

Studies in the Tenebrionidae (Coleop.).

By FRANK E. BLAISDELL, SR., San Francisco, California.

The following new species are based on facts observed in the field, by Messrs. Ralph Hopping and F. W. Nunenmacher respectively.

Coniontis hoppingi n. sp.

Oblong, smooth and shining; black, frequently nigro-piceous; tibiae and tarsi rufo-piceous, antennae and palpi rufous, pubescence minute and inconspicuous.

Head equal to one-half the width of the prothorax, convex between the eyes, vertex rather prominent, finely and sparsely punctate, the punctures frequently denser laterally and on the epistoma; fronto-clypeal suture is more or less evident, and the posterior canthus of the eye is slightly more prominent than the anterior. Antennae extending to a point slightly behind the middle of the pronotum. Epistoma triangularly emarginate with the angles rather narrowly rounded. Setae absent. *Antennae* rather slender, the third joint distinctly twice as long as the second, the fourth to the seventh inclusive, subequal in length and obconical, eighth to the tenth subtriangular, eleventh suboval and smaller.

Pronotum about one-sixth wider than long, base one-third wider than the apex; disk evenly convex, finely and sparsely punctulate, the punctules becoming slightly larger and denser laterally; apex emarginate in circular arc, rather finely beaded, more strongly so laterally; sides subparallel in basal half, thence evenly arcuate to the apex, or more distinctly arcuate to the base, bead rather strong; base as wide as the elytra, emarginate, moderately lobed at the middle third and sinuate laterally; basal angles slightly less than right; apical angles narrowly rounded.

Elytra rather more than one-half to almost one-third longer than wide; sides subparallel, distinctly and rather broadly arcuate in apical third, slightly so in basal two-thirds; apices swollen and reflexed, sub-tuberculate and slightly divergent; disk convex, moderately so on the dorsum, strongly and evenly rounded laterally, with a tendency to a slight inflexion, arcuately declivous posteriorly, sides of the declivity more or less slightly inflated, very finely and at times sub-obsolete punctulate, setae only visible under high power. At times there is evidence of eroded grooves, occasionally there are evanescent corrugations.

Propleurae longitudinally rugose and smooth. Prosternal process strongly margined and feebly convex.

Length 14.0-15.5 mm.; width 6.5-7.5 mm.

A series of thirteen specimens collected at Colony Mills, Tulare County, California, elevation 5415 ft., by Mr. Ralph Hopping. *Type* in the writer's collection.

A very distinct species. The tumid or tuberculate, everted and reflexed elytral apices, are unique characters by which the species can be quickly recognized. Under high power the surface of the insect appears very finely pitted or pseudo-punctulate between the true punctures; the elytral surface is microscopically and densely granulate.

According to Casey's table, the species belongs to the *viatica* group.

The occurrence of eroded grooves and costae on the elytra is atavistic. The crumpling occasionally observed also, may in some individuals of other species of the genus *Coniontis*, amount to rugosities as evident as those of the elytra of *Microschatia inaequalis* Lec.

This form of sculpturing in *Coniontis* is purely anomalous, and can be experimentally produced by puncturing the elytral apodemes immediately after the casting of the pupal skin. The wrinkling is due to shrinkage on account of the loss of tension, which allows the inherent elasticity of the integumentary tissues to act.

The rugulosity in their feeblest form can be also produced by the rapid evaporation of the body fluids immediately after the emergence of the insect from the pupa. These facts explain this form of sculpturing so frequently observed in beetles, and which is to a greater or less extent a fortuitous physiological modification, and one which is usually considered of specific or varietal importance. Its constancy in certain species depends upon the stability of the meteorological conditions of the environment. When these conditions are fitful, the sculpturing is apt to be asymmetrical. *Coclocnemis* presents this condition more or less constantly, both in its symmetrical and asymmetrical state in a certain per cent. of individuals.

The crumpling of the elytra of *Microschatia inaequalis* is inherent and fixed, and is entirely of a different order from that observed in *Coniontis*.

In *hoppingi* it is to be noted that the prosternal process is strongly margined in all of the specimens; but three of them exhibit distinct evidences of the margin becoming obsolete at the apex. In part of the specimens the sides of the prosternal process are parallel and no dilatation occurs behind the coxae; in others the apex is distinctly dilated with the sides arcuate.

Three specimens are perfectly smooth, the others of the series show evidences of incipient crumpling; in four there is evidence of the very slight costae and grooves. Ten of the specimens are oblong with the sides parallel; three show evidence of being cuneate. This form is due to a relative widening of the prothorax and a tendency of the elytra to narrow more or less from base to apex. I am not prepared to say whether this is of one or both sexes.

Two of the specimens are more strongly punctulate, and one is broader behind than in front. In the types the elytral punctuation is finer than that on the pronotum.

The variation exhibited by this small series is characteristic of nearly all the species of *Coniontis*, and should be noted by those who study the genus.

