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THE GENUS COCHLORHINUS, UHLER, AND ITS ALLIES (JASSIDÆ).

BY E. D. BALL, FORT COLLINS, COLO.

Some time ago Dr. Uhler was kind enough to lend me the types of *C. pluto* for study in connection with some allied material from the National Museum. This new material, while generically distinct, is so closely allied to *Cochlorhinus* in many ways, and at the same time possessing more nearly the typical Acocephaline characters, that it is now possible to assign this unique genus to an approximately correct position in the group, and give its characters from a comparative standpoint.

It is apparently a rare form, as the three original females taken more than twenty-five years ago are the only known specimens of the species. To make this nondescript form more accessible to the workers in the group, and as a basis for the comparisons in the descriptions that follow, it has been thought best to give a comparative description of the genus and species, and also a figure of the type, together with its more important details.

Genus COCHLORHINUS, Uhler.

Uhler, Bull. U. S. Geol. and Geog. Surv. II., p. 358, 1876. Van Duzee Cat., p. 289.

Related to *Acocephalus*, but quite distinct; vertex slightly longer than broad, acutely angled, disc flat, with the margins slightly elevated, ocelli on the margin almost one-third the distance to the apex. Face retreating, acutely angled with vertex, concave in profile. Front narrow, convex, a distinct ridge extending to the apex, either side of which the margin is depressed and slightly foliaceous. Pronotum transverse, coarsely transversely rugulose, the margins nearly parallel, the anterior slightly more curved. Elytra coriaceous, the nervures raised, apical margin broadly rounding, with a narrow appendix; venation definite, two cross nervures between the sectors, three anteapical cells, the outer one usually stylated at its apex; five apical cells, the first triangular, the three following broadly wedge-shaped, and the fifth similar to the anteapical cells; their bases and the base of the fifth apical, which is usually either a forked or double nervure, broadly embossed with white obscuring the actual course of the nervures.

The flat vertex with its slight margin, the coriaceous elytra with the raised nervures, and the ocelli distant from the eyes, will place this in the *Acocephalinæ;* at the same time the whole vertex and front strongly suggest the genus *Platymetopius*, and the pattern of venation approaches that found in some species of that genus. Whether this indicates relationship or similar lines of development can be more easily answered when the habits and life-history have been studied, and other of its relatives have been found.

Cochlorhinus pluto, Uhler. Plate 2, fig. 1.—Elongate, subparallel; vertex acutely angled, the apex produced. Black, with an irregular band on the elytra behind the middle, and a triangle across the face, white. Length, 6 mm.; width, almost 2 mm.

Genus UHLERIELLA, n. gen.

Resembling *Acocephalus* in form and general appearance, but with the ocelli on the sharp vertex margin, and the venation quite distinct and resembling that of *Cochlorhinus*. Vertex slightly, obtusely angled, nearly half wider than long in the female, still shorter in the male, not quite as long as the pronotum, disc sloping, the margin flat or slightly upturned; ocelli on the margin not quite twice as far from the apex as from the eyes. Face slightly, evenly rounding, front wedge-shaped, the margins nearly straight; in profile straight or slightly convex, never concave nor with a median ridge. Clypeus parallel margined, a trifle rounding at apex. Pronotum as in *Cochlorhinus*; lateral margins rounding almost from eyes, posterior margin emarginate. Elytra rather broad, varying from coriaceous to subhyaline, slightly obliquely truncate posteriorly, with the angles rounded; venation resembling that of *Cochlorhinus*, the outer anteapical usually stylated and with two slightly divergent nervures from the apex to the costa, these nervures, and often forkings of the sectors, obscured by the white embossing.

Type *U. Coquilletti*, Van Duzee.

In the general plan of venation and the white embossing, the shape of the pronotum and the transverse light band on the face this genus approaches closely to *Cochlorhinus*, but in the shape of the vertex and front, which are the dominant characters in this group, it is widely divergent, and approaches most closely to *Acocephalus*, from which, however, the position of ocelli and venation renders it quite distinct.

KEY TO THE SPECIES.

A Elytra short and stout, a transverse white band across the bases of the anteapical cells reaching the costa, outer anteapical stylate, its outer nervure straight or slightly rounding before the juncture. Face half or more than half black.

B Vertex and pronotum with alternate bands of black and light. Elytra with the nervures and transverse bands light. Male plates individually rounding at apex... *Coquilletti*, V.D.

BB Black except for the transverse band on the elytra and dot at apex. Male plates acute at apex...... *stygica*, n. sp.

AA Elytra longer and narrower, without transverse white marking, and lacking the second cross nervure; outer anteapical cell angled out nearly to the costa. Face more than half light...... *signata*, n. sp.

Uhleriella Coquilletti, Van Duzee. Plate 2, fig. 2.—Deltocephalus Coquilletti, Van Duzee, Ent. Americ., VI., p. 95, 1890.—Cat. p. 293. Form of *stygica* nearly, but broader and with more flaring elytra; vertex and pronotum of same form and colour pattern as in *signata*, elytra broad, clavus black with the nervures broadly light, corium brown, the nervures narrowly light, an oblique band across the first cross nervure, a transverse band across the second, a band across the base of the apical cells forked at each end, and the narrow apical margin, milk white.

This species is somewhat intermediate in form between the two following and by itself might not be recognized as being related to *Cochlorhinus*, but when compared with *stygica* this relation is at once evident.

Uhleriella stygica, n. sp. Plate 2, fig. 3.—Form of *Coquilletti* nearly, slightly smaller and with a longer and more rounding vertex. Shining black, a transverse band on elytra and another on face, white. Length, ♀ 4.5 mm., ♂ 4 mm.; width, 1.5 mm.

Vertex slightly sloping, transversely depressed, the margin sharp, half wider than long in female, almost twice as wide in the male, slightly obtusely angled, with the apex rounded off. Pronotum distinctly transversely rugose; elytra coriaceous, but little longer than body, compressed at tip; venation resembling that of *C. pluto*.

Colour: black above, a raised transverse band extending from the costa across the bases of the anteapical cells and running out a little on each nervure, milky white; the tip of the fourth apical nervure is also white. Below black, a broad crescentiform band across the face, the tibiæ and tips of all the femora, yellowish white.

Genitalia: female segment nearly twice as long as the penultimate, posterior margin rounding, with a slight median emargination. Male valve roundingly triangular, about as long as the ultimate segment; plates broad, roundingly triangular with the apices acute, nearly three times the length of the valve.

Described from eight specimens received from the National Museum; from Kern Co., Calif. Coquillett collector.

Uhleriella signata, n. sp. Plate 2, fig. 4.—Closely resembling *Coquilletti*, larger and with longer elytra, pattern of marking similar, but without the two white bands on elytra. Length, 5–5.5 mm.; width, 1.75 mm.

Vertex slightly sloping, flat or slightly transversely depressed, not quite twice wider than long, a little over half as long against eye as on middle; face as in *Coquilletti*, front narrow, wedge-shaped. Pronotum more strongly convex in front than in *Coquilletti*, emarginate posteriorly with the outer angles rounded. Elytra long and rather narrow, subhyaline towards the margins, the apex roundingly truncate. Venation resembling *Coquilletti* in general pattern, but with the outer anteapical cell angled out nearly to the costa and lacking the white bands on the cross nervures, two apical nervures arise from the exposed outer face of the central anteapical cell and run nearly parallel to the costa, forming a long narrow cell; the second cross nervure wanting.

