A Monographic Revision of the Species of CREMASTOCHILUS *of the United States.*

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In the Trans. Amer. Ent. Soc. 1871, p. 339, et. seq., will be found a table prepared by me of the species then known, after a short study, the object of which was to present some means for their identification in a ready manner, the descriptions being scattered in books, inaccessible to many, and sometimes unintelligible, either from their brevity or want of appreciation of characters which have since come to be of greater value. The above mentioned table was made use of by Prof. Westwood (in his "Thesaurus Oxoniensis," p. 58), who at the same time described a certain number of supposed new species, since which others have been described by Dr. LeConte, so that the aggregate assumed quite formidable dimensions for a genus so peculiar.

The types from which Prof. Westwood's descriptions were made are for the most part in the Royal Museum of Berlin, where I had the opportunity of examining them, through the kindness of the curator in charge. The descriptions appeared soon after my examination had been made, and left nothing to be desired for their identification.

Having had occasion to study the species more closely, I have seen no reason for any great alteration of the table already given, further than to add the new species and transpose one which seemed rather out of place. The accompanying table is, however, made so full as to contain nearly all the important characters of each species, so that the chances of a mistake in identification are reduced as near as possible to the minimum.

Before proceeding to the table it seems proper that the characters should receive more extended notice and comparison, which can be accomplished by considering the different members in order.

The head is short, oval, rather deeply inserted in the thorax, the vertex usually convex, the clypeus more suddenly deflexed, forming an angle with the front. In *planatus* and *saucius* the head is more exsert and presents in each characters worthy of special observation, these are—the carina on the middle of the clypeus common to both species, the supraorbital carinæ of the first and the sudden narrowing of the head behind the eyes in the second. In neither species is there an obtuse ridge indicating the limits of the clypeus and front, but the upper surface of the head is gradually declivous in *planatus* and very convex in *saucius*. In *pilosicollis, crinitus* and *Knochii* the front is rather flat and the limit between it and the clypeus is indicated by an obtuse arcuate ridge, so that the clypeus seems suddenly deflexed from the front. In *leucostictus* the front and clypeus are on the same plane, nearly flat, while all the other species not already mentioned have the front convex but to a variable degree.

The clypeus normally is not broader than the head, the margin reflexed, the anterior edge more or less arcuate, the angles rounded. In two species the clypeus is wider than the head, in *Wheeleri* conspicuously so with the angles rather acute, in *crinitus* less dilated with the angles rounded. The anterior margin is rather widely reflexed and is useful in aiding the species in their fossorial tendencies.

The mentum presents important modifications, the simplest being that of *leucostictus* or *saucius*, in which the face is quite flat and the margins narrowly reflexed. From this form the mentum becomes more concave and the sides more widely reflexed so that it becomes cupuliform. Those species with the mentum least concave have the posterior margin entire, as the concavity increases we find a slight notch, which in the last four species becomes a rather wide and deep excision semicircular at bottom. These modifications of the mentum form a very natural means of dividing the species.

The thorax is so modified in form and structure in all the species, that nearly all can be separated by it alone. The simplest form is that of *leucostictus* which resembles that of Trichius; apex feebly emarginate, sides feebly subangulate, hind angles rounded, the margin acute posteriorly, there is no incisure about the front angles nor are there any pubescent spots such as occur in every other species. In *planatus* the sides are subacutely margined, arcuate in front and gradually narrowed behind, not very unlike Iphthimus, in fact the species resembles a Tenebrionide when walking. The anterior angles are small, the notch or fovea within feeble, and there is a notch in the lateral margin which limits the angle. The hind angles are continuous with the margin, not very prominent and limited by an oblique groove within. The next modification in degree is in the *Schaumii* group, in which the thorax is broader and less depressed, the anterior angles are feeble, the fovea within them, but no lateral notch in the margin. In two of the species the hind angles are not limited by any groove and the anterior margin of the thorax beneath is not notched. In *angularis*, however, the hind angles have a limiting groove, and beneath the front angles is a slight incisure.

The three species following *angularis* do not present any very important modification of its type, the angles are nearly the same and there is the subangular incisure, but in *pilosicollis*, we observe a groove running outward from the fovea and limiting the anterior angles. This gives the first intimation of the tuberculiform angle which is observed further on.

In *nitens*, the front angles begin the nodiform structure by the greater depth of the transverse groove. The hind angles are also much retracted within the line of the sides, and the groove which limits them within is so deep that the angle is depressed below the surface of the disc of the thorax.

In passing to *variolosus*, the anterior angles become so completely surrounded by deep grooves as to become almost like isolated tubercles, and may be assumed to be the result of the gradual exaggeration of the various

grooves and incisures mentioned in the preceding forms. In *Harrisii* the anterior angles are rather broad and more obtuse than in any of the species described and the incisure beneath them is very feeble.

Of a totally different type of thorax we must consider *saucius* and *Wheeleri*, which require special mention. These have the disc of three parts, a central more depressed portion and the lateral more convex, which may be compared with Hetærius or Plegaderus. The division is best marked in *saucius*. The region of the anterior angles in this species presents a curious modification, in which the anterior angles appear to be auriculate, but this is really an extension upward and forward of the anterior margin or collar of the thorax, and corresponds in homology with that portion of the under side of the thorax of the other species which is below the incisure. The true anterior angle will be observed in the figure behind the auriculate process. The hind angles are spiniform, their structure will be observed in the figure. In *Wheeleri*, the tripartite character is less observable. The anterior angles do not depart much from the normal type, and the incisure beneath is well marked. The hind angles are broad but obtuse, and have a feeble trace of an oblique limiting groove. This species deserves mention as being the only one with the middle coxæ absolutely contiguous and the prosternum behind the coxæ slightly elevated.