***Coniontis globulina*, n. var. *muscula*.**

Oblong-oval, slightly elongate, black, dull to feebly shining; mouth parts and legs rufous to rufo-piceous; antennae rufous, more or less piceous in distal one-half; pubescence mouse-colored to yellowish, abundant and more or less conspicuous, moderately persistent, not dense, not hiding the general surface, rather less than moderate in length and recumbent.

Head rather small, a little less than one-half the width of the pronotum, finely and sparsely punctate, punctures denser on the epistoma, labrum with thirty to forty sparsely placed punctures; front nearly flat, vertex distinctly convex; anterior canthus less prominent than the posterior and rounded, the latter scarcely more prominent than the posterior margin of the eye. Mentum transverse, almost smooth and obsoletely punctate; apex feebly and broadly emarginate to straight, angles not prominent and rounded. Antennae moderately short and thick, not reaching beyond the basal fourth of the pronotum; outer joints broadened and compressed.

Pronotum transverse, length equal to about three-fifths of the width, evenly and moderately arcuate from side to side, scarcely con-

vex antero-posteriorly; apex almost arcuate in circular arc, middle third of the arcuation somewhat straight; base subtruncate, feebly sinuate laterally; disk almost evenly punctate, punctures slightly larger than those of the elytra; sides feebly arcuate in basal one-half, thence more strongly arcuate to apex, bead moderately fine; apex finely beaded; apical angles well rounded; basal angles subrectangular and somewhat more than narrowly rounded.

Propleura more or less longitudinally rugulose.

Prosternum finely and sparsely punctate; process feebly margined between the coxae; apex rounded, not margined; varying in length and moderately constricted.

Elytra one-half longer than wide, evenly convex from side to side, evenly and arcuately declivous in apical third; apex ogival; sides finely margined; disk somewhat irregularly and rather finely punctate, apical declivity scarcely rugose; there is slight evidence of longitudinal costae or smooth lines.

Epiplcura smooth.

Paraplcurea, meso- and metasterna sparsely punctate.

Abdomen finely and very sparsely punctate, last two segments more strongly punctate.

Metafemora very sparsely and finely punctate; metatarsi slightly shorter than the metafemora.

♂. Form narrower than the females.

Length 7.0-9.5 mm.; width 3.5-4.7 mm.

Type locality—San Joaquin County (San Joaquin Valley), Calif. Collector, F. W. Nunenmacher. *Type* in the writer's collection.

Habitat—Under leaves, cowchips, etc., and running over the ground.

Distribution—California (San Joaquin Valley southward to the Tehachapi Pass).

Remarks—Abundant. Described from a series of one hundred and thirty-five specimens. Several males are distinctly cuneate, others are less so and pass gradually into the normal oblong-oval form.

Muscula is a race of the anomalous *globulina* Casey. Several years ago the writer received from Prof. H. F. Wickham a small series of the latter species, who collected them at the Tehachapi Pass. The series contained the short and stout form described as *globulina* with others that gradually connected the latter with those of a normal *Coniontis*-like form. It is

perfectly evident to the writer that the race *muscula* becomes broader to the northward and narrower to the southward. If the labels were removed from the normal form taken at Tehachapi Pass and mixed with those of the northern form it would be impossible to positively separate them again. The transition is complete from *globulina* to *muscula*. The subgenus *Brachyontis* is without foundation when a large series is studied and the variations noted. Compare the descriptions of *globulina* and *muscula*.

Bibliography.—Casey, Thos. L. A Revision of the Tenebrionid Subfamily Coniontinæ. Proc. Wash. Acad. Sciences, Vol. X, p. 141.

Coniontis montana Casey.

According to Casey's description the salient characteristics of this species are its

"oblong, stout and parallel form, conspicuous fulvous pubescence and dull lustre.

"Length 10.8-13.0 mm.; width 4.9-6.2 mm."

By these characters it can be diagnosed from all of the other species of *Coniontis*. The value of other characters as aids in diagnosis will be considered below. Mr. F. W. Nunenmacher has, by persistent collecting in southern Oregon, northern and northwestern California, amassed a series of forty-five specimens. These, with the results of the writer's own collecting, give a total of eighty specimens, from which the following observations have been made.

Distribution.—The specimens were collected in the following States and counties: California (Calaveras, Alpine, Eldorado, Placer, Sierra, Plumas, Lassen, Shasta and Siskiyou Counties); Oregon (Josephine County.) A smaller series of twelve specimens have been separated as *C. canonica* Casey. These were collected in Klamath County, Oregon; part of these are intermediates between *montana* and *canonica*.

As considerable use has been made of the characters presented by the prosternal process, I shall give the results of an examination of a series taken in the order in which they happen to be placed in the cabinet box, and therefore not selected to prove any preconceived notion.