Colour: vertex pale yellow, a transverse band just before the middle, parallel with the posterior margin, testaceous brown. Pronotum with four transverse bands parallel with the anterior margin, the anterior one testaceous brown, the next pale creamy or slightly greenish yellow, the third, which does not reach the lateral margins, light testaceous, posterior margin greenish white. Scutellum pale yellow, with large triangular black spots in the basal angles and a pair of interrupted stripes across the disc. Elytra brown, darkest on the clavus, shading out to subhyaline along the margin, the sutural margin and claval sutures narrowly light, nervures, except the apical ones, broadly so; apical margin narrowly milk white, bordered inside by a wider smoky band, the bases of the apical cells hyaline white in sharp contrast. Face pale yellow, a black band across between the eyes, narrowed on the front and emitting a line under the vertex margin, clypeus and lower third of loræ, black.

Genitalia: female segment long and narrow, over twice the length of the penultimate, narrowing posteriorly and terminating in two rounding lobes separated by a broad notch; male valve obtusely triangular, as long as the ultimate segment, plates broader than the valve, long triangular, over four times as long as the valve, their margins clothed with long silky hairs.

Described from eleven specimens from the National Museum; from Los Angeles Co., Calif. Coquillett collector.

In shape and colour marking of vertex and pronotum this species and *Coquilletti* are almost identical, but the venation of the elytra as well as its colour pattern is quite different, and the genitalia are distinctive. Those who consider the presence or absence of the second cross nervure a good generic character would place these two species in different genera.

Genus HULERIA, n. gen.

Form long and narrow, almost parallel margined, vertex longer and more angulate than in *Parabolocratus*, as long as its basal width, one-third longer than the pronotum in the female, two and one-half times as long on middle as against eye, disc flat, the margins inclined to be elevated; ocelli on the margin about one-fourth the distance from eye to apex. Face in profile perfectly flat, retreating as strongly as in *Hecalus*, transversely convex; the front broad above, the margins straight from the ocelli to the rather small, parallel margined, clypeus. The upper part of the front has a quite definite median ridge, which becomes narrower and more elevated as it approaches the apex of vertex, leaving a narrow compressed margin to the vertex. Pronotum twice wider than long, the anterior and posterior margins nearly parallel, lateral margins straight; elytra very long and narrow, evenly rounding at the apex, with a very narrow appendix; venation as in *Thamnotettix*, the anteapical cells very long, extending more than half their length beyond the apex of clavus, apical cells very short and regular.

Type of the genus *H. 4-punctata*.

The elevated ridge on front and general shape of face and vertex are very similar to *Cochlorhinus*, but the venation and general shape of the elytra are quite different.

Huleria 4-punctata, n. sp. Plate 2, fig. 5.—Pale dirty yellow; four spots across the vertex in front of the eyes; two irregular stripes on pronotum, and a stripe under the edge of the vertex, black. Length, 7 mm.; width, 1.5 mm.

Vertex acutely angled, with the apex bluntly rounding, slightly upturned; eyes small, slightly wider than pronotum. Pronotum transverse, roundingly or slightly angularly emarginate posteriorly. Elytra with the nervures distinct, two claval nervures, long, straight and parallel with the suture; but one cross nervure between the sectors, the inner anteapical cell much longer than outer, often an extra apical nervure arising from the apex of the outer anteapical, forming a small subquadrate cell.

Colour: vertex pale yellow, a pair of angular black spots on the margin between the ocelli and eyes, another pair on the disc slightly in advance of these; eyes reddish brown. Pronotum dirty straw, a wavy black stripe running back from the inner corner of each eye, but not reaching the posterior margin; elytra dirty straw, slightly tinged with brown, the nervures and margins pale and quite distinct. Face and below pale creamy yellow, a parallel margined black stripe half its own width below the margin of the vertex, and extending back under the eye.

Genitalia: female segment nearly half longer than penultimate, narrowing posteriorly; posterior margin slightly rounding, with an abrupt subquadrate notch; a short strap-shaped tooth almost fills this notch (a quite marked median carina in this specimen); male valve as broad as the ultimate segment and a little longer, posterior margin evenly rounding, plates nearly as wide as the valve and three times as long, roundingly narrowing two thirds of the distance, and then produced as two finger-like tips, margined with short weak hairs.

Described from one female and two males from the National Museum collection, labelled "Los Angeles Co., Calif. Coquillett collector."

EXPLANATION OF PLATE 2.

Fig. 1.—*Cochlorhinus pluto*, Uhler. Female from type.
a, face; *b*, ♀ genitalia; *c*, ♂ genitalia; *d*, elytron, showing venation and embossing; *e*, profile of face; *f*, head and pronotum of co-type.

Fig. 2.—Elytron of *Uhleriella Coquilletti*, Van Duzee, showing venation and pattern of marking. *c*, ♂ genitalia.

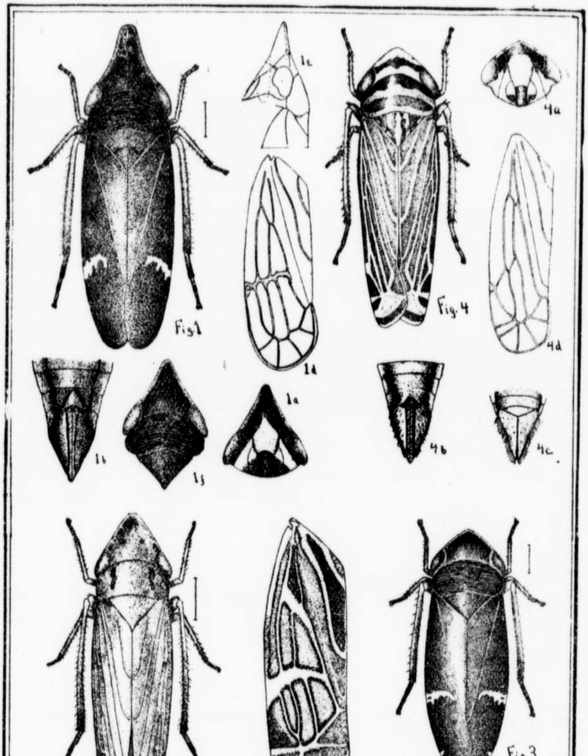

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Fig. 3.—*Uhleriella stygica*, n. sp. Female.
a, face ; *b*, ♀ genitalia ; *c*, ♂ genitalia.

Fig. 4.—*Uhleriella signata*, n. sp. Female.
a, face ; *b*, ♀ genitalia ; *c*, ♂ genitalia ; *d*, elytron, showing venation.

Fig. 5.—*Huleria 4-punctata*, n. sp. Female.
a, face ; *b*, ♀ genitalia ; *c*, ♂ genitalia.

FURTHER NOTES ON MASSACHUSETTS COCCIDÆ.

BY GEORGE B. KING, LAWRENCE, MASS.