The legs also vary to an important extent, and will be found described with each species. The tarsi follow the modifications of the legs, and, from being as long as the tibiæ, are reduced to even less than half that length in *Schaumii*. As a rule the shorter the tarsi the more compressed do they become, the only exception being in *leucostictus*, which with short tarsi has the upper side flat, so that the transverse section of a joint would be an isosceles triangle.

The distribution of the species in accordance with the form of the mentum is well known. Those with the mentum entire belong from the eastern base of the Rocky Mountains to the Pacific Coast, there being but one exception, *leucostictus*, from Maryland. Where the mentum is notched or deeply emarginate, the species belongs to the Atlantic fauna, most of them having a wide range of distribution, except in the case of *squamulosus*, which is limited to Georgia and Florida.

In the accompanying table and descriptions there is very rarely any mention made of the hairs of the surface. These exist to a greater or less extent on all the species, but are very easily removed and are therefore of uncertain value. So also with the spots of whitish exudation which I have observed to a greater or less extent on *leucostictus*, *pilosicollis*, *angularis*, *Schaumii*, *Westwoodi*, *canaliculatus*, and *castaneæ*. These have all been observed in ants' nests.

Mentum plate entire behind.

Anterior tarsi with last two joints thickened.

Clypeus carinate at middle, head with lateral carinæ above the eyes prolonged backward in obtuse processes.....**planatus** Lec.

Anterior tarsi not thickened, more slender at tip.
Disc of thorax trilobed.
Clypeus carinate at middle; tibiæ slender at base.....**saucius** Lec.
Clypeus not carinate, broader than the head; middle and posterior tibiæ broad and flat; middle coxæ contiguous...**Wheeleri** Lec.
Disc of thorax simple, not trilobed.
Hind angles of thorax rounded, the margin posteriorly acute; tarsi very short and flat above.....**leucostictus** Burm.
Hind angles of thorax more or less prominent.
Legs and tarsi short, the former decidedly fossorial, the latter much compressed.
Tarsi very short, less than half the tibiæ, hind angles continuous with the disc.....**Schaumii** Lec.
Tarsi longer than half the tibiæ.
Hind angles continuous with the disc.....**Westwoodi** Horn.
Hind angles limited by an oblique groove.....**angularis** Lec.
Legs ambulatorial, tarsi as long as the tibiæ.
Hind angles continuous with the side margin.
Front angles smooth, limited behind by a transverse impression.....**pilosicollis** Horn.
Front angles continuous with the disc, punctured.
Clypeus wider than the head.....**crinitus** Lec.
Clypeus not expanded.....**Knochii** Lec.
Hind angles strongly retracted. Surface shining...**nitens** Lec.
Mentum plate with a small acute incisure behind,
Hind angles of thorax much retracted, anterior angles prominent and distinct from the disc.....**variolosus** Kby.
Hind angles feebly retracted, anterior angles continuous with the disc..
squamulosus Lec.
Mentum plate with a deep emargination at the middle of the posterior margin.
Disc of thorax coarsely and densely punctured. Surface opaque.
Anterior angles of thorax continuous with the disc.
Hind angles feebly retracted, continuous at the outer margin with the disc.....**canaliculatus** Kby.
Hind angles strongly retracted, depressed below the surface of the thorax.....**retractus** Lec.
Anterior angles separated from the disc by a transverse impression, hind angles feebly retracted but depressed beneath the surface of the disc.....**castaneæ** Kn.
Disc of thorax sparsely and irregularly punctured.
Anterior angles short, obtuse, hind angles moderately retracted and slightly depressed.....**Harrisii** Kby.

In the above table *Wheeleri* is placed in the series with entire mentum, although that organ is usually, but not always incised posteriorly. It would be decidedly out of place anywhere else, when the aggregate of its construction is taken into account.

C. planatus Lec.

Elongate, black, sub-opaque. Head densely punctured, clypeus subtruncate in front, angles rounded, margin moderately reflexed, a short carina at middle, vertex above the eyes obtusely carinate, the carina prolonged backward in a pyramidal process, occiput deeply transversely impressed. Mentum plate transversely oval, pointed behind, the sides and posterior margin reflexed, the anterior margin thickened. Thorax broader than long, narrower at base, sides in front arcuate, posteriorly oblique, margin subacute, anterior angles nodiform, excavated in front, the concavity pubescent, posterior angles moderately prominent, smooth, limited within by a distinct groove, surface coarsely punctured and with a vague median groove. Elytra flat, the disc limited by an obtuse ridge, vaguely bicostate, and moderately closely sculptured with elongate punctures. Pygidium obtusely carinate surface with coarse ocellate punctures. Body beneath with very coarse punctures, less dense on the abdomen. Legs slender, moderately long, anterior tibiæ bidentate near the tip, the middle and posterior unispinose at middle, tarsi slender, at least as long as the tibiæ, the anterior with the last two joints suddenly thickened. Length, .66–.72 inch ; 17–18 mm. Pl. iv., fig. 1.

This species is one of the most peculiar in the genus from the length of the legs and the structure of the anterior tarsi. The latter character is not sexual, the female possessing it to an extent as great if not greater than in the other sex.

With this species I have united *depressus* Horn, founded on a specimen in which the hind angles are wanting by accident or deformity.

Arizona, Dr. Irwin ; southern coast-range of California, W. M. Gabb.