As the examination progressed the specimens were arranged in the following groups with definitions:

1. Prosternal process longer, horizontal, finely and sparsely punctate, very feebly narrowed between the coxae, distinctly margined at the sides and obsoletely so at the tip, the latter evenly rounded. 1 ♂ and 2 ♀♀.
2. Process just the least convex longitudinally, sparsely punctate, scarcely narrowed between the coxae, distinctly margined throughout; surface distinctly and transversely convex between the marginal sulci, tip evenly rounded. 1 ♀.
3. Process shorter, deeply margined throughout, sparsely, finely and distinctly punctate, longitudinally impressed at middle between the coxae; surface convex behind the impression; tip broadly rounded, narrowed between the coxae as in Group 1. 1 ♀.
4. As in Group 2, but the process is shorter, strongly and more densely punctulate. 1 ♀.
5. Process feebly narrowed between the coxae, distinctly convex longitudinally and noticeably prominent between the coxae, otherwise as in Group 1. 1 ♂.
6. Process not impressed, longitudinally convex; surface convex from side to side between the marginal sulci. Otherwise as in Group 3. 1 ♀.
7. Process longitudinally convex between the coxae, becoming concave behind the coxae, tip gradually deflexed ventrad. Otherwise as in Group 3. 1 ♂.
8. Process shorter yet, just the least convex both ways, strongly margined at the sides, no evidence of a bead at tip; the latter broadly and less strongly rounded. 3 ♂♂.
9. Process distinctly narrowed between the coxae. Otherwise as in Group 2. 1 ♀.
10. Process longer, margin obsolete at tip. Otherwise as in Groups 3 and 7. 1 ♀.
11. As in Group 3, except that the process is longitudinally convex, flat from side to side between the marginal sulci, marginal head feeble laterally and obsolete at tip. 3 ♀♀.
12. Process longitudinally convex, not marginal at tip; surface flat transversely between the marginal sulci. Otherwise as in Group 2. 1 ♀.
13. As in Group 11, except that the process is strongly margined throughout, narrowed between the coxae and with the tip more strongly dilated. 6 ♀♀.

The taxonomical value of the characters presented by the prosternal process is self-evident.

The relative prominence of the canthi cannot be relied upon for taxonomical purposes. The majority of the specimens have the anterior canthi slightly less prominent than the posterior; in a few specimens the anterior are most prominent. Bilateral asymmetry is occasionally observed.

The smallest specimen has the following dimensions: Length, 9.5 mm.; width, 4.3 mm. (♂). The largest specimen measures: Length, 14.0 mm.; width, 6.5 mm. (♀).

It is probable that the *subpubescens* group includes a number of geographical forms that may be described as species or races when studied in large series. Each species and race will have a varying number of intraspecific variants, which should be grouped as *formae*. This is imperative and practical. If not, the continuous founding of so-called species upon these intraspecific variants will in time clog our lists with useless synonyms. There is a crying need for conservatism. In the majority of cases the characters used to define a species have no more value than the variation of the malar prominences, nose, ears, etc., as specific or varietal taxonomical characters in human beings.

Montana is as distinct a species as can be found in the *subpubescens* group. *Canonica* Casey is only a narrower form of *montana*, and thus far observed in the north, namely:—in northern California and southern Oregon. *Montana* is very closely related to *subpubescens*, and when followed southward along the Coast Range of mountains gradually becomes indistinguishable from *subpubescens*, as observed in Marin County, California.

The epistomal sinus is usually subtriangular, but occasionally it becomes broader, less deep and arcuately emarginate. Two specimens from Del Norte County agree in every way with those from Eldorado County, except that the pubescence is shorter and therefore less conspicuous.

In two specimens from Dutch Flat, Placer County, the suture between the episternum and epimeron of the mesosternum is completely obliterated; the two side pieces appearing as one. The specimens are more strongly convex transversely, more oblong, with finer pubescence which is not as long as

usual. In the latter character they resemble those from the Calaveras Big Trees. The pubescence increases in coarseness to the northward. Specimens from Lassen County, California, and Josephine County, Oregon, have the coarsest pubescence and punctuation, and where the narrower form becomes *canonica* Casey.

Specimens with coarse pubescence and punctuation are found among those taken in Eldorado and Calaveras Counties and to the southward; but they are fewer in number than to the northward. The transition from one variant into the other is gradual in all directions, and therefore no limitation can be drawn between them. They are all included under *normal specific variation*. If there are different species or races they must be defined from larval or pupal characters—or from both.

Analogy is found in the series collected on the south fork of the Kaweah River, Tulare County, California, by Mr. Ralph Hopping, whose entire collection of *Coniontis* is before the writer. *Montana* in that region gives a variation—*perspicua* Casey—that is the opposite of *canonica* in form. *Canonica* is narrower, and *perspicua* is much broader than *montana*. In Mr. Hopping's series the specimens gradate so evenly that it is impossible to tell where *montana* ends and *perspicua* begins.

Perspicua and *globulina* are anomalous forms; *canonica* less so. It is unfortunate that *globulina* is a type species, for it is the same as if a dwarf or a hunchback was the type of *Homo sapiens*.

These forms are undoubtedly due to certain physiological conditions induced by environmental phenomenon. Seasonal vicissitudes of unusual stress may be considered as factors in the production of unusual forms, which in all probability revert to the type-form when causative factors cease to operate. Some forms are due to mechanical interference, as when larvae are forced to pupate in places that do not offer sufficient space, for instance, where the cell is short so that the prepupal and pupal stages are under flexion stress. It is a question of mechanics.