

THE GALERUCINI OF BOREAL AMERICA.

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The essay of Dr. LeConte published in the *Proc. Acad.* 1865, pp. 204-222, was intended as a *Prodromus* of a more extended work when the accumulation of material would have made the work more perfect as to the species themselves, and a more nearly complete as to the contents of our fauna. In the same journal, in 1873, Crotch published a few notes on the tribe. Since the work of LeConte a small number of species have been described.

In 1875 the eleventh volume of the "Genera" appeared from the able hand of Chapuis, and which formed the basis of the table of genera given in the "Classification of the Coleoptera of North America."

The Galerucini treated in the following pages form one of the two divisions or sub-tribes, into which the tribe Galerucini is divided by all recent authors in the following manner :

Hind thighs slender, adapted for walking.....GALERUCINI.
Hind thighs thickened, adapted for leaping.....HALTICINI.

This distinction is ample for those with some entomological tact, whose experience in a general way will enable them to place doubtful forms in their approximately correct relationship, but it must be admitted that forms will occasionally present themselves in which the aggregate of an insect's structure must be given weight when characters that are considered more especially distinctive fail.

The femoral characters is without doubt the most constant, and least liable to give rise to doubt. There are, however, some Galerucini in which the thighs are quite as much thickened as in some Halticini. An instance in which the hind thighs of one of the latter group are scarcely thickened will be treated in a supplement to the present essay.

As a rule, the anterior coxæ are separated in the Halticini and contiguous in the Galerucini, but exceptions occur in both sub-tribes, although the characters may be said to have value next to that drawn from the femora.

The hind tibiæ in the Halticini are nearly always provided with a

terminal spur often largely developed or modified. The exceptions to this rule are very few. In the Galerucini the hind tibiæ are very often without spurs, but the absence of these spurs is less characteristic of the Galerucini than is their presence of the Halticini. It can very readily be understood why a spur is important on a hind tibia of a saltatorial insect, giving, as it does, a point of resistance in the act of leaping.

In the Halticini the general rule is that the third joint of the antenna is equal to or longer than the fourth, while in the Galerucini the third joint is usually smaller. There are, however, exceptions in both sub-tribes.

The characters have been given in the order of their importance and constancy, so that by having regard for them all it seems possible to solve all doubtful points.

It hardly seems necessary to enter into any detailed discussion of the various characters used in classification. With one there will doubtless be difficulty, which there seems no way of surmounting. The first joint of the hind tarsus plays, justly, an important role, but it has been found impossible to draw any absolute line of demarcation. In cases of doubt in using the table regard must be had to the aggregate of the characters of the insect after the manner indicated for the separation of the higher sub-divisions.

Chapuis, in dealing with the large number of genera, has found it necessary to divide them into twenty-seven groups. Of these eleven are represented in our fauna, as follows: Cœlomerites, Atysites, Drabroticites, Phyllobroticites, Scelidites, Luperites, Metacyclites, Agelasticites, Galerucites, Cerotomites and Sermylites, to which two others have been added to accommodate some troublesome genera in our fauna—Androlyperites and Phyllethrithes. In the comparatively few genera in our fauna an ordinary analytical table would suffice for their separation, but for the purpose of bringing our genera in relation with the best work hitherto done on these insects the groups adopted by Chapuis have been indicated in the table.

Fortunately, it has been found necessary to indicate but two new genera, while four genera hitherto unknown in our fauna have been introduced,—*Triarius*, *Malacosoma*, *Malacorhinus* and *Luperodes*, the last named containing nearly all those formerly called *Luperus*.

Galerucella is the equivalent of *Galeruca* Chap., which has erroneously been placed among the genera with closed front coxal cavities. *Scelolyperus* is the equivalent of *Scelida* Chap.

Chapuis arranges the tribes as they occur in our fauna in the following order: Phyllobroticites, [Phyllethrutes], Diabroticites, Agelastocites, [Androlyperites], Scelidites, Luperites, Atysites, Cœlomerites, Metacyclites, Galerucites, Sermylites and Cerotomites. It seems, however, that the arrangement produced by the analytical table gives quite as satisfactory results in the cabinet.

Anterior coxal cavities open behind.....	2.
Anterior coxal cavities closed behind.....	8.
2.—Claws of tarsi bifid (simple in ♀ <i>Monoxia</i>).....	3.
Claws of tarsi appendiculate... ..	4.
3.—Tibiæ without terminal spurs.	

First joint of hind tarsus equal to the next two and nearly as stout (*Androluperites*).

Tibiæ without spurs; anterior coxæ distinctly separated.

Androlyperus.

Tibiæ with spurs on the middle and posterior legs; anterior coxæ separated by a thin lamina.....**Malacorhinus.**

7.—Prothorax narrowed at base; all the tibiæ with spurs; sexes unlike in form (*Metacyclites*)**Metacycla.**

Prothorax not narrowed at base; all the tibiæ with spurs; sexes similar (*Agelastites*)**Malacosoma.**

Prothorax not narrowed at base; tibiæ without spurs; sexes similar in form, but with differing antennæ, either in form or number of joints (*Phyllecthrites*)**Phyllecthrus.**

8.—Tarsal claws bifid; tibiæ without spurs (*Galerucites*).....**Galeruca.**
Tarsal claws appendiculate.

First joint of antennæ longer than the fourth, third joint elongate (*Cerotomites*).

All the tibiæ with spurs; front of male not impressed....**Cerotoma.**

Front tibiæ without spurs; front of male deeply transversely depressed.

Andrector.

First joint of antennæ not longer than fourth, third joint shorter (*Sermylites*)**Agelasa.**

MONOCESTA Clark.

Antennæ slightly thickened, a little longer than half the body, joints 1–3–4 about equal in length, third about half, joints 5–10 gradually shorter, eleventh about as long as the seventh. Head deflexed, moderately deeply inserted, eyes oval, entire; clypeus truncate, abruptly thickened behind the margin, labrum large, subacutely oval in front; maxillary palpi not very robust, the terminal joint acute, as long as the preceding joint and more slender; mandibles stout. Thorax short and broad, transversely depressed; scutellum moderately large, the apex oval; elytra somewhat inflated, broader behind, the epipleuræ very narrow, extending three-fourths to apex; prosternum not extending between the coxæ; metapleuræ moderately wide, narrower posteriorly. Legs not long; tibiæ slightly broadened at tip, the outer edge grooved, apex without spurs; tarsi rather broad in both sexes, claws bifid.

This genus contains species formerly placed in *Coelomera*, from which it differs by characters of somewhat doubtful value. The species are numerous, and for the most part Brazilian, a number are found in Mexico, but one occurs in our regions. Chapuis placed the genus in a group, *Cœlomerites*, which may readily be distinguished from all others with entire anterior coxal cavities and bifid claws by the deeply grooved outer edge of the tibiæ.

M. coryli Say, Journ. Acad. iii, p. 455; ed. Lec. ii, p. 220.—Oval, moderately convex, broader behind, yellowish testaceous, elytra metallic-blue, with a broad, transverse testaceous band at middle, broader at suture and sides. Antennæ pale brown. Head sparsely punctate, with a median impressed line from the occiput to the labrum, transverse impression feeble. Thorax more than twice as wide as long at middle, apex emarginate, base truncate, sides regularly arcuate, the margin slightly reflexed posteriorly, anterior angles slightly prominent, hind angles obtuse, disc transversely depressed, surface sparsely finely punctate; elytra twice as long as wide at base, dilated behind the middle, surface punctate, but less distinctly at apex and base. Body beneath and legs dull testaceous, the abdomen often darker. Length .40—.60 inch.; 10—16 mm.

Male.—Last ventral segment broadly and deeply transversely emarginate, a slight fovea at the apex of the notch.

Female.—Last ventral broadly, but not deeply emarginate.

This species varies greatly in size, and I think I have seen specimens larger than the measurements given above. The normal coloration is that described above, but specimens occur with less blue, and some almost entirely yellow.

Occurs in Virginia, Illinois and Kansas.

HALTICIDEA n. g.

Head oval, not deeply inserted, the eyes oval, prominent and free, frontal tubercles distinct, not prominent; a transverse groove between the eyes; labrum transverse, faintly emarginate; maxillary palpi short and stout, the terminal joint conical, longer than the preceding joint. Antennæ slender, nearly half the length of the body; first joint slightly clavate, twice as long as the second, this a third shorter than the third joint, fourth joint scarcely longer than third, joints five to ten slightly shorter, eleventh longer and acute at tip. Thorax more than twice as wide as long, sides arcuate, hind angles not distinct, disc convex, with a median transverse impression, sometimes indistinct or obliterated at middle; elytra oval, slightly oblong, the epipleuræ distinct in front, but becoming internal behind the middle; anterior coxal cavities narrowly closed behind, the prosternum not visible between the coxæ. Legs moderate in length, the tibiæ scarcely broader at tip, the outer edge finely grooved, no terminal spurs; tarsi rather stout, the first joint about equal to the next two; claws strong, deeply bifid, the portions widely divergent. Body glabrous.

This genus is proposed for several small species which might readily be mistaken for *Haltica* by their facies. Among the groups suggested by Chapuis it seems best placed in the Galerucites by its entire anterior coxal cavities, unarmed tibiæ and bifid claws, although it differs from them in its glabrous surface.

The only other representative of the group in our fauna is *Gal. externa*, beside which the species of the present genus seem rather out of place, but as classification should be based on structural characters and not facies, there seems no other course to pursue than to place the species in the Galerucites.

Suffrian has described, from Cuba, a *Haltica dichroa* (Archiv. für Naturgesch. 1868, p. 203) in such a manner as to lead one to suppose that it might possibly be a member of the present genus.

The species are closely allied, and not easy to separate sharply, by description, although easily separable in cabinet. The following characters will, with the description, assist in their identification:

Head and thorax smooth, punctuation scarcely evident.

Base of thorax regularly arcuate, hind angles not distinct; punctuation of elytra rather fine and moderately closely placed.....**placida.**

Base of thorax truncate at middle, oblique each side, hind angles distinct; punctuation of elytra coarse.....**modesta.**

Head and thorax very distinctly punctate, the former alutaceous.

Base of thorax arcuate, hind angles slightly evident; punctuation of elytra fine and not well impressed.....**delata.**

H. placida n. sp.—Oval, slightly oblong, subdepressed, yellowish testaceous, meta-pectus piceous, elytra metallic-blue; antennæ pale brownish testaceous. Head shining with minute scattered punctures. Thorax more than twice as wide as long, slightly narrowed in front, sides strongly arcuate, disc with a deep, median, transverse depression, which may be reduced to a fovea each side, surface shining, minutely sparsely punctate; elytra finely and moderately closely punctate, much smoother at apex. Body beneath sparsely pubescent. Legs pale yellowish. Length .12 inch.; 3 mm.

Male.—Last ventral with a broad, almost semicircular emargination.

Female.—Last ventral entire.

Three specimens—Arizona, doubtless from the southern part.

H. modesta n. sp.—Oval, slightly oblong, yellowish testaceous, elytra bluish green; antennæ yellow. Head smooth, sparsely minutely punctate, a slight median impression of the front. Thorax more than twice as wide as long, slightly narrowed in front, sides strongly arcuate, disc with a sharp, median, transverse depression, surface smooth, with a few punctures near the sides, hind angles small but distinct; elytra relatively coarsely, not closely punctate; punctures a little less distinct at apex. Body beneath and legs yellowish testaceous, sparsely pubescent. Length .10 inch.; 2.5 mm.

Male.—Last ventral truncate, with a small emargination at middle, disc of segment slightly flattened.

The only specimen examined is entirely yellow beneath, while the other two species have the meta-pectus piceous. With such limited material it is not possible to assert the constancy of the character.

Collected in Biscayne, Fla., by Mr. E. A. Schwarz.

H. delata n. sp.—Oval, slightly oblong, subdepressed, head and thorax yellow, sometimes piceous, elytra piceous, with a faint surface lustre. Antennæ piceous, the basal joints paler beneath. Head alutaceous, punctate. Thorax as in *modesta*, but without distinct hind angles, the transverse depression not deep; surface alutaceous, sparsely punctate; elytra not closely punctate; punctures feebly impressed, apex much smoother. Body beneath and legs yellow, meta-pectus piceous, distinctly bronzed. Length .11 inch.; 2.75 mm.

Male.—Last ventral truncate, with a small emargination at middle.

Female.—Last ventral entire.

In this species the head and thorax, while usually yellow, tends to become brownish or piceous. The meta-pectus is also similarly variable in color. The surface lustre of the elytra may be violaceous or bronzed, but in none of the dozen specimens before me is there any trace of blue.

Collected abundantly at San Antonio, Texas, by H. F. Wickham. Occurs also in Arizona.

TRIRHABDA Lec.

Head broad, moderately deeply inserted, eyes oval, convex and entire. Antennæ slender, three joints the length of the body, first joint claviform, second small, but oblong, third not quite twice as long as the second, fourth longer than the third, joints 4–10 gradually decreasing in length, eleventh longer; labrum transverse, emarginate; maxillary palpi not very stout, last joint conical, acute, narrower than the preceding joint and about as long. Thorax much broader than long, widest at middle, the angles distinct, and more or less prominent; scutellum short, obtuse; elytra elongate, parallel, or slightly broader behind, distinctly margined at sides, the epipleuræ narrow, but extending somewhat posterior to the middle; prosternum not prolonged between the coxæ, these prominent and contiguous; middle coxæ slightly separated in front, contiguous posteriorly; metasternal side-pieces moderately broad, narrower posteriorly. Legs moderate, the tibiæ faintly grooved on the outer side, without spurs at tip; tarsi not long, the first joint as long, or a little longer than the next two; claws bifid, but somewhat dissimilarly in the sexes.

It seems not to have been observed by those who have had occasion to study the genus, that the claws are somewhat dissimilar in the two sexes. In the male the claws are narrowly bifid at tip, while in the female they are more broadly bifid posterior to the tip, seeming almost to be toothed.

The first attempt at a study of our species was made by Dr. LeConte (Proc. Acad. 1865, p. 219), who separated the species with

characteristic acumen. Later (Proc. Acad. 1873, p. 56) Mr. Crotch, in a few words, suppresses many of the species as mere varieties without giving any definite reasons for such action. The results of the present study confirm the views of Dr. LeConte, basing the separation of the species on structural characters not observed by either of the preceding authors.

Before giving the table of the species it is well to observe that, contrary to the idea expressed by Crotch, the species are far less variable in their markings than might have been expected. The elytral sculpture is also remarkably constant, and forms two fairly-well defined types, the first illustrated by *tomentosa* and *luteocincta*, in which the punctuation is so fine and dense as to appear almost as an opacity; the second form by *virgata* and *flavolimbata* has the elytra distinctly punctate and slightly asperate, the punctures closely placed, but evidently distinct.

In the following table the species are divided into two series, the first without any trace of metallic surface lustre on any portion of the body, while in the second there is more or less such lustre. There is no trouble in applying this character, except in some forms of *luteocincta*, in which the elytra are nearly black, but an examination of the plaga of the occiput, or the thoracic spots, shows the surface lustre very plainly.

The occipital spot is of far greater constancy and importance than would have been expected of so trivial a character. In about one-half the species the occiput has merely a small spot in front of the edge of the thorax, while in the other species a large transverse space is piceous, extending at times nearly to the eyes. It is true that in nearly all the species, when the head is unduly extended, a piceous band is visible across the occiput, but the difference between the two sets of species can be easily appreciated by an examination of such well-known forms as *canadensis* and *flavolimbata*.

The following table has been prepared as an aid to the separation of the species more fully described in the subsequent pages; a cabinet arrangement is suggested by the number preceding each species.

Surface of body without any trace of metallic lustre in the markings, these being piceous or brownish.....	2.
Surface with metallic lustre in the markings, if not on the elytra at least on the head and thorax.....	6.
2.--Thorax more than twice as wide as long; epipleuræ more or less piceous.	
	2. brevicollis.
Thorax not twice as wide as long; epipleuræ always pale.....	3.

- 3.—Elytra very densely and finely punctured, the punctures so dense as to be indistinct as such.....4.
 Elytra closely punctate, but the punctures are distinctly separated.....5.
- 4.—The yellow vittæ of elytral disc attenuate to apex.....1. **tomentosa**.
 The yellow vittæ broad, parallel and entire.....4. **canadensis**.
 The yellow vittæ divided at middle by a fine black line; thorax coarsely punctate and subopaque; body beneath almost entirely piceous.
 5. **geminata**.
- 5.—Elytra normally vittate, as in *canadensis*.....3. **virgata**.
 Elytra almost entirely pale, the darker vittæ indistinct or obliterated.
 6. **caduca**.
- 6.—Thorax smooth, impunctate; head with small occipital spot; elytra subtruncate, sutural angle acute, or even slightly prolonged....7. **nitidicollis**.
 Thorax more or less punctate and impressed.....7.
- 7.—Occiput with a small piceous spot; elytra very finely punctate..9. **diducta**.
 Occiput with transverse piceous space.....8.
- 8.—Punctuation of elytra comparatively rough.
 Elytra normally vittate.....10. **convergens**.
 Elytra entirely blue, except border.....13. **flavolimbata**.
 Punctuation of elytra fine and dense.
 Elytra yellow, with slender blue vittæ, resembling *nitidicollis*.
 8. **Lewisii**.
 Elytra blue, with a short discal vitta attenuate to apex, as in *tomentosa*.
 11. **attenuata**.
 Elytra green, blue, or purple-black12. **luteocincta**.
- By a rare exception, specimens of *luteocincta* have a dull, yellow, indistinct vitta.

T. tomentosa Linn., Syst. Nat. ed. xii, p. 601; Lec., Proc. Acad. 1865, p. 220; *bacharidis* Weber, Abs. Ent. p. 57; Fab., Syst. El. i, p. 480; Oliv., Ent. vi p. 629, pl. 3, fig. 34; *lampyroides* Gmel., Ed. Linn. i, 4, p. 1731.—Form oblong, slightly broader behind; antennæ entirely piceous when fully mature, the fifth joint distinctly longer than the third. Head testaceous, with a small occipital spot piceous, surface coarsely obsoletely punctate. Thorax not quite twice as wide as long, the angles usually prominent, sides obtusely angulate, but variable, disc with a vague depression each side of middle variable in extent, surface sparsely indistinctly punctate, color yellowish with the usual three piceous spots; scutellum piceous, sometimes margined with testaceous; elytra piceous, opaque, the entire margin from humerus to apex testaceous, the disc with a testaceous vitta broader at base, gradually narrowed to tip, extending three-fourths to apex, surface densely finely punctate, and finely, inconspicuously pubescent; epipleuræ always pale; pro- and metasternum always pale, metasternum at least piceous at the sides. Abdomen pale at middle and piceous at sides, or at times entirely piceous. Legs yellowish testaceous, the outer side of the front tibia, the tips of the middle and hind tibiæ and the tarsi piceous. Length .34—.40 inch.; 8.5—10 mm.

Male.—Last ventral segment broadly, but not deeply emarginate; claws slightly bifid at tip, the two divisions equal in length.

Female.—Last ventral obtuse, entire; claws more deeply bifid, the inner division a little shorter and more divergent.

The variation observed in this species are of but little moment, and have been recorded in the description. Under this description Crotch was disposed to unite several others, assuming that the differences in color were merely varietal, but as these differences are supplemented by others, the sexual often being important, the species recognized by LeConte must be admitted.

Occurs on the Atlantic coast from Long Island to Florida, usually very abundant.

T. brevicollis Lec., Proc. Acad. 1865, p. 221.—Form rather more broadly oval than usual. Antennæ piceous, the underside of the three basal joints testaceous. Head dull yellowish testaceous with a small occipital piceous spot, surface nearly smooth, a few indistinct coarse punctures at middle of the vertex. Thorax more than twice as wide as long, slightly narrower in front, sides obtusely angulate, disc irregular, with a moderately deep oblique impression each side, the two meeting opposite the scutellum, surface sparsely indistinctly punctate, more evidently near the front angles; scutellum pale, piceous at apex; elytra dull yellow, with a common sutural piceous vitta broad at base, gradually narrowing to apex, a broad vitta from the humerus extending nearly to tip and joining the sutural by a narrow isthmus; surface closely and finely punctate, finely pubescent; epipleuræ piceous, except at humerus. Body beneath dull yellowish testaceous, the ventral segments with small piceous space at sides; femora yellow, tibiæ on the outer side and tarsi piceous. Length .31—.38 inch.; 8.5—9.5 mm.

Male.—Last ventral segment with a broad and moderately deep emargination; anterior tarsi very slightly dilated.

Female.—Last ventral entire.

This species resembles *canadensis*, but is known by the short and broad thorax, the black tibiæ and tarsi, and the usually black epipleuræ.

The variations are not great. The occipital spot is often indistinct. The piceous spots on the thorax are never conspicuous, and the middle one may be obliterated and the lateral small. The epipleuræ are usually black, except at base, but one specimen has been observed with the piceous color at apex only. The fifth joint of the antennæ is scarcely longer than the third. The tarsal claws are similar in the sexes, being rather widely bifid at apex, the inner portion slightly shorter, and at the same time divergent from the outer.

Occurs on the sea-coast from Florida to Texas.

T. virgata Lec., Proc. Acad. 1865, p. 220.—Oblong oval, less elongate than *tomentosa*, but narrower than *brevicollis*. Antennæ piceous externally, gradually paler to base, especially on the underside of the joints, fifth joint much longer than the third, the second and third together, but little longer than the fourth.

Head yellow, occiput with a median piceous spot, surface irregularly coarsely punctate. Thorax a little less than twice as wide as long, slightly narrower in front, the angles slightly upturned, disc with a deep oblique impression each side, transversely united across the middle, surface sparsely irregularly punctate, color yellowish with the three piceous spots well developed; scutellum piceous; elytra slightly broader behind the middle, surface relatively coarsely punctate, inconspicuously pubescent, color dull black, the entire margin from humerus to apex yellow, disc on each side with a moderately wide yellow vitta, which gradually narrows near the tip, and in some instances joining the apical yellow margin; epipleuræ pale. Body beneath and abdomen nearly always piceous, excepting the pro- and mesosternum, and the middle of the metasternum. Legs testaceous, the tibiæ on the outer side and the tarsi brownish. Length .26—.36 inch.; 6.5—9 mm.