Since the publication of my last contribution on the Massachusetts *Coccidæ*, in 1899, no less than 34 other species have been found to inhabit Mass., some of which appear to be of recent introduction and new to the United States ; and while the larger portion has been recorded from other States, we have found several interesting new species hitherto not known to science. I have abandoned in part the citation of the geographical distribution and many of their food-plants, as time will not permit me to consult some of the literature. I have included an additional check-list and the Bibliography. In the original check-list several species are listed whose names have since been changed as follows. Those in heavy type are the old names, while those now considered correct are in *italics :*

Dactylopius adonidum, L.	*D. longispinus*, Targ.
Lichtensia viburni, Sign. var.	*Pulvinaria Cockerelli*, King.
Aspidiotus ficus, Ashm.	*Chrysomphalus aonidum*, L.
Parlatoria Pergandii, Comst.	*P. proteus*, var. *Pergandii*.
Mytilaspis pomorum, Bouché.	*Mytilaspis ulmi*, L.
" citricola, Pack.	" *Beckii*, Newm.
Gossyparia ulmi, Geoff.	*G. spuria*, Modeer.
Asterolecanium quercicola, Sign.	*A. variolosum*, Ratz.
Lecanium hemisphæricum, Targ.	*Saissetia hemisphærica*, Targ.
" filicum, Boisd.	" *filicum*, Boisd.

The following are additions to the Mass. list :

Dactylopius nipæ, Mask. Found for the first time in the U. S., in the Harvard botanical greenhouse at Cambridge, Mass. *Introduced.*

Kermes Pettiti, Ehrh., 1899. A very common species on oak throughout the State, and seems to have been taken and mixed with *K. galliformis* for a long time. *Native.*

Kermes Andrei, King, 1900. Described from Lawrence, Mass., on oak; has been found in Georgia; it is a pretty and clearly a distinct species. *Native.*

Kermes Perryi, King, 1900. As yet only known from Mass. on oak. *Native.*

Lecanium lauri, Boisd., 1735. Found on *Laurus nobilis*, Springfield, Mass., by Dr. G. Dimmock. The small tree was so badly infested that it died. It has been found in France and New Zealand. *Introduced.*

Eulecanium cerasifex, Fitch, 1856. On wild and cultivated cherry trees at Andover and Lawrence, Mass., but not in sufficient numbers to cause any alarm. *Native.*

Eulecanium quercitronis, Fitch, 1856. This is found on *Ulmus Americana* at Methuen, Mass., on *Xanthoxylum Americanum* at Cambridge, Mass., and on *Ulmus Americana* in company with *Chionaspis Americana*. *Native.*

Eulecanium armeniacum, Craw. Dr. Dimmock sent this from Springfield, Mass., infesting *Prunus serotina*. *Native.*

Eulecanium tulipiferæ, Cook, 1878. Probably *E. liriodendri*, Gmel., on *Liriodendron tulipifera* at Springfield, Mass. Coll. Dimmock. *Introduced.*

Saissetia oleæ, Bern., 1782. Found on a small shrub out of doors in the Harvard botanical garden at Cambridge, Mass. *Introduced.*

Saissetia, sp., resembling *oleæ*, but not that species, was found at the same place in one of the greenhouses, on *Cycas revoluta*, but not sufficient for proper study. *Introduced.*

Eulecanium pruinosum, Comst., M. S. Coql., 1891, was found on *Prunus domestica*, var. *Bradshawi*, at the Harvard botanical garden, Cambridge, Mass. *Native.*

Lecanium longulum, Dougl., on *Monstera deliciosa*, in the Harvard tropical greenhouse, Cambridge, Mass. *Introduced.*

Lecanium melaleucæ, Mask., 1898, at the same place and on the same plant. It is new to North America. *Introduced.*

Eulecanium pyri, Schr., was found on pig-nut hickory at Andover, Mass. Although there were apple trees near by, none of these scales were found on them. *Introduced.*

Eulecanium Kansasense, Hunter, 1899, described from Kansas on *Cercis Canadensis*, was found on shadbush at Methuen, Mass. *Native.*

Eulecanium Websteri, Ckll. and King, 1901. This has been found on high-bush blueberry and *Spiræa* at Lawrence, and on white birch at Methuen, Mass. *Native.*

Pulvinaria Cockerelli, King, 1899. A common species on *Spiræa salicifolia* and *Prinos verticillatus* at Lawrence and Methuen, Mass. *Native.*

Pulvinaria acericola, W. and R., 1868. This was found by Dr. Dimmock at Springfield, Mass., on maple in deep woods. *Native.*

Pulvinaria phaiæ, Lull., 1899 (probably identical with *P. floccifera*, Westw.), was found by Mr. Cooley in the college greenhouse at Amherst, Mass., on orchid *(Phaius maculatus). Introduced.*

Aspidiotus abietis, Schr. *A. pini* is the same. This was found on pine at Forest Hills, Mass. (Mus. Comp. Zool.). It was communicated by Mr. Samuel Henshaw to Mr. Cockerell. *Introduced.*

Aspidiotus rapax, Comst., 1881. Found on *Coprosma Baueriana* at the Harvard botanical garden, Cambridge, Mass. *Native.*

Aspidiotus Britannicus, Newst., 1898. Described from England in 1898, and the same year was found at Salem, Oregon, on holly, and in 1900 found in abundance on holly at the public gardens, Boston, Mass. *Introduced.*

Aspidiotus juglans-regiæ, Comst., 1881, was found on English walnut at Methuen, Mass. *Native.*

Aspidiotus lataniæ, Sign., 1869, was found on an unknown plant in the greenhouse of the Harvard botanical garden, Cambridge, Mass. *Introduced.*

Diaspis carueli, Targ., 1868. Very abundant on *Juniperus sphærica* at Fort Hills, Mass. Coll. S. Henshaw and by the writer on *Thuja occidentalis* at the Boston public gardens, and was previously found by Mr. J. G. Jack at Jamaica Plain, Mass., on *Juniperus sphærica. Introduced.*

Diaspis minima, Targ., was found on *Biota (Thuja) orientalis* in the Harvard botanical garden, Cambridge, Mass. The tree is a native of China, and the scale is new to North America. *Introduced.*

Diaspis cacti, Comst., 1883. This has been found on the plants in the greenhouse of the Agricultural College at Amherst, Mass. Probably *introduced.*

Chionaspis corni, Cooley, 1899. Found at Reading, Mass., on *Cornus paniculata* and *C. alternifolia*. Probably *native.*

Chionaspis salicis-nigræ, Walsh, 1867. A common species found at Huntington, Bedford, Malden and Lawrence, Mass. Its food-plant is various, and seems to be a general feeder, commonly found on willow, cottonwood, dogwood and shadbush. *Native.*

Chionaspis Americana, Jhn., 1896. This is found on elm at Amherst and Springfield, Mass. *Native.*

Chionaspis ortholobis, Comst., 1881. Dr. Dimmock has found this at Springfield, Mass., on poplar and butternut. *Native.*

Hemichionaspis aspidistræ, Sign., 1869. This was found in destructive numbers on a fern *(Davallia Moorei)* in the Harvard botanical greenhouse at Cambridge, Mass. *Introduced.*

Ischnaspis longirostris, Sign., 1882. Found by Mr. Samuel Henshaw in a greenhouse at Boston, Mass., on *Monstera*, sp. *Introduced.*

Parlatora Pergandei, var. *camelliæ*, Comst., 1883, was found by Mr. J. W. Folsom at the Harvard botanical gardens, Cambridge, Mass., and communicated to Mr. Cockerell. *Introduced.*

Bibliography.

