, COLLEGE PARK, MD.

Some few weeks ago I had an inquiry referred to me by the Editor of the *American Miller* from a Canadian correspondent, who stated that the flour moth was less than fourteen miles away from his mill, in Wellington (Ontario) district. I contributed a short article regarding this moth in the May number of the *American Miller*, in response to which two other localities have been discovered. One comes from York district, along the Lake, and one from Leeds district, along the St. Lawrence River. It seems clear to me that this insect is spreading along the watercourses of the lakes and inland along the railroads. Four other cases were reported to me, with larvæ and pupæ from each, from the United States side, one coming from Ohio, the first reported from that State, and three from New York. I also have one from Southern California. In every instance the pest has maintained its former reputation as a most dangerous insect.

TAENIOCAMPA RUBRESCENS, WALK.

BY J. ALSTON MOFFAT, LONDON, ONT.

This interesting species has at last been added to the collection of the Entomological Society of Ontario, by the industrious collecting of Mr. J. W. Bice, who took it at electric light in the season of 1898, and was recently identified for me by Dr. J. B. Smith. *Taeniocampa alia*, Guen.—*incerta*, Hubn.—was in remarkable profusion during the early part of that season; and ranging through an extent of variation that was quite confusing. Three good specimens of *rubrescens* were taken at the same time, each differing from the other in colour, and were picked out as possibly another variety of *alia*, but when seen by Dr. Smith, he pronounced my Nos. 3, 4, 5 to be *T. rubrescens*, and his remark on them was, "A very pretty series, No. 4 being a new form to me."

It seems to be a somewhat rare moth. I find that it was first described and named by Walker in 1865, from a specimen in Dr. Bethune's collection, and from there it has been transferred to the U. S. National Museum, where it is now deposited as the type of the species. As late as 1890, Dr. Smith redescribed it in *Entomologica Americana*, Vol. VI., p. 123, as *T. venata*, from a single specimen taken by Mr. Bruce many years before, and concludes his remarks upon it thus: "I have never seen anything to match this species, and do not think it can be readily confused with any of the described forms." But he afterwards discovered that Mr. Walker had been there before him. Dr. Smith regards it as distinctly a northern species, it never having been taken as far south as New Jersey. In his 1893 Catalogue of the Noctuidæ found in Boreal America, he gives its habitat as "Canada, New Hampshire, northern New York." One would suppose that a northern species would have far less difficulty in spreading southward than a southern one would northward, unless severely restricted in its food plant. Henry Edwards gives the food plants of *T. incerta*, Hubn., as "*Quercus*, *Salix*, *Prunus*." That of *T. rubrescens* may be similar, but I have not found any reference to it, and collecting at light is not conducive to the discovery of food plants.

A fine pair of *T. subterminata*, Smith, was added to the collection at the same time, and in the same way.

CLASSIFICATION OF THE ENTOMOPHILOUS WASPS, OR
THE SUPERFAMILY SPHEGOIDEA.

BY WILLIAM H. ASHMEAD, ASSISTANT CURATOR, DIVISION OF INSECTS,
U. S. NATIONAL MUSEUM.

(Paper No. 1.)

In the Journal of the New York Entomological Society for March, 1899, I separated the Hymenoptera into ten superfamilies, viz.: I. Apoidea, II. Sphegoidea, III. Vespoidea, IV. Formicoidea, V. Proctotrypoidea, VI. Cynipoidea, VII. Chalcidoidea, VIII. Ichneumonoidea, IX. Siricoidea, and X. Tenthredinoidea.

In the following pages I now propose to give a classification of the second of these superfamilies, or the Sphegoidea, a large group of wasps at one time confused with the genuine fossorial wasps, but which may be readily separated from them by having the hind angles of the pronotum not extending back to the tegulæ. Of all wasps these are the ones most closely allied to the bees.

Some of the best entomologists of the past — Leach, Dahlbom, Haliday, Westwood, and others — held that the group represented many distinct families; but quite recently some of our modern systematic workers — men of the highest attainments and ability — hold quite different views, treat this vast group as a single family, and would suppress or merge into a single genus many genera that were formerly considered good and distinct.

To use a slang expression, it is the old battle between the "lumpers" and the "splitters" revived, and the evolutionary problems taking place around us are ignored or misunderstood.