Male.—Last ventral segment with a broad, but very shallow emargination; tarsal claws widely bifid at tip, the inner division shorter and divergent from the outer.

Female.—Last ventral broadly semicircular, the margin entire; claws as in the male.

This species is one of those supposed by Crotch to be merely a variety of *tomentosa*, but it seems abundantly distinct. The elytral punctuation is much coarser and less dense. The tarsal claws of the male are deeply and divergently bifid. In the two characters mentioned the species approaches *brevicollis*, but differs from that species in the less transverse thorax and pale epipleuræ.

Occurs on the Atlantic coast from Massachusetts to Florida, from which point to Texas it is replaced by *brevicollis*.

T. canadensis Kby., Fauna Bor. Am. iv, p. 219; Lec., Proc. Acad. 1865, p. 219.—Oblong, similar in form to *tomentosa*. Antennæ piceous, the basal joints partly testaceous. Head yellow, with an oblong occipital piceous spot, surface sparsely punctate. Thorax not twice as wide as long, slightly narrowed in front, sides arcuate, or very obtusely angulate, angles scarcely prominent, disc with a vague oblique impression each side from the front angles to the middle of base, surface sparsely coarsely punctate, color yellow, with the three piceous spots usually small; scutellum piceous, sometimes partly pale; elytra more yellow than black, a narrow black sutural vitta extending nearly to apex a black vitta from humerus, which becomes broader behind the middle, then narrower at apex, incurving to join the sutural, disc densely finely punctured, not closely pubescent; epipleuræ pale; underside of body yellowish testaceous, except a slight darkening at the sides of metasternum and abdomen. Legs pale yellow, tarsi slightly darker. Length .28—.38 inch.; 7—9.5 mm.

Male.—Last ventral segment broadly, but not very deeply emarginate; claws narrowly bifid at apex, the inner division shorter.

Female.—Last ventral broadly semicircular; claws more deeply bifid, slightly more divergent.

The coloration of this species is remarkably constant even in the most remote localities of its occurrence. The black vittæ vary a

little in width, and in some specimens the lateral vitta does not join the sutural at apex.

An examination of the elytral sculpture shows that it approaches very closely the dense and fine form seen in *tomentosa*, differing from the coarser form of *virgata* and *brevicollis*. The markings, however, more nearly resemble those of the last two species, but in both there is more black than yellow, while the reverse is the case in *canadensis*. The sexual characters are more nearly those of *tomentosa*, as in the last two-named species the claws do not greatly differ in the sexes.

This species is probably the most widely distributed of any in our fauna. Specimens are known to me from Hudson's Bay region, Canada, New Jersey coast, Kansas, Nebraska, Colorado, Utah and California.

T. geminata n. sp.—Oblong, slightly broader behind. Antennæ entirely piceous when fully mature, the fifth joint a little longer than the third. Head, excepting the front piceous; occiput coarsely and closely punctate. Thorax much less than twice as wide as long, slightly narrowed in front, angles not prominent, sides arcuate, disc with very vague, oblique depression each side. surface subopaque, scabrous and coarsely punctate, color dull yellow, with the three discal spots of variable size; scutellum piceous; elytra in great part dull black, margin from humerus to apex yellow, disc on each side with a dull yellow vitta extending three-fourths to apex, itself longitudinally divided by a narrow black line, surface densely finely punctured and extremely finely pubescent; epipleuræ pale. Body beneath, except prosternum, piceous. Legs in great part piceous, except the underside of the femora. Length .20—.28 inch.; 5—7 mm.

Male.—Last ventral broadly, but feebly emarginate; claws cleft at tip, the inner portion slightly divergent and shorter.

Female.—Last ventral entire; claws more deeply cleft, the inner portion more divergent and shorter than in the male.

In order to properly appreciate this species it is necessary first to see a fully colored specimen. Even then it would probably be associated with *maritima* or *morosa*, from its form and appearance. Among the species without any metallic lustre this one is known by the greater part of the head being piceous and coarsely punctate, the thorax feebly impressed and rugose, the elytra opaque, with the feebly marked yellow vitta divided by a black line, and by the underside of the body almost entirely piceous.

Two specimens before me are fully mature and marked as above described, one is entirely testaceous and probably immature. A fourth specimen has the entire dark fuscous, and apparently only the border yellow, but a careful inspection shows the geminate yellow vitta a little paler than the rest of the surface.

Occurs at San Diego, Cal., and Arizona.

T. caduca n. sp.—Form oblong, slightly broader behind, color dirty yellow, each elytron with a narrow piceous sutural vitta and another very narrow from the humerus to apex, both more or less evanescent. Antennæ brownish, fifth joint scarcely longer than the second. Head yellow, with a piceous occipital spot, surface coarsely and roughly punctured. Thorax nearly twice as wide as long, sides arcuate, angles not prominent, disc vague, obliquely impressed each side; surface sparsely, but rather coarsely punctate, color yellow, with the usual three black spots; scutellum piceous, or bordered with yellow; elytra closely, but not densely punctate, the pubescence extremely short and inconspicuous, color dull yellow, with a narrow sutural darker border and a vitta from the humerus. Body beneath and legs yellowish testaceous. Length .22—.26 inch.; 5.5—6.5 mm.

Male.—Last ventral broadly and moderately deeply emarginate; claws narrowly bifid close to the tip, the inner portion slightly shorter.

Female.—Last ventral nearly semicircular, with a slight triangular notch at middle; claws more deeply bifid than in the male, the inner portion shorter.

At first glance this species would be supposed to be a *Galerucella* from its color and feeble markings. It could only be suspected of being a feebly colored *canadensis*, but it is more coarsely sculptured than that, and with the pubescence very indistinct.

In the most perfectly developed specimens the markings resemble *L. bivittatus*, but the vittæ may be almost entirely obliterated.

Owen's Valley, California, six specimens.

T. nitidicollis Lec., Proc. Acad. 1865, p. 219.—Oblong, nearly parallel, clear yellowish testaceous, each elytron with a sutural and narrow lateral bluish stripe. Antennæ piceous externally, the basal joints, except the first, paler; fifth joint much longer than the third. Head yellow, a small piceous occipital spot, occiput coarsely punctate. Thorax less than twice as wide as long, slightly narrowed in front, hind angles rounded, sides obtusely angulate, disc scarcely at all impressed, surface polished, color yellow testaceous, with the three spots small; scutellum pale; elytra densely feebly punctate, sparsely finely pubescent, apices subtruncate or sinuate, the sutural angle acute or even slightly prolonged, a narrow sutural stripe extending nearly to apex, a narrow vitta from the humerus joining the sutural near the apex; epipleuræ pale. Body beneath entirely pale, except the sides of the abdomen at base. Legs and tarsi pale. Length .26—.40 inch.; 6.5—10 mm.

Male.—Last ventral broadly, but not deeply emarginate; claws finely bifid at apex.

Female.—Last ventral broadly semicircular, entire at tip; claws more deeply bifid, the inner portion evidently shorter.

This species is known by its smooth and even thorax, and by the form of the apices of the elytra. The markings seem very constant, and vary but little in width.

Occurs in Colorado, Utah and New Mexico.

T. Lewisii Crotch, Proc. Acad. 1873, p. 56.

This name was suggested by Crotch for a form supposed to be a variety of *nitidicollis*, but it seems to be a valid species. While it has the form and color of that species the occiput has a large transverse plaga, the thorax is sparsely punctate and obliquely impressed each side, the elytra are not subtruncate, and the sutural angle is obtuse. On the whole, it is a little smaller than *nitidicollis*, but otherwise agrees in color and sculpture.

Occurs in Colorado.

T. diducta n. sp.—Oblong nearly, parallel, yellowish, elytra with bluish green vittæ. Antennæ brownish, pale at basal half, fifth joint not longer than the third. Head yellow, a small occipital spot, in and around which are a few coarse punctures. Thorax a little more than twice as wide as long, sides strongly arcuate, disc with a deep transverse depression at middle, surface indistinctly sparsely punctate and with the usual piceous spots small; scutellum piceous, bordered with yellow, or entirely pale; elytra in great part yellow, with a narrow bluish-green sutural vitta, a broader vitta from the humerus, which often joins the sutural near the apex, between these a narrow bluish line not reaching the base, surface densely finely punctured, but less so at base, very finely and indistinctly pubescent; epipleuræ, body beneath and legs, entirely pale. Length .24--.28 inch.; 6--7 mm.

Male.—Last ventral broadly, but not deeply emarginate; claws very narrowly bifid at tip, the inner portion a little shorter.

Female.—Last ventral broadly semicircular, with a very small semicircular notch at middle; claws more deeply bifid, the parts more divergent, the inner shorter.

This species resembles *nitidicollis* more than any other, but differs in its shorter and broader thorax, with deep transverse depression and punctate surface. In this species the apices of the elytra are rounded and the sutural angle very obtuse.

The only variation observed in this species is in the extent of the narrow blue line between the sutural and lateral vittæ.

Occurs in western Nevada and adjacent regions of California.

T. convergens Lec., Proc. Acad. 1865, p. 220.—Oblong, nearly parallel, body beneath almost entirely piceous, above pale yellow, the elytra with metallic-green vittæ. Antennæ piceous, the basal joints paler, fifth not longer than third. Head yellow, with a broad, transverse occipital piceous space, the surface rather coarsely punctured. Thorax less than twice as wide as long, not narrowed in front, sides arcuate, disc vaguely obliquely impressed each side, surface coarsely sparsely punctate; color yellow, with three piceous spots; scutellum piceous; elytra rather coarsely and somewhat roughly punctate, pubescence distinct, but not close, color in greatest part metallic-green, the side margin and apex yellow, and a yellow vitta on the middle of each elytron, nearly reaching the apex, usually parallel-sided, sometimes slightly narrower to tip; epipleuræ

pale. Body beneath, except the pro- and mesosternum, piceous. Legs pale, tarsi slightly darker. Length .20—.28 inch.; 5—7 mm.

Male.—Last ventral broadly and moderately deeply emarginate: claws narrowly bifid at tip, the parts nearly equal.

Female.—Last ventral broadly semicircular, usually entire, rarely with a feeble trace of a notch at middle; claws more deeply and widely bifid, the inner portion distinctly shorter.

This species is the smallest in our fauna. The elytral markings seem to vary very little. The sculpture of the elytra is rather coarse, resembling in this respect *virgata* and *flavolimbata*.

Occurs in Nova Scotia (Ulke), Kansas, Colorado and Wyoming.

T. attenuata Say, Journ. Acad. iii, p. 459; ed. Lec. ii, p. 223; Lec., Proc. Acad. 1865, p. 220.—Oblong, slightly broader behind. Antennæ piceous, gradually paler to base, fifth joint longer than the third. Head yellow, occiput with large piceous transverse space, surface moderately closely punctate. Thorax fully twice as wide as long, slightly narrowed in front, sides subangulate, disc sparsely, obsoletely punctate, a moderately deep oblique impression each side, color dull yellow, with the usual three piceous spots; scutellum piceous, or partly pale; elytra densely and finely punctured, finely pubescent, color in great part metallic-blue or green, the side margin and apex yellow, a discal yellow vitta extends from base a little beyond the middle, broad at base, gradually attenuate at apex, or sometimes bifid; epipleuræ pale. Body beneath pale, the sides of metasternum and abdomen piceous with metallic surface lustre. Legs yellow. Length .24—.30 inch.; 6—7.5 mm.

Male.—Last ventral segment feebly emarginate; claws finely bifid at tip.

Female.—Last ventral broadly semicircular, with a very slight notch at middle; claws bifid behind the apex, the inner portion shorter.

This species varies in the extent of the dorsal yellow vitta, which extends sometimes two-thirds to apex, or is a short spot at base, the usual extent being to the middle.

The elytral punctuation is dense and fine, as in *canadensis* or *luteocincta*. This removes it from suspicion of being a variety of either *convergens* or *flavolimbata*, both of which have the coarse sculpture of *virgata*. *T. diducta* has still finer sculpture and a small occipital spot.

Occurs in Kansas, Utah, Nevada and British Columbia.

T. luteocincta Lec., Proc. Acad. 1858, p. 88; Proc. Acad. 1865, p. 220.—Form oblong, usually nearly parallel, color variable: green, blue, purple, or purple-black. Antennæ piceous externally, gradually paler to base, fifth joint longer than the third. Head testaceous, with a large occipital space piceous, with more or less metallic surface lustre, sparsely punctate. Thorax not twice as wide as long, sides strongly arcuate, hind angles slightly reflexed, disc sparsely finely punctate, an oblique or oval depression each side, the three spots well marked; scutellum nearly always piceous, rarely partly pale; elytra oblong, nearly parallel, disc variable in color, margin and apex pale, surface densely

finely punctate, finely pubescent; epipleuræ pale. Body beneath piceous, with greenish surface lustre, except the pro- meso- and middle of metasternum. Legs testaceous, the outer edge of all the tibiæ and both sides of the middle and front femora piceous. Length .20—.38 inch.; 5—9.5 mm.

Male.—Last ventral with a moderately deep, almost semicircular emargination; claws slightly bifid at tip.

Female.—Last ventral with a more or less deep, nearly circular emargination, nearly closed posteriorly by an acute process from each side; claws bifid, slightly posteriorly to the apex, the divisions more divergent than in the male, the inner shorter.

Variation in this species is really greater than has been observed in any other. The color varies from green, which is not nearly so bright as in *flavolimbata*, through blue and purple to nearly black. In the latter forms there is always a trace of purple in the black, and the spots of the head and thorax always show more or less metallic lustre. In those forms of the latter color others will be observed with a dull yellow vitta extending from the base nearly to apex.

Without a considerable series the nearly black forms would be suspected of being varieties of *tomentosa* with the vitta obliterated, but the broad plaga of the occiput separate them. In any event the females may be the most readily separated from any other species by the sexual characters.

The distribution of this species is remarkable. Occurs in California from San Diego northward, also on the New Jersey coast, probably near Long Branch. The latter are all of the darker form, and are certainly very misleading in appearance.

T. flavolimbata Mann., Bull. Mosc. 1843, p. 308; Lec., Proc. Acad. 1865, p. 220.—Oblong, somewhat oval. Antennæ piceous, paler at base, especially on the underside, fifth joint but little longer than the third. Head yellow, occiput with a broad greenish plaga, which is moderately closely punctate. Thorax twice as wide as long, slightly narrower in front, sides arcuate, disc with a moderately deep transverse impression on each side, surface with a few scattered punctures; color yellow, with the three spots as usual; scutellum piceous, or partly yellow; elytra comparatively roughly punctate, the entire disc blue or green, the side margin and apex yellow; pro- and mesosternum yellow, sides of metasternum and abdomen piceous, with more or less metallic surface lustre. Legs and tarsi pale. Length .20—.32 inch.; 5—8 mm.

Male.—Last ventral segment broadly and moderately deeply emarginate; claws finely bifid at tip, the inner division slightly shorter.

Female.—Last ventral broadly semicircular, the apex entire; claws more deeply bifid, the division more divergent, the inner shorter.

Among the species with metallic ornamentation two only have comparatively roughly punctate elytra, the present species and *con-*

vergens. The latter having well defined and regular vittæ, will not be mistaken for this species. Small specimens of *attenuata* in which the vitta is reduced to the minimum do resemble this one, but the character of the punctuation and the female sexual characters readily separate it.

No specimens have been showing any trace of a discal yellow vitta, although Dr. LeConte supposed they might exist.

Occurs in Colorado, Utah, Lake Superior region, Nevada, northern California and southern Oregon. Found on *Solidago* (Cockerell).

GALERUCELLA Crotch.

Head not deeply inserted, usually with a distinctly impressed median line, frontal tubercles rather small; labrum moderately prominent, rounded in front; maxillary palpi stout, the terminal joint conical, a little longer than the preceding. Antennæ as long, or longer than half the body, filiform; third joint longer than the fourth, joints 4-10 gradually decreasing in length, the eleventh longer. Thorax usually twice as wide as long, and a little narrower in front, the disc with a median and lateral depressions with piceous spots; scutellum oval at tip; elytra oblong or oval, the lateral margin somewhat explanate in all but two species, surface irregularly punctate, usually coarsely, never really finely, the ornamentation variable; epipleuræ moderately wide, extending three-fourths to apex; anterior coxal cavities open behind, confluent at middle, the coxæ moderately prominent; middle coxæ contiguous, separated in three species by a distinct prolongation of the mesosternum reaching the metasternum. Legs not long, femora somewhat thickened, tibiæ carinate externally and without terminal spurs; tarsi rather stout, the first joint of the posterior not longer than the next two; claws bifid in both sexes, but more deeply in the females.

This genus was proposed by Crotch for those species formerly enrolled in *Galeruca*, in which the anterior coxal cavities are open behind. It includes in our fauna all those placed in *Galeruca* by LeConte (Synopsis, Proc. Acad. 1865), except *externa*, which is a *Galeruca*, and *maritima*, *morosa* and *erosa*, which are removed to *Monoxia*.

Galerucella and *Monoxia* are very closely allied genera, and some of the paler forms of *notata*, etc., are not easy to place, but the much shorter antennæ of *Monoxia* will distinguish the two. The male claws of the two genera are much alike, but the secondary sexual characters of the last ventral are better marked in *Galerucella*.

The situation of the elytral apex with the acute sutural angle is not in our species of specific value, as in *americana* there is great variability entirely independent of sex.

Two species in those following are also found in Europe, and have doubtless been introduced.

The following table will assist in the identification of the species, but the ornamentation is so variable that considerable latitude must be allowed, as in *americana* specimens without vittæ are quite common.

- Elytra coarsely punctate, more finely toward the apex; antennæ similar in color above and beneath.....2.
- Elytra comparatively finely and equally punctate; antennæ piceous above, pale beneath; sides of elytra distinctly explanate.....**xanthomelæna.**
- 2.—Elytra with vittate markings.....3.
- Elytra not vittate.....6.
- 3.—Elytra scarcely at all explanate; middle coxæ distinctly separated by the mesosternum.....4.
- Elytra distinctly explanate; middle coxæ contiguous.....5.
- 4.—Elytra very coarsely punctate, convex; thorax more or less shining and very indistinctly trimaculate; pubescence of surface (when present) erect.
americana.
- Elytra less coarsely and more closely punctate, not very convex; thorax opaque, trimaculate; pubescence recumbent.....**sexvittata.**
- 5.—Sutural vitta indistinct or absent, the next inner vitta long, nearly reaching the apex.....**integra.**
- Sutural vitta always distinct.
- The next inner vitta joining the sutural at, or behind the middle.
notulata.
- The next inner vitta very short, basal.....**notata.**
- 6.—Color red, head red.....7.
- Color dirty yellow, brown or piceous, occiput usually piceous.8.
- 7.—Elytra more coarsely punctured, the punctures with distinct intervals, surface shining.....**cavicollis.**
- Elytra more finely and densely punctured, surface rather opaque.
rufosanguinea.
- 8.—Middle coxæ distinctly separated by a prolongation of the mesosternum; thorax angulate at middle and subsinuate posteriorly, with obtuse hind angles.....**nymphææ.**
- Middle coxæ contiguous; hind angles of thorax distinct.
- Thorax irregularly punctate, with smoother areas along the apex and near the hind angles.....**tuberculata.**
- Thorax quite densely punctured and opaque.....**decora.**

G. americana Fab., Syst. Ed. i, p. 489; Oliv., Ent. vi, p. 636, pl. iii, fig. 43; Lec., Proc. Acad. 1865, p. 215; *cribrata*, *conferta* Lec., loc. cit.—Form oval convex, of more pinguid facies than any other species, color dull yellow, elytra each with three piceous vittæ, more or less indistinct, or even wanting; surface sparsely pubescent. Antennæ piceous externally, paler at basal half. Head

coarsely and closely punctured, a vague median impression, color dull yellow, with sometimes a median darker line. Thorax usually more than twice as wide as long, although much narrower in the male, wider at base than apex, sides arcuate, or in some males very obtusely subangulate, disc convex, often even more usually with a vague median and lateral depressions, surface variably punctate, sometimes sparsely, more usually coarsely and closely; elytra oval with rounded humeri, the apices obtuse, or subtruncate in most females, the lateral margin not explanate, the marginal sulcus not evident, surface very coarsely, deeply and moderately closely punctate, sparsely pubescent, with three narrow piceous vittæ on each side, which are often entirely obliterated. Body beneath more finely and closely punctate, finely pubescent, color usually like the upper surface, but the metasternum and abdomen are sometimes piceous. Legs always pale. Length .14—.26 inch.; 3.5—6.5 mm.

Male—Last ventral with a narrowly triangular incisure extending half the length of the segment; claws finely bifid close to the tip.

Female.—Last ventral more broadly triangularly emarginate; claws more deeply bifid and the divisions more divergent.

In this species the middle coxæ are distinctly separated by a prolongation of the mesosternum meeting the metasternum. The humeri are also more rounded, the metasternum shorter. The wings seem less feebly developed.

The variation in this species is carried to such a degree that it is not easy to find two specimens even reasonably alike. In form most of the females are as broadly oval as *G. externa*, and more convex, while the males are as oblong as any *Monoxia*. The general color varies but little, although the markings are very variable. Often the thorax shows no traces of the three spots, but they are never very well marked in any specimen. The vittæ on the elytra are slender, and when perfectly developed, which is rare, are nearly entire, but all gradations are seen from this to the perfectly plain form. The sculpture of the thorax varies greatly, specimens (always female) occur with the surface sparsely punctate with smooth intervals and without inequalities, and from this form they pass gradually to those with coarse and close punctures. The elytral sculpture does not vary so greatly as the thoracic, but extreme forms are quite different in appearance. When specimens are fresh or carefully preserved, the pubescence is always distinct, seeming to be more persistent in the males, the larger pinguid females soon losing the hairs. In those specimens in which the pubescence remains it will be observed to be in great part erect.