Cockerell, T. D. A., 1899, Journal New York Ent. Soc., Vol. 7, p. 258, gives descriptive notes on *Aspidiotus Forbesi*, Johnson, found on *Acer pseudoplatanus* at Reading, Mass. Coll. Kirkland, Feb. 24, 1898.

Cockerell, T. D. A., 1899. Science N. S., Vol. 10, July, No. 238, p. 86–88. A reply is given to Mr. Marlatt's "Some sources of error in recent work on *Coccidæ*."

Cockerell, T. D. A., 1900, Psyche, Vol 9, p. 44, gives a table for the determination of all the known North American species of the genus *Kermes*. (Since published three other species have been described.)

Cooley, R. A., 1899. Special Bulletin Mass. Agr. Coll., Aug. 10, 1899. The Coccid *Genus Chionaspis* and *Hemichionaspis*, *Chionaspis corni*, *C. salicis-nigra*, *C. pinifolii*, *C. furfurus* and *C. Americana* are cited from Mass.

Howard, L. O., 1889. Insect Life, Vol. 2, p. 34. A new imported elm insect, *Gossyparia ulmi*, is described. Localities, food-plants are given and cited as found at Cambridge, Mass., by Mr. J. G. Jack, in 1897.

Howard, L. O., 1892. Insect Life, Vol. 5, p. 51. *Gossyparia ulmi* is again found at Malden, Mass., by Mr. C. H. Rowe.

Howard, L. O., 1895. Insect Life, Vol. 7, p. 360. A new locality for the juniper scale at Jamaica Plain, found by Mr. J. G. Jack. (The above three quotations were overlooked in my first list.)

King, G. B., 1899. Psyche, Vol. 8, p. 417. *Pulvinaria Cockerelli*, n. sp., is described, found at Methuen and Andover, Mass.

King, G. B., 1900, CANADIAN ENT., Vol. 32, p. 9, gives the bibliography of the Mass. *Coccidæ* up to Aug., 1899.

King, G. B., 1900. CANADIAN ENT., Vol. 32, p. 214. The *Coccidæ* of the ivy, eleven species are cited, several of which were found in Mass.

King, G. B., 1900. Psyche, Vol. 9, p. 78, 84. The genus *Kermes* of North America, 15 species are cited and tables given ; two new species are described by Prof. Cockerell and King. (Since the above paper appeared there has been one other new species described by Prof. Bogue.)

King, G. B., 1900. Psyche, Vol. 9, p. 116–118. Miscellaneous notes on *Coccidæ* from Western Mass., 22 species are cited found by Dr. Dimmock.

King, G. B., 1901. Psyche, Vol. 9, p. 153. The *Coccidæ* of the Harvard botanical gardens, 19 species are listed, with notes on the species.

King, G. B., 1901. Entomological News, Vol. 12, p. 50. *Lecanium caryæ*, Fitch. The species are described, with notes on localities and food-plants.

King, G. B., 1901. CANADIAN ENT., Vol. 33, p. 106–109. *Lecanium Websteri*, n. sp., with notes on allied forms and table to separate the species. *Lec. Kansasense* and *L. Websteri* are also found in Mass.

Additional Check List.

Dactylopius nipæ, Mask.
Kermes Pettiti, Ehrh.
" Andrei, King.
" Perryi, King.
Lecanium lauri, Boisd.
" longulum, Dougl.
" melaleucæ, Mask.
Eulecanium cerasifex, Fitch.
" quercitronis, Fitch.
" armeniacum, Craw.
" tulipiferæ, Cook.
" pruinosum, Coqul.
" pyri, Schr.
" Kansasense, Hunter.
" Websteri, Ckll. & King.
Pulvinaria Cockerelli, King.
" acericola, W. & R.
" phaiæ, Lull.
Aspidiotus abietis, Schr.
" rapax, Comst.
" Britannicus, Newst.
" juglans-regiæ, Comst.
" lataniæ, Sign.
Diaspis carueli, Targ.
" minima, Targ.
Diaspis cacti, var. calyptroides, Costa.
Parlatoria proteus, var. Pergandei, Comst.
Chionaspis corni, Cooley.
" salicis-nigræ, Walsh.
" Americana, Jhns.
Hemichionaspis aspidistræ, Sign.
Ischnaspis longirostri, Sign.
Saissetia oleæ, Bern.
" sp.

THE ECOLOGY OF INSECT SOUNDS.

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"Ecology," as it is coming to be universally considered, is the science of cause. It is constantly asking "Why?" and not until we can answer "because," have we solved a problem in Ecology. It is the capping stone of the other branches of biological investigation. Morphology describes an organ or character; physiology shows us how it works and what it does; ecology, building on these, tells how and why the character or organ arose. It, then, must be considered as more than the old Natural History. Although the value of the latter cannot be overestimated, more must sooner or later be done.

This is well illustrated in the case of insect sounds. No biological subject has been more written about in popular publications—prose and poetry alike being noisy with references to the insect musicians. A large amount of strictly scientific work has also been done, and while there is much still to do, we, nevertheless, have a fairly clear idea of the anatomy of sound-producing organs, their taxonomic distribution (1), the methods of using them, some of the influences of external conditions (2), and many hypotheses as to functions of the sounds. But we know comparatively little as to why a cricket, for instance, stridulates with his wings, while a beetle rasps with his abdomen, or a cicada possesses such a complicated musical apparatus.

The translation (3) of J. Portchinsky's ('86) paper in Horæ Societatis Entomologicæ Rossicæ, Vol. XX., pp. 111–127, has, however, suggested a fruitful line of investigation. Considering the Orthoptera, he calls attention to the fact that the Acrididæ—unlike their relatives, the crickets and the long-horned grasshoppers—do not stridulate with their wings, but rub "the femur against the raised meshwork of veinlets upon the tegmina." Another striking difference between this family and the other families of the order is that here, alone, we get the bright colouring of the inner surface of the hind legs. These are often the only bright colours the insect possesses. It has become an axiom that insects are constantly endeavouring to show their beauty—especially if it be a secondary char-

(1) Swinton, Insect Variety.

(2) Dolbear, A. E., Amer. Natur., Vol. XI., No. 371, pp. 970-971. Riley, C. V., Proc. Amer. Assoc. Adv. Science, XXXIV., 1885, pp. 330-332. Scudder, S. H., Proc. Bost. Soc. Nat. Hist., Vol. XI., 1868, pp. 306-313 and 316.

(3) Ent. Record and Journal of Var. (1901), Vol. XIII., No. 9.

acter, as grasshopper colours often are—and in the case of the Acrididæ this can only be done by twisting their hind legs about. Such a motion would necessarily result in friction between the femur and the tegmina, friction in irritation and increased growth, and this growth is the sound organ.