C. saucius Lec.

Castaneous or piceous, shining. Head sparsely punctured, widest at the eyes and rapidly narrowing behind them, clypeus oval in front, anterior margin broadly reflexed, at middle a strong carina, vertex convex without carinæ. Mentum flat, sides and posterior margin narrowly reflexed. Thorax broad, as wide as the elytra, surface of three parts, the middle less convex, and the sides more convex, forming a broad thickened border as in *Hetærius*, anterior angle auriculate, separated from the thickened margin by a deep fissure, sides moderately arcuate, near the hind angles suddenly sinuate, the angles acute, surface sparsely punctured. Elytra slightly narrowed posteriorly, moderately convex, disc at middle vaguely impressed, surface sculptured with short strigæ. Pygidium finely punctured. Body beneath very sparsely and rather finely punctured. Legs sub-fossorial, the femora broad and compressed, anterior tibiæ with the outer apical angle prolonged, and with a tooth at middle, middle and posterior tibiæ compressed, slender at base, gradually broader toward the tip, a spine at middle of outer mar-

gin; tarsi slender and except the posterior as long as the tibiæ. Length 44–.52 inch; 11–13 mm. Pl. iv, fig. 2.

A specimen which Mr. Ulke has loaned me is larger and darker in color than any other I have seen, its mentum is not pointed behind nor have the four posterior tibiæ the spine at middle, it, however, agrees in all other important particulars, and I take it to be an abnormal specimen, especially as there are three sets of claws on the left anterior tarsus, pl. iv, fig. 11. The trilobed form of the thorax is certainly a very remarkable character which at once suggests the similar structure of *Hetærius*.

Occurs in Kansas, Nebraska and Texas.

C. Wheeleri Lec.

Black, subopaque. Head sparsely obsoletely punctate, not narrowed behind the eyes, clypeus truncate or feebly bisinuate in front, wider between the anterior angles than the head, margin moderately reflexed, angles obtuse, vertex rather flat. Mentum transversely oval, pointed behind, very deeply cupuliform, lateral angles very prominent. Thorax transversely quadrate, broader at base, sides irregular, sometimes a little wider behind the middle than at base, anterior angles obtusely prominent, pubescent within, hind angles pyramidal, obtuse at tip, disc of thorax depressed, lateral third more convex, the former more densely punctured, the latter less so, the angles smooth. Elytra a little wider than the thorax, disc flattened, at sides gradually rounded, surface with elongate foveæ sparsely placed. Pygidium coarsely punctured. Prosternum behind the coxæ slightly elevated. Middle coxæ contiguous. Body beneath opaque, coarsely but sparsely punctured, abdomen with short yellowish hairs. Legs sub-fossorial. Anterior tibiæ bidentate near the tip, the apical tooth not much prolonged, middle and posterior tibiæ flattened, broad, very little narrowed at base, a small tooth at middle. Tarsi compressed, nearly as long as their respective tibiæ. Length .40–44 inch; 10–11 mm. Pl. iv, fig. 3.

The mentum in some specimens is feebly notched as in *variolosus*, but in others less acute and entire, so that the present might be associated with that species. The division of the disc of the thorax into three parts, although less distinct than in *saucius*, seems to indicate some relation between them, although this is hardly supported by any other characters. The form of thorax recalls somewhat that of *Plegaderus*, and the hind tibiæ, *Psiloscelis*. The peculiar characters of this species are—the broad clypeus, the point of

prosternum slightly elevated behind, the middle coxæ contiguous.

Occurs in Nebraska, New Mexico and in Eldorado county, California.

C. leucostictus Burm.

Black, shining, elytra with whitish spots at the sides. Head sparsely punctate, clypeus subtruncate in front, not wider than the head, angles broadly rounded, anterior margin moderately reflexed, vertex and clypeus nearly continuous in the same plane. Mentum plate flat, smooth and shining form hexagonal, margins, except in front, narrowly reflexed. Thorax broader than long, apex feebly emarginate, base truncate, feebly emarginate at middle, sides subangulate in front of middle, in front of which they are straight, posteriorly arcuate, margin very acute posteriorly and feebly reflexed, anterior angles not prominent, posterior rounded, disc sparsely punctate at middle, a little more densely at the sides. Elytra feebly depressed, disc very vaguely bicostate, surface with small foveæ sparsely placed. Pygidium moderately densely punctured. Body beneath shining, sparsely punctured and without pubescence. Legs sub-fossorial. Anterior tibiæ bidentate externally, the upper tooth distant from the apical. Middle and posterior tibiæ moderately compressed, narrow at base, a moderately strong oblique ridge at middle. Tarsi short, scarcely as long as half the tibiæ, slightly compressed, the upper edge, however, broad and flat. Length .52 inch; 13 mm. Pl. iv, fig. 4.

I have seen but one ♀ specimen of this species, which is peculiar by the absence of prominent thoracic angles. The short tarsi cause this species to approach *Schaumii* and *angularis* in which also the mentum is feebly concave. The tarsi themselves are peculiar in their very flat upper side, so that in transverse section the joints are very distinctly triangular.

One specimen, Maryland, in the cabinet of Mr. Ulke, who kindly loaned it for study.

C. Schaumii Lec.

Black, subopaque, above with short, black, erect hairs, sparsely placed, beneath with longer hairs. Head moderately densely punctured, clypeus smoother, at middle arcuate, sides oblique. Mentum nearly flat, punctured at the sides, posterior margin alone reflexed. Thorax one-half broader than long, a little wider at base than apex, sides regularly arcuate, anterior angles feebly prominent, excavated and pubescent on the inner side, posterior angles continuous with the curve of the margin or very slightly excurved, triangular, smooth above and with silken pubescence beneath, disc of thorax slightly convex, densely, coarsely punctured. Elytra slightly flattened on the disc, at sides convex, surface with oblong foveæ, sparsely placed. Pygidium with coarse shallow punctures. Body

beneath coarsely punctured, abdomen less densely. Legs short, decidedly fossorial, femora short and broad, anterior tibiæ scarcely narrowed at base, near the apex feebly bidentate, middle and posterior tibiæ broad, scarcely narrower at base, compressed, outer margin unispinose near the middle. Tarsi short, compressed, gradually narrowed toward the end and scarcely as long as half the tibiæ. Length .60–.64 inch; 15–16 mm. Pl. iv, fig. 5.