This species seems to be very widely distributed, specimens having been seen from the entire region east of the Rocky Mountains and the Rio Grande, and from Canada to the Gulf.

G. sexvittata Lec., Proc. Acad. 1865, p. 215.—Oblong oval, rather depressed as compared with *americana*, dull yellow or pale brown, opaque; thorax with three distinct spots, each elytron with three slender piceous vittæ. Antennæ entirely black. Head densely punctured, a vague median depression with a piceous line. Thorax twice as wide as long, distinctly narrower in front, sides arcuate, hind angles distinct, disc densely punctured and opaque, a vague depression each side a median piceous line and a spot each side; scutellum black; elytra slightly broader behind, humeri distinct, but obtuse; lateral margin not explanate, apices obtuse, sutural angles slightly retracted, disc rather densely punctured and opaque, on each side three entire piceous vittæ. Body beneath similar in color to the upper surface, the hind margins of the ventral segments darker. Legs concolorous, tibiæ on the outer side, tarsi and a median femoral spot piceous. Length .20—.24 inch.; 5—6 mm.

The sexual characters are as in *americana*. Dr. LeConte mentions a transverse depression on each side of the last ventral segment, but this is more or less evident in all the species. In the ample number of specimens examined no notable variation has been observed.

This species could only be mistaken for a variety of *americana*, and on the other hand some of the varieties of the latter might be mistaken for this, but the two may be separated by the much coarser and less close punctures of *americana*, which also has erect pubescence, while in *sexvittata* the pubescence is always recumbent and always present. From *integra*, which resembles the present in markings and somewhat in sculpture, *sexvittata* may be known by the separated middle coxæ.

Occurs from Pennsylvania to Louisiana.

G. cavicollis Lec., Proc. Acad. 1865, p. 216.—Oval, narrower in front, subdepressed; color dull red, slightly shining, very sparsely finely pubescent. Antennæ entirely black. Head red, coarsely punctured, without median depression, frontal tubercles smooth. Thorax nearly twice as wide as long, narrower in front, sides arcuate, or obtusely subangulate, hind angles distinct, base on each side obliquely sinuate, disc feebly convex, a broad depression each side and another along the middle, surface coarsely punctured, more densely in the depressions; scutellum red; elytra broader behind the middle, sides arcuate, margin explanate, humeri distinct, but rounded; sutural angle well marked, but obtuse; disc with coarse and deep punctures not crowded, less deep near the apex, interspaces smooth, shining. Body beneath red, the metasternum often piceous, sparsely finely punctate and finely pubescent. Legs variable in color entirely red to almost entirely piceous. Length .18—.22 inch.; 4.5—5.5 mm.

Male.—Claws finely bifid at apex. Last ventral segment broadly emarginate at apex, with a deep triangular depression limited by a sharply elevated line.

Female.—Claws more deeply bifid, the parts more divergent. Last ventral segment with a very slight emargination, in front of which is a slight fovea.

The middle coxæ are absolutely contiguous, the mesosternum is not prolonged between them, except as to the color of the legs no variation has been observed in this species.

G. sanguinea, of Europe, has been referred to as probably allied to this species, but an examination of that shows that it should be associated with *americana*, by reason of its convex form and not explanate elytral margin.

Occurs from Canada to the New England and Middle States westward to Wisconsin; North Carolina (Lec.)

G. rufosanguinea Say, Journ. Acad. v, p. 299; ed. Lec. ii, p. 343.—Oval, narrower in front, subdepressed, dull red, subopaque, sparsely finely pubescent. Antennæ entirely black. Head entirely red, coarsely and densely punctured, and with a slight median depression. Thorax nearly twice as wide as long, slightly narrower in front, sides arcuate, hind angles distinct and slightly prominent, base on each side oblique, disc feebly convex, a broad fovea each side and a median depression, surface coarsely and closely punctured; scutellum red; elytra slightly wider behind the middle, sides feebly arcuate and distinctly explanate, humeri distinct, but obtuse; sutural angle well marked, but not acute; surface very closely punctate, rather coarsely at middle, more finely at sides and apex. Body beneath and legs dull red, metasternum somewhat darker. Length .18—.22 inch.; 4.5—5.5 mm.

Male.—Claws bifid at tip, the parts rather widely divergent. Last ventral as in *cavicollis*.

Female.—Claws similar to the male. Last ventral either simple, or with a very feeble fovea at the middle of the edge.

As in *cavicollis* the middle coxæ are contiguous. No variations have been observed.

This species and *cavicollis* are closely related, but the denser punctuation of the surface, together with the resulting opacity, will readily separate this species.

Occurs in Pennsylvania, Maryland, North Carolina, and at times abundant along the sea-coast.

G. integra Lec., Proc. Acad. 1865, p. 218.—Oblong, oval, not very convex dull yellow, feebly shining, sparsely clothed with fine recumbent pubescence, thorax trimaculate, each elytron with a subsutural and three discal slender stripes. Antennæ piceous, the four basal joints paler at base. Head closely, not coarsely punctate, a fine median depression and piceous line. Thorax not quite twice as wide as long, slightly narrower in front, sides arcuate, hind angles rounded, disc not very irregular, closely finely punctured, with more sparsely placed coarser punctures, then piceous spots, the median linear, the lateral small and round; scutellum pale; elytra scarcely widened behind the humeri, these distinct, but obtuse; sutural margin feebly prominent, disc closely punctate, the punctures gradually finer to apex, sutural angle obtuse, subsutural vitta not reaching base or apex, second and fourth entire usually united at apex, the third not reaching either base or apex. Body beneath colored as above, metasternum sometimes darker. Legs pale. Length .16—.20 inch.; 4—5 mm.

Male.—Last ventral segment with a very narrow triangular incisure extending nearly the length of the segment; claws finely bifid at tip.

Female.—Last ventral more broadly and less deeply triangularly emarginate; claws stouter and more deeply bifid.

In comparison with the other vittate species this one has the elytra more finely punctate than any, except, possibly, *sexvittata*. From the latter species, which it most resembles, it differs in having the middle coxæ absolutely contiguous. There is also a distinct subsutural vitta in the present species not seen in that. From the next two species it differs not only in the different arrangement of the vittæ, but also in the finer punctuation.

Occurs from Pennsylvania to Florida and Texas.

G. notulata Fab., Syst. El. i, p. 489; Oliv., Ent. vi, p. 636, pl. 3, fig. 44; Lec., Proc. Acad. 1865, p. 217; *bilineata* Kby., Fauna Am. Bor. iv, p. 220.—Oval, slightly oblong, moderately convex, dull yellow, sparsely clothed with fine, recumbent, silky pubescence; thorax trimaculate, each elytron with a subsutural and three discal vittæ. Antennæ piceous, the basal half paler. Head coarsely and moderately closely punctate, the median line impressed and piceous. Thorax nearly twice as wide as long, narrower in front, sides strongly arcuate, base on each side oblique, hind angles distinct, disc depressed each side with three piceous spots as in *integra*, more or less obliterated; surface coarsely, but not very closely punctate; elytra scarcely wider behind, humeri distinct but obtuse, lateral margin narrowly explanate, sutural angle obtuse, disc closely punctate, punctures coarse, but varying, finer toward apex, the subsutural vitta rarely reaches the base, the second vitta is oblique and joins the sutural at or behind the middle, the third is often nearly entire, the fourth starts at the umbone and often joins the sutural. Body beneath pale, with piceous metasternum. Legs pale. Length .14—.20 inch.; 3.5—5 mm.

The sexual characters do not differ notably from those observed in *integra*.

The markings of the elytra vary by obliteration to a great extent, so that at times it may require considerable tact to determine whether a specimen should be referred to this species or *notata*. When the markings are entirely obliterated, the resemblance to some *Monoxiæ* is very great, but the form of the claws, if a female, will enable the specimen to be placed.

Frequently specimens occur in which the vittæ seem to be elevated and subcostiform, these represent the *bilineata* of Kirby.

Occurs in the entire region east of the Rocky Mountains from Canada southward, also in New Mexico. Specimens are before me from California, but it has probably been introduced there.

G. notata Fab., Syst. El. i, p. 488; Oliv., Ent. vi, p. 637, pl. 3, fig. 45; Lec., Proc. Acad. 1865, p. 218.—Oval, slightly oblong, dull yellow, opaque, sparsely clothed with fine recumbent pubescence, thorax trimaculate, each elytron with a sutural and three discal vittæ, the inner one short, basal. Antennæ piceous or

brown, paler at base. Head closely punctate, a moderate median depression, which is more or less piceous. Thorax twice as wide as long, slightly narrowed in front, sides arcuate, base on each side oblique, hind angles distinct, disc slightly depressed each side, surface closely punctate and opaque with three spots, the middle one linear; elytra very little arcuate on the sides, the margin somewhat explanate, humeri distinct, but obtuse; sutural angle obtuse, surface closely and not very coarsely punctate, punctures finer at apex, a subsutural vitta not reaching either base or apex; a short, slightly arcuate vitta at base, external to which are two vittæ, the outer one entire the inner abbreviated at both ends. Body beneath similar in color to the upper surface, the metasternum usually darker. Legs pale. Length .14—.20 inch.; 3.5—5 mm.

Male.—Last ventral segment deeply, but narrowly triangularly notched; claws widely bifid at tip.

Female.—Last ventral more widely triangularly emarginate; claws widely bifid at tip.

As in *notulata* and *integra*, the middle coxæ are contiguous. The punctuation is finer than in the former and a little coarser than in the latter. The elytral markings approximate those of some varieties of *notulata*, but a little experience will soon enable one to distinguish the two species.

Widely distributed with *notulata*, but no specimens have been seen from the Pacific coast.

G. nymphaeæ Linn., Syst. Nat. ed. x, 1758, p. 376; Oliv., Ent. vi, p. 643, pl. 3, fig. 31; *marginella* Kby., Faun. Am. Bor. iv, p. 308; Lec., Proc. Acad. 1865, p. 217; *sagittariæ* Gyll., Kby. loc. cit. p. 219; *femoralis* Mels., Proc. Acad. iii, p. 161; *luctuosa* Mann., Bull. Mosc. 1852, ii, p. 368.—Oval, slightly oblong, narrower in front, subdepressed, piceous-brown; thorax dull yellow, with three piceous spots; side margin, apex and epipleuræ of elytra yellowish, surface finely pubescent. Antennæ piceous, five or six of the proximal joints pale at basal half. Head piceous, frontal region pale, vertex and occiput densely punctured and opaque. Thorax twice as wide as long, sides rather strongly angulate, frontal angles small, prominent; hind angles nearly obliterated, disc with a large depression each side, which is densely punctured and piceous, a median narrow depression; surface, except in the foveæ, smooth and glabrous; elytra slightly broader behind, margin distinctly explanate, humeri distinct, but obtuse; sutural angle acute, surface coarsely and moderately closely punctate, much finer at apex. Body beneath piceous, last ventral segment pale. Legs pale. Length .18—.24 inch.; 4.5—6 mm.

Male.—Last ventral segment slightly emarginate at apex, with an oval, sharply limited depression as in *cavicollis*, but smaller; claws rather deeply bifid; posterior tibiæ slightly arcuate.

Female.—Last ventral slightly emarginate, with a feeble depression near the middle of the apical margin; claws deeply bifid, the inner portion much shorter.

The middle coxæ are comparatively widely separated by a prolongation of the mesosternum meeting the metasternum.

Comparatively little variation has been observed in the specimens examined. The thoracic spots are, however, very inconstant as to size, but the coloration in other respects varies but little.

From the species with which this one might be confounded, it differs by the quite smooth thorax, pale elytral margin, the acute sutural angles, and finally, by the completely separated middle coxæ.

Much European bibliography and synonymy has been omitted, only that pertinent to our fauna being given.

Occurs abundantly throughout northern Europe and in the northern regions of our continent in Canada and the Hudson's Bay region. A specimen has been received from Mr. Wickham, collected at Luling, Texas. Received also from Oregon and Owen's Valley, California.

G. tuberculata Say, Journ. Acad. iii, p. 256; edit. Lec. ii, p. 220; *punctipennis* Mann., Bull. Mosc. 1843, p. 308.—Oblong oval, scarcely wider behind, subdepressed, opaque, finely pubescent, color variable from dull yellow to piceous. Antennæ entirely black. Head coarsely and closely punctate, occiput black, front and clypeus yellow. Thorax yellow, with three piceous spots, the central one larger and triangular, nearly twice as wide as long, somewhat narrowed in front, sides rounded or obtusely subangulate, hind angles distinct, base on each side oblique, surface somewhat shining, coarsely and closely punctured, smoother near the front angles and along the apex; elytra somewhat wider behind the middle, humeri distinct, but obtuse, sutural angle well defined, surface coarsely and deeply punctured, closely around the scutellum, much more finely and sparsely at sides and apex. Body beneath piceous, finely pubescent. Legs either entirely pale or piceous. Length .20—.24 inch.; 5—6 mm.

Male.—Last ventral broadly emarginate at middle, the disc with a deep semi-oval depression with sharply-limited edges; claws finely bifid at tip.

Female.—Last ventral with a very small notch at middle of apex; claws more widely bifid.

The middle coxæ are absolutely contiguous.

Two varieties of this species occur:

G. tuberculata Say.—Color dull yellow or reddish brown, the underside usually piceous; legs pale.

G. punctipennis Mann.—Piceous, the front and thorax yellowish.

Occurs in the Middle States (Lec.), Colorado, Idaho, Washington, California, Oregon and Vancouver.

G. decora Say, Long's Second Exped. ii, p. 294; ed. Lec. i, p. 195; ? *salicis* Rand., Bost. Journ. ii, 1838, p. 31; var. *carbo* Lec., Proc. Acad. 1861, p. 358.—Form oblong, scarcely wider behind, not very convex, color dull yellow, brown or entirely black, surface with fine, short, silken pubescence. Antennæ entirely piceous, or with the proximal ends of the four or five basal joints pale. Head densely punctured, opaque, a finely impressed median line. Thorax twice as wide as long, narrower in front, sides arcuate, hind angles slightly prominent, base oblique each side, disc moderately convex, with a vague median depression and a shallow fovea each side, surface densely punctate and opaque, the three spots usually indistinct; elytra scarcely widened behind, humeri distinct, margin

explanate, sutural angle distinct, but not prolonged; surface coarsely, deeply and moderately closely punctate, somewhat finer toward apex. Body beneath finely and not closely punctate, feebly pubescent. Length .18—.22 inch.; 4.5—5.5 mm.

Male.—Last ventral segment emarginate at tip, the disc with a deep triangular depression limited by an elevated line; claws finely bifid at tip.

Female.—Last ventral either entire, or with a very feeble emargination at middle; claws stouter and more deeply bifid than in the male.

Var. *decora* Say.—“Dusky, elytra dull testaceous, sericeous, with golden-brassy hair.”

In this form the head may be partly piceous. The thoracic spots distinct or not. The underside may be dull yellow or entirely piceous. Legs pale.

Var. ———.—Brownish testaceous, varying as in the preceding form.

This form seems to be labeled *sagittariæ* in most American collections, but the thorax in the latter is formed as in *nymphææ*, and many authors consider the two identical. *G. salicis* Rand. is probably the equivalent of this variety. Numerous specimens were found by Dr. LeConte in the Adirondack region infesting the willows.

Var. *carbo* Lec.—Entirely black, above and beneath.

Occurs in Canada, Massachusetts, New York, Wisconsin and Colorado in the paler forms, and in Nebraska, Washington and Oregon in the black form.

G. xanthomelæna Schrank, Enum. Ins. Aust. 1781, p. 78; Fairm., Gen. Col. Eur. iv, pl. 68, fig. 326; *calmariensis* Fab. Harris. Ins. Inj. Veg. ed. ii, p. 124; *gelatinariæ* Fab., Syst. El. i, p. 490; Oliv., Ent. vi, p. 631, pl. 3, fig. 36.—Oblong, subdepressed, scarcely wider behind, yellowish testaceous, finely pubescent, a black spot on the occiput, three on the thorax, a vitta from the humeral callus and a short vitta from the middle of base of each elytron. Antennæ piceous on the upperside, paler beneath. Head yellow, with a black occipital spot; surface moderately coarsely not closely punctate. Thorax more than twice as wide as long, slightly narrowed in front, sides arcuate, base slightly sinuate each side; disc with an oblique depression each side, a shallow fovea on the median line behind the apex; surface moderately, not closely punctate; elytra a little wider behind the humeri, these distinct, but obtuse; margin explanate, sutural angle well defined, not dentiform; surface moderately closely, not coarsely punctate, the punctures equal from base to apex. Body beneath piceous, the sides and apices of the ventral segments pale. Legs pale, each femur with a small piceous spot in front. Length .20—.28 inch.; 5—7 mm.

Male.—Last ventral emarginate, with a broad triangular depression; claws strong, deeply bifid.

Female.—Last ventral slightly emarginate, with a narrow triangular depression simulating an incisure; claws as in the male.

This species seems to vary but little, and only by the absence of the short stripe.

In recent years this insect has attracted much attention in our country from the damage done to the Elm trees, which are sometimes almost entirely defoliated. For an account of these ravages the reader will consult "Insect Life" and the reports of several experiment stations.

M. L. de Joannis, in Abeille iii, p. 84, adopts the name *cratægi* Forst. for this species, but I have not been able to satisfy myself that the description applies to the species under consideration. Forster, moreover, gives *Cratægus oxyacantha* as the food-plant of his species.

Occurs abundantly all over Europe, and in our country from Massachusetts southward.

MONOXIA Lec.

Head oval, moderately convex, not deeply inserted, front feebly or not impressed. Antennæ filiform, not longer than half the body, third joint as long as the first, fourth longer than the second, joints 6-10 subequal in length; labrum moderately prominent, truncate with rounded angles; maxillary palpi moderately stout, second and third joints obconical, the terminal conical and more slender; prothorax transverse, widest at base, except in *sordida*; scutellum oval at tip; elytra oblong, scarcely broader behind the humeri, closely and irregularly punctured, the side margin not prominent; epipleuræ narrow, but extending nearly to the tips of the elytra; prosternum entirely obliterated between the coxæ, the coxal cavities open behind. Legs moderate, the anterior tibiæ indistinctly grooved on the outer side, tibiæ without terminal spurs; tarsi shorter than the tibiæ, the first joint as long as the next two; claws dissimilar in the sexes, finely bifid in the male, absolutely simple in the female.

The definitive characters of the genus are—the anterior coxal cavities are open behind, the prosternum obliterated between them; the tarsal claws not appendiculate, but finely bifid in the male and simple in the female. In the group *Atysites*, to which it is referred by Chapuis, it may be known by the short antennæ, of which the third joint is longer than the fourth.

To Mr. Crotch we owe the observation that the differences in the claws are sexual and not specific, as Dr. LeConte was disposed to consider them. Chapuis seems not to have known the observation of Crotch, and expresses the view that the strictest account should be taken of the claws, and that the two sections indicated by LeConte, which we now know to be sexes, should be made distinct genera.

While the form of the claws in the comparatively small species was observed, the fact entirely escaped both LeConte and Crotch that some larger forms placed in *Galerucella* were similarly constructed. These will now take their places in *Monoxia*, with the result of making the genus a little less homogeneous in aspect, but leaving *Galerucella* more so by their absence.

LeConte seems to have had an idea that the vertical pygidium had some value, but in examining a large series it will be found that while the pygidium may be more or less vertical in the males of the small species, that member does not differ notably from that of other Galerucini in their females, nor in either sex of the larger species.

In accordance with the results obtained from a study of large series of all the species the following table is presented:

Larger species .27—.34 inch.; fifth joint of antennæ very obviously shorter than either the fourth or the sixth.....**puncticollis.**

Smaller species .10—.20 inch.; fifth joint of antennæ not shorter.

Thorax narrower at apex than at base.

Elytral punctuation rather fine and dense, a little coarser at base and near the scutellum; color usually entirely pale yellow, very rarely with spots.
consputa.

Elytral punctuation comparatively coarse, scarcely finer at sides and apex than at base; color dull yellow, with numerous small black spots, often arranged in series.....**debilis.**

Thorax not narrowed at apex.

Elytral punctuation fine, pubescence fine; color yellowish, with numerous black spots with a tendency to coalesce along the suture.....**sordida.**

M. puncticollis Say, Journ. Acad. iii, 1824, p. 458; ed. Lec. ii, p. 222; *morosa* Lec., Pacif. R. R. Rep. p. 70; *maritima* Lec., Proc. Acad. 1865, p. 218; *erosa* Lec., Trans. Am. Ent. Soc. 1884, p. 28.—Form oblong, narrowed in front; surface finely pubescent, color variable from pale yellow to entirely black, or with the elytra vittate. Antennæ variable in color from entirely black to pale, generally with the outer half dark, the base pale, fifth joint always shorter than the fourth or sixth. Head coarsely and closely punctate. Thorax not quite twice as wide at base as long at middle, broader at base than apex, sides feebly arcuate, base broadly emarginate at middle, oblique each side, hind angles distinct; disc usually irregular, with broad, vague depressions each side, so that at times the sides of the thorax appear deplanate, a vague median impressed line, surface very coarsely and irregularly punctate; elytra closely punctate and finely pubescent, the punctures coarser near the base, fine and closer toward the sides and apex. Body beneath finely sparsely punctate and pubescent. Length .27—.34 inch.; 7—8.5 mm.

Male.—Claws finely bifid at tip; last ventral segment obtuse, with a short median linear impression near the apex.

Female.—Claws absolutely simple; last ventral obtuse, with a small notch at middle, from which proceeds a slight impression or a smooth line.

Varieties:—

Var. *puncticollis*, typical form.—“Dull yellowish brown; thorax confluent punctured, unequal; antennæ and two fillets on each elytron black.”

“Body with minute hairs; head, above confluent punctured; clypeus and labrum glabrous; antennæ black; thorax rough, with excavated confluent punctures, immaculate, unequal; elytra with minute punctures, fillets obsolete, often wanting or hardly visible; thighs with a black spot, tibiæ and tarsi black.”