An interesting analogy which he does not mention is found in the subfamily, Œdipodinæ. Lugger (4), in describing the Œdipodinæ, said: "The insects belonging here are mostly large and showy, often possessing bright-red, yellow or even blue wings, with black bands. Nearly all the bright-coloured locusts found in the United States belong to this subfamily; most of them are very conspicuous objects in flight, when they show their colour, which is at other times entirely hidden. Œdipodinæ are also very noticeable on account of the rattling noise which the males of most species produce in flight." The connection here between sound and something to be called attention to is quite marked, and while it is about as hard to tell which came first—colour or sound—as it is in the proverbial case of hen or egg, doubtless Portchinsky would say that the sound was originally caused by the vigorous beating of the insect's wings in its amorous display, and is as much a secondary matter as the femora-tegminal stridulation.

We know that under sexual excitement many insects constantly vibrate their wings, expanding and contracting them, and swell their body to its fullest extent. It is easy to suppose that formerly male crickets, having no bright colours to display, made the most of such motions, elevated their tegmina and nervously vibrated them. The tegmina of the two sides would necessarily rub together, and the result would be the same as in the case of the Acrididæ, except for the position of the organs. Of course, if sounds are of any value at all in sexual selection, better sounds are of more value, and so these males, possessing wings well fitted for producing a noise, would win and transmit their exceptional characters. The same applies to the Locustidæ.

But passing to the other groups, we find that sounds are not always concerned with love-making. In a recent journal (5) Babb has described the stridulation of *Passalus cornutus*. In this case the abdomen is raised, rubbing against the wings when the insects are disturbed. Both males and females stridulate, and he was "led to the conclusion that it is evidence of the insect's displeasure at being disturbed, and not a sexual

(4) Third annual report of the Entomologist of the University of Minnesota.

(5) Entomological News, Vol. XII., No. 9, Nov., 1901.

call." Now, it is a common trick among insects to raise the abdomen when disturbed, and if any structures are in the way they will be rubbed, and the insect will make a noise whether he wants to or not. Such rubbings, in time, bring about physiological changes resulting in "organs." These organs are simply modified hairs, and the position of such modifications depends on the parts rubbed; in this case, the abdomen and the parts of the wings next to it.

If some often-repeated motion rubs together the pro- and meso-notum (e. g., in *Cerambycidæ*), a rasping organ will appear there; if it be the pro- and meso-sternum *(Omaloplia brunnea)*, or the elytra and the abdomen *(Elaphrus)*, or the hindwings and the elytra *(Pelobius Hermanni)*, we will find rasping organs there, as long as the physiological law holds that irritation produces excessive growth. Why this law is true is a physiological question. When this motion is made as a result of fear, anger, sociability or love, it will be sure to express fear, anger, sociability or love, as the case may be.

If we may be allowed to thus expand the idea presented so neatly by Portchinsky, the logical conclusion is that many or most insect sounds are the necessary concomitants of certain motions, not the object of the motions; and that the sound organs are callouses or growths caused by the friction, possibly perfected by natural selection.

SUPPLEMENTARY NOTE ON BURTIA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

In reference to my remarks on the genus Burtia, published in the CAN. ENT. for Dec., 1901, I have received the following communication:

MY DEAR SIR,—Re *Burtia* vs. *Gundlachia*, the latter name is the property of a genus of Mollusca. In a paper on the nomenclature of some Hymenoptera, in the "*Entomologist*" a few years ago, I explained this very matter. There is a citation of it under Lepidoptera in Zoological Record, so it should have been easy to find it. Yours,

THEO. D. A. COCKERELL.

This efficiently settles the matter. The Cuban genus of Lepidoptera must be known as BURTIA, Grote, July, 1866. The two species are *B. rubella*, Grote, and *B. coneuta*. H.-S. Sir Geo. Hampson having also distinguished the two genera, Burtia (Gundlachia) and Didasys, the reference in the Philadelphia List is incorrect.

SOME NEW PARASITIC HYMENOPTERA.

BY H. L. VIERECK, PHILADELPHIA.

Hammaniella relativa, n. sp. — Face and dorsum subopaque, punctured, front opaque, the pleura more shining, longitudinal raised line on metapleura distinct, terminated abruptly, the mesothorax not appearing sharply truncate. The longitudinal medial lines on metanotum converging.

♂.—Length 14 mm. Clypeus with a few punctures, somewhat shining, transversely impressed, anteriorly though not strongly. Face closely punctured, front opaque. Cheeks impunctate on the eye margin, otherwise with distinct, small, separated punctures, shining malar space punctured, opaque. Dorsulum almost opaque, the punctures tolerably small, closely arranged. The scutellum more strongly punctured. Mesopleura shining, with well separated, to smaller closer punctures. Metanotum with converging, crude, longitudinal medial carinæ becoming obsolete before the apical margin, transverse carina strong. Metapleura separated from the metanotum by a distinct raised line, which stands out prominently, being margined on each side by a more or less distinct channel. Wings subhyaline, with a dullish cast. Areolet imperfectly trapezoidal in form, the petiole shorter than any of its sides, one-half of the curved and longest side of the areolet, one-half of the second recurrent nervure and a short distance of cubito-discoidal nervure, hyaline; stigma and nervures almost uniformly light brown, base of the wings yellow. First dorsal segment strongly punctured, the spiracles distinctly produced, the succeeding dorsal segments becoming less and less punctured, to almost smooth.

Black: face, clypeus and mandibles excepting apex, four anterior femora, tibiæ and tarsi, a pointed mark on anterior part of the dorsum, two dots on scutellum, extreme base and apex of posterior femora and the posterior tibiæ excepting apex, ochraceous. Tegulæ, one spot aside and below them, coxæ and trochanters of four anterior legs, part of posterior coxæ and trochanters, yellow. On the posterior legs the greater part of femora, apex of tibiæ and all of tarsi are more or less dark brown. Apex of first dorsal segment somewhat claret-brown, the second, third, fourth and greater part of fifth mostly ferruginous.

Type: Coll. Am. Ent. Soc., Phila.

Type locality, New Jersey.

Two males; the co-type from Massachusetts, has a length of 12 mm.

The Massachusetts specimen was cited under the description of *Lampronota varia*, Cress. (Trans. Am. Ent. Soc., III., 164, ♂), as a variety. *Varia*, however, is a quite constant species, a series of twelve specimens showing no great extremes either in sculpture or coloration. The metathorax of *H. relativa* is very distinct from that in *varia*, which lacks longitudinal lines, and is more finely and uniformly sculptured otherwise. The yellowish cast of the wings and yellowish abdominal ornamentation is also characteristic of *varia*, and offers a good superficial difference for separating these two species.

Nadia apalachia, n. sp.—Head and thorax more or less finely and closely punctured. Mandibles heavy and incurved. Abdomen finely sculptured. Areolet sessile.