This species is abundantly distinguished from all others in our fauna by the extremely short tarsi. The surface of the hind angles of the thorax is continuous with that of the disc, there being no limiting depression.

With this species must be united *crassipes* Westw. I have seen the type and know it to be identical with *Schaumii*, Prof. Westwood having mistaken the next species for the present.

Occurs in California, especially in the south, near San Diego.

C. Westwoodi, n. sp.

Similar to *Schaumii* in all its characters, except in the form of the tarsi. These are at least two-thirds the length of the tibiæ, compressed, but scarcely broader at base than at tip. The joints are moreover more loosely articulated and do not appear to be retracted the one within the other as in *Schaumii*. The body beneath and abdomen are more densely punctured. Length .60 inch; 15 mm.

Occurs in Owen's Valley, California, where it was not rare, being found usually in or near ants' nests.

C. angularis Lec.

Black, subopaque, very sparsely pubescent above and beneath. Head densely punctured, clypeus arcuate in front, lateral angles broadly arcuate. Mentum moderately concave, the entire margin narrowly reflexed. Thorax broader than long, sides moderately arcuate, anterior angles moderately prominent, excavated and pubescent within, and limited behind by a slight transverse impression, hind angles triangular, continuous with the lateral margin, smooth above, pubescent beneath and separated from the disc by an oblique impression, disc feebly convex, coarsely and deeply punctured, median line vaguely impressed. Elytra flattened on the disc, convex at the sides, surface with oval foveæ moderately closely placed. Pygidium coarsely and deeply punctured. Body beneath as in *Schaumii*. Legs decidedly fossorial, the tibiæ a little narrowed at base, tarsi about half the length of the tibiæ, strongly compressed, and gradually narrowed to tip. Length .56 inch; 14 mm.

This species is closely related to *Schaumii*, but is always smaller, and more elongate. The impression within the hind

angles gives them an aspect of being more prominent than in *Schaumii*. The tarsi are formed similarly to that species, but a little longer. The next species is also closely allied, but the legs lose their fossorial character and become ambulatorial.

This species is widely distributed in the Pacific region.

C. pilosicollis Horn.

Closely related to *angularis*, but usually flatter above, and, when recently captured, with longer hairs. The head and thorax do not differ especially, except that the transverse impression behind the anterior angles is more distinct, and the median line more marked. The legs are ambulatorial, the tibiæ slender at base. The tarsi are as long, or very nearly so, as the tibiæ, slender, compressed and scarcely wider at base. Length .40–.50 inch ; 10–13 mm.

Specimens recently captured have moderately long hair on the thorax, and the elytra have whitish spots arranged in irregular transverse strigæ, these characteristics are evanescent and are of no specific value. If the figure of the legs of *C. armatus* Walker be correct, the name should have priority over *pilosicollis* (see Westw. Thesaurus, pl. xiv, fig. 1).

Occurs in California, Nevada and Oregon.

C. crinitus Lec.

Black, opaque, body above clothed with long, yellowish hairs, which are, however deciduous. Head densely punctured, clypeus a little wider than the head, in front feebly arcuate, sides rounded, anterior margin broadly reflexed. Mentum plate smooth, transversely oval, pointed behind, at bottom flat, margins reflexed more widely at the sides. Thorax broader than long, between the basal angles wider than at apex, sides moderately arcuate, anterior angles moderately prominent in front, within foveate and pubescent, posterior angles triangular, smooth, limited within by an oblique impression, disc of thorax flat, a vague median line, surface very coarsely punctured. Elytra flat on the disc, very vaguely bicostate, surface coarsely foveate-punctate. Pygidium coarsely, sparsely punctate. Body beneath coarsely punctate, more shining. Legs ambulatorial, anterior tibiæ bidentate near the tip, middle and posterior slender at base, gradually broader to tip. Tarsi nearly as long as the tibiæ, compressed. Length .50 inch ; 12.5 mm. Pl. iv, fig. 6.

I have seen but one ♀ of this species. It is closely allied to *pilosicollis* and *Knochii*, but differs from both by the clypeus being wider than the head between the eyes. It differs also from the former by the absence of transverse

impression limiting the anterior angles, and from *Knochii* by its much more depressed form, coarser sculpture. The hind angles are continuous with the lateral margin as in the two species cited. The hairs of the upper surface, although few, are a marked feature, but as they are probably deciduous as in *pilosicollis*, too much value cannot be attached to them in a specific point of view.

Occurs in California or Utah, locality doubtful.

C. Knochii Lec.

Black, feebly shining. Head moderately densely punctured, front slightly concave on each side, clypeus arcuate in front, side rounded, anterior margin reflexed. Mentum plate flat at bottom, sides and posterior margin more widely reflexed. Thorax one-half wider than long, base not wider than apex, sides broadly arcuate, anterior angles feebly prominent, not limited behind by a line, and feebly pubescent within, posterior angles triangular, smooth, distinctly limited within by an oblique impression, disc of thorax usually moderately convex, at middle vaguely canaliculate, surface with coarse but not densely placed punctures. Elytra moderately convex, disc rarely depressed, surface with oval shallow foveæ not densely placed. Pygidium sparsely punctate. Legs as in *crinitus*, tarsi as long as the tibiæ, slender and feebly compressed. Length, .36–.52 inch; 9–13 mm.