The above is Say's description reproduced to bring before the student the evidence that the present species is really what Say had before him. The vittate forms seem to be much less common than the others. The elytral vittæ, two on each side, are placed—one arising from the side of the scutellum runs parallel with the suture extending three-fourths to apex, the second begins at the umbone, runs parallel with the side margin, curving inward at apex, but not reaching the suture. These vittæ may be more or less indistinct, or the lateral one may alone remain.

Specimens illustrative of this form have been examined from Colorado, Texas, Utah and Florida.

Var. ———.—Beneath piceous, head and thorax pale, elytra black with the suture, side margin and apex pale.

Specimens have been seen from California and the Atlantic coast.

Var. ———.—Totally black, including legs and antennæ.

Specimens have occurred with the preceding variety.

Var. ———.—Entirely dull yellow, the outer portion of the antennæ and the tarsi brownish.

This is the most abundant form, and is known from the Atlantic coast from Massachusetts to Florida; Colorado, Utah, New Mexico, Texas and California.

The legs vary in color with the body. As a general rule the pale bodies have pale legs, those entirely black have black legs, while the vittate, or the partially black forms, have the tibiæ externally, the tarsi and a space on the femora piceous.

It is probable that some objection may be urged to my identification of Say's species from the fact that he states its length as “three-twentieths of an inch,” while the species is never that small, and is usually twice that size. It is probable that Say made a slip of the pen in this case, as is well known in several other instances in his works.

With the above identification it is readily seen why Say saw a resemblance to *baccharidis*, as he must doubtless have known *Trir-*

habda canadensis, which later authors, even, have assumed to be a variety of *baccharidis* = *tomentosa*. Those who have studied Say's methods of description will understand why he places the description of *puncticollis* between *Galeruca externa* and *Trirhabda attenuata*.

In regard to the forms described as *erosa*, *morosa* and *maritima*, no tangible difference seems to exist. The first was separated on account of its roughly punctured thorax, but a moderate series of specimens from various localities shows no difference. The other two were distinguished by the short hair of *maritima*, and somewhat longer hair in *morosa*. Here, too, the difference is imaginary, and depends rather on the method of collection than the specimens themselves.

M. consputa Lec., Pacif. R. R. Rep. Ins. p. 70; *guttulata* Lec., loc. cit.; *angularis* Proc. Acad. 1859, p. 90.—Form oblong, slightly oval, pale yellowish testaceous above and beneath, surface sparsely clothed with fine silken pubescence. Antennæ similar in color to the body, rarely slightly brownish, the fifth joint not shorter than the sixth. Head closely punctate. Thorax not quite twice as wide as long, narrower in front, widest between the basal angles, which are usually obtuse, sides feebly arcuate, base truncate at middle, oblique each side, disc uneven, a broad, but vague median depression, on each side a broad shallow fovea, sometimes obliquely placed; surface coarsely and moderately closely punctate, finely pubescent; elytra often entirely unicolorous, frequently with small black spots arranged in three indistinct series, surface closely punctate, a little more coarsely near the base, but becoming rapidly finer and denser toward the sides and apex. Body beneath closely punctate, the pubescence more conspicuous than above. Length .14—.18 inch.; 3.5—4.5 mm.

Male.—Claws finely bifid at tip; last ventral broadly emarginate, with a slight notch at middle prolonged into a short impression, simulating a fissure; pygidium convex and slightly inflexed at apex.

Female.—Claws simple; last ventral slightly broadly emarginate, with a well defined median impression the entire length of the segment, in the form of a deep, sharply defined gutter.

From the very large series before me this species seems the most constant in form and color of any known. It is always pale; the black spots, when present, small, and arranged in three fairly regular series. The next species often presents pale specimens resembling those of the present, that the mode of punctuation alone must be examined for their separation. The sexual characters are slightly different, but only a large series and experience can make use of this means.

Occurs in Montana, Dakota, Kansas, Colorado, Utah, Washington, Arizona and California.

M. debilis Lec., Proc. Acad. 1865, p. 222; *obtusa* Lec., loc. cit.—Very similar in form to *consputa*, but with a generally darker color, differing superficially in

having the elytral punctuation coarse over the entire surface, although a little finer toward the sides and apex. Length a little smaller on the average than the preceding species.

Male.—Claws bifid at apex, the inner portion a little shorter; last ventral segment vaguely emarginate from side to side with a slight median depression; pygidium slightly inflexed at apex.

Female.—Claws simple; last ventral less emarginate, with a slight notch at the middle of the edge, in front of which is a slight triangular depression.

Forms occur in this species as pale as any of those of *conspua*, but as a rule the color is darker and the black spots more numerous, forming three fairly marked lines with intermediate smaller spots irregularly placed. In the more decidedly maculate specimens the thorax often has a median dark stripe and a spot each side.

Occurs in Wyoming, Dakota, Utah, Oregon, California, Nevada, Arizona. In his description of *obtusa* LeConte gives Andover, Mass., as one of the localities. This is much more than doubtful.

M. sordida Lec., Proc. Acad. 1858, p. 88; loc. cit. 1865, p. 222.—Form oblong, similar to the preceding species, but a little more slender; color yellowish testaceous, the elytra with black spots of irregular size with a tendency to coalesce along the suture, rarely specimens occur with the surface entirely testaceous. Antennæ more or less brown. Head closely punctate, a finely impressed median line, surface finely pubescent. Thorax nearly twice as wide as long, not wider at base than apex, widest at middle, sides moderately arcuate, base truncate at middle, oblique each side, angles not prominent, disc irregular, a well-marked median sulcus, on each side two depressions, one near each angle; surface closely punctate, finely pubescent: elytra closely and rather coarsely punctate, finely pubescent, rarely entirely testaceous, usually with numerous black spots of irregular size. Body beneath brown or piceous, sparsely punctate or pubescent. Legs pale, sometimes the tibiae and femora are banded at middle. Length .12—.14 inch.: 3—3.5 mm.

Male.—Claws finely bifid at tip. Last ventral truncate and broadly emarginate, with a slight depression near the margin.

Female.—Claws simple. Last ventral as truncate, with a slight emargination at the middle of the edge, from which proceeds a groove extending about one-third the length of the segment.

This species may be either entirely pale, or with spots which do not show the same tendency to form series. When the black spots are numerous they sometimes coalesce, forming larger spots placed at the umbone, each side of scutellum; an interrupted band in front of middle, oblique each side, another transverse, arcuate band one-third from the apex; often the entire suture is narrowly bordered with black.

This species may be known from either of the preceding by the thorax being not wider at base than at apex. The punctuation is a little finer than in *debilis*, but coarser than in *conspua*.

Occurs in New Mexico, Utah, Nevada, California and Arizona.

The genus *Monoxia*, as instituted by LeConte, contained merely the smaller species. He divided them primarily into two series from the form of the claws, which Crotch first recognized as merely sexual differences (Proc. Acad. 1873, p. 56).

While the arrangement above is not exactly in accord with Crotch's apportionment of the synonymy, the fact remains that three of LeConte's species are males and three females. Another character used by LeConte will be found to have but little value, and that is the oblique impression of the elytra. This may occur in either sex, but may be considered rather a male than a female characteristic. No mention has been made of it in the foregoing description.

TRIARIUS Jacoby.

Head free, eyes oval, entire; labrum moderate in length, not emarginate; maxillary palpi not very stout, the last two joints nearly equal in length, the terminal conical. Antennæ slender. Thorax broader than long, slightly narrower at base than apex; scutellum oval at tip. Elytra oblong, parallel, the epipleuræ limited by a distinct marginal line and extending three-fourths to apex; prosternum very narrowly separating the coxæ, the cavities open behind, although very narrow in some specimens; metapleuræ moderate in width, parallel; ventral segments nearly equal in length, the fifth longer; femora moderately stout, tibiæ slender, but broader at tip; all the tibiæ with a well-developed spur; hind tarsi with the first joint not longer than the next two; claws bifid.

This genus was proposed for an insect (*T. mexicanus*) previously described by Dr. LeConte as *Phyllobrotica livida*. As correctly remarked by Mr. Jacoby, the armed tibiæ and the bifid claws forbid its entrance in the genus in which Dr. LeConte placed it. On the other hand I cannot agree with Mr. Jacoby that it has any special affinity with *Phyllobrotica*, the elytral epipleuræ being quite as well marked as in the vast majority of the members of the entire tribe. The relationship seems rather with *Diabrotica*, the only character of moment separating it being the separation of the front coxæ by the prosternum.

Two species are known to me:

Head with a distinct transverse depression between the eyes; color dull yellow; legs entirely yellow; elytra without ornamentation.....**lividus**.
 Head without transverse depression; color yellow; elytra with piceous lines; legs in part piceous.....**trivittatus**.

T. lividus Lec. (*Phyllobrotica*), Trans. Am. Ent. Soc. xii, November, 1884, p. 28; *mexicanus* Jacoby, Biol. Cent.-Amer. vi, pt. 1, p. 571; id. Suppl, p. 335.—Oblong parallel, yellowish testaceous, often dull, head and thorax with a slight reddish tinge. Head smooth, a deep transverse frontal impression. Antennæ piceous, the three or four basal joints rufescent. Thorax one-fourth wider than long, slightly narrowed at base, sides feebly arcuate, the margin at front angles thickened, disc feebly convex, smooth. Elytra sparsely punctate, surface finely alutaceous. Body beneath with piceous metasternum, otherwise yellow. Legs entirely yellow. Length .16—.25 inch.; 4—6.5 mm.

Male.—Last ventral with a truncate lobe at middle, limited each side by a notch, disc of segment slightly concave; first joint of anterior tarsus distinctly dilated.

Female.—Last ventral broadly oval at tip; tarsi not dilated.

The sexual characters of the male are more nearly of the type of *Phyllobrotica* than to *Diabrotica*, to which latter the genus seems most closely related.

Occurs in Arizona south of Tucson.

T. trivittatus n. sp.—Form more slender and elongate than *lividus*, pale yellow, moderately shining, elytra with piceous vittæ. Head smooth, without impressed transverse line. Antennæ piceous, with three basal joints yellow. Thorax one-fourth wider than long, narrower at base, sides feebly arcuate, front angles slightly thickened, disc moderately convex, smooth. Elytra oblong, but little wider than the thorax; surface obsoletely finely punctate, color pale yellow, suture piceous, slightly broader behind, a basal piceous line, a vitta from the umbone nearly to the apex, a short vitta between this and the suture near the base, the side margin from the sutural angle nearly to base piceous; epipleuræ pale. Body beneath entirely yellow. Legs yellow, all the tarsi, the posterior tibiæ, and the outer edge of the front and middle tibiæ, piceous. Length .16—.24 inch.; 4—6 mm.

Male.—Last ventral segment with a moderately prolonged truncate middle lobe, limited each side by a notch, the disc of segment flat; first joint of anterior tarsus distinctly dilated.

Female.—As in *lividus*.

This insect looks not unlike *Luperus bivittatus*, with an addition of a short piceous line near the base. The five specimens before me are uniform in coloration. In this species some of the specimens have the anterior coxal cavities so nearly closed that a unique specimen might give rise to doubt as to its position.

Occurs in Arizona, Pinal Mountains (Wickham, 55).

DIABROTICA Chev.

Head not inserted as far as the eyes, front transversely impressed, vertex foveate, a carina between the antennæ. Eyes broadly oval, entire; labrum rather large, truncate, or feebly emarginate. Antennæ slender, at least longer than half the body, sometimes longer than the body, second and third joints often very small; maxillary palpi moderately stout, the terminal joint conical, shorter and narrower than the preceding. Thorax broader than long, sometimes nearly square, the margin distinct, slightly reflexed, disc usually bifoveate; scutellum acutely oval at tip. Elytra with a very distinct and slightly reflexed side margin, the epipleuræ distinct to apex; anterior coxæ contiguous, the prosternum with merely a linear prolongation, the cavities open behind; metasternal parapleuræ long, narrower behind. Legs moderately long and slender; tibiæ slender, the middle and posterior pairs with terminal spurs, the outer edge carinate from knee to tip, except in a few species; first joint of hind tarsus at least as long as the next two, sometimes nearly as long as the next three; claws bifid.

Diabrotica is, with few exceptions, confined to the Western Hemisphere, represented by many species of varied facies and ornamentation. It is the most numerously represented of all the Galerucide genera of our fauna.

All attempts to arrange the species have been based primarily on the structure of the antennæ with the result of completely confusing the species in their true relations to each other.

In the majority of the species the second and third joints are small, together scarcely as long as the fourth, sometimes only half as long; several species have the third joint nearly or quite as long as the fourth, while the second remains small. When the third joint is equal, or nearly so, to the fourth, it will be found to be densely punctured and pubescent like the fourth, but when that joint is small it will be found smooth and like the second in structure.

That some of the species have the tibiæ carinate, while in others it is not, seems not to have been observed by authors.

The male sexual characters are feeble. All have the last ventral truncate, and in some broadly emarginate. A few have the first joint of the anterior tarsi dilated.

Our species seem to divide naturally into three series, and may be determined by the aid of the annexed table:

Elytra irregularly, not closely punctate, the surface without striæ or sulci; tibiæ with a distinct carina extending the entire length of the outer edge.

Series A.

Elytra vaguely subsulcate, the punctures irregular and separated by smooth lines; tibiæ carinate (except in *vineta*), but less distinctly than in Series A.

Series B.

Elytra regularly sulcate-striate, the intervals very regularly elevated, the punctures arranged quite regularly in a double series in the sulci; tibiæ not at all carinate..... Series C.

Series A.

The species belonging to this series may be separated in the following manner:

Antennæ with third joint fully as long as the fourth and twice as long as second.

Elytra with a broad brown band at base, enclosing on each side an oval pale spot, emarginate at the side margin; four small round spots in an arcuate series at the posterior third.....**connexa.**

Elytra with three transverse black bands and a small apical spot, the second and third bands divided by the suture.....**tricincta.**

Antennæ with joints two and three small, together rarely longer than the fourth, usually shorter.

Elytra ornate, nearly as in *connexa*, but with the four posterior spots forming a crescent; joints nine and ten of antennæ conspicuously pale.

picticornis.

Elytra with three arcuately transverse series of black spots of four in each.

Entire underside of body and legs black.....**soror.**

Abdomen and base of femora pale.....**12-punctata.**

Elytra yellowish white, with three entire transverse bands of pale bluish green.....**balteata.**

Series B.

The species of this series may be separated in the following manner:

Antennæ with joints two and three small, nearly equal, together much shorter than the fourth.... 2.

Antennæ with joint third longer than second, and nearly or quite as long as the fourth..... 3.

2.—Head and legs pale.....**longicornis.**

Head and legs in part piceous.

Abdomen and femora pale; elytra pale green, with short piceous vittæ at suture and from the umbone.....**virgifera.**

Abdomen and femora pale; elytra black, with the entire margin and apical space yellow; antennæ very long.....**filicornis.**

Abdomen and femora entirely black.

Elytra entirely black.....**atripennis.**

Elytra black, with the side margin and median vitta yellow.

lemniscata.

3.—Elytra pale, merely a slight fuscous area near the scutellum and humerus; legs pale.....**blandula.**

Elytra black, with a narrow side margin and a narrow vitta nearer the suture pale; legs black, except the base of femora.....**vineta.**

Series C.

This series contains but two species each with yellow elytra, with the black suture entire and a vitta from the umbone nearly to apex. Antennæ entirely black; legs black, except the bases of the femora.

trivittata.

Antennæ with three basal joints pale; middle and posterior legs pale, except knees and tarsi..... **vittata.**

D. connexa Lec., Proc. Acad. 1865, p. 212; Jacoby, Biol. Cent.-Amer. vi, pt. 1, p. 549, pl. xxxii, fig. 20.—Oblong-oval, narrower in front, moderately convex, pale yellow, elytra with brown ornamentation; metasternum, tibiæ and tarsi piceous. Antennæ a little longer than half the body, slender, piceous, three basal joints pale, third joint slightly longer than the fourth and twice as long as the second. Head pale castaneous, smooth, clypeus sparsely punctate. Thorax wider than long, slightly narrower at apex, sides arcuate in front, sinuate behind the middle, disc moderately convex, sparsely obsolete punctate. Elytra slightly broader behind the middle, sparsely finely punctate, a broad brown band occupying nearly the basal half of the elytra, the posterior border sinuous, at sides emarginate, not reaching the border of the elytra, enclosing on each side an oval pale spot of variable size, one-third from apex is an arcuate row of small brown spots, two on each side. Body beneath sparsely pubescent, abdomen finely punctulate; tibiæ with a well-marked carina on the outer edge extending from the knee to the apex. Length .28 inch.; 7 mm.

Male.—The last ventral segment is broadly truncate.

Female.—Last ventral slightly prolonged and oval at tip.

Very little variation has been observed in this species, the color of the head and the markings on the elytra may be lighter or darker, but never pass beyond the brown color.

Occurs in Texas and Mexico.

D. picticornis n. sp.—Form and somewhat like *connexa* in coloration. Antennæ slender, more than half the length of the body, joints 1-3 pale, 4-8 piceous, 9-10 pale, 11 piceous; joints 2-3 small, the third a little longer, the two together a little longer than the fourth. Head black, smooth. Thorax broader than long, slightly narrower in front, sides anteriorly feebly arcuate, posteriorly slightly sinuate, disc convex, color slightly reddish, surface sparsely finely punctate. Elytra broader behind the middle, obsolete punctate; yellow, with a broad piceous black band, similar in form to that of *connexa*, and a crescentic band one-third from apex. Abdomen very sparsely punctate, yellow; tibiæ carinate on the outer edge. Length .26 inch.; 6.5 mm.

Male not seen. The last ventral of female oval at tip.

This species bears a deceptive resemblance to *connexa*, and might readily be thought a variety of it, but the form of the second and third joints of the antennæ, together with the arrangement of the colors of the joints, will at once distinguish it.

Occurs in Texas, locality unknown.

D. tricineta Say, Journ. Acad. iii, p. 457; ed. Lec. ii, p. 221; *suffriani* Jacoby, Biol. Cent.-Amer. vi, pt. 1, p. 551, pl. xxxii, fig. 3.—Form oblong, feebly convex, color yellow; head, metasternum, tibiae and tarsi black, elytra with three transverse bands and a small apical spot black. Antennae piceous, two basal joints paler. Head impunctate. Thorax very little wider than long, slightly narrowed in front, sides anteriorly feebly arcuate, then slightly sinuate to base, anterior angles slightly prominent, disc convex, smooth. Elytra sparsely punctate, yellow, with three transverse bands which do not attain the side margin, the basal band crosses the suture and sends a short branch backward, the second and third bands are interrupted by the suture, the apical spot is small and at the sutural angle. Abdomen yellow, sparsely pubescent, finely punctate; tibiae carinate on the outer edge. Length .22—.26 inch.; 5.5—6.5 mm.

Male.—Last ventral truncate and broadly emarginate; first joint of front tarsi dilated.

Female.—Last ventral narrowly oval at tip.

Occurs from Colorado southward to Arizona, extending into Mex.

D. duodecimpunctata Fab., Syst. Ent. p. 103; Oliv., Ent. vi, p. 628, pl. 2, fig. 31; *tenella* Lec., Proc. Acad. 1858, p. 58.—Oblong-oval, narrower in front, moderately convex, pale yellowish green, each elytron with six piceous black spots of variable size. Antennae slender, longer than half the body, piceous, three basal joints pale, joints 2-3 small, the third the longer, the two together about as long as the fourth. Head black, smooth, vertical impression deep. Thorax wider than long, slightly narrower in front, sides slightly arcuate anteriorly, then feebly sinuate; disc convex, with a moderately deep fovea each side of middle, surface smooth; scutellum piceous. Elytra wider behind the middle, sparsely obsolete punctate; color yellow, with a slight tinge of green, on each side of the scutellum an oblong spot obliquely placed, another oblong spot on umbone; at middle two spots placed slightly obliquely, one-third from apex two spots more obliquely placed; metasternum piceous. Abdomen yellow, sparsely punctate; tibiae distinctly carinate on the outer side. Legs piceous, the basal half of the femora pale.

Male.—Last ventral truncate and broadly emarginate; front tarsi not dilated.

Female.—Last ventral narrowly oval at tip.

This species does not vary greatly from a normal standard. Specimens are occasionally seen in which the spots show a tendency to elongate and unite in a longitudinal direction.

Var. *tenella* Lec.—This name was suggested for those forms in which the spots are reduced to a very small size, and in which the posterior series may be entirely lost. In this variety the antennae are usually paler, and the femora are more than half pale.

This species occurs over the entire eastern region from Canada southward to Texas, extending into Arizona, and even to southern California. It doubtless occurs in Mexico also. The variety *tenella* occurs only in the extreme southwest.

D. soror Lec., Proc. Acad. 1865, p. 212; 12-*punctata* ‡ var. Mann., Bull. Mosc. 1843, p. 309.

This species resembles 12-*punctata* in so many ways that a full description is hardly necessary. The following are the distinctive points: Antennæ almost entirely piceous, the basal three joints merely slightly paler. Thorax less transverse, entire body beneath and legs black; the size is usually less than in 12-*punctata*. The sexual characters are the same.

As a rule the piceous spots on the elytra are larger than in 12-*punctata*, and have more of a tendency to become confluent and in a transverse direction, although specimens are not rare in which the humeral spot is prolonged to the next series of spots. The spot near the scutellum is confluent with its fellow, the two forming a quadrate spot.

At this time the query may be proposed as to whether 12-*notata* Harold is not related to *soror* in the manner that *tenella* is to 12-*punctata*.

Occurs from Oregon southward through California to Arizona, and probably Mexico.