I believe firmly both schools, if we may call them such, are honest in their beliefs; but since I belong to the latter, it seems to me as if the students in the former were restrained or misled by affinities, or relationships, often obscure and indefinable, and overlook the fact that evolutionary changes have already been accomplished; and, because they

find certain affinities, would treat all of these important changes that have occurred through ages of evolutionary forces as of no value or significance.

This tendency to lumping I consider a retrogression in our systematic workers, tending to confusion and to unwarrantable changes in our nomenclature ; and it is to combat this tendency and make an effort to restore to their proper standing these suppressed families and genera, in accordance with the views held by the older entomologists, that I present herewith, in tabular form, the only possible way of demonstrating thoroughly the value and utility of divisions and genera, my ideas on the classification of this great group of wasps.

Before proceeding with my tables, however, and in order to afford a basis of comparison with my own views, it may be well to call attention to the views of two leading hymenopterists who have given much time and study to this group of wasps, namely, Mr. Wm. J. Fox, of the Philadelphia Academy of Sciences, and Dr. Franz Kohl, of the Royal Hofmuseums of Vienna, Austria.

In 1894, Mr. Fox, following the opinion of some of the recent European authorities, in his paper entitled "A Proposed Classification of the Fossorial Hymenoptera of North America," treats these wasps as representing a single family. He says : "It has been evident for some time that the existing arrangement, that contained in Cresson's Synopsis, is of little value, as it is too superficial. Entirely too many families, without characters to substantiate them, were recognized. The Sphegidae, for instance, were divided into no less than nine families. Accepting these nine families would, it seems to me, necessitate the erection of families for such genera as Neolarra, Bothynostethus, Trypoxylon, and others, which stand more or less isolated and yet possess characters which connect them in one way or another with the formerly existing families, and would form more distinct families were they recognized than, say, the Mellinidae, Ampulicidae, Nyssonidae or Bembicidae. How these nine

supposed families have been disposed of the following pages will show."

Mr. Fox then proceeds with his classification of the Fossores *without*, however, giving a table for recognizing these families or even mentioning the salient characters that would distinguish them. He has not even given a single character for distinguishing this so-called family, Sphegidæ, but begins by saying: "I would divide this vast family into five subfamilies as follows: Spheginæ, Pemphredoninæ, Bembicinæ, Oxybelinæ, and Crabroninæ."

Fox then goes on and separates these five subfamilies into tribes: The Spheginæ he separates into two tribes, Sphegini and Ampulicini, upon most superficial and totally unreliable characters when the exotic forms are considered; the Pemphredoninæ into two tribes, Psenini and Pemphredonini; the Bembicinæ, a most conglomerate mixture, into thirteen tribes, Philanthini, Mellinini, Nyssonini, Stizini, Bembicini, Neolarrini, Bothynostethini, Astatini, Diploplectrini, Miscophini, Larrini, and Trypoxylonini; while the Crabroninæ and Oxybelinæ are without tribes.

The Oxybelinæ were first separated from the Crabronidæ in 1874 by the Swedish entomologist, C. G. Thompson. I believe they represent a distinct family and have so treated them in my work.

In 1896, Dr. Franz Kohl, who had, however, years before published much on these wasps, published his "Die Gattungen der Sphegiden," a most valuable work, in which he treats these wasps as belonging to a single large family, the Sphegidæ, which he divides into generic groups, allied groups, subgenera and species groups.

The work is a masterpiece and should be in the hands of all students of these wasps.

Dr. Kohl recognized nine generic groups, arranged in the following sequence:

GENERIC GROUPS.	SUBGENERIC GROUPS.	ALLIED GROUPS.	SUBGENERA.	SPECIES GROUPS
I. Crabro.....	Crabro, s. l.....	Crabro, s. str.....	Crabro, Kohl. Rhopalum, Kohl. Brachymerus, Dahlb. Lindenius..	Lindenius, Dahlb. Entomognathus, Dahlb Encopognathus, Kohl.
	Oxybelus, Latr.....	Anacrabro, Pack. Belomicrus, Costa..... Oxybelus, Costa., s. str.		Belomicrus, Costa., s. str. Oxybelomorpha, Brauns.
II. Pison, Jurine.....	Pison, Jur., s. l.....	Pison, Jur., s. l.....	Parapison. Pison.	
	Pisonopsis, Fox.	Aulacophilus, Smith. Trypoxylon, Ltr.		
III. Miscophus, Jur..	Nilela, Latr.	Syalaon, Pisc.		
	Solierella, Spin.....	Solierella spinolæ, Kohl. Solierella chilensis, Kohl. Nitelopsis, Saund.		
	Plenocalus, Fox.	Miscophus.....		Miscophus (genuine). Miscophus chrysis, Kohl. Miscophus handlischii, Kohl.
	Miscophus, Jur.....	Soliosstethus, Brauns. Miscophus, Brauns.		

- Lyroda, Say. {
 Gastroericus, Spin.
 Homogambrus, Kohl.
 Parapiagetia, Kohl.
 Prosopigastera, Costa.
 Tachysphex, Kohl.
 Tachytes, Pauz.
 Ancistromma, Fox.
- IV. Larra, Fabr..... {
 Larraxena, Sm.
 Larra, Fabr.
 Motes, Kohl.
 Paraliris, Kohl.
 Notogonia, Costa.
 Liris, Fabr.
 Piagetia, Rits.
- Laphyragogus, Kohl..... {
 Laphyragogus, Kohl.
 Leianthrena, Bingham.
- Dinetus, Jur.
 Palarus, Latr.
- Sericophorus..... {
 Helioryctes, Sm.
 Sericophorus, Sm. (Shuck.)
 Sphodrotes, Kohl.
- V. Zoyphium, Kohl.
 Astata, Kohl..... {
 Astata, Latr..... {
 Dryudella, Spin.
 Isolated.
 Diploplectron, Fox.

GENERIC GROUPS.	SUBGENERIC GROUPS.	ALLIED GROUPS.	SUBGENERA.
	Isolated.		
	Heliocausus, Kohl.		
	Bembex	Bembex, Fab. Microbembex, Patt. Bembidula, Burm. Steniolia, Say. Monedula, Latr. Stizus, Handl. Handlirschia, Kohl. Sphecius, Dahlb.	
VII.	Bembex, Fab.		
	Stizus, Latr.		
	Exeirus, Shuck. Kohlia, Handl. (Isol.) Gorytes, Ltr. (Hdl.) (Isol.) Entomosericus, Dahlb. (Isol.) Mellinus, Fab. (Isol.)		
VII.	Alyson, Jurine, s. l.		Alyson, Jur., s. str. Didineis, Wesm.
Alyson, Jur.	Bothynostethus, Kohl, s. l.	Bothynostethus, Kohl. Scaphentes, Handl.	
	Nyson, Latr. (Isolated)		Nyson. Hyponysson, Cress. Acanthostethus, Sm. Philanthus, Kohl. Anthophilus, Dahlb.
	Philanthus, Kohl, s. l.	Philanthus, Kohl, s. str.	
		Trachypus, Klug. Philoponus, Klug. Aphilanthops, Patt.	
VIII.	Philanthus, Fabr.	Cerceris, Latr.	Cerceris, Dhlb. (genuine). Nectanebus, Spin. Didesmus, Dahlb.
	Cerceris, Latr., s. l.		
		Eucerceris, Cress.	

	Sceliphron, Ill. (Kby.), s. l.	Sceliphron, Ill. s. str.	Petropocus, n. sp. Sceliphron. Chalybion, Dahlb. Podium, Fabr., s. str. Trigonopsis, Perty. Dynatus, Spin. Ammophila, Kohl. Parapsammophila, Tschbg.
IX	Ammophila, Kirby.....	Ammophila, Dahlb. Psammophila, Dahlb. Chlorion, Fabr.	
Sphex, L.	Sphex, L., s. l.	Harpactopus.....	Pseudosphex, Tschbg. Calosphex, Kohl. Parosphex, Smith. Palmodes, Kohl. Gastrospheeria, Costa.
	Ampulex, Jur., s. l.	Isodontia, Patt. Sphex, s. str. Aphelotoma, Westw. Ampulex, Jur., s. str.	Rhinopsis, Westw. Ampulex, Jur. (genuine).
	Triogramma, Westw. Dolichurus, Latr.		Psen, Ltr. (genuine) = Mesopora Westw. = Dahlbomia, Westw.
	Psen, Kohl.	Psen, Latr., s. str.	Psen annulipes, Com. Mimesa, Westw. Aporia, Westw.
	Pemphredon, Ltr.	Psenulus, Kohl (= Psen, Dahlb.) Pemphredon, Shuck. Ceratophorus, Shuck. Diphlebus, Westw. Passaloecus, Shuck., s. str. Polemistus, Sauss.	
	Passaloecus, Shuck., s. l.		
	Diodontus, Curt. (Isol.) Harpactophilus, Sm. (Isol.)		
	Stigmus, Kohl.	Stigmus, Jur., st. Pauz. Spilomena, Shuck. Ammoplanus, Gir.	
X.	Ampulex, Jur.		
	Pemphredon.....		
XI.			

Every one must and will appreciate the immense work performed by Dr. Kohl in this contribution, and I feel sure the thanks of all working hymenopterologists go out to him for it. His tables are excellent, and with these and the fine figures of venation, representing nearly every known genus, no student will have any difficulty in placing in its proper genus any of these wasps he may capture, provided they are described.

I think, however, some will take exception to his peculiar views in regard to the rank and value he has given his generic groups, subgeneric groups, allied groups, subgenera and species groups. Nor do I think they will always agree with him in his arrangement of some of these groups. In some cases, at least, according to my views, he has not been successful in showing the true affinities of the groups, and has brought into juxtaposition groups and genera that are widely separated. For instance, I do not consider his group *Pemphredon* (representing the old family *Pemphredonidæ*) to have any affinity whatever with *Ampulex* (*Ampulicidæ*), next to which he has placed it.

Other similar incongruities might be pointed out, but since my views in regard to the rank, affinities and arrangement of these wasps are incorporated in the following tables, it will not be necessary to call attention to them here; they will become apparent in my table, and may be readily detected on a comparison of my arrangement with his.

My arrangement of the families recognized is as follows:

SUPERFAMILY II.—Sphegoidea.

Table of Families.

Middle tibiæ always with two apical spurs. 5.

Middle tibiæ with only one apical spur (occasionally absent in some males).

Median cell in hind wings not twice as long as the submedian, the latter often the longer; front wings with two or three submarginal cells; if with one only the head transverse, not quadrate. . . 2.

Median cell in hind wings fully twice as long as the submedian; front wings with only one submarginal cell, very rarely with an indistinctly defined areolet.

Head transverse, the temples not very broad; scutellum margined, the postscutellum armed with a spine, thorn or forked process and with squamæ; front wings with the

first discoidal cell obliterated, rarely distinct, most frequently confluent with the second discoidal

cell. Family XV., Oxybelidæ.

Head large, quadrate or trapezoidal, the temples very broad; scutellum normal, the postscutellum unarmed without squamæ; front wings with the first discoidal cell always distinct, separated from the second. . . Family XVI., Crabronidæ.

2. Abdomen with a strong constriction between the first and second segments; eyes often emarginate within. 4.

Abdomen without a strong constriction between the first and second segments; eyes most frequently normal, rarely emarginate within.

Abdomen sessile, never petiolate. 3.

Abdomen petiolate or subpetiolate; cubitus in hind wings usually originating before the transverse median nervure, more rarely interstitial or originating slightly beyond it; transverse median nervure not sinuate ζ -shaped; ocelli distinct; labrum most frequently hidden, rarely triangularly exerted, never free. Family XVII., Pemphredonidæ.

3. Labrum large, free, well developed and triangularly elongated, much longer than wide; cubitus in hind wings usually originating beyond the transverse median nervure, the latter sinuate or somewhat ζ -shaped; ocelli aborted, represented by cicatrices. Family XVIII., Bembicidæ.

Labrum small, not free, usually completely hidden by the clypeus; cubitus in hind wings most frequently originating beyond the transverse median nervure, the latter straight, not ζ -shaped; mandibles often emarginate on under side; ocelli distinct or at most with the lateral or hind ocelli aborted or wanting, indicated by cicatrices; front wings with a distinct stigma. Family XIX., Larridæ.

4. Head wider than the thorax, the temples not narrow, rather broad; eyes most frequently normal; rarely deeply emarginate within, although often slightly emarginate within; abdomen most frequently sessile or subsessile, rarely petiolate (*Tachypus*, Klug), not elongate, ovate or oblong-oval, and most frequently with a deep constriction between the segments, or at least always with a constriction between the first and second; front wings with three submarginal cells, the second often petiolate, the second and third each receiving a

- recurrent nervure; cubitus in hind wings variable, interstitial or nearly, or originating far beyond the transverse median nervure. Family XX., Philanthidæ.
- Head not wider than the thorax, the temples very narrow or flat; eyes always deeply emarginate within, or reniform; abdomen elongate, clavate, the first segment elongate, petioliform; front wings with two submarginal cells, the second, however, usually more or less indistinct or subobsolete; cubitus in hind wings originating beyond the transverse median nervure. Family XXI., Trypoxylidæ.
5. Abdomen without a constriction between the first and second segments; intermediate coxæ not contiguous. 6.
 Abdomen with a more or less distinct constriction between the first and second segments, the first segment coarctate; intermediate coxæ contiguous; mesosternal suture wanting. Family XXII., Mellinidæ.
6. Mesosternum produced into a forked process posteriorly; mesepisternum not separated; mesonotum with distinct parapsidal furrows. 8.
 Mesosternum normal, not produced into a forked process posteriorly; mesepisternum separated; mesonotum without parapsidal furrows, or at most only vaguely defined.
 Abdomen distinctly petiolated. 7.
 Abdomen sessile or subsessile.
 Labrum not free, entirely covered by the clypeus, or at most with only its apex visible; cubitus in hind wings originating *before* the transverse median nervure, rarely slightly beyond it, the latter most frequently straight, rarely sinuate or somewhat ζ -shaped. Family XXIII., Nyssonidæ.
 Labrum free, well developed, subtriangular or semicircular, wider than long; cubitus in hind wings originating usually before the transverse median nervure, the latter strongly sinuate or somewhat ζ -shaped; ocelli distinct. Family XXIV., Stizidæ.
7. Clypeus never produced posteriorly between the antennæ, the latter inserted above the base of the clypeus; metathorax most frequently rounded posteriorly, very rarely with acute angles; cubitus in hind

- wings variable, most frequently originating *beyond* the transverse median nervure, more rarely interstitial . . . Family XXV., Sphegidae.
8. Clypeus posteriorly usually carinate or produced between the insertion of the antennæ so that its basal margin is beyond a line drawn from their base ; anteriorly it is often rostriform carinate, or at least more or less produced medially ; metathorax usually long, abruptly truncate posteriorly with the angles acute or toothed, although sometimes the angles are rounded ; pronotum rather long, conically produced Family XXVI., Ampulicidæ.

CORRESPONDENCE.

SPILOSOMA CONGRUA, Walk.

SIR,—As I understand the Rev. Mr. Fyles's recent article on *Spilosoma congrua*, it is contended (1) that *S. congrua*, of Walker, is the same as *S. antigone*, Strecker, and (2) that *cunea*, Drury, is also *antigone*, not *textor*, Harris.

To the former proposition I am inclined to assent on the following grounds :

1. Grote, who made the first examination of Walker's specimens, recognized in them a distinct species.

2. Walker knew *cunea*, Dru., and well separated it from his *congrua* in these words (Cat. Brit. Mus., III., 667):

A. Alæ anticæ albæ.

B. Abdomen non maculatum.

a. Alæ sat angustæ *cunea*, Drury.

b. Alæ latæ *congrua*, Walker.

3. Prof. Smith's statement (Ent. Amer., V., 119), that Walker's description of *congrua* does not apply to *antigone* was doubtless due to his not having before him any specimens of Mr. Fyles's variety "f."

We may then return to the old synonymy of the species :

S. congrua, Walk.

antigone, Strk.

The larva has been described in the following places :

1870. Saunders, CAN. ENT., III., 36 (as *H. cunea*).

1886. Hulst. Ent. Amer., II., 15.

1889. Soule & Elliot, Psyche, V., 263.

1895. Packard, Journ. N. Y. Ent. Soc., III., 177.

1897. Dyar, Journ. N. Y. Ent. Soc., V., 131.

1899. Fyles, CAN. ENT., XXXI., 101.

I am familiar with the larva, as I have found it at Keene Valley and Rhinebeck, New York, and Fort Lee, New Jersey. My larvæ had six stages, not five, as given by Mr. Fyles. The widths of head were .35, .5, .8, 1.3 to 1.45, 2 to 2.2, 2.7 to 3 mm. The full-grown larva corresponds with his description, but occasionally a striking variety occurs, in which the incisures dorsally are banded with pale yellow, somewhat in the manner of *Ecpantheria scribonia*.

To Mr. Fyles's second proposition I would positively dissent :

1. Walker knew *cunea* and separated it by a good character from *congrua*.

2. Southern specimens of *cunea* are larger than the dwarfed ones from the north with which Mr. Fyles is familiar, and it is absurd to suppose that after giving an account of the life-history of the webworm, Dr. Riley should have figured only moths coming from a black, ground-feeding larva (*congrua*). Besides, Dr. Riley's moths are still in the National Museum and are structurally *Hyphantria*, while, previous to my taking charge of the collection, the Museum had but two specimens of *congrua* (Dr. Riley's collection had none), neither of which could have served for the published figures of *cunea*.

3. In markings, *cunea* and *congrua* may be practically alike. The differences reside principally in the structural characters of the number of spurs on the hind tibiæ and the wing shape.

4. Mr. Saunders's description of the larva of *cunea* as black and feeding on the ground, was simply due to a misidentification of the imago.

Therefore the synonymy of this species may be :

H. cunea, Dru.

punctatissima, S. & A.

punctata, Fitch.

pallida, Pack.

var. *budea*, Hübn.

textor, Harr.

candida, Walk.

Numerous references to the larva will be found in Bull. 35, U. S. N. M.

HARRISON G. DYAR.

BOOK NOTICES.

A NATURAL HISTORY OF THE BRITISH LEPIDOPTERA.—By J. W. Tutt, F. E. S.; Vol. I. Swan, Sonnenschein & Co., London, 1899.

In this excellent work of 560 pages the first twelve chapters are devoted to the origin of the Lepidoptera; the ovum or egg; the embryology of a lepidopterous larva; parthenogenesis, external and internal structure of a lepidopterous larva; variation of the imagines; protective coloration and defensive structures of lepidopterous larvæ and classification of the Lepidoptera, with a plate on which is given a phylogenetic tree, illustrating the development of the lepidopteran from a hypothetical base. Part II. is devoted to the Spingo-micropterygid stirps, the Mycropterygids, the Nepticulides, the Cochlidides and the Anthrocerides.

This first volume on the British Lepidoptera is a model in its way, and gives promise that when the entire work is completed little will be left to be desired. One would have expected a chapter on the pupal stage following that on the larva, but probably this will appear in a future volume, as well as the anatomical structure of the imago. The subjects in the first part are dealt with very fully, and it would almost appear that every writer of importance had been culled from, yet the work is not entirely a compilation, for the author's own observations and conclusions are everywhere in evidence.

The subjects of the second part are even more exhaustively treated than those in the first, which is very proper in a work of this character. Six pages and a half are devoted to the first insect dealt with, *Micropteryx calthella*, L., under the headings: synonymy, original description, imago, sexual dimorphism, variation, comparison with other species, egg-laying, ovum, habits of larva, larva, cocoon, pupa, food-plant, habitat, time of appearance, localities and distribution. It is rather discouraging to the student of North American micros to see how full and complete a history is given of these insects in England, while our knowledge of the species in this country stands in comparison to what remains to be learned like small and remote oases in the great desert. It is impossible to do justice to a work of this character in the short space that can be allowed, but no worker on the Lepidoptera should be without it.

C. H. FERNALD.

CATALOGUE OF THE LEPIDOPTERA PHALÆNÆ IN THE BRITISH MUSEUM,
Vol. I., Syntomidæ.—By Sir George F. Hampson, Bart., London.
Printed by order of the Trustees, 1898.

This work, on the general plan of the old British Museum catalogues, avoids all the objections that have been urged against that work. The British Museum authorities are especially fortunate in possessing the services of so thorough and accurate a worker as Sir George Hampson. The volumes are really monographs of the families treated, all species that have been described being included, and not only those represented in the British Museum. In this respect the title fails to do the work justice. A set of plates accompanies the volume, but under a separate cover, which is explained on page vii. of the preface. A synoptic table of the genera is given and of the species in each genus, a description of each species with bibliography and the larvæ when known. An introduction of fifteen pages deals with the general characters of the Lepidoptera in all stages. The author recognizes fifty-two families of Lepidoptera, and he has arranged them in the form of genealogical tree. It would take altogether too much space to discuss this tree in full, but it may be said that it presents many good points, as well as others against which objections can be urged. A key to the families follows.

The Syntomidæ of the world are made to comprise one hundred and sixty-eight genera, and eleven hundred and eighty four species, of which by far the greater portion are from the tropics of South America. The family runs into the Arctiidæ, it being stated (page 20) that no very exact lines can be drawn between them. Under these conditions it is not surprising that certain genera are included, which, in the opinion of the reviewer, are Arctiidæ. A large table showing the phylogeny of the genera is given, necessarily without reference to the larval characters, as only about one and one-half per cent. of the larvæ of this family have ever been described. The table is without explanation, except the short discussion on page 21, which refers indirectly to it. The few North American species of the Syntomidæ are arranged as follows :

477 *Cosmosoma auge*, Linn.

569 *Pseudomya minima*, Grt.

It is gratifying to have this species at last placed correctly.

679 *Syntomicida ipomeæ*, Harr.

My partial description of the larva of this species is not referred to.

(Boston Soc. Nat. Hist., XXVII., 138.)

- 680 *Syntomeida epilais*, Walk.
- 797 *Didasys bala*, Grt.
The larva is unknown.
- 923 *Lymire Edwardsi*, Grt.
This is the *Scepsis Edwardsii*, at times so destructive to the rubber banyan tree of Florida; transferred to one of Walker's genera.
- 928 *Horama texana*, Grt.
The larva is unknown.
- 1117 *Eucereon confine*, H. S.
Nelphe carolina, Hy. Edw., is made a synonym of this, the larva being unknown.
- 1148 *Scepsis fulvicollis*, Hübn.
Under this heading *Packardii*, Grt., is recognized as a variety only. The larva is not referred to, though it has been described by Coquillett. (CAN. ENT., XII., 44.)
- 1149 *Scepsis Wrightii*, Str.
Coquillett's notes on the pupa (Journ. N. Y. Ent. Soc., VI., 249) were published too late for insertion.
- 1150 *Propyria Schausi*, Dyar.
This is referred from the United States under a misapprehension, unless the British Museum possesses specimens from our country. The types are two specimens in the Edwards collection from Jalapa, Mexico, and I do not know of the occurrence of this species further north.
- 1152 *Lycomorpha Grotei*, Pack.
The larva is unknown.
- 1153 *Lycomorpha fulgens*, Hy. Edw.
The larva is unknown.
- 1154 *Lycomorpha pholus*, Dru.
- 1165 *Ctenucha venosa*, Walk.
Cressonana, Grt., is made a synonym, certainly erroneously, as it is larger, broader winged, the fringe of both wings continuously white outwardly, the wing markings narrower and paler yellow; the palpi are red on the sides except the terminal joint, not on the under side only as in *venosa*. The larva is unknown. Dr. Packard has published notes on a supposed larva of *Cressonana* (Ann. N. Y. Acad. Sci., VIII., 89).

- 1166 *Ctenucha sanguinaria*, Strk.
Wrongly credited to Stretch instead of Strecker. This is much more likely to be a variety of *Cressonana* than the latter to be related to *venosa* at all closely. The larva is unknown.
- 1168 *Ctenucha brunnea*, Str.
The larva is unknown.
- 1169 *Ctenucha multifaria*, Walk.
The larva is unknown.
- 1170 *Ctenucha rubroscapus*, Mén.
The larva is unknown.
- 1171 *Ctenucha virginica*, Charp.
- 1174 *Dahana atripennis*, Grt.
The larva is unknown.

Erruca pertyi is shown to be a Brazilian insect.

The larvae of the North American species are known in 43 per cent.

Finally, when it is remembered that the genera of the Syntomidæ were heretofore in almost inextricable confusion, the great value of this publication to working entomologists may be appreciated. The undertaking of a series of monographs of the families of the Lepidoptera of the world, by a competent author, is one of the most important aids to entomology that has ever been produced, and it is entirely fitting that these should emanate from the British Museum. HARRISON G. DYAR.

MR. ARTHUR GIBSON, who has been for three years Secretary and is now President of the Toronto branch and a Director of the Entomological Society of Ontario, has recently been appointed assistant to Dr. James Fletcher, Entomologist and Botanist of the Experimental Farms of the Dominion.

It is with much regret that we record the death of EDWARD WINSLOW CROSS, youngest son of Judge and Mrs. David Cross, which took place at his home in Manchester, N. H., on the 23rd of April. He was a young man of great promise, being only in his 24th year, and was studying law with earnest application at the Harvard Law School up to a fortnight before his death. Two years ago he graduated from Amherst College, Mass. He was an ardent entomologist and had formed a remarkably fine collection of Geometridæ. To his parents and family we beg to offer our respectful sympathy.

Mailed June 2nd, 1899.