This species exhibits a slight range of variation in the sculpture of the upper surface, the punctures at times being coarser and more closely placed. This usually occurs in those specimens with the disc of thorax and elytra flatter, causing them to resemble the preceding species. The median line of the thorax is always more distinctly impressed. In very fresh specimens the surface is sparsely clothed with very short yellowish hair.

The three preceding species form a small group among those with entire mentum, by the legs being ambulatorial, tarsi moderately long, the hind angles continuous with the side margin of thorax, and not retracted.

To this species should be referred the *crenicollis* of Westwood.

Occurs from Illinois westward to Utah.

C. nitens Lec.

Castaneous, moderately shining. Head coarsely and densely punctured, vertex convex, clypeus arcuate, angles broadly rounded, margin moderately reflexed. Mentum plate smooth and flat at bottom, sides and pos-

terior margin widely reflexed. Thorax one-half wider than long, base not wider than apex, sides rather broadly arcuate, margin crenate, anterior angles very little more prominent than the apical margin, pubescent on the inner side, limited within and posteriorly by a deep grove, posterior angles smooth, auriculate, retracted within the line of the sides, and much depressed below the level of the disc, surface moderately convex, shining, punctures coarse, sparsely and irregularly placed, leaving large smooth spaces. Elytra slightly convex on the disc, coarsely, deeply and closely punctured. Pygidium coarsely punctured. Body beneath shining, coarsely but irregularly punctured. Legs ambulatorial, anterior tibiæ bidentate near apex, the terminal tooth moderately prolonged, middle and posterior tibiæ stout. Tarsi as long as the tibiæ, feebly compressed. Length .44 inch ; 11 mm. Pl. iv, fig. 7.

This species is the only one at present known in which the mentum plate is acute behind without notch, and the hind angles of the thorax retracted within the line of the sides. The middle and posterior tibiæ are thicker or less compressed than in any species of this series. It seems to be the link between the groups with the entire mentum and those with that organ notched or emarginate posteriorly, these all having the hind angles more or less retracted.

Two specimens, western Kansas.

C. variolosus Kby.

Black, slightly shining. Head coarsely and densely punctured, vertex convex, clypeus arcuate, margin reflexed. Mentum plate deeply concave, shining, posterior margin acutely notched. Thorax more than half wider than long, sides moderately arcuate and gradually wider behind, very suddenly and rather deeply constricted in front of the hind angles, anterior angles smooth, tuberculiform, completely surrounded by a deep groove, hind angles smooth, somewhat triangular, projecting laterally and separated from the disc by a deep impression, disc of thorax slightly convex, coarsely and densely punctured. Elytra flattened on the disc, surface with shallow oblong foveæ, somewhat confluent. Pygidium coarsely punctured. Body beneath very coarsely but rather sparsely punctate. Legs as in *squamulosus*. Length .36 inch ; 9 mm. Pl. iv, fig. 8.

This species is abundantly distinguished from the preceding by the thoracic characters, the anterior angles being more completely surrounded by a groove than in any other species, in our fauna. In some specimens the median line of the thorax is feebly impressed.

Synonymous with this species are *cicatricosus* and *Percheroni* Westw.

Occurs in the Middle States region.

C. squamulosus Lec.

Brownish or piceous, moderately shining. sparsely clothed with very short inconspicuous pubescence. Head coarsely and densely punctured, vertex convex, clypeus arcuate in front, sides broadly rounded, margin reflexed. Mentum plate deeply concave, posterior margin acutely incised. Thorax broader than long, sides rather irregular, usually diverging at apical third, then parallel at middle, in front of hind angles suddenly but not greatly narrowed, anterior angles scarcely more prominent than the margin, nodiform, smooth, limited within by a rather deep depression and posteriorly with a very faint groove, hind angles triangular, not very prominent, feebly punctate and separated from the disc by a deep oblique impression, disc of thorax slightly convex, coarsely and very regularly punctate. Elytra slightly convex, surface coarsely, deeply and rather closely punctate. Pygidium coarsely and densely punctate. Body beneath coarsely but not closely punctate. Legs ambulatorial, tibiæ stout, the anterior bidentate near the tip, the middle and posterior with a slight oblique ridge at middle. Tarsi as long as the tibiæ, rather slender and feebly compressed. Length .36–.40 inch ; 9–10 mm.

The notch in the margin of the mentum plate varies in extent, sometimes being very slight, but usually extending through the reflexed edge.

With this species must be united *junior* Westw.

Occurs in Georgia and Florida.

C. canaliculatus Kby.

Black, feebly shining. Head densely punctured, front convex, clypeus arcuate in front, lateral angles broadly rounded, margin reflexed. Mentum plate deeply concave, side and posterior margin very widely reflexed, deeply emarginate posteriorly. Thorax one-third wider than long, sides moderately arcuate and slightly coarctate in front of the hind angles, anterior angles obtuse, feebly prominent, limited within by a deep fovea, surface continuous with the disc and punctured, hind angles triangular, punctured, tip slightly turned outward, limited by a moderately deep groove, but not depressed below the surface of the disc, disc slightly convex, coarsely and densely punctured. Elytra flattened on the disc, vaguely grooved, and with shallow foveæ moderately densely placed. Pygidium coarsely and densely punctured. Body beneath densely and coarsely punctured, abdomen less densely. Legs as in *nitens*. Length .50 inch ; 12.5 mm.

This species is known from *castaneæ* by the hind angles being much less retracted and not depressed below the disc, as well as by the form of the anterior angles.

Occurs in Canada, Georgia and Illinois.

C. retractus Lec.

Resembles very closely the preceding species in form and sculpture, and

differs in the following characters: Disc of thorax more convex, hind angles much retracted, separated from the surface of the thorax by a deep impression, and depressed beneath it. Length .44–.48 inch; 11–12 mm. Plate iv, fig. 10.