D. balteata Lec., Proc. Acad. 1865, p. 213; Jacoby, Biol. Cent.-Amer. vi, pt. i, p. 530, pl. xxix, fig. 23; *sallei* Baly, Journ. Linn. Soc. Zool. xix, p. 227.—Form very like 12-*punctata*. Antennæ piceous, three basal joints paler, joints 2-3 small, the third slightly the longer, the two together about equal to the fourth. Head rufescent, smooth, a deep vertical fovea. Thorax pale yellow, or slightly greenish, broader than long, slightly narrower in front, sides slightly arcuate anteriorly, feebly sinuate thence to base; disc moderately convex, smooth, with a fovea each side variable in extent; scutellum piceous. Elytra broader behind the middle, moderately closely but obsoletely punctate; color very pale malachite green with yellowish white spaces as follows: the lateral margin narrowly nearly to apex, an oval subhumeral spot, a larger oval spot near scutellum, two slightly arcuate bands which do not attain the margin or suture, one before and one behind the middle, an ill-defined spot near apex; entire body beneath pale yellow, except metasternum, tibiæ and tarsi, which are piceous; tibiæ distinctly carinate. Length .20—.24 inch.; 5—6 mm.

Male.—Last ventral truncate and broadly emarginate; tarsi not dilated.

Female.—Last ventral narrowly oval at tip.

The above description has been drawn from specimens in perfect condition. The color of the elytra is, however, so dilated that it soon fades by too long preservation in spirit or from exposure to light. The color then becomes a dull yellowish white, in which, however, traces of the paler bands may usually be seen on close examination.

The only variation observed is in the tendency of the antennæ to become ferruginous.

Occurs from Texas southward through Mexico to Columbia, S. A.

D. longicornis Say, Journ. Acad. iii, p. 460; ed. Lec. ii, p. 223.—Oblong, moderately elongate, entire body and legs yellowish white, or with a slight tinge of green. Antennæ slender, longer than half the body, pale brown or ferruginous, joints 2-3 small, the third a little longer, the two together not longer than the fourth. Head smooth, vertical fovea not deep. Thorax a little wider than long, sides arcuate in front, slightly sinuate posteriorly, disc convex, with a moderately deep fovea each side, surface smooth. Elytra distinctly wider behind the middle, surface moderately coarsely and closely punctate, disc vaguely subsulcate, and with a costiform elevation from the umbone two-third to apex. Abdomen very sparsely punctate; tibiæ distinctly carinate. Length .20—.22 inch.; 5—5.5 mm.

Male.—Last ventral truncate and slightly emarginate; first joint of anterior tarsi dilated.

Female.—Last ventral narrowly oval at tip; tarsi not dilated.

No variations have been observed. This is the only species in our fauna in which the entire body and legs are uniformly pale.

Occurs from the Middle States westward to Kansas.

D. virgifera Lec., Trans. Am. Ent. Soc. 1868, p. 59.—Oblong, nearly parallel, pale yellow head; metasternum, tibiæ and tarsi black. Antennæ black, three basal joints testaceous, joints 2-3 small, together but little longer than half the fourth. Head smooth, vertical fovea moderately deep. Thorax very nearly as long as wide, not narrowed in front, sides slightly sinuate behind the middle, disc smooth, bifoveate; scutellum piceous. Elytra nearly parallel, moderately closely punctate, smoother near the apex, surface vaguely subsulcate, with an obtuse costa from the umbone three-fourths to apex; color pale yellow, or with a slight greenish tinge, a narrow, sutural, piceous vitta, and one from each umbone extending three-fourths to apex. Abdomen yellow, obsoletely punctate; tibiæ and tarsi black, femora yellow, sometimes with an upper line piceous. Length .20—.24 inch.; 5—6 mm.

Male.—Last ventral segment truncate; tarsi not dilated.

Female.—Last ventral oval at tip.

The type described by LeConte, as well as my own, have doubtless been decolored by immersion in alcohol. More recent specimens show that the true color is slightly green. The sutural and lateral vittæ are apt to be much reduced in extent. While the second and third joints are usually small and scarcely longer together than half the fourth, one specimen has these two nearly equal to the fourth.

Occurs at Fort Wallace, N. Mex., southern Arizona and northern Sonora.

D. filicornis n. sp.—Oblong, similar in form to *vittata*, color piceous black; thorax, side margin, and apex of elytra and abdomen yellow. Antennæ slender,

a little longer than the body, piceous; second and third joints small, a little longer than half the fourth. Head piceous, smooth, vertical impression moderate. Thorax nearly as long as wide, sides slightly arcuate in front and feebly sinuate posteriorly, disc smooth, vaguely bifoveate. Elytra sparsely punctate, smoother at base and apex, vaguely subsulcate, and with an obtuse carina from umbone three-fourths to apex; color piceous black shining, the margin yellow, expanding to a spot at apex; femora yellow, with the upper edge piceous, anterior and middle tibiae piceous externally, yellow on inner side, posterior tibiae and all the tarsi, piceous. Length .20 inch.; 5 mm.

Male.—Last ventral truncate; first joint of front tarsus dilated and thickened.

Female.—Last ventral oval at tip.

In one specimen before me there is an indefinite yellow spot on each side of the suture near the base, as if varieties of the species might occur with *trivittata* elytra as in *vittata*.

This species is peculiar among those in our fauna in having the antennae longer than the entire body.

Occurs in New Mexico, special locality unknown (Schaupp).

D. atripennis Say, Journ. Acad. iii, p. 461; ed. Lec. ii, p. 224; *cristata* Harris, Trans. Hartf. Nat. Hist. Soc. p. 90; *fossata* Lec., Proc. Acad. 1858, p. 88. —Oblong-oval, narrower in front, either entirely black, or with the thorax and abdomen yellow. Antennae three-fourths the length of the body, black; joints 2-3 small, nodiform, together scarcely longer than half the fourth. Head smooth, vertical fovea feeble. Thorax broader than long, sides arcuate in front, sinuate posteriorly, disc smooth, bifoveate. Elytra obsoletely sparsely punctate, vaguely subsulcate, with an obtuse carina from the umbone three-fourths to apex; tibiae distinctly carinate. Length .15—.20 inch.; 4—5 mm.

Male.—Last ventral truncate and broadly emarginate; first joint of front tarsus slightly broader and thicker.

Female.—Last ventral oval at tip.

Var. *atripennis* Say.—Thorax and abdomen yellow.

Var. *crestata* Harris.—Thorax yellow, with a median stripe black. Abdomen black.

Var. *fossata* Lec.—Entirely black.

A rather common species distributed from Massachusetts to Dakota, Kansas and Texas.

D. lemniscata Lec., Trans. Am. Ent. Soc. ii, 1868, p. 58.—Form elongate, parallel, piceous black, shining, each elytron with the side margin and a vitta yellow. Antennae piceous, three-fourths the length of body, joints 2-3 small, together not as long as the fourth. Head smooth, vertical fovea moderate. Thorax a little wider than long, sides arcuate in front, slightly sinuate posteriorly, disc smooth, bifoveate. Elytra sparsely and indistinctly punctulate and alutaceous; disc very vaguely subsulcate, an obtuse plica from umbone toward apex. Body beneath and legs entirely black; tibiae distinctly carinate. Length .20—.24 inch.; 5—6 mm.

Male.—Last ventral truncate and broadly emarginate; first joint of anterior tarsus slightly thickened.

Female.—Last ventral broadly oval at tip.

Very little variation has been observed, except in one specimen, in which the middle vitta tends to disappear.

Occurs near the Raton Mountains and at Fort Union, N. Mex.

D. blandula Lec., Trans. Am. Ent. Soc. ii, 1868, p. 58.—Oval, oblong, yellowish white, head and metasternum piceous. Antennæ brown, paler at base, nearly three-fourths the length of body, joint 2 small, 3 nearly as long as four. Head smooth, vertical fovea feeble. Thorax one-third wider than long. Head smooth, vertical fovea feeble. Thorax one-third wider than long, sides slightly arcuate in front, feebly sinuate posteriorly, disc smooth, with two vague fovea, which tend to meet posteriorly. Elytra sparsely punctate, distinctly subsulcate, the humeral carina feeble, color pale yellow, with a short brownish vitta from the scutellum and from the umbone. Abdomen nearly smooth. Legs pale yellow, tarsi piceous; posterior tibiæ carinate near base only. Length .20 inch.; 5 mm.

Male.—Last ventral truncate.

Female.—Unknown.

This species resembles *virgifera* in color and markings, but may be known by the structure of the antennæ, the broader thorax and color of the legs.

Occurs near the Smoky Hill River, New Mexico.

D. vineta Lec., Proc. Amer. Philos. Soc. xvii, 1878, p. 416.—Oblong oval, form of *vittata*, above black, thorax yellow, elytra with the side margin and an entire median vitta yellowish white. Antennæ three-fourths the length of the body, piceous; joint two small, the third nearly as long as the fourth. Head black, smooth, vertical fovea small. Thorax slightly wider than long, sides feebly arcuate in front, slightly oblique behind, disc smooth, bifoveate; scutellum black. Elytra rather coarsely and closely punctate, the surface vaguely subsulcate, the humeral carina not present, color black, side margin to suture and a vitta from base to apex ivory-white; metasternum piceous, abdomen and base of femora yellow. Legs otherwise black; tibiæ carinate near the base only. Length .16—.18 inch.; 4—4.5 mm.

The only specimen before me is a female having the broadly oval apex to the last ventral segment.

The median vitta on each elytron resemble the so-called ivory vitta seen in many *Cerambycidæ*.

Occurs in Georgia and Florida at Capron.

D. vittata Fab., Syst. Ent. p. 122; *melanocephala* Fab., loc. cit. p. 118; Oliv., Enc. Meth. vi, p. 590; Ent. vi, p. 633, pl. 3, fig. 38; *americana* Gmelin, ed. Linn. i, 4, p. 1715; *stolata* Gmel., loc. cit. p. 1724.—Oblong-oval, pale yellow above; head, a sutural and humeral vitta on each elytron black. Antennæ more than half the length of the body, the three basal joints partly pale, joint two small, the third nearly as long as the fourth. Head black, smooth, ventral fovea rather large. Thorax one-fourth wider than long, sides arcuate in front, slightly sinuate posteriorly, disc deeply bifoveate; scutellum black. Elytra slightly oval,

surface rather broadly striate, striæ biserially punctate, intervals convex, subcostiform, color pale yellow, a sutural black vitta occupying two intervals extending from base to apex, a humeral vitta nearly reaching the apex on the intervals 6-8. Body beneath piceous. Legs yellow, the knees, the anterior tibiæ and tarsi and the tips of the middle and posterior tibiæ and their tarsi piceous; tibiæ without trace of carina. Length .18—.24 inch.; 4.5—6 mm.

Male.—Last ventral truncate and feebly emarginate; tarsi not dilated.

Female.—Last ventral oval at tip.

This species is remarkably constant in its characters for one so widely diffused.

Abundant over the entire eastern United States from Canada southward.

D. trivittata Mann., Bull. Mosc. 1843, p. 309.

Very closely resembling *vittata*, differing in the following particulars:

Antennæ entirely piceous. Thorax bifoveate, the two foveæ coalescing posteriorly. Legs entirely black, except the bases of the femora.

Male.—Last ventral feebly truncate, slightly emarginate; first joint of front and middle tarsi distinctly broader and thicker.

Female.—Last ventral oval at tip; tarsi not dilated.

This species occurs throughout California, where it replaces *vittata* of the Eastern States.

D. amœnula and *D. octonotata* described by Boheman, and placed doubtfully in our lists, are from the Pacific islands, and do not occur in our fauna.

PHYLLOBROTICA Redt.

Head free, transversely grooved between the eyes. Eyes nearly round, prominent; labrum short, feebly emarginate; maxillary palpi not stout, the third and fourth joints obconical, the latter smaller and acute at tip. Antennæ slender, longer and more slender in the female, first joint stout, second and third usually shorter, the third longer than the second, four to eleven nearly equal in length. Thorax transversely quadrate, sides nearly straight, disc usually with depressions; scutellum oval at tip. Elytra parallel, without lateral margin and without separate epipleuræ; prosternum obliterated between coxæ, the cavities open behind; metasternal parapleuræ rather wide and parallel; ventral segments one to four equal in length, fifth much longer. Legs rather slender, tibiæ without spurs; first joint of hind tarsus scarcely as long as the next two, claws appendiculate and divaricate.

This genus is very properly separated from all the others with open front coxal cavities and appendiculate claws by the entire absence of epipleuræ in so far as these are defined by the acute lateral margin of the elytra. It seems to me that this genus alone should constitute the group of *Phyllobroticites*, and that *Phyllecthrus* should be removed, reasons for which are given under that genus.

There are now eight species known to me, five belonging to the Atlantic region and three to the Pacific, the former having ornate elytra, the latter blue or greenish.

They may be known by the characters given in the following table:

Legs pale or bicolored.

Thorax yellow.

Elytra bicolored, maculate, vittate or margined.

Head entirely yellow.

Elytra yellow, with two oval piceous spots on each.....**decorata.**

Elytra piceous, with suture and sides yellow.

Elytra with elevated costæ and punctate.....**costipennis.**

Elytra not costate.

Thorax with a moderately deep fovea each side.....**discoidea.**

Thorax with a transverse depression.....**limbata.**

Head black, front pale; each elytron with an intermediate pale vitta.

vittata.

Elytra uniform, blue or greenish.....**viridipennis.**

Thorax black, elytra dull blue or greenish.....**luperina.**

Legs entirely black.

Head, thorax and body black, elytra dull blue... ..**nigripes.**

P. decorata Say, Journ. Acad. iii, p. 459; ed. Lec. ii, p. 203; *Olivieri* Kby., Fauna Am. Bor. iv, p. 218.—Form elongate, parallel. Head black, front yellow, impunctate. Antennæ piceous, the three basal joints yellow. Thorax broader than long, sides slightly sinuate, disc smooth, color yellow. Elytra yellow, on each two oval piceous spots, one at base smaller, and one behind the middle, oblong; surface not distinctly punctate. Body beneath piceous black, with a few sparsely placed punctures. Legs entirely yellow. Length .22—.28 inch.; 5.5—7 mm.

In the male the last ventral segment is large, canaliculate in front, broadly concave near the apex, the apical margin bisinuate. The last dorsal is deeply semicircularly emarginate; posterior tibiæ arcuate; the last ventral of the female is not concave, the apex oval.

Very little variation has been observed in this species. There is, however, in Mr. Ulke's cabinet one female in which the two spots unite and form a vitta, as in *discoidea*, but, from the fact that the thorax is very evenly convex, I incline to consider it a variety of the present species. Its size prevents it from being considered *circumdata*.

Occurs in the Lake Superior region, Illinois and Colorado.

P. costipennis n. sp.—Form of *discoidea*; head and thorax yellow, elytra black, with the entire limb and suture narrowly yellow. Antennæ entirely black. Head smooth. Thorax wider than long, sides slightly arcuate in front, straight and convergent behind, disc smooth, on each side of middle a large, but shallow fovea. Elytra with the suture elevated and four distinct discal costæ, between which the surface is distinctly punctate. Body beneath yellow, abdomen piceous, sparsely finely punctate; femora yellow, tibiæ in greater part and tarsi piceous. Length .24—.28 inch.; 6—7 mm.

In the male the segments 2—3—4 are short, and have a slight gibbosity on the median line. The last ventral is very large, convex, with a shallow median depression, and at middle of apex a short oval lobe limited each side by a sinuation. The last dorsal is truncate and broadly emarginate. The female ventral segments are of normal structure.

This species may be readily known by the costate elytra. The male sexual characters resemble those of *discoidea*.

Occurs in Georgia and Florida.

P. discoidea Fab., Syst. El. i, p. 485; *circumdata* Say, Journ. Acad. iii, p. 457; edit. Lec. ii, p. 221.—Form of *decorata*. Head smooth, yellow. Antennæ black, the three basal joints often paler, but not conspicuously so. Thorax wider than long, slightly wider at apex, sides slightly sinuate, disc smooth, a moderately deep foveiform depression each side of middle. Elytra piceous black, with the base, suture and side margin yellow, surface sparsely punctate, and in the females vaguely subcostate. Body beneath yellow varying to brownish. Legs yellow, tips of tibiæ and tarsi piceous. Length .14—.26 inch.; 3.5—6.5 mm.

In the male the third and fourth segments of the abdomen are short, together but little longer than the second; the last ventral is large, convex, a slight median depression, the apex bisinuate. The last dorsal is emarginate at middle and on each side ciliate. In the female the segments 2—3—4 are gradually shorter, the fifth oval at tip, the last dorsal entire.

No variations worthy of note have been observed.

It is very clear that Dr. LeConte and others have confused three species under the name *discoidea*, the present species, *limbata*, and another which he mentions as a curious color variety. That Fabricius clearly differentiated his two species is very evident from his mention of the black antennæ and the bifoveate thorax of the present species. Say's synonym has been fixed by the antennæ. The male sexual characters separate the two beyond all doubt. In the present species it will be observed that the elytra are a little less shining from the more evident punctuation.

Occurs in Virginia, North Carolina and Georgia.

P. limbata Fab., Syst. El. 1, p. 486.—Form of *discoidea*, and closely resembling it in coloration. Antennæ piceous, the three basal joints conspicuously paler. Thorax also similar in form, but with a transverse depression of somewhat crescentic form, sometimes slightly deeper at the ends. Elytra very indistinctly punctate and quite shining. Body beneath entirely yellow, the abdomen sometimes slightly darker. Legs yellow, sometimes with the tips of the tibiæ and tarsi darker. Length .14—.26 inch.; 3.5—6.5 mm.

In the male the segments 2–3–4 are not very different in length, being successively slightly shorter. The last segment is large, the disc in front convex, near apex a deep fovea, beyond which the segment is prolonged in a truncate lobe limited each side by a deep notch. Last dorsal segment truncate, slightly emarginate, ciliate on its edge. In the female the terminal ventral segment is oval, the pygidium oval, but more acute.

This species resembles *discoidea* so greatly superficially, that it is not surprising that it has not been separated. It will be observed that the thorax has a vague transverse depression in place of two foveæ, the antennæ are shorter and stouter, sex for sex, than in *discoidea*, the elytra smoother and more shining. The structure of the last ventral of the male is notably different.

As a rule, the three basal joints of the antennæ are conspicuously paler, while in *discoidea*, usually piceous. In the present species the abdomen is yellow, and in *discoidea* usually more or less piceous. While the legs here are usually all yellow, it is the rule in *discoidea* to have the tips of tibiæ and tarsi piceous.

Occurs in District of Columbia, Virginia, Iowa, Texas.

P. vittata n. sp.—Form of *discoidea*. Head black, shining, front yellow. Antennæ piceous, basal joint sometimes pale. Thorax yellow, one-half wider than long, sides nearly straight, slightly convergent posteriorly, disc smooth, a vague transverse depression of variable extent. Elytra piceous, side margin and suture yellow, and a similar vitta of variable extent from the humeri to apex, surface either quite smooth ♂, or sparsely finely punctate ♀. Body beneath yellow, abdomen usually piceous, sometimes yellow. Legs yellow, tibiæ at apex and tarsi piceous. Length .16—.20 inch.; 4—5 mm.

In the male the ventral segments 2–3–4 are nearly equal in length, the fifth much larger, convex in front, very deeply cupuliform behind, at middle prolonged in a short truncate lobe limited each side by a notch; the last dorsal is truncate and ciliate. The ventral segments of the female are as in *limbata*.

In the female the antennæ are of the usual filiform structure, while in the male they are evidently thicker toward the tip.

This species is founded on the "singularly-colored specimen" mentioned by Dr. LeConte. It varies somewhat in its markings. In two specimens before me ♂ ♀, the humeral is short and slender, not reaching the apex, while in two others the vitta is broad and entire. In three specimens the abdomen is brown or piceous, in one pale yellow. The form of thorax is that of *limbata*, and the male sexual characters nearly so, but the depression of the last ventral is much deeper.

Occurs in Pennsylvania, North Carolina and Georgia.

P. viridipennis Lec., Proc. Acad. 1859, p. 81; loc. cit. 1865, p. 207.—Similar in form to *discoidea*, but less elongate. Antennæ often entirely yellow, usually with the outer joints darker. Head yellow, with an occipital piceous spot of variable size, usually sparsely finely punctate. Thorax wider than long, sides slightly arcuate in front, straight and convergent posteriorly, disc smooth, with a fovea on each side of variable extent. Elytra violet-blue or slightly greenish, sparsely finely punctate. Body beneath entirely piceous. Legs yellow. Length .20—.26 inch.; 5—6.5 mm.

In the male the ventral segments 2—3—4 are gradually shorter, the fifth large, with a deep oval excavation nearly the length of the segment, the apex of the segment deeply emarginate, with a slight lobe in the emargination, the last dorsal narrowed at apex and truncate. Ventrals of female normal.

The style of coloration will enable this species to be known from any other in our fauna. No striking variations have been observed.

Occurs in California and Nevada.

P. luperina Lec., Proc. Acad. 1865, p. 207.—Form slightly more robust than *viridipennis*; head and thorax black, shining; elytra blue or slightly greenish. Antennæ piceous externally, the basal five joints yellow. Head black, sparsely punctate, front yellow. Thorax wider than long, sides nearly straight and slightly convergent to base, surface sparsely finely punctate, and on each side a fovea, these sometimes united by a vague transverse depression; surface sparsely, finely and indistinctly punctate. Body beneath entirely black. Legs yellow, tips of tibiæ and tarsi slightly darker. Length .20—.26 inch.; 5—6.5 mm.

In the male the ventral segments 2—3—4 are gradually shorter, the fifth large and with a large and deep oval excavation, the apex of the segment emarginate, with a feeble median lobe, the last dorsal is truncate and slightly emarginate. The ventrals of the female are of normal structure.

Occurs in California south of San Francisco; at San Mateo and Santa Barbara.

P. nigripes n. sp.—Form of *luperina*, black, shining; elytra dull blue or greenish. Antennæ entirely black. Head with few scattered fine punctures. Thorax one-fourth wider than long, sides nearly straight, slightly convergent to base, disc feebly convex, a broad but vague oblique depression each side, the two uniting at middle, surface vaguely punctate. Elytra finely alutaceous, punctate, smoother near apex. Body beneath black, shining, sparsely punctate. Legs entirely black. Length .20 inch.; 5 mm.