♂.—Length 10.5 mm. Clypeus with a few strong punctures, elevated transversely. Face closely, indistinctly punctured, opaque, front also opaque, punctures well separated. Cheeks somewhat shining, minutely sculptured and with sparse punctures. Mandibles heavy, incurved rather strongly. Flagellum thirty-four jointed. The superior half of propleura distinctly punctured, somewhat shining, the inferior half obscurely sculptured, opaque. Punctures of dorsum very close anteriorly, more separated posteriorly, from opaque to faintly shining. Scutellum arched, somewhat impressed on each side, closely punctured. Mesopleura with an abbreviated longitudinal raised line anteriorly, not so distinct, the integument punctured somewhat like dorsulum, the punctures closer and finer below than above. Metathorax gently rounded, almost uniformly, very closely punctured. The division between the metanotum and metapleura only indicated by a very faint impression. Wings hyaline, with a faint yellowish cast. The first and second transverse cubiti uniting on the radius, forming an acute angle. Stigma and nervures almost uniformly light brown. First dorsal segment opaque, with fine, close punctures, the spiracles not strongly protuberant, the remaining dorsal segments more finely sculptured, the apical ones becoming shining. Almost uniformly pubescent, abdomen sericeous. Black: mandibles except base and apex, clypeus, face, part of the scape, a pointed mark on anterior margin of dorsulum, base of the wings, tegulæ, a spot aside and below, a spot on scutellum, four anterior legs more or less, apex of posterior coxæ, apex of femora, the tibia excepting apex (more or less), and tarsi yellow. Part of posterior trochanters and greater part of femora deep brown. Flagellum, apex of first and all of second, third and fourth dorsal segments, ferruginous.

Type: Coll. Am. Ent. Soc., Phila.

Type locality, Connecticut.

Two male specimens; in the co-type there is a transverse, median black belt on the second dorsal segment.

Cidaphurus Cressonii, n. sp.—Head and thorax opaque, spine on scutellum rudimentary. Wings subfuscous. Colour pattern much like in *Cidaphurus superbus*.

♀.—Length 13.5 mm. Clypeus moderately emarginate, slightly impressed medially, sparsely punctured. Face indistinctly sculptured, punctures separated and distinct on a longitudinal median line, to the sides indistinct, and forming faint ripples. Cheeks more shining and with sparse minute punctures. First joint of the flagellum about as long as the following two united. Dorsulum closely punctured, the punctures closer and finer posteriorly, a somewhat shining line extending from the anterior border to the middle, medially. Mesopleura with regular separated punctures. Scutellum shining, closely punctured, spine rudimentary. Metanotum coriaceous. Superior posterior angle margined laterally. Metapleura closely punctured, somewhat shining. Median and marginal cells subfuscous, the rest of the cells paler. Stigma and costal nervure pale, the other nervures brown, second cubitus basally and first and second recurrent nervures apically interrupted by a transparent space, first and second cubitus uniting on the radial nervure, second recurrent nervure received by the areolet before the middle. Abdomen shining, polished apically, first segment closely punctured, the punctuation of succeeding segments sparser. Head yellow; malar space, a line from clypeus to insertion of antennæ, and branching out behind insertion, a line on vertex from eye to eye, and occiput, black or nearly so; scape behind and flagellum dark brown. Anterior and posterior margins of prothorax, a loop on each side of dorsulum, tegulæ, a line below, nearly one-half of mesopleura, scutellum, greater part of metathorax, apical border on first, second, third and greater part of remaining dorsal abdominal segments, greater part of four anterior legs, apical trochanter, and basal half of tibiæ in posterior legs, more or less yellow. A broad median belt extending more than half way back on dorsulum from the anterior margin, mesopleura posteriorly and metanotum anteriorly, and base of first dorsal abdominal segment, black.

Related to *Cidaphurus superbus*, Cress.

Type: Coll. Am. Ent. Soc.

Type locality, Massachusetts.

One female specimen. I take pleasure in naming this fine species after Mr. E. T. Cresson.

AN ABERRATION OF ACTIAS LUNA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

My friends have not always forgotten me, but have occasionally sent me live Saturnian chrysalids, spun up no doubt with the intention of the insect to emerge in America. Instead, the poor deluded creatures appeared as moths in my German room, allowing me to deceive myself for the moment that I was at home. *Cynthia*, *promethea*, *cecropia*, *polyphemus*, *io* and even *imperialis*, came out just as in America. The only difficulty I had was with my few cocoons of *luna*, the moths in some cases failing to expand their wings. But, if my memory does not fail, this accident happens also more especially with *luna* in the breeding cage at home. Among the examples which emerged here is one small male, expanding 78 mil., which is the most curious example of the species I remember to have seen. The wings are almost perfectly expanded, a little unevenness of the costa of the right primary, which is somewhat concave, and a slight crumpling of the costal region of both secondaries, are traces of retarded development; the "tails" are fully out. The eye spot on the left primary is interlined with red, and the spot itself is connected by a reddish-purple bar with the purple costal margin. On the right primary the suffusion of the eye spot with purple is entire, and a wider reddish-purple bar fuses it with the costal band. This bar is finely edged with black outwardly and gives the appearance of the eye spot being distorted. On the outer margins the reddish terminal band is very distinct (var. *dictynna).* But the most curious feature is the appearance over the eye spot of the right secondary (the wings on the right side are the more abnormal) of a straight purple bar, intersecting the eye spot over the middle and projecting somewhat before and behind it. The eye spot on the left secondary is normal, and there is no other apparent deviation, except that on the under surface all the four eye spots are suffused with reddish-purple. There are some blackish discolorations on the hind wings, accidentally caused, I think, by body fluids.

I have exhibited the specimen at Frankfort and at other entomological meetings here, but the species not being well known, it excited but a passing interest. I would have sent the specimen to America, but hope to live to bring it myself.

NOTES ON THE MOUTH-PARTS OF BOMBUS.

BY T. D. A. COCKERELL AND JOHN M'NARY, E. LAS VEGAS, N. M.

We have lately studied the mouth-parts of a number of species of Bombus, both American and European, and adding our results to those obtained by Radoszkowski (1877) we find as follows :—

(1) Taking the first joint of the labial palpus of the ♀ as an index of the length of the mouth-parts (it is especially convenient for accurate measurement), we find that the longest-mouthed species is *B. Gerstackeri*, from the European Alps (our examples were collected by Friese at Engelberg), a species known to be the exclusive visitor of *Aconitum lycoctonum* in that region. The *Aconitum* (Knuth, Blütenbiologie, Vol. II., p. 53, fig. 20) has the hood enormously produced, and is adapted only to bees with extremely long tongues.

(2) No Rocky Mountain or other American *Bombus* examined by us has nearly such long palpi (or tongue) as *B. Gerstackeri*, nor have we such an Aconite as *A. lycoctonum*. Our longest-tongued type seems to be *B. Nevadensis*, which visits *Delphinium*.

(3) The species with shortest mouths are mostly high-alpine or arctic: *proximus*, *melanopygus*, *lapponicus*, *viduus*. *B. terrestris* also ranks with these as one of the shortest-mouthed ; it is remarkable that the species which superficially looks exactly like *B. terrestris*, namely, *B. hortorum*, is one of the longest-mouthed of all, having the first joint of labial palpus about 6½ mm. long. We have both *terrestris* and *hortorum* from Innsbruck, collected by Friese.

(4) *B. ligusticus*, *ruderatus* and *ussurensis* rank with the longest-mouthed species, and probably, like *Gerstackeri* and *hortorum*, are adapted to *Aconitum*.

(5) The commonest length for the first joint of the labial palpi is from 4 to 4½ mm. Here come *B. juxtus*, *Morrisoni*, *rajellus*, *muscorum*, *senilis*, *fragrans*, *equestris*, *sylvarum*, *Stewenii*, *Latreillelus*, *Mlocosewiczi*, *calidus*. The American *virginicus* and *Kincaidii* fall short of this by a small amount, although they are large bees.

(6) The second joint of the labial palpi does not usually enlarge in proportion to the first, hence the longest-mouthed species have the greatest difference between the joints. In such species as *ruderatus*, *ussurensis*, etc., the first joint is from 5½ to 6 times as long as the second. In nearly half the species, the first joint is from 4 to 4½ times as long as the second ; in *proximus* it is only 2½ to 3 times as long. In *Gerstackeri* the

second joint has lengthened in proportion to the first, so that the average proportions are preserved, although the palpi are extremely long. In *B. sonorus* the first joint is relatively short (about as long as in *pratorum*, *hypnorum*, etc.), but it is nevertheless over 4½ times as long as the second.

(7) It seems probable that the only oligotropic bumble-bees are those with extremely long tongues, adapted to certain species of aconite. The American species probably all visit miscellaneous flowers, and this must be especially true of the Arctic species, which have nearly a monopoly (so far as bees are concerned) of the flowers of their region. Thus, *B. Kincaidii* is the only bee on the Pribiloff Islands, where brightly-coloured flowers abound.

NOTE ON PITYOPHTHORUS CONIPERDA, SCHWARZ.

BY W. HAGUE HARRINGTON, OTTAWA.

This species was described in the Proceedings of the Entomological Society of Washington, Vol. III., p. 144, 1895, and the author stated: "I offer herewith a description of this species, being solely tempted thereto by the interest attached to its life-history; for, as far as I am aware, there is no other Scolytid known which normally develops within the cones of pine trees." Possibly since that time a similar habit may have been observed in regard to other members of the Scolytidæ, but I cannot recall any reference to such observations. The beetle in question was first collected by me on May 24, 1884, and its capture was quite accidental. Mr. Fletcher and myself had that day visited a grove of white pines on the Gatineau, a few miles north of Ottawa, with the special object of collecting the somewhat rare little butterfly, *Thecla Niphon*, of which we succeeded in capturing several good specimens. Having climbed up into one of the pine trees, to try and net a butterfly which had settled up aloft, I noticed that the young buds at the tips of the twigs were injured by some insect. Investigation showed that one of the bark-boring beetles was at work, and a few specimens were collected. These were determined for me as *Dryocœtes affaber*, and were referred to by me under that name in notes on Canadian Rhyncophora in the CANADIAN ENTOMOLOGIST, 1891, Vol. XXIII., p. 26. At Aylmer, Que., about eight miles above the city, on the Ottawa River, on June 25, 1887, while seeking, with my friend Fletcher, upon red pines for *Podapion gallicola*, we found the shoots and cones seriously infested by a Scolytid, which appeared slightly larger, but which proved to be the same species. The infested cones were shrivelled and hard, and their development was entirely arrested. The following year similar observations were made in the same locality, and similar infestations were noted in subsequent seasons. On May 26, 1901, I examined some white pines not far from the locality where the beetle had been first noticed in 1884, and found that there was a serious infestation of the cones. The ground beneath the trees was strewn with aborted and undeveloped cones, which were compact and hard, about three inches in length, but only one-half inch in diameter. On breaking open any one of these, *P. coniperda* was apparent and its burrows running through the resinous compacted scales. In one cone I observed a small bright Chalcid, but, unfortunately, it dropped in the grass and was lost, much to my regret, for it was evidently a parasite of the beetle. With the hope of obtaining specimens of the Hymenopteron, I took home some of the cones, but no flies appeared. After it was apparent that there was no probability of any insects emerging, I broke up the cones, which was not an easy matter, owing to their hard, resinous condition, but could find no trace of any of the parasites. Some beetles were obtained (all dead), but many of them were broken in digging them out of their burrows or in tearing apart the cones. As was mentioned in my former note on this species, the beetles remain continually in the cones; none of them emerged of their own accord. While other members of our Scolytidæ may be found flying about, some species in great abundance, I have never met with this species at large, although it must be fairly abundant and widely distributed. Probably on account of this habit of concealment, it does not fall a frequent prey to our collectors, as I have not found it in collections sent to me for examination. That excellent entomologist, the late Dr. John Hamilton, with whom I had the privilege of corresponding for several years, obtained the species at Sparrow Lake, Ont., and published an interesting note upon it in Canadian Entomologist, 1893, Vol. XXV., p. 279. The species is not so destructive as many others of the Scolytids, but apart from its arresting the growth of the cones and the development of the seeds, it causes a certain amount of injury by its infestation of the young shoots. Schwarz records it from Michigan, Virginia, New York and Pennsylvania, proving that its range is an extensive one. I may add that my only specimens of true *Dryocœtes affaber* (determined by Dr. Hopkins) occurred upon spruce.

LARVA OF DATANA, UNKNOWN SPECIES.

During my last week of collecting in the Huachuca Mts., Cochise Co., Arizona, I found, Aug. 11th, 1899, eighteen *Datana* larvæ on a Manzanita bush *(Arctostaphylos glauca)* or Western bearleaf. This larva was not known to me, and therefore I was anxious to send it to the artist who made the figures for Prof. A. T. Packard's "Bombycine Moths." To all appearance the larvæ were nearly full-grown, and I had a negative taken of them by an ornithologist camping near by, so as to have a memento left in case they should transform before reaching their destination. Cloudy weather and drizzling rain late in the day made it difficult to obtain a good picture. I had to mail the insects early the next morning from Fort Huachuca, which is 12 miles from Ramsey Canyon, and further delay was hazardous. I took a hasty description of the larva, then boxed two of them in a tin canister for Mr. L. H. Joutel, the artist, care of American Museum of Natural History of New York City. But, unfortunately, these larvæ, although received, were never turned over to the artist, whose address I could not find in my notebook. The other sixteen larvæ I sent to Mr. Chas. Palm, then rusticating in Sullivan Co., N. Y., with a view to having these raised on some eastern food-plant. The larvæ refused everything offered, and finally Mr. Palm set them at liberty in the bush, trusting that some might transform there.

Description of larva: Body black, with longitudinal yellow lines, of which three are subdorsal on each side of a broad, black dorsal band, and one sub-spiracular yellow line; another broad, black band between the last subdorsal and spiracular line, of nearly the same width as that on the dorsum. A yellow, central abdominal line from the first to twelfth segment. Head and anal plate pitchy black and smooth. Abdominal protuberance at the base of black legs of a purplish-pink colour. Spiracles black, enclosed by a circular silvery line. All true and abdominal legs pitchy black. Mouth-parts purplish-pink. Long white hairs from 5 to 8 mm. long all over the body, except dorsal black band, on which the hairs were shorter and more scattered.

Length of larva, 35 mm., and width, 5 mm. When at rest the larvæ assumed the usual curved posture, the anterior and posterior three segments well thrown up.

R. E. KUNZE, Phœnix, Arizona.

A NEW GALL-MAKING COCCID.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. MEX.

Cryptophyllaspis Rübsaameni, n. sp.—♀. Orange, oblong, caudal end sunken, overlapped at the sides by lobiform projections; no circumgenital glands; anal orifice broad-oval, about 17 μ long, and distant about 39 μ from the bases of the median lobes; lobes and squames formed just as in *C. occultus* and of the general type of *Aspidiotus cyanophylli*; three pairs of lobes, not even the median ones darkened in the least; median lobes slightly notched on each side; squames narrow and pointed, strongly fringed; beyond the third lobe are three double squames, each having the appearance of two squames united at the base; interlobular incisions with thickened edges, of the *Diaspidiotus* type; two rows of dorsal glands, not very numerous, on each side of the caudal end; spines small.

Galls small, subcylindrical, about 2 mm. long, thickly clustered on leaves of *Codiæum*.

Hab. — Bismarck Archipelago; communicated by Mr. E. H. Rübsaamen. Types in Coll. N. M. Agric. Exp. Sta. and U. S Dept. Agriculture.

NOTES ON MR. LYMAN'S PAPERS.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

I was much interested by Mr. Lyman's careful paper on a species of *Gortyna*, boring in burdock. If *aerata*, Lyman, is a good American species it should have an alternative food plant, since the burdock is imported from Europe. From Mr. Lyman's detailed statements, the distinction from *necopina* is assured. The differentiation from *nitela* is not so clearly given.

With regard to *nitela*, Mr. Lyman is quite correct, that Guenée first describes *nebris* and then *nitela*; and in my catalogue of 1874 I give the two as distinct species in the above order of their description. But in my Buffalo Check List of 1875 I place *nitela* first; and in 1882 I retain this sequence and record *nebris* as a variety of *nitela*. But I am not agreed with Mr. Lyman that *nebris*, the white-spotted type, represents the original form of the species. I think the white filling in of the ordinary spots a specialization, therefore a variation from the original form of the species. The normal Gortynid ornamentation is probably that shown by *inquæsita*, *necopina* and *nitela*. This appears to me a reasonable view when we consider the markings of the Noctuids as a whole.

It is a delicate question whether we should prefer the name given to the variety, when described on the same page as the species, merely because it stands first. I do not think it subserves the practical ends of science. For instance, I prefer the name *Orthosia ferrugineoides* for our common species, and record *bicolorago* as designating the aberration, although the latter stands first in Guenée. It is pushing priority beyond what the law intends. But if *nebris* and *bicolorago* were first described by another author and in another book, their priority for the species would be undoubted.

I was also much interested by Mr. Lyman's paper in the January number. In the Annals of the N. Y. Lyceum N. Hist., Vol. VIII., 1866, will be found a paper by Grote and Robinson, Lepidopterological Contributions, with three coloured plates, in which we originally drew attention to Abbot's figuring two species on Plate 78 of the Insects of Georgia. We then gave the following synonymy on page 374, *l. c.*:

(1) *Lophodonta georgica.*
Phalæna angulosa, Ins. Ga., 78 [83], ♂, upper left-hand figure (1797).
Notodonta georgica, H.-S., Ex. Lep. 384, ♀ (1855).

(2) *Lophodonta angulosa.*
Phalæna angulosa, Ins. Ga., 78 [83], ♀ ?, lower right-hand figure (1797).
Lophodonta angulosa, Packard, P. E. S. P., 358 (1864).

It is not certain that the lower right-hand figure represents a female. We gave particulars which render it possible that this figure also represents the male sex. The name *angulosa* became restricted to this species by Herrich-Schæffer's description of *georgica*.

CHANGES IN ENTOMOLOGICAL FAUNA OF NORTHERN ILLINOIS.

BY F. M. WEBSTER, WOOSTER, OHIO.

Among the ways I find that one can study the changes in the insect fauna of a locality as years go on is to occasionally go back to some such section where one has years ago been familiar with the insects to be found there and note the number of newcomers or, possibly, the passing of some of the old ones, though these last are by far the less numerous of the two.

Recently, while on a visit to my old home in De Kalb county, Northern Illinois, the insects of which I was pretty well acquainted with twenty years ago, but with which I have known little since that time, I was most unexpectedly met with complaints of the Buffalo Carpet beetle, *Anthrenus scrophulariæ*, unheard of there until within a few years, and which I never captured there myself.

Another newcomer was the Box Elder bug, *Leptocoris trivittata*, which I encountered in February, crawling and flying about my room, which had not been kept heated during the winter. This last was not so much of a surprise, as Dr. Forbes, whose monumental works on the insects of Illinois will stand as long as applied entomology itself, told me last fall that it had then nearly or quite crossed the State from west to east. But the thing did certainly look out of place to me where I found it.

Of the old-time injurious species, such as occurred there thirty or forty years ago, there is not one that does not occur there now, though not always in such numbers. The Chinch bug, *Blissus leucopterus*, that I remember back in the fifties, is not as destructive as of old, on account, I believe, of the fact that all uncultivated grounds are now generally pastured during summer, leaving no protection for the bugs during winter.

In most cases great diminution in numbers is most conspicuous among such species as fed on the natural vegetation, and as the land has been underdrained and brought into cultivation, these have disappeared with their food-plants. Thus, *Saperda mutica* and *Plectrodera scalator* have gone the way of the willows upon which they subsisted. *Acmæodera pulchella*, formerly always common on the blossoms of *Rudbeckia hirta*, has become far less so, as the plant has succumbed to the cultivation or pasturing of the land where once they grew abundantly.

The busy, economic entomologist has far too little time to watch these things closely, but it would seem that there was here a field for such as are able to withdraw from the hurry and push of professional work, and quietly and carefully watch these comings and goings mid the insect world, for other States than Illinois offer equally desirable fields for such observations. Not only this, but we not infrequently hear complaints from those who follow some line of business and study insects only as a pastime, that they have no opportunity to collect outside their own narrow field, whereas, here is a phase of entomological study that is really suffering for just such labour as these circumscribed people can best give to it. The data obtained in this manner are something more than mere gossip, as, if accurately observed and recorded where they are accessible to the busy man, these notes will sooner or later prove invaluable in the study of insect diffusion and disappearance.

BOOK NOTICE.

INSECTS INJURIOUS TO STAPLE CROPS.—By E. Dwight Sanderson, B. S. Agr., Entomologist, Delaware College Agricultural Experiment Station. New York: John Wiley & Sons. (Price $1.50.)

This is a very satisfactory compilation of the information to be obtained from the publications of State Agricultural Experiment Stations and of the Division of Entomology at Washington, regarding a considerable number of insects of practical interest to farmers. The writer lays no claim to originality, but he has succeeded in preparing a useful book, full of information of a trustworthy character, arranged in a convenient manner, and sufficiently illustrated. Some of the photogravures, however, are by no means as clear as one would wish. The book is intended for the use of farmers, and aims at giving them a correct knowledge of the insects with which they may have to contend and the methods that have been found most serviceable for preventing or controlling their injuries. Whether the ordinary farmer can be induced to read and make use of a book of this kind is somewhat doubtful, but if he does it will surely repay him well for any effort he may put forth in doing so.

The work opens with a short account of some of the most startling losses caused by insects, which must give the reader a vivid idea of their importance. After a chapter on the structure and development of insects, there follows a very useful epitome of the methods of intelligent farming, which will be found effective in preventing insect injury. A chapter is devoted to beneficial insects, in order that the farmer may know friend from foe, and the greater part of the book to descriptions and life-histories, together with remedies, of insects affecting various grain crops, corn, clover, cotton, tobacco, hops, potatoes, and sugar beets. The work is completed by an account of the most useful insecticides and the formulæ for their preparation. On the whole, it is an excellent manual, and will be found a handy book for reference by all who are engaged in the practical work of fighting against insect foes.

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