The characters separating this species from *canaliculatus* are those in which it agrees with *castaneæ* from which the form of the anterior angles will distinguish it, the present species having the front angles of the first and the hind angles of the second.

Two specimens, Iowa and Texas.

Synonymous with this is *Walshii* Westw.

C. castaneæ Knoch.

Piceous, feebly shining. Head coarsely and densely punctured, front convex, clypeus arcuate in front, sides broadly rounded, margin reflexed. Mentum plate deeply cupped, the margin widely reflexed except in front, hind margin deeply emarginate. Thorax nearly twice as wide as long, sides moderately arcuate and slightly coarctate in front of the hind angles, anterior angles tuberculiform, limited within by the usual deep foveæ and posteriorly by an impressed line, hind angles triangular punctured at base, tips turned outward, separated completely from the surface of the disc by a deep impression, disc moderately convex, coarsely and closely punctured, median line sometimes feebly impressed. Elytra moderately flat, surface with large shallow foveæ. Pygidium very coarsely punctured. Body beneath coarsely and sparsely punctured, abdomen with very few punctures. Legs as in *nitens*, but with the tibiæ a little less thickened. Length .40 inch; 10 mm.

This species is known among those of the present group by the nodiform front angles which are separated from the disc by the transverse impression, the hind angles are also completely surrounded by a groove, and become depressed below the level of the disc.

C. Lecontei Westw. is merely a feeble form of this species, and is found in the more western regions.

Occurs in the Middle States region, extending westward to Colorado.

C. Harrisii Kby.

Piceous, moderately shining. Head very coarsely and deeply punctured, front convex, clypeus arcuate, angles broadly rounded, margin reflexed. Mentum plate deeply concave, margins reflexed, more strongly at the sides and posteriorly, the posterior margin rather broadly and deeply notched. Thorax more than one-half wider than long, sides very feebly

arcuate, anterior angles short, obtuse, limited within by a deep impression and behind by a finely impressed line, hind angles moderately retracted, somewhat triangular, smooth, separated from the disc by a moderately deep impression, disc slightly convex, sparsely irregularly punctured with smooth spaces and a broad impression at the middle of the sides. Elytra flattened on the disc, surface very coarsely, deeply and densely punctured. Pygidium shining, coarsely and closely punctured. Body beneath coarsely but not densely punctured, abdomen nearly smooth at middle. Legs very closely resembling *nitens*. Length .40 inch; 10 mm. Pl. iv, fig. 9.

This species is easily known from the others of this group by its comparatively shining surface and the sculpture of the thorax. The impression of the disc near the sides is variable in extent, being in some specimens quite feeble.

Occurs in Canada, Middle States and Illinois.

Notes on the Species described or quoted by Prof. Westwood in his "Thesaurus Entomologicus Oxoniensis."

The work of Prof. Westwood, so repeatedly quoted in the preceding pages, seems to require a little more notice than has been given it, from the fact that its distribution in European Libraries will have considerable weight in the determination of our species; and as the species are (with one exception) peculiar to our fauna, it seems proper that they should be reviewed in the light of more material than Prof. Westwood possessed.

In this work there are described as new, seven species, *Lecontei*, *Walshii*, *cicatricosus*, *junior*, *Percheroni*, *crenicollis* and *crassipes*, the type of the latter being in the cabinet of Maj. Parry in London, *Percheroni* in the Univ. Halle, and the others in the Berlin Museum.

With the first six we have more especial need to deal. *Lecontei* and *Walshii* are described from specimens in the Berlin Museum, from very short notes made in 1869, before my synoptic table appeared giving succinctly the differential characters of the species. The next four species "are introduced in this work mainly on the authority of Dr. Schaum, who possessed specimens of them, and who was in an excellent position to judge of their specific rank, both from possessing the typical specimens of Gory, and from his actual acquaintance with the American collections made during a long visit to the United States." The authority from Prof. W.'s own statement is derived from letters written in 1847, '48 and '49! and had the science in America been dormant, those species might possibly have remained twenty-five years undescribed. That they are all to be added to our synonomy is to be regretted, while it is fortunate that so able a describer has made the task of their determination so easy.

As Prof. Westwood has given descriptions of all our species either by quotation or from nature, with figures of many, I propose to pass them briefly in review, giving the synonomy and notes on the figures.

C. (Psilocnemis) *leucostictus* Burm. Westw. Thesaurus p. 56, pl. ii, fig.

4. The thorax of the figure is incorrect in outline and sculpture, and the tarsi too long, except in fig. 4 d. (See annexed plate, fig. 4.)

C. canaliculatus Kby. Westw. p. 58 ; no figure given.

C. castaneæ Knoch. Westw. p. 59, pl, xiv, fig. 4 ; a fair figure.

C. Harrisii, Kby. Westw. p. 59 ; no figure given.

C. Lecontei Westw. p. 60 note, is our western form of *castaneæ.* No figure is given.

C. Walshii Westw. p. 60 note, is the same as *retractus* Lec. I can hardly determine the priority. The latter name appeared in March, 1874, the "Thesaurus" is simply dated 1874. No figure given.

C. variolosus Kby. Westw. p. 60, pl. xiv, fig. 7. The figure is good, except that the sides of the thorax in front of the posterior emargination are much too acutely prolonged.

C. cicatricosus Westw. p. 60, pl. xiv, fig. 9, is *variolosus,* and the figure much better than that above.

C. squamulosus Lec. Westw. p. 60, pl. xiv, fig 8. From the index to plates this figure belongs to the next.

C. junior Westw. p. 61, pl. xiv, fig. 8, is *squamulosus,* and the figure a moderately good one of that species.

C. Percheronii Westw.p. 61, pl. ii. fig. 5, is *variolosus,* and the figure a far better one than those above quoted (pl xiv, figs. 7 and 9).