The male has the segments 2–3–4 of the abdomen gradually shorter, the fifth large, with a broad and deep groove running its entire length. The last dorsal is oval at tip. In the female the segments are of normal form.

This species is the only one in our fauna with totally black legs. Its resemblance to *Haltica bimarginata* is so deceptive, that the two individuals in my cabinet were sent with specimens of that species.

Occurs at Los Angeles, Cal. (D. W. Coquillett).

SCELOLYPERUS Crotch.

Antennæ slender, longer than half the body, second joint shorter than the third. Elytra with distinct edge separating the epipleuræ, the latter nearly reaching the apex of the elytra; last joint of maxillary palpus obtusely conical, slightly longer than the preceding joint, and as wide at base; anterior coxæ contiguous; tibiæ without spurs; first joint of hind tarsus nearly as long as the following joints united; claws broadly appendiculate at base.

The species of this genus are of graceful form, moderately elongate, slightly depressed, the legs rather long. The antennæ are similar in the sexes.

In the males of all the species the last ventral segment is nearly as long as the three preceding joints, the apex very obtuse, the surface flattened and slightly concave along the apex. The last ventral of the female is about as long as the two preceding, acutely oval at tip.

Our species of this genus have been heretofore placed in *Luperus*, from which they differ in the absence of tibial spurs. They are larger than *Luperus*, and of quite different facies, and have always seemed out of place in association with them.

On an examination of Crotch's type I cannot find that there is any reason why the species subsequently described as *Scelida* should not be united with it. The character which seems to have attracted Crotch's attention, and which probably induced him to separate the genus, is the presence of a strong tooth on the inner edge of the

curved tibiae near the knec. There will, however, be found in the annexed table two species with curved hind tibiae in the male which are certainly not separable from *Scelida*, while Crotch's type differs from those in the single sexual character of a tooth on the curved tibiae. While the description of *Scelolyperus* is rather meagre, the presence of the type makes it necessary to suppress *Scelida*.

All our species belong to the Pacific faunal region and occur in Oregon, California and Arizona, one species extending to Montana and Colorado. They may be separated as follows:

Thorax always entirely yellow.

Head and femora yellow.....**flaviceps.**

Head metallic green.

Elytra finely sparsely punctate, smoother at apex, posterior tibiae ♂ straight and not toothed.....**flavicollis.**

Elytra coarsely sparsely punctate; posterior tibiae ♂ stout, arcuate and toothed at base.....**tejonicus.**

Elytra sparsely punctate and alutaceous; posterior tibiae ♂ strongly curved, not toothed.....**loripes.**

Thorax either maculate or blue, varying to black.

Thorax yellowish, with a median and lateral spot piceous....**maculicollis.**

Thorax uniformly blue or black.

Elytra evidently punctate.

Thorax polished, impunctate, black, slightly narrowed to base.

maculicollis var.

Thorax sparsely punctate.

Antennae and legs black; posterior tibiae of male straight.

graptoderoides.

Antennae at base, anterior femora and tibiae in part yellow; posterior tibiae ♂ curved.....**Schwarzi.**

Elytra alutaceous, not punctate.

Antennae filiform, last joint scarcely longer than the preceding.

longulus.

Antennae broader externally, the outer joints flattened and slightly concave beneath in ♂, last joint notably longer.....**decipiens.**

S. flaviceps n. sp.—Similar in form to *flavicollis*, but a little more robust; head, thorax, metasternum and femora yellow, elytra metallic-green or blue in certain lights. Antennae two-thirds the length of body, piceous, the underside of the three basal joints pale. Head smooth, yellow. Thorax broader than long, slightly narrower at apex than at base, sides slightly arcuate in front, parallel posteriorly, disc moderately convex, smooth and impunctate; scutellum yellow. Elytra with slightly arcuate sides, surface rather polished, sparsely finely punctate; metasternum and abdomen piceous, with bluish lustre; femora reddish yellow, tipped with piceous at the knees, the tibiae and tarsi black. Length .26 inch.; 6.5 mm.

Two female specimens have been examined, their ventral characters the same as in *flavicollis*.

This species seems to resemble *metallica* Jacoby, as figured in Biol. Cent.-Amer. vi, pt. 1, pl. xxxiii, fig. 10, but the color of the legs will easily distinguish the two.

Occurs in Arizona, special region unknown.

S. flavicollis Lec. (*Phyllobrotica*), Proc. Acad. 1859, p. 81; Lec. (*Luperus*), Proc. Acad. 1865, p. 209.—Form oblong, parallel, above blue or green, metallic, thorax yellow, legs piceous. Antennæ two-thirds the length of the body, piceous, the three basal joints bicolored. Head metallic-green, impunctate. Thorax yellow, broader than long, slightly narrower in front, sides feebly arcuate, disc convex, smooth, impunctate. Elytra with feebly arcuate sides, disc sparsely finely punctate, less distinctly at apex, surface metallic-green or blue, distinctly alutaceous. Body beneath and legs piceous, with distinct greenish surface. Length .26—.28 inch.; 6.5—7 mm.

Male.—Last ventral truncate at middle, a slight sinuation each side, disc flattened.

Female.—Last ventral rather densely prolonged.

Occurs at Fort Tejon and other places in southern California.

S. tejonicus Crotch, Trans. Am. Ent. Soc. 1874, p. 79.—Oblong, parallel, moderately convex, glabrous, shining; body beneath and legs, black; antennæ at base pale, head and elytra blue. Head smooth, carinate between the antennæ. Thorax quadrangular, slightly broader than long and somewhat narrowed in front, sides slightly arcuate anteriorly, disc slightly convex, with impunctate surface. Elytra coarsely sparsely punctate. Body beneath very sparsely pubescent. Length .20 inch.; 5 mm.

Male.—Last ventral segment truncate and sinuate at apex, the disc slightly concave; middle tibiæ slightly, posterior strongly arcuate, and with a strong tooth on the inner edge near the knee.

The female is unknown.

The structure of the posterior tibiæ is rather remarkable, no such structure having been noticed in any of the hitherto described species.

One specimen collected at Fort Tejon, Cal.

S. loripes n. sp.—Oblong, parallel, beneath piceous, head and elytra metallic-blue, thorax yellowish. Antennæ piceous, the basal four joints pale on the underside. Head alutaceous, impunctate. Thorax a little wider than long, slightly narrowed in front, sides very feebly arcuate, disc very indistinctly alutaceous, with very minute, sparse punctures, larger along the base. Elytra distinctly alutaceous, punctuation not large nor close, smoother toward apex. Body beneath very sparsely pubescent. Legs piceous, the anterior femora at knees, their tibiæ in great part, yellow. Length .20 inch.; 5 mm.

Male.—Last ventral transversely concave, the apex vaguely emarginate; posterior tibiæ stout, arcuate.

This species might readily be mistaken for a small *flavicollis*, which it resembles in form and color, although more distinctly punctate. As females of *loripes* are unknown, the only differential character must be drawn from the hind tibiæ of the male.

Occurs in California, probably northern.

S. maculicollis Lec. (*Luperus*), Trans. Am. Ent. Soc. xii, p. 27.—Oblong, parallel, beneath and legs piceous; above, head black; thorax either yellow with piceous spots or entirely black, elytra bluish or greenish. Antennæ two-thirds the length of the body, piceous; the three basal joints pale beneath. Head smooth, black. Thorax broader than long, sides slightly arcuate in front, then divergent to base; disc slightly convex, polished in the black specimens, or with a very few punctures in the maculate; scutellum black. Elytra moderately closely punctate, not alutaceous, in some specimens vaguely subsulcate. Length .24—.28 inch.; 6—7 mm.

Male.—Last ventral semicircularly emarginate at middle, truncate each side.

Female.—Last ventral broadly oval at tip.

Two varieties occur in this species between which all necessary intermediate forms are in my cabinet.

In the typical form the thorax is yellow, with an oblong-oval, piceous spot, broader in front, on the median line, and a smaller piceous spot on each side near margin. In the other form the thorax is polished black.

Occurs at San Diego, Cal.

S. graptoderoides Crotch (*Luperus*), Trans. Am. Ent. Soc. 1874, p. 80.—Form of *flavicollis*; head and thorax greenish blue, elytra cobalt-blue, body beneath and legs piceous, with distinct bluish tinge. Antennæ two-thirds the length of the body, piceous; the three basal joints paler beneath. Head smooth. Thorax slightly wider than long, a little narrower at apex, sides feebly arcuate in front, then parallel to base, disc moderately convex, sparsely finely punctate; scutellum blue-black. Elytra sparsely, but very distinctly punctate, surface alutaceous. Body beneath and legs piceous, with bluish lustre. Length .26—.28 inch.; 6.5—7 mm.

Male.—The ventral characters are as in *flavicollis*; the first joint of front tarsus slightly dilated and thickened.

Female.—As in *flavicollis*.

Occurs at Santa Barbara, San Buenaventura and Los Angeles (Cal.).

S. Schwarzii n. sp.—Form oblong, parallel, beneath piceous, above uniformly blue, greenish or bronze. Antennæ piceous, the basal four joints in great part testaceous. Head alutaceous, sparsely punctate near the eyes. Thorax a little wider than long, slightly narrower in front, sides anteriorly feebly arcuate, then feebly sinuous to base, disc shining, sparsely punctate, more evidently near the base. Elytra distinctly not closely punctate, smoother at apex, sutural region slightly depressed near the base, the suture itself slightly elevated. Body beneath piceous, with slight metallic lustre. Legs piceous, the anterior knees and the front tibiae in great part yellow. Length .18—.20 inch.; 4.5—5 mm.

Male.—Last ventral piceous, shining, the disc transversely flattened, the apex feebly emarginate; posterior tibiae stout and rather strongly curved.

Female.—Last ventral acutely oval at tip; hind tibiae slightly arcuate.

This species is closely related to *loripes*, but differs in the color of

the thorax and the more distinctly punctured surface. The only variation is that due to the tendency of the blue metallic surface to piceous green or coppery-bronze.

From the fact that the hind tibiae of the female are curved (but less than in the male) in this species, it is possible that the other two species with curved tibiae in the male may have similar females. In that case they would form a series by themselves in the genus, as the genus might be divided into *Scelida* for those with straight hind tibiae, and *Scelolyperus* for the others.

Collected by Mr. E. A. Schwarz at Hood River Valley, Oregon; another in my cabinet from northern California.

S. longulus Lec. (*Luperus*), Pacific R. R. Rep. Ins. p. 69; Proc. Acad. 1865, p. 209; *nigrocyaneus* Lec., Bull. U. S. Geol. Surv. 1879, p. 517.—Form narrow, elongate, piceous, with slight green-bronze lustre. Antennae more than half the length of the body, piceous, the three basal joints paler beneath. Head smooth, black. Thorax broader than long, slightly narrower in front, sides arcuate anteriorly, then slightly convergent to base, disc convex, usually sparsely punctate. Elytra elongate, nearly parallel, the surface slightly scabrous, distinctly alutaceous and not punctate. Body beneath piceous, shining. Legs piceous, the front tibiae somewhat paler. Length .18—.20 inch.; 4.5—5 mm.

Male.—Last ventral segment truncate at middle with a slight sinuation each side, the disc slightly concave.

Female.—Last ventral longer, oval at tip.

This species varies but little. The thorax is usually distinctly sparsely punctate, but specimens occur quite smooth. Typical specimens of *nigrocyaneus* show that they differ merely in smaller size from *longula*.

Occurs in northern California, Oregon, Nevada, Montana, Colorado, Utah and Texas.

S. decipiens n. sp.—Form narrow, elongate, nearly as in *longula*, piceous, shining, with a faint bluish lustre. Antennae more than half the length of the body, piceous, the four basal joints yellow in great part, the outer joints broadened and flattened, the eleventh distinctly longer than the tenth, joints 2-3-4 gradually longer. Head finely transversely wrinkled, the transverse groove entire. Thorax very little wider than long, widest in front of middle, sides feebly arcuate, hind angles sharply rectangular, disc nearly smooth ♂, sparsely punctate at base and sides ♀. Elytra nearly twice as long as wide, alutaceous, very sparsely minutely punctate. Body beneath piceous. Legs piceous, the anterior tibiae at knee and the first joint of all the tarsi at base yellowish. Length .16—.18 inch.; 4—4.5 mm.

Male.—Last ventral segment prolonged at middle in a short truncate lobe; tarsi not dilated; outer joints of antennae slightly concave on the underside.

Female.—Last ventral oval at tip; outer joints of antennae not concave.

This species resembles *longula* so closely that it would be mixed

with that species without an examination of the antennæ. The sexual characters are not very different, except that in *decipiens* the middle truncate portion of the last ventral is slightly more prolonged.

Occurs at Yreka, Cal., collected by Mr. Wm. Duenkel.

TRACHYSCELIDA n. g.

This new name is proposed for a species described posthumously by Dr. LeConte as *Agelastica bicolor*. The characters are those of *Luperus*, excepting that the tibiæ are all without spurs. The first joint of the hind tarsus is nearly as long as the three following joints together and slender. The anterior coxæ are very narrowly separated, the cavities open behind.

The length of the first joint of the hind tarsus excludes it from association with *Agelastica*, and by that character, and the absence of tibial spurs, it approaches *Scelida*. From the latter genus it is separated by its broadly oval and convex form and by the front coxæ being narrowly separated by the prosternum.

T. bicolor Lec., Trans. Am. Ent. Soc. xii, November, 1884, p. 28.—Form rather broadly oval, convex, body and legs honey-yellow, elytra black, surface shining. Antennæ piceous, the four basal joints pale. Head smooth. Thorax more than twice as wide as long, slightly narrower in front, sides very slightly arcuate, angles rather obtuse, disc convex, smooth and shining. Elytra oval, broader behind, convex, disc slightly impressed behind the scutellum; surface punctate, regularly over the entire surface, the punctures not coarse nor close. Body beneath smooth, with very sparse pubescence. Length .21 inch.; 5.5 mm.

The only specimen examined is the type described by Dr. LeConte under the genus *Agelastica*, a female, in which the last ventral is oval at tip and entire.

The species resembles very closely the figure given by Jacoby, Biol. Cent.-Amer. vi, pt. i, pl. 34, fig. 4, of *Metacycla robusta*, and is about the same size. The latter species seems not to be a *Metacycla*.

Collected at Fort Yuma, Cal.

LUPERODES Motsch.

Head not deeply inserted, transversely grooved between the eyes and carinate between the antennæ. Eyes slightly oval, moderately prominent. Antennæ slender, longer than half the body, joints 2-3 often small, together not longer than the fourth; labrum transverse, slightly emarginate; maxillary palpi not stout, the last two joints subequal in length, the last more slender, conical and acute; prothorax variable in form, from transverse to quadrate, the hind an-

gles sometimes dentiform and prominent, the disc never distinctly impressed. Elytra oval, oblong-oval or parallel, the epipleuræ extending nearly to the apex; anterior coxal cavities open behind, sometimes absolutely confluent, often with a narrow prolongation of the prosternum separating the coxæ. Legs slender, not long, the tibiæ slender, slightly broader at tip, all with a terminal spur, that of the posterior pair usually longer; hind tarsi variable; claws appendiculate and divaricate.

To the genus *Luperodes* all those species of *Luperus*, described in our fauna, are referred, excepting those which have already been referred to *Scelida*.

The original description of *Luperodes*, by Motschulsky, gives nothing tangible by which it can be distinguished from *Luperus*, and the method adopted by Mr. Jacoby is equally objectionable. In the absence of any of Motschulsky's species for comparison and study I find myself compelled to rely entirely on the differential characters given by Chapuis, that is to say, in *Luperodes* all the tibiæ have a terminal spur, while in *Luperus* the posterior tibiæ alone are so formed. This character is not at all times easy to observe, but this is no excuse for neglecting it as a valid structural difference.

Since the above paragraph was written I have received, through the kindness of Mr. Jacoby, a specimen of *Luperodes nigripennis* Motsch. In studying this, in comparison with *Luperus niger* Göze sent at the same time, there seems no reason for a change of opinion. Our *L. thoracicus* very closely resembles *nigripennis*, except in its pale legs, and several other species have the same oval form, from which there is a gradual transition in our series to the elongate form, which is thought to be the more characteristic form of *Luperus*.

Two other genera are placed by Chapuis in close proximity to *Luperodes*, and separated from it by the relative lengths of the joints of the posterior tarsi. From the characters given, some of our species should be referred to these genera, *Astena* and *Iphidea*, but our species show such a degree of variation in respect to the relative lengths of the tarsal joints that it has been thought best to retain all in the one genus.

In those species of decidedly oval form, such as *thoracicus*, *luteicornis*, *varicornis* and *atriceps*, the first joint of the hind tarsus is fully as long, or even a little longer than the three following joints together, while in the more oblong forms the rule is that the first joint is a little shorter than the next three, although several excep-

tions will be found. So, also, with the second joint in its relation to the third; in many cases the former is twice the length of the latter; often they are about equal, while others act as intergrades.

The relative length of the second, third and fourth joints of the antennæ is subject to considerable variation. In about half the species the second and third joints are small, the third always a little longer than the second, the two together not as long as the fourth. In two species, *spretus* and *texanus*, the second is very much smaller than the third, which is nearly as long as the fourth. In the remainder of the species the three joints are respectively gradually longer, so that the second and third together are longer than the fourth.

The structure of the prosternum also requires attention. In those species of the more oval form and with the widest thorax, as in *thoracicus* and *varicornis*, the front coxæ are absolutely contiguous without trace of prosternum between them, while the more oblong species have, in most cases, the coxæ separated by a very narrow prolongation of the prosternum. Had the length of the hind tarsal joint and the form of prosternum been concurrent in all cases, there might have been good reasons for dividing the genus, but, as before stated, the first hind tarsal joint varies so much in its relation to the other joints that nothing positive can be done with it.

One of the minor peculiarities of the species of this genus requires particular attention, and that is the coloration of the legs. It seems, indeed, remarkable that such apparently trivial differences of coloration should be indicative of specific distinctness, but the persistency of color, and its almost absolute invariability within specific limits, is proven by the presence of other characters often sexual.

The coloration of the antennæ is less invariable than that of the legs.

The general color shows no variation within specific limits, excepting so far as the metallic-blues vary to green.

The comparatively numerous species are from all parts of the country, each species, with few exceptions, of limited distribution. They may be separated by the following table :*

* *Luperus thoracicus* Boh., Eug. Resa, Ins. p. 181, described as from San Francisco, has not been identified, and, like very many of the species there described, may not be from California at all. The name is preoccupied, and should be dropped from the literature.

- Body above yellow or pale castaneous; head yellow, except in *atriceps*; elytra vittate in *bivittatus*2.
- Body above bicolored or metallic; head black.....3.
- 2.—Elytra with the suture and a vitta piceous.....**bivittatus**.
Elytra not vittate.
Head never black, legs testaceous, or with the tibiæ darker; surface shining.....**varicornis**.
Head, legs and underside black; surface subopaque.....**atriceps**.
- 3.—Thorax yellow.....4.
Thorax blue or black.....8.
- 4.—Form oval; thorax twice as wide as long; prosternum not visible between the coxæ.....5.
Form oblong; thorax not much wider than long.....6.
- 5.—Elytra piceous, sparsely punctate; legs almost entirely yellow.
thoracicus.
Elytra dull blue, densely punctulate; legs entirely black.....**luteicollis**.
- 6.—Prosternum not visible between the coxæ; second joint of antennæ very small**texanus**.
Prosternum quite distinct between the coxæ; second joint of antennæ a little shorter than the third7.
- 7.—Elytra at most obsoletely punctate, usually nearly smooth.
All the tibiæ yellow**transitus**.
Anterior tibiæ alone yellow.....**laticeps**.
Legs piceous, all the knees slightly paler.....**Wickhami**.
Elytra very evidently punctate.
Anterior knees alone yellow.....**torquatus**.
- 8.—Antennæ entirely yellow: legs yellow, or more yellow than piceous9.
Antennæ in great part piceous; legs black, or with but little yellow (except in *spretus*).....10.
- 9.—Legs entirely yellow; elytra minutely alutaceous, without punctuation.
Lecontei.
Legs more or less varied with piceous.
Elytra punctate and alutaceous; hind angles of thorax dentiform; all three femora more or less piceous.....**meraca**.
Elytra very obsoletely punctate, scarcely alutaceous; hind angles of thorax not dentiform; middle and posterior femora partly piceous.
cyanellus.
- 10.—Legs entirely black11.
Legs bicolored.....12.
- 11.—Body blue; surface punctate and alutaceous; antennæ bicolored at base.
smaragdinus.
Body above black, sparsely punctate, not alutaceous; antennæ black.
morulus.
- 12.—Legs in great part yellow, the femora piceous at base.....**spretus**.
Anterior tibiæ and knees, middle and posterior knees also yellow.
Morrisoni.
Anterior tibiæ and knees yellow.....**varipes**.

L. bivittatus Lec., Proc. Acad. 1859, p. 81; loc. cit. 1865, p. 209.—Form elongate, beneath piceous, above yellow, each elytron with the suture and a vitta

from the umbone piceous, legs yellow. Antennæ yellow, longer than half the body, joint 2 shorter than 3, this shorter than 4, 2 and 3 together longer than 4. Head smooth, the transverse impression arched upward, not reaching the eyes. Thorax one-fourth wider than long, sides arcuate, hind angles not prominent, disc regularly convex, smooth; scutellum black. Elytra about twice as long as wide, sides nearly parallel, surface scarcely visibly punctate, the sutural and discal stripes not reaching the apex. Length .20—.22 inch.; 5—5.5 mm.

Male.—First joint of anterior and middle tarsi slightly thickened. Last ventral segment truncate at middle, the disc with a vague triangular depression.

Female.—Tarsi not thickened. Last ventral oval at tip.

The first joint of the posterior tarsi is about a third the length of the tibia and a little longer than the next two joints.

No variation has been observed in the numerous specimens examined.

This species is peculiar in being the only species in our fauna with vittate or ornate elytra.