C. planatus Lec. Westw. p. 62, pl. xiv, fig. 5. The figure is not at all good, the anterior angles of the thorax are represented as double, and the tarsal dilatation not well shown.

C. depressus Horn. Westw. p. 62. A quotation.

C. angularis Lec. Westw. p. 63, pl. xiv, fig. 1. This figure seems to be made from specimens collected by J. K. Lord, in Vancouver, which are the types of Mr. Walker's *C. armatus.* If the tarsi are correctly figured, then this name should have priority over *pilosicollis* Horn, which this figure fairly represents. The tarsi are not those of *angularis* Lec. Westwood says that this species (*armatus*) has been received from Japan.

C. pilosicollis Horn. Westw. p. 63, a quotation. See note above.

C. nitens Lec. Westw. p. 63, pl. xiv, fig. 2. Westwood appears to quote the description, yet gives a figure without stating its source ; it is, however, not good.

C. saucius Lec. Westw. p. 64, a quotation.

C. Knochii Lec. Westw. p. 64, pl. xiv, fig. 6 ; a fair figure.

C. Schaumii Lec. Westw. p. 64, pl. xiv, fig. 3. The figure is a copy from one drawn by Wagenschieber and sent by Schaum, in which the tarsi and tibiæ are not well drawn. The body fairly represents the above species, while, as it stands, it more nearly resembles *Westwoodi* Horn.

C. crassipes Westw. p. 204 ; Trans. Ent. Soc. London, 1878, pl. 1, fig. 6. This is the true *Schaumii.* I have seen the type. The figure is not a very good one.

C. crenicollis Westw. p. 65, pl. ii, fig. 6, is *Knochii* Lec., and, in 1849, was an undescribed species. The figure is from Schaum by the artist above named, and is a better representation of *Knochii* than that on pl. xiv, fig. 6.

Bibliography and Synonymy.

C. planatus Lec. New Species, 1863, p. 81.
depressus Horn. Trans. Am. Ent. Soc. 1871, p. 340 (deformity).
C. saucius Lec. Journ. Acad. 1858, 4, p. 16.
C. Wheeleri Lec. Wheeler's Report, 1876, p. 516 (App. H, 10).
C. leucostictus Burm. Handb. III, p. 677.
polita Schaum. Ann. Ent. Soc. Fr. 1844, p. 397.
C. Schaumii Lec. Proc. Acad. 1853, p. 231.
crassipes Westw. Thesaurus, p. 204; Trans. Ent. Soc. London, 1878, p. 30, pl. i, fig. 6.
C. Westwoodi, n. sp.
Schaumii ‡ Westw. Thesaurus Entom. Oxon. 1874, p. 65, pl. xiv, fig. 3.
C. angularis Lec. Pacif. R. R. Rep. 1857, App. 1, p. 37.
? armatus Walker, Naturalist in Vancouver, II, p. 320.
C. pilosicollis Horn. Trans. Am. Ent. Soc. 1871, p. 341.
C. crinitus Lec. Trans. Am. Ent. Soc. 1874, p. 55.
C. Knochii Lec. Proc. Acad. 1853, p. 231.
crenicollis Westw. Thesaurus, p. 65, pl. ii, fig. 6.
C. nitens Lec. Proc. Acad. 1853, p. 232.
C. variolosus Kby. Zool. Journ. II, p. 516; III, p. 152, pl. v, fig. 4–6.
castaneæ ‡ G. et P. Mon. p. 118, pl. xvi, fig. 7.
Sayi Harris. Jour. Acad. V, p. 388.
Percheroni Westw. Thesaurus, p. 61, pl. ii, fig. 5.
cicatricosus Westw. loc. cit. p. 60, pl. xiv, fig. 7.
C. squamulosus Lec. Journ. Acad. 1858, IV, p. 17.
junior Westw. Thesaurus, p. 61, pl. xiv, fig. 8.
C. canaliculatus Kirby. Zool. Journ. III, p. 151, pl. iii, fig. 5, c, d.
castaneæ ‡ Schaum. Germ. Zeits. III, p. 255; Burm. Handb. III, p. 681.
Hentzii Harris. Jour. Acad. V, p. 386.
C. retractus Lec. Trans. Am. Ent. Soc. 1874, p. 54.
Walshii Westw. Thesaurus, Entom. Oxon. Oxford, 1874, p. 60, note.
C. castaneæ Kn. Neue Beitr. p. 115, pl. iii, fig. 1.
Lecontei Westw. loc. cit. p. 60, note.
C. Harrisii Kby. Zool. Journ. III, p. 152, pl. v, fig. 3*a*; Schaum, Germ. Zeitschr. III, p. 254; Burm. Handb. III, p. 680.
castaneæ ‡ Kby. Zool. Journ. II, p. 517; Harris, Journ. Acad. V, p. 384.

Synopsis of the EUPHORIÆ *of the United States.*

BY GEORGE H. HORN, M.D.

(*Read before the American Philosophical Society, Dec.* 19, 1879.)

The occurrence of several new species in our fauna affords an opportunity of briefly reviewing our entire series.

The first question presenting itself is the generic name which should be adopted, and this seems to be a difficult matter to determine. The ablest European authorities who have had to deal with the Cetonia group as a

E. aestuosa, n. sp.

E. Kernii Hald. Stansb. Expl. p. 374, pl. 9, fig. 10; Lec. Proc. Acad. 1853, p. 440.

Clarki Lec. loc. cit., p. 441.

texana Schauf. Sitz. Ges. Isis, 1863, p. 113.

E. hirtipes, n. sp.

E. devulsa, n. sp.

E. sepulcralis Fab. Syst. El. ii, p. 56; Burm. loc. cit., p. 376.

lurida Oliv. Ent. 1, 6, p. 43, pl. 9, fig. 81; Schaum. Ann. Ent. Soc. Fr. 1849, p. 266.

Reichei Gory et Perch. Mon. p. 210, pl. 38, fig. 3.

E. melancholica Gory et Perch. loc. cit., fig. 4; Schaum. loc. cit.

E. fascifera Lec. Proc. Acad. 1861, p. 336.

E. fulgida Fab. Syst. Ent. p. 48; Gory et Perch. Mon. p. 175, pl. 31, fig. 2; Burm. loc. cit. p. 393.

E. californica Lec. New Species. 1863, p. 80.

E. herbacea Oliv. Ent. 1, 6, p. 35, pl. 11, fig. 101; Schaum. Ann. Ent. Soc. Fr. 1845, p. 375.

antennata Gory et Perch. Mon. p. 177, pl. 31, fig. 4.

pubera Gyll. Schönh. Syn. Ins, 1, 3, App. p. 53; Burm. loc. cit. p. 391.

E. inda Linn. Syst. Nat. Ed. X, p. 352; Oliv. Ent. 1, 6, p. 40, pl. 6, fig. 40; Burm. Hand. iii, p. 389.

barbata Say. Journ. Acad. iii, p. 239.

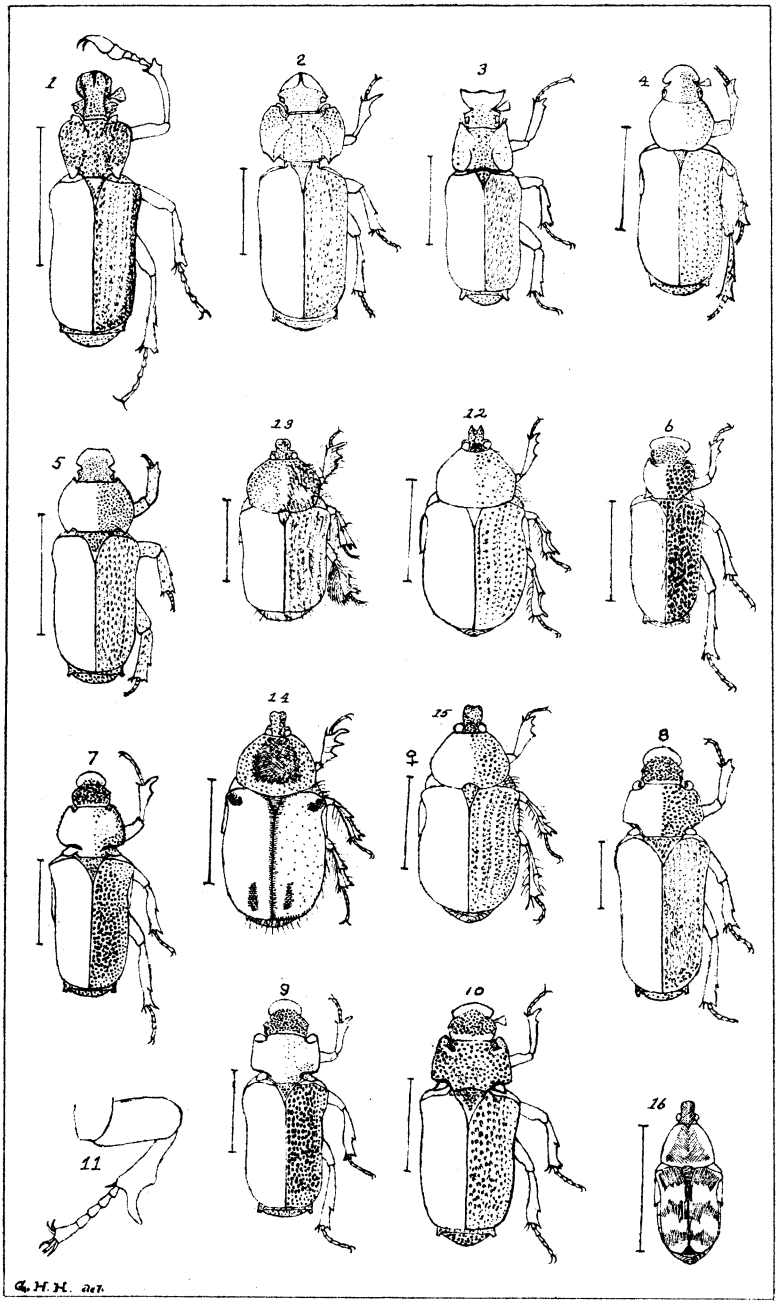
brunnea Gory et Perch. Mon. p. 267, pl. 51, fig. 6.

marylandica Fröhl. Naturf. 26, p. 116.

E. Schottii Lec. Proc. Acad. 1853, p. 441.

Explanation of Plate IV.

1. **Cremastochilus planatus** Lec.
2. **C. saucius** Lec.
3. **C. Wheeleri** Lec.
4. **C. leucostictus** Burm.
5. **C. Schaumii** Lec.
6. **C. crinitus** Lec.
7. **C. nitens** Lec.
8. **C. variolosus** Kby.
9. **C. Harrisii** Kby.
10. **C. retractus** Lec.
11. Tarsal monstrosity in **C. saucius.**
12. **Euphoria verticalis** Horn.
13. **E. hirtipes** Horn.
14. **E. aestuosa** Horn.
15. **E. devulsa** Horn.
16. **E. fascifera** Lec.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