Occurs in California in the coast range region south of San Francisco, at Tejon and near Yuma.

L. varicornis Lec., Trans. Am. Ent. Soc. ii, 1868, p. 57; *brunneus* Crotch, Proc. Acad. 1873, p. 54.—Oval, slightly oblong, entirely pale yellow, varying to pale castaneous, metasternum sometimes piceous. Antennæ two-thirds the length of body, variable in color from entirely piceous to banded with the basal joints pale, joints 2-3 small, nearly equal in length, the two together equal to the fourth. Head smooth, the transverse impression straight, attaining the eyes. Thorax about a third wider than long, slightly narrowed in front, sides feebly arcuate, hind angles slightly prominent, disc smooth. Elytra about a third longer than wide, sides arcuate, surface sparsely punctate, the punctures varying in distinctness in different specimens. Length .12—.17 inch.; 3—4.5 mm.

Male.—Last ventral truncate at middle, with a linear incisure each side extending half the length of the segment; tarsi not dilated.

Female.—Last ventral oval at tip.

The first joint of the hind tarsus is nearly half the length of the tibia, and much longer than the next two joints together.

This species varies in color, as has been stated, from pale yellow to brownish. The punctuation of the elytra may be nearly obsolete, or fairly distinct. The antennæ are often entirely piceous, or the three basal joints may be pale. Many specimens occur with the outer joints pale at base, while the three basal joints are entirely pale. The legs are usually entirely pale, but specimens occur with the posterior four tibiæ and tarsi infuscate. The metasternum is rarely piceous.

L. brunneus Crotch was founded on specimens from the Zimmerman collection (one of them is now before me) discolored, probably, by age.

Specimens are known to me from North Carolina, Georgia, Texas, Kansas and Arizona.

L. atriceps n. sp.—Form oval, body beneath, head, legs and antennæ black; thorax, elytra and abdomen dull yellow, subopaque. Antennæ two-thirds the length of body, second and third joints small, nearly equal, together a little longer than the fourth. Head alutaceous, opaque, the transverse impression straight, a short, median, impressed line. Thorax more than a half wider than long, slightly narrowed in front, sides feebly arcuate, hind angles obtuse, disc evenly convex, surface alutaceous, moderately closely punctulate; scutellum piceous. Elytra one-half longer than wide, sides arcuate, surface moderately closely punctulate. Length .18 inch.; 4.5 mm.

The specimen before me is a female with the usual oval last ventral segment.

The first joint of the hind tarsus is more than a third the length of the tibia and slightly longer than the next three joints together.

This species resembles some of the forms of *varicornis*, but differs in its coloration and more punctate surface.

One specimen; Arizona, without more definite indication of locality, from Mr. Aug. Merkel.

L. thoracicus Mels., Proc. Acad. iii, p. 162; Lec., Proc. Acad. 1865, p. 209.—Oval, slightly oblong, black; thorax and legs, in great part, yellow. Antennæ two-thirds the length of the body, entirely black, third joint slightly longer than second, these two together a little longer than the fourth. Head smooth, the transverse impression straight, not reaching the eyes. Thorax nearly twice as wide as long, not narrowed in front, sides feebly arcuate, hind angles not prominent, disc moderately convex, sparsely obsoletely punctate. Elytra nearly twice as long as wide, sides feebly arcuate, surface smooth, sparsely obsoletely punctate, but less at sides and apex. Body beneath, except pro- and mesothorax, black. Legs yellow, tarsi fuscous. Length .18—.20 inch.; 4.5—5 mm.

Male.—First joint of anterior and middle tarsi distinctly dilated. Last ventral segment truncate at middle, with a linear incisure each side extending half the length of the segment.

Female.—Last ventral oval at tip.

The first joint of the hind tarsus is less than half the length of the tibia, and equal to all the following joints together.

The ventral sexual characters of this species are very like those of *varicornis*, but the latter has not dilated tarsi.

This species is widely distributed, but does not seem common. It is known from Pennsylvania, Maryland, Georgia and Kansas.

L. luteicollis Lec., Trans. Am. Ent. Soc. ii, 1868, p. 57.—Oval, slightly oblong; body beneath, head and legs, black; thorax yellow, elytra dull blue. Antennæ black, two-thirds the length of body, third joint a little longer than the second, the two equal to the fourth. Head sparsely punctate and alutaceous, the transverse impression straight and entire. Thorax nearly twice as wide as

long, slightly narrowed in front, sides very feebly arcuate, hind angles not prominent, disc convex, a very vague fovea each side, surface closely and rather finely punctate, not shining. Elytra nearly twice as long as wide, sides feebly arcuate, surface finely scabrous and very finely punctulate. Length .16—.18 inch.; 4—4.5 mm.

Male.—First joint of the anterior and middle tarsi distinctly thickened. Last ventral truncate, with a rectilinear incisure each side as in *thoracicus*.

Female.—Last ventral oval at tip.

The first joint of the hind tarsus is one-third the length of the tibia, and as long as the following joints together.

This species is peculiar in the densely finely punctate and opaque surface.

Occurs in Colorado and New Mexico.

L. texanus n. sp.—Form oblong, parallel, black, thorax and legs (except bases of femora) yellow. Antennæ two-thirds the length of the body, brown, the basal five joints pale, joint two small, nodiform, third three-fourths the length of the fourth. Head smooth, transverse impression straight, entire. Thorax one-third wider than long, widest in front of middle, not narrower in front, sides arcuate, hind angles not prominent, disc smooth. Elytra twice as long as wide, sides very feebly arcuate, disc sparsely, but distinctly punctate, nearly smooth at apex, surface shining. Body beneath black, prosternum piceous, not at all prolonged between the coxæ. Legs yellow, the bases of the femora piceous, but less on the anterior pair. Length .16 inch.; 4 mm.

Female.—Last ventral acutely oval at tip.

The first joint of the hind tarsus is scarcely more than a fourth of the length of the tibia, and not as long as the following joints together.

This species begins a series of oblong form and with yellow thorax. They seem to be very closely related, but may be separated by a strict regard for the characters given in the table, the present being especially well separated by the absence of any metallic coloring and by the front coxæ being absolutely contiguous.

Occurs in Texas, special locality unknown.

L. transitus n. sp.—Elongate, parallel, beneath piceous, head and elytra metallic-green or bluish, thorax yellow. Antennæ two-thirds the length of body, piceous, the basal five joints yellow, with brownish streak above, joints 2-3-4 gradually longer. Head smooth, the transverse impression straight and entire. Thorax a little wider than long, widest in front of middle, sides slightly arcuate in front, oblique posteriorly, hind angles slightly prominent, disc convex, smooth; scutellum piceous. Elytra rather more than twice as wide as long, sides parallel, disc sparsely punctate, sides and apex smooth; prosternum with a linear prolongation between the coxæ; femora piceous, with metallic lustre, the tips with the tibiæ and tarsi yellow. Length .16 inch.; 4 mm.

Male.—First joint of front tarsi slightly thickened. Last ventral segment broadly truncate, the disc slightly flattened.

Female.—Last ventral oval at tip.

The first joint of the hind tarsus is one-third the length of the tibia, and about as long as the following joints together.

From the localities given by Dr. LeConte I am quite confident that this species was mixed by him with *torquatus*, from which it differs in having all the tibiæ and tarsi yellow, and by the smooth thorax and much less punctate elytra.

Occurs in California, Santa Barbara, San Mateo and Dunsmuir (Wickham).

L. laticeps n. sp.—Moderately elongate, parallel, beneath black, head and elytra bluish green, thorax yellow. Antennæ two-thirds the length of body, piceous, the basal three and part of fourth yellow, joints 2-3-4 gradually longer. Head smooth, the transverse impression angulate, deep, entire. Thorax about a half wider than long, widest in front of middle, sides anteriorly arcuate and thence slightly oblique to base, hind angles slightly prominent, disc convex, smooth. Elytra twice as long as wide, the sides nearly parallel, surface alutaceous, very sparsely, finely punctulate; prosternum very narrowly prolonged between the coxæ. Legs piceous, the anterior tibia and apex of femur and the apex of middle femur and base of tibia yellow. Length .15 inch.; 3.75 mm.

Male.—First joint of middle and anterior tarsi slightly thickened; the last ventral segment broadly truncate and slightly concave.

Female.—Last ventral oval at tip.

The first joint of the hind tarsus is one-third the length of tibia and scarcely as long as the following joints together.

When viewed from above the front is rather flat, and the eyes a little more prominent than usual, giving the head a somewhat broader appearance.

This species is closely related to *torquatus*, but has a differently shaped and smooth thorax. The elytra are also alutaceous and much less punctate, and the legs differently colored.

Two specimens; California, region unknown.

L. Wickhami n. sp.—Oblong, nearly parallel, beneath piceous; above, head and elytra bluish green, thorax yellow. Antennæ longer than half the body, piceous; joints 2-3-4 gradually longer. Head smooth, the frontal transverse impression scarcely reaching the eyes. Thorax about one-fourth wider than long, widest in front of middle, base and apex equal, sides arcuate, hind angles not prominent, surface smooth. Elytra not twice as long as wide, very obsoletely sparsely punctate, the surface shining; prosternum narrowly prolonged between the coxæ. Legs piceous with greenish lustre, all the knees faintly paler. Length .14—.16 inch.; 3.5-4 mm.

Male.—Last ventral segment with a narrow, slightly prolonged truncation limited each side by a notch, the disc slightly concave; tarsi not dilated.

Female.—Last ventral oval at tip.

The first joint of the hind tarsus not quite a third the length of the tibia and not longer than the next two joints together.

This species is, by the color of the legs, more nearly related to *torquatus*, but the latter has the elytral punctuation so well marked, while in the present species and the two which precede, the punctuation is almost obliterated.

Occurs in Arizona at Peach Springs (Wickham).

L. torquatus Lec., Trans. Am. Ent. Soc. xii, 1884, p. 28.—Form elongate, nearly parallel, beneath and head black, thorax yellow, elytra metallic-blue or green. Antennæ a little longer than half the body, piceous, the basal five joints testaceous beneath, joints 2-3 nearly equal, the fourth but little longer than the third. Head greenish, smooth, the transverse impression entire. Thorax very little wider than long, slightly narrowed in front, sides feebly arcuate, hind angles not prominent, disc convex, sparsely punctate, shining. Elytra rather more than twice as long as wide, sides nearly parallel, surface indistinctly alutaceous, very evidently punctate, but not closely; prosternum narrowly prolonged between the coxæ. Legs black, the anterior knees and a portion of the tibia testaceous. Length .12—.16 inch.; 3—4 mm.

Male.—First joint of front and middle tarsi distinctly thickened. Last ventral truncate at middle, the disc flat and rather smooth.

Female.—Last ventral oval at tip.

The first joint of the hind tarsus is about a fourth the length of the tibia and not as long as the following joints united.

Occurs in California, Los Angeles and southward.

L. Lecontii Crotch, Proc. Acad. 1873, p. 54; *rufipes* || Lec., Col. Kans. p. 27.—Form moderately elongate. Body beneath, head and thorax black, elytra blue, antennæ and legs entirely yellow. Antennæ more than half the length of the body, joints 2-3-4 gradually longer. Head alutaceous, transverse impression deep and entire. Thorax a little wider than long, sides slightly arcuate in front, hind angles prominent, disc convex, smooth. Elytra nearly twice as long as wide, sides slightly arcuate, surface alutaceous, with very minute punctures sparsely scattered; prosternum very narrowly prolonged between the coxæ. Legs entirely yellow. Length .20 inch.; 5 mm.

Female.—Last ventral oval at tip.

The first joint of hind tarsus is nearly half the length of the tibia, and as long as the following joints together.

Closely resembles *meraca*, which, however, has the elytra more shining and more punctate, and all the femora at base are piceous.

Occurs in New Mexico, near Santa Fé.

L. meraca Say, Journ. Acad. v, 299; ed. Lec. ii, p. 344.—Form elongate, beneath piceous, above dark blue or blue-black. Antennæ two-thirds as long as the body, entirely yellow, joints 2-3-4, gradually longer. Head slightly alutaceous, sparsely punctate, transverse impression deep and entire. Thorax scarcely wider than long, sides feebly arcuate in front, slightly sinuate behind, angles acute and prominent, disc convex, smooth. Elytra fully twice as long as wide, sides nearly parallel, surface faintly alutaceous, sparsely punctate; prosternum

narrowly prolonged between the coxæ. Legs yellow, the basal half of the femora piceous. Length .20 inch.; 5 mm.

Male.—First joint of anterior and middle tarsi slightly thickened. Last ventral broadly truncate, disc smooth.

Female.—Last ventral oval at tip.

The first joint of the hind tarsus is nearly a third the length of tibia, but not as long as the following joints together.

This species is easily distinguished by its sculpture and color of legs from *Lecontii* and from *cyanellus* by the more nearly square thorax.

The elytral punctuation varies in distinctness, the males before me are smoother than the females.

Occurs in New Hampshire, Massachusetts, Pennsylvania, Georgia, Illinois, Kansas.

L. cyanellus Lec., Proc. Acad. 1865, p. 209.—Oblong-oval, beneath piceous, above blue. Antennæ entirely yellow, a little longer than half the body, joints 2-3-4 gradually longer. Head indistinctly alutaceous, the transverse depression deep, entire, deflexed at middle. Thorax nearly a third wider than long, widest at middle, sides regularly arcuate, hind angles not prominent, disc convex, smooth, sparsely punctate at sides and base. Elytra not twice as long as wide, sides slightly arcuate, disc shining, indistinctly alutaceous, sparsely finely punctate; prosternum very narrowly prolonged between the coxæ. Legs usually entirely yellow, rarely with the middle and posterior femora infusate near the base. Length .12—.18 inch.; 3-4.5 mm.

Male.—Front and middle tarsi not dilated. Last ventral truncate, disc smooth.

Female.—Last ventral oval.

The first joint of the hind tarsus is not more than a fourth the length of the tibia and shorter than the following joints together.

This species is more shining than either *meraca* or *Lecontii*, and less distinctly punctate than the former. It has a broader thorax than either, and with less prominent hind angles.

Occurs in Pennsylvania, Missouri, Illinois.

L. smaragdinus Lec., Proc. Acad. 1859, p. 286.—Form moderately elongate, beneath and legs black, above blue. Antennæ two-thirds the length of body, piceous, the four basal joints pale beneath, joints 2-3-4 gradually longer. Head indistinctly alutaceous, the transverse impression deep and entire. Thorax one-fourth wider than long, sides slightly arcuate in front, then oblique to base, hind angles not prominent, disc moderately convex, indistinctly alutaceous, sparsely punctate. Elytra fully twice as long as wide, sides parallel, surface indistinctly alutaceous, sparsely finely punctate; prosternum very narrowly prolonged between the coxæ. Length .23 inch.; 6 mm.

Male.—Last ventral obtusely truncate, the surface smooth; first joint of anterior and middle tarsi slightly dilated.

First joint of hind tarsus scarcely one-third as long as the tibia and shorter than the following joints together.

This species is the only one in our fauna entirely blue above with black legs. It resembles very greatly *Scelida graptoderoides*, but may be known by the presence of spurs on all the tibiae.

Occurs in California, Punto de los Reyes.

L. morulus Lec., Proc. Acad. 1865, p. 210.—Oblong-oval, black, shining. Antennae a little longer than half the body, second joint a little longer than half the third, these two longer than the fourth. Head smooth, the transverse impression straight, entire. Thorax one-half wider than long, sides feebly arcuate, hind angles not prominent, disc moderately convex, a vague depression each side, sparsely finely punctate near the front angles. Elytra one-half longer than wide, sparsely and very finely punctate; prosternum very narrowly prolonged between the coxae. Body beneath black, shining. Length .14 inch.; 3.5 mm.

Male.—Last ventral truncate at middle with a linear incisure, each side extending half the length of the segment.

The hind legs are unfortunately wanting in my specimen.

The sexual characters of the last ventral of the male are precisely those of *thoracicus* and *varicornis*. The length given by LeConte, .4 inch., is plainly a misprint.

Occurs in Texas, precise locality unknown.

L. spretus n. sp.—Oblong-oval, black, shining, four basal joints of the antennae and the legs (except femora at base) yellow. Antennae three-fourths the length of the body, second joint small, nodiform, scarcely half the third, these two as long as the fourth. Head smooth, transverse impression straight, entire. Thorax one-third wider than long, widest in front of middle, sides feebly arcuate, hind angles not prominent, disc convex, smooth, a few very fine punctures near the front angles. Elytra shining, sparsely finely punctate; prosternum narrowly prolonged between the coxae. Legs entirely yellow, except the bases of the femora. Length .16 inch.; 4 mm.

The male is unknown.

The first joint of the hind tarsus is one-third the length of the tibia, and scarcely as long as the following joints together.

This species greatly resembles *texanus* in form, but differs in being totally black above, and by the elytra much less distinctly punctate. It also resembles the European *Luperus niger*, but differs in having terminal spurs to all the tibiae and the anterior coxae distinctly separated by the prosternum.

Occurs in Texas, precise region unknown.

L. Morrisoni Jacoby, Biol. Cent.-Amer. vi, pt. 1, p. 595.—Oblong, beneath piceous, above metallic-blue or green. Antennae two-thirds the length of body, piceous externally, the four or five basal joints pale, joints 2-3 oblong, nearly equal in length, the two longer than the fourth. Head smooth, the transverse impression deflexed at middle, entire. Thorax one-third wider than long, widest in front of middle, sides anteriorly arcuate, thence slightly oblique to base, hind

angles not prominent, disc moderately convex, sparsely finely punctate, but smoother at middle. Elytra twice as long as wide, sides parallel, surface punctate, but smoother at sides and apex; prosternum narrowly prolonged between the coxæ. Legs piceous, the anterior tibiæ, knees and tarsi, the middle and posterior tibiæ at base pale. Length .18—.20 inch.; 4.5—5 mm.

Male.—Anterior and middle first tarsal joint slightly thickened, posterior tibia straight. Last ventral broadly truncate at middle, the disc smooth and slightly concave.

Female.—Last ventral broadly oval.

First joint of hind tarsus scarcely a third the length of the tibia, and not as long as the following joints together.

This species closely resembles *varipes*, but has a broader thorax, differently colored legs and less pronounced male sexual characters.

Occurs in southern California and Arizona (Morrison).

L. varipes Lec., Pacif. R. R. Rep. p. 69.—Form oblong, moderately elongate, beneath piceous, above bright blue. Antennæ longer than half the body, piceous, the four basal joints testaceous, upperside piceous, joints 2–3–4 gradually longer. Head smooth, the transverse impression entire. Thorax very nearly square, sides feebly arcuate, hind angles slightly prominent, disc moderately convex, sparsely punctate along the base. Elytra twice as long as wide, surface distinctly alutaceous, sparsely punctate, more finely and less distinctly at the sides and apex; prosternum very narrowly prolonged between the coxæ. Legs piceous, middle knees testaceous, anterior femora at apex, the tibiæ and tarsi testaceous. Length .18—.20 inch.; 4.5—5 mm.

Male.—The first joint of *all* the tarsi thickened, hind tibiæ slightly arcuate. Last ventral truncate at middle, with a slight sinuation each side, disc slightly concave.

Female.—Last ventral oval at tip; tarsi not dilated, tibiæ straight.

The first joint of the hind tarsus is one-third the length of the tibia, and not longer than the other three joints together.

This species varies a little in the punctuation of the thorax; usually the disc is quite smooth, sometimes sparsely punctate. The description by LeConte being comparative with the species then known, gives rather an exaggerated idea of the punctuation.

The dilatation of the first joint of all the tarsi in the male, with the arcuate hind tibiæ, is rather a remarkable character.

Occurs in California from San Francisco northward, extending into Montana and Colorado.

ANDROLYPERUS Crotch.

Head oval, inserted as far as the eyes, which are slightly oval and prominent; labrum transverse, truncate; maxillary palpi not very stout, the fourth joint twice as long as the third, somewhat fusiform in shape. Antennæ longer than half the body, intermediate joints subserrate in the male, first joint moderately stout, clavate, second

small, ovate, third a little shorter than first, fourth longer than the third, joints five to ten nearly equal in length, shorter than the fourth, but longer than the third, eleventh equal to the fourth. Thorax quadrate, slightly wider than long, sides feebly arcuate, disc not impressed. Elytra oblong-oval, broader in the male; epipleuræ wide, extending three-fourths to apex; prosternum distinctly separating the coxæ; anterior coxal cavities open behind. Legs moderate in length; tibiæ scarcely broader to tip, the outer edge rounded, the apex without spur; tarsi moderate, first joint of posterior pair longer than the next two; claws appendiculate.

This genus was named by Crotch from a pair of specimens in my cabinet and characterized in a few words without any attempt to indicate its relationship beyond that it belongs in the vicinity of *Luperus*. Its position is rather difficult to assign, owing to the want of extensive material for comparison. That it is not very near *Luperus* is shown in the shorter first joint of the hind tarsus and the absence of tibial spurs. On the other hand, that tarsal joint is longer than in the groups in which the joint is at most the length of the next two. From a manuscript label still attached to my specimen, it is evident that Crotch was at first disposed to place the species in *Malacosoma*. There seems no course to be pursued but to place it in a separate group.

A. fulvus Crotch, Proc. Acad. 1873, p. 55.—Oblong-oval, subdepressed, above fulvous; head, antennæ, legs, meso-metasternum and last ventral segment piceous black, surface glabrous, shining. Head smooth, a transverse impressed line between the eyes, frontal tubercles flat, clypeus carinate. Thorax quadrate, a little wider than long, sides feebly arcuate in front, thence slightly sinuate to base, base regularly arcuate with a marginal line, a little wider than the apex, hind angles rectangular, anterior angles slightly nodiform, disc convex, smooth and not impressed; scutellum piceous. Elytra oblong-oval, slightly wider behind the middle, disc smooth and shining. Body beneath very sparsely pubescent. Length .20 ♂—.24 ♀ inch.; 5—6 mm.

Male.—Antennæ a little more subserrate than the female; third and fourth ventral segments each with two slender processes on each side of the middle of the posterior margin of the segment, the disc flat. Last ventral deeply concave, smooth, piceous; side margin of elytra deeply and irregularly plicate one-fourth from apex.

Female.—Ventral segments simple; elytra simple.

In the male there is on each elytron a short, indistinct piceous vitta near the apex.

The male ventral characters are certainly very extraordinary. The structure of the last ventral is not unlike that seen in some

Phyllobrotica, but the slender, slightly diverging processes of the third and fourth ventrals are very unusual. The plication of the side margin of the male elytron is also a rare character, but some of the species of *Malacorhinus* are similarly provided.

Two specimens from the coast range region of California, south of San Francisco.

MALACORHINUS Jacoby.

Head oval, not deeply inserted, front with a transverse impressed line, frontal tubercles flat. Eyes slightly oval, moderately prominent; labrum transverse, entire; maxillary palpi moderately stout, the terminal joint conical, longer than the preceding. Antennæ slender, longer than half the body, first joint rather stout, second half as long, third as long as first, fourth a little longer than third, joints five to ten equal to third, eleventh a little longer. Thorax quadrate, narrower in front; scutellum broadly triangular. Elytra oval, broader in the male; epipleuræ moderately broad, reaching nearly the apex; prosternum narrowly prolonged between the coxæ, the cavities open behind. Legs slender, tibiæ rounded on the outer edge, the anterior pair without terminal spurs; tarsi moderately long, the first joint of the posterior a little longer than the next two joints together; claws appendiculate.

To this genus *Androlyperus maculatus* is referred. The description by Jacoby is far too short, however, to be absolutely certain, but the facies and the male sexual characters leave very little doubt that our species is congeneric with some of those placed by Jacoby as typical of the genus. The joints, about which there may be doubt, are as follows: Jacoby states that the front coxæ are contiguous; our species has a laminiform prosternum separating them; it is also vaguely stated that the tibiæ are mucronate, but it is not stated whether all are so; the thorax is said to be constricted at base, but our species and all those figured show no constriction, but merely that the thorax is narrower at base than at apical third.

The position of the genus in its relation to those already described is somewhat problematical. It seems to be related to *Malacosoma*, but the tarsi more nearly approach those of the Luperite series. In fact, the female of the only known species has been placed in *Malacosoma* by Allard. At present it will probably be best to associate it with *Androlyperus* to form a group based on the structure of the tarsi and the deformed elytra of the male.

One species occurs in our fauna.

M. maculatus Lec., Trans. Am. Ent. Soc. xii, November, 1884, p. 28; *cimex* Allard, Ann. Belg. 1889, p. lxviii.—Oblong-oval, differing in the sexes, color pale blood-red (when recent) or reddish yellow, each elytron with two black spots, surface shining ♀, or with subopaque elytra ♂. Head entirely black, smooth. Antennæ black. Thorax broader than long, narrower at apex, sides very obtusely angulate one-third from apex, thence slightly sinuous to base, hind angles acutely rectangular, anterior angles slightly tuberculate, disc convex at sides only, smooth, polished. Elytra oblong and parallel ♀, or rather broadly oval ♂, each with two irregularly oval piceous spots placed a third from apex and from base, surface smooth, impunctate. Body beneath and legs black, abdomen yellow, the last segment piceous ♀, surface sparsely fulvo-pubescent. Length .27—.31 inch.; 7—8 mm.

Male.—Elytra rather broadly oval with subopaque surface, about one-half longer than wide, lateral margin one-third from apex incised, wrinkled and foveate, lateral margin rather widely explanate. Last ventral segment truncate, the apex sinuate, disc foveate near the edge.

Female.—Elytra oblong, parallel, polished, rather more than twice as wide as long, margin entire and narrowly prominent. Last ventral oval at tip, entire.

In this species the male has a broader and more depressed form than any of the species figured by Jacoby, while the female is not very unlike in form a depressed *Phyllobrotica*. The sexes are thus so unlike that they might readily be supposed to be distinct species.

Occurs in the southern part of California.

METACYCLA Baly.

Head not large, not deeply inserted, front oblique. Eyes narrowly oval, entire. Antennæ slender, reaching the tips of the elytra, joint one stout and conical, two half as long, joints 3–11 nearly equal, the fourth a little longer; labrum transverse, slightly emarginate; maxillary palpi not stout, the last joint as long as the preceding and a little more slender; prothorax transverse, narrower at base than at apex; scutellum oval, broader than long. Elytra oblong oval, the epipleuræ moderately broad, extending nearly to apex; prosternum not extending between the coxæ, the coxal cavities open behind. Legs moderate, the tibiæ carinate on the outer edge, a terminal spur on all the tibiæ; claws broadly appendiculate.

This genus is remarkable in the great dissimilarity of the sexes. In the male the elytra completely cover the abdomen, and the form is not unlike *Cerotoma*, while in the female the abdomen is greatly inflated, as in *Meloe*, and the elytra scarcely cover more than a third of its length. Unaware of the identity of the genera, Dr. LeConte described this one as *Gastrogyna*, Dr. Baly's *Metacycla* having been described four years previously.

Metacycla forms in the system of Dr. Chapuis a group by itself characterized by the open anterior coxal cavities, distinct epipleuræ, first joint of hind tarsus not longer than the two following; claws appendiculate, and thorax distinctly narrowed behind.

M. insolita Lec., Proc. Acad. 1861, p. 338; loc. cit. 1865, p. 311.—Form unlike in the sexes, color dull yellow, each elytron with two small, black spots. Antennæ piceous, basal joint pale, extending to apices of elytra. Head smooth. Thorax twice as wide as long, narrower at base, sides feebly arcuate, anterior angles obtusely prominent, hind angles small, subacute, disc convex, with two vague transverse depressions, surface smooth; scutellum piceous. Elytra coarsely and moderately closely punctate; femora dull yellow, tibiæ and tarsi brown. Length .23 ♂—.46 ♀ inch.; 6—11.5 mm.

Male.—Body winged, elytra covering the abdomen. Last ventral truncate with a broad and vague emargination.

Female.—Body apterous, abdomen inflated and extended, brownish in color. Last ventral broadly oval at tip.

Occurs at Cape San Lucas, Peninsula of California.

MALACOSOMA Rosenh.

Head moderate, inserted nearly to the margin of the eyes, front transversely grooved between the antennæ; labrum moderately large, not emarginate. Eyes oval, entire; maxillary palpi with the last two joints obconical, nearly equal in length. Thorax quadrangular, wider than long, disc without depressions; scutellum oval at tip. Elytra distinctly margined at the sides, the epipleuræ extending beyond the middle; prosternum distinctly separating the coxæ but narrow, broadened at tip, the coxal cavities open behind; ventral segments not very unlike in length. Legs moderate, tibiæ slightly broader at tip, with very well developed spurs on all three pairs; tarsi rather stout, the first joint of posterior pair not quite as long as the next two together; claws broadly appendiculate.

The species here placed in *Malacosoma* exhibit some differences from the generic description as given by Chapuis, but in deference to the views of Mr. Jacoby, to whom one of the species was known, they are allowed to remain. M. Bedel observes that, in the European species, the "outer border of the eyes is provided with long grey hairs." In *vittipenne* the lower border of the eyes is ciliate, but not in *brevicorne*.

The two species known may be separated in the following manner:

Antennæ piceous, with the three basal joints pale, the joints three to ten more than twice as long as wide. Elytra yellow, with narrow black vittæ.

vittipenne.

Antennæ entirely piceous, short and stout, the joints three to ten not twice as long as wide. Elytra dull yellow, varying through brownish to black.

brevicorne.

These two species are from the southwestern regions of our country.

M. vittipenne n. sp.—Oblong, parallel, slightly depressed, pale yellow, elytra with narrow black vittæ, metasternum and abdomen piceous, surface glabrous, shining. Antennæ slender, more than half the length of the body, black; three basal joints yellow. Head smooth, yellow, occiput with a large piceous spot each side. Thorax one-third wider than long, sides arcuate in front, widest one-third from apex, anterior angles slightly nodiform, disc moderately convex, smooth, shining; scutellum black. Elytra very little wider than the thorax, shining, minutely sparsely punctate, color paler yellow than the thorax, with the side margin not reaching apex, suture and three narrow vittæ black, the middle vitta begins within the humeral umbone at base and extends nearly to apex, the other two vittæ are incomplete in front, but meet around the end of the middle vitta near the apex. Legs always entirely pale. Abdomen sparsely hairy. Length .26 inch.; 6.5 mm.

Male.—Last ventral segment truncate at middle, each side of which is a moderately deep notch, the disc of the segment concave.

Female.—Last ventral segment with a broadly curved margin.

At first glance this insect very much resembles some of our *Disonychæ* from the style of ornamentation.

The front has a distinct transverse groove between the eyes in this species, but much less marked than in *brevicorne*, and in neither has there been observed any tendency to a carination of the tibiæ near the knee. In both these characters the two species seem at variance with those given by Chapuis.

Occurs in southwestern Texas, precise region unknown.

M. brevicorne Jacoby, Biol. Cent.-Amer. vi, pt. 1, p. 582 (December, 1887).—Oblong, parallel, less depressed, color fulvous, the elytra varying to brown or black. Antennæ entirely piceous, extending but little beyond the hind angles of the thorax. Head smooth, a deep transverse frontal impression, color variable, sometimes entirely black, rarely entirely yellow, usually with the front yellow and occiput black. Thorax one-fourth wider than long, sometimes slightly narrower at apex than at base, disc convex, smooth; scutellum piceous. Elytra moderately closely punctate with coriaceous wrinkles, color fulvous, varying to black; epipleuræ of the color of the elytra. Body beneath variable in color, rarely entirely black or yellow, usually with the metasternum alone piceous. Legs somewhat variable in color, sometimes entirely black, usually with the knees, tibiæ and tarsi black. Length .20--.24 inch.; 5--6 mm.

Male.—Last ventral segment with a median truncate lobe limited each side by a notch, the disc of the segment with an oval, abrupt depression.

Female.—Last ventral oval at tip.

The variations of this insect have been in great part indicated in the description. From the material before me it would seem that

the male has the tendency to become black. One male before me is entirely black, except that the thorax is orange-yellow, but I think I have seen in Mr. Ulke's cabinet an entirely black specimen.

Occurs in Utah and Arizona, and in the State of Coahuila, Mex.

PHYLLECTHRUS Lec.

Form elongate, surface glabrous and nearly smooth. Head free, eyes oval, entire, distant from the margin of the thorax, front more or less grooved transversely above the insertion of the antennæ, labrum short, emarginate; maxillary palpi stout, the terminal joint acute, narrower and shorter than the preceding. Antennæ moderately long, slender in the ♀, thickened toward the tip ♂ in all the species except *gentilis*; 11-jointed in both sexes, but 10-jointed in the male of *gentilis*. Thorax broader than long, slightly narrowed at base, sides distinctly margined, base arcuate; scutellum oval at tip. Elytra with very distinct lateral margin, epipleuræ narrow, but extending more than half to apex; prosternum obliterated between coxæ; metapleuræ moderately wide and slightly concave longitudinally. Legs moderately long, tibiæ slender and without spurs; first joint of hind tarsi longer than the next two; claws broadly appendiculate at base.

The position of this genus as indicated by Chapuis is by no means satisfactory. With *Phyllobrotica*, especially, it seems to have but little affinity. In the latter genus there is absolutely no lateral margin to the elytra, and consequently no epipleuron properly defined. In *Phyllecthrus*, on the contrary, the margin is even more sharply defined than in many *Luperus*, and the epipleuron as fully developed as in that genus. The length of the first joint of the hind tarsus and the entire absence of tibial spurs on all the feet place its relationship with but few of the groups suggested by Chapuis, and apparently the most closely with the Mimastrites. I am, however, inclined to believe that *Chthoneis* may be related to *Phyllecthrus*, although that genus is known to me by description alone. Assuming a relationship with the Mimastrite (as can easily be done by regarding females alone of *Phyllecthrus*) we are then forced to admit a very close relationship with *Cneorane*. One fact is, however, very evident—too many of the genera of Galerucini have been described from uniques without any published references to sexual peculiarities, which are often a guide to relationship when other characters cause doubt by their double indication.

In the uncertainty from want of specimens of many foreign genera, and from the fact that our small fauna hardly requires the separation of genera in groups, I refrain from indicating a new group.

Phyllecthrus is peculiar to our fauna, and contains but few species, which may be separated in the following manner:

Antennæ dissimilar in form in the two sexes, thickened toward the tip ♂ or filiform ♀, but 11-jointed in both sexes.

Scutellum yellow; elytra comparatively smooth.

Elytra wider than the thorax; antennæ piceous in both sexes...**dorsalis.**

Elytra not wider than the thorax; antennæ quite pale ♂, and but little darker ♀ **parallelus.**

Scutellum black; elytra vaguely subsulcate and distinctly punctate.

Elytra a little wider than thorax; antennæ brown ♂, piceous ♀.

subsulcatus.

Antennæ filiform in both sexes and piceous, but 10-jointed ♂, 11-jointed ♀.

Elytra distinctly wider than the thorax and quite smooth; scutellum yellow.

gentilis.

P. dorsalis Oliv., Ent. vi, p. 646, pl. 4, fig. 54; *atriventris* Say (partim), Journ. Acad. iii, p. 461; ed. Lec. ii, p. 224; Lec., Proc. Acad. 1865, p. 207.—Head, thorax and underside of body yellow, elytra and abdomen black, thorax sometimes with a piceous stripe each side. Antennæ black. Head smooth. Thorax broader than long, sides slightly arcuate at front angles, nearly parallel behind, disc convex, with a vague shallow impression each side, surface smooth; scutellum yellow. Elytra black, shining, usually impunctate, sometimes sparsely punctate. Body beneath quite smooth, abdomen sparsely, finely punctate; femora yellow, tipped with black, tibiæ and tarsi black. Length .24 inch.; 6 mm.

Male.—Antennæ 11-jointed, gradually thicker to apex, joints 2 and 3 small and equal, together shorter than the fourth, the fourth but little shorter than the first, eighth joint shorter than the seventh or ninth; middle tibiæ deeply notched on the innerside near the apex; first joint of anterior tarsus shorter than the second; second ventral with a conical process from the middle of the posterior edge.

Female.—Antennæ slender, 11-jointed, joints 2 and 3 together equal to the fourth, joints 4–11 nearly equal in length; middle tibiæ simple; first joint of front tarsi fully as long as the second.

Variations.—Specimens occur with the broad piceous band near the side of the thorax, or with the thorax entirely yellow. The latter are more generally females. Specimens occur with almost the underside of the body piceous, including the legs. The elytra may be absolutely smooth or punctate, my specimens showing the former to be female and the latter male, but sufficient material is not at hand to say if the character is really sexual.

There seems to be very little doubt that Say has confused two species in his *atriventris*. The general description, except as to the color of the antennæ, will fit this species or *nigripennis* Lec., but the

antennæ are 11-jointed in both sexes here, while in *nigripennis* ♂ they are 10-jointed, as stated by Say.

Occurs abundantly near Washington, D. C. (Schwarz), and from thence westward to Missouri and Texas.

P. parallelus n. sp.—Form moderately elongate, parallel, slightly depressed. Head yellow, slightly darker than the thorax, sparsely finely punctate. Thorax wider than long, slightly narrowed behind, sides slightly arcuate in front, thence oblique to the hind angles, disc moderately convex, with a vague crescentic transverse depression, surface smooth, color yellow; scutellum yellow. Elytra but little wider than the thorax; black, shining, the lateral margin narrowly yellow, surface alutaceous, sparsely punctulate; epipleuræ yellow. Body beneath and abdomen piceous. Legs yellow, the hind tibiæ and tarsi and upper line of femora piceous. Length .18 inch.; 4.5 mm.

Male.—Antennæ entirely yellow, except upperside of first joint, joints two and three small, together not as long as the fourth, joints four to ten gradually shorter, eleventh longer; middle tibiæ deeply emarginate on the innerside near the apex, first joint of front tarsus very short.

Female.—Antennæ slender, darker than in the male, formed as in *subsulcatus*; middle tibiæ simple; first joint of front tarsus as long as the second.

This species may be known in the group in which the male antennæ are 11-jointed by its more parallel form and relatively broader thorax. From *subsulcatus* it is distinguished by its smoother elytra and yellow scutellum, and from *dorsalis* by the yellow margin and epipleuræ, and by the pale antennæ.

Occurs in Texas, region unknown.

P. subsulcatus n. sp.—Piceous black, shining, head and thorax entirely yellowish. Head smooth; thorax distinctly wider than long, slightly narrower behind, sides anteriorly slightly arcuate, then nearly straight and slightly convergent to base, disc convex, a slight fovea each side, surface smooth; scutellum piceous. Elytra vaguely subsulcate, distinctly punctate and slightly alutaceous smoother near the apex. Body beneath piceous black, shining; femora in great part piceous; tibiæ and tarsi usually pale. Length .12 inch.; 3 mm.

Male.—Antennæ ferruginous, gradually thicker to tip, 11-jointed, joints two and three small and similar, together shorter than the fourth, joints eight and nine subequal, these shorter than either the seventh or tenth; middle tibiæ deeply emarginate on the innerside near the tip; first joint of front tarsus distinctly shorter than the second.

Female.—Antennæ piceous, slender, 11-jointed; third joint slightly longer than the second, the two together equal to the fourth; middle tibiæ simple, first joint of anterior tarsus as long as the second.

Variations.—The abdomen is nearly always piceous, but specimens are before me with yellow abdomen. A specimen ♂ is before me, probably partially immature, in which the scutellum is yellow, and the basal portion of the elytra also, gradually shading into the piceous. The epipleuræ, abdomen and legs are also yellow.

From the sculpture of the elytra this species at first glance has some resemblance to *Diab. atripennis*. It may be readily known from either of the species of the 11-jointed male series by the elytral sculpture and black scutellum.

Occurs in New Mexico, Texas and Arizona; in the latter region near Yuma and Santa Rita Mountains (Wickham).

P. gentilis Lec., Proc. Acad. 1865, p. 208; var. *nigripennis* Lec., Trans. Am. Ent. Soc. 1868, p. 58; *atripennis* (partim?) Say, Journ. Acad. iii, p. 461; ed. Lec., ii, p. 224; var. *texanus* Lec., Trans. Am. Ent. Soc. xii, p. 28.—Variable in color. Antennæ piceous, the three basal joints variegated. Head entirely yellow, smooth. Thorax a little wider than long, sides nearly straight, disc convex, often with a vague transverse depression, surface smooth, color entirely yellow, or with a broad piceous stripe each side, with intermediate forms; scutellum yellow. Elytra shining, microscopically alutaceous, impunctate, color variable, either entirely black, side margin narrowly pale, or with side and suture more widely yellow; epipleuræ always pale. Body beneath piceous, sometimes entirely yellow. Legs pale, often with the hind tibiæ darker. Length .10—.15 inch.; 2.5—4 mm.

Male.—Antennæ slender, second joint small, half as long as the third, joints three to ten nearly equal; middle tibiæ with a slight emargination on the inner side near the tip; first joint of anterior tarsi not shorter than the second.

Female.—Antennæ slender, joints two and three equal, together a little longer than the fourth, joints four to eleven equal; middle tibiæ not emarginate.

Variations:

Var. *gentilis* Lec.—Thorax with a broad black stripe each side occupying one-third of the disc, but with the extreme margin pale. Elytra black, with the suture, side margin and apex yellow; the underside of the body is usually entirely yellow, but the abdomen may be piceous.

Var. *nigripennis* Lec.—Thorax similar to *gentilis*, but the lateral stripes show more of a tendency to disappear, and one specimen before me has merely a black spot each side in front. Elytra black. Body beneath black, the abdomen sometimes yellow.

Var. *texanus* Lec.—Thorax entirely yellow, without trace of black stripes or spots. Elytra black, with a narrow side margin yellow. Body beneath entirely yellow.

It is probable that Say confounded the variety *nigripennis* with his *atriventris*, as the description of the latter coincides more nearly with what we know as *dorsalis*, while his after remark that the antennæ are 10-jointed, shows that he must have had a specimen of one of the varieties of the present species before him. It is not possible to make Say's name available, as he doubtless intended it to apply to *dorsalis* Oliv.

It seems rather remarkable that with what has been written of *Phyllecthrus*, the fact has not been discovered that this species is the only one in which the male antennæ are 10-jointed.

Occurs from eastern Pennsylvania westward to Kansas, Dacota and Montana, and south to Georgia and Texas. Dr. Hamilton takes the *gentilis* variety on *Robinia pseudacacia* as well as by sweeping low herbiage.

In the *Biologia Cent.-Amer.* vol. vi, pt. 1, p. 600, Mr. Jacoby describes a genus *Oroetes*, in which the species has the middle tibiæ of the male notched as in *Phyllethrurus*. While it is doubtless distinct, the genus seems related to *Phyllethrurus*.

GALERUCA Geoff.

Head moderately large, not deeply inserted, front grooved between the antennæ, the tubercles not large. Eyes oval, feebly prominent; labrum short, transverse; maxillary palpi stout, the terminal joint elongate conical, as long as the preceding, but narrower. Antennæ rather stout, not longer than half the body, joint three nearly twice as long as the second, 3-10 gradually decreasing in length, eleventh longer. Thorax transverse; scutellum nearly semicircular. Elytra oval; epipleuræ entire; anterior coxæ contiguous, the cavities closed behind; middle coxæ very narrowly separated. Legs rather robust; tibiæ carinate on the outer edge, slightly broader at apex, the middle pair with one terminal spur; tarsi stout, the first joint of the posterior pair nearly as long as the next two; claws cleft slightly behind the middle.

The name *Galeruca* is adopted for this genus in accordance with the views of Mr. Crotch. It corresponds with *Adimonia*, as recognized by Chapuis and others. In our species the middle tibiæ in both sexes have a well-marked spur, although Chapuis states that the tibiæ are unarmed.

In his remarks on this genus Crotch admitted all the species of LeConte's first group (*Proc. Acad.* 1865, p. 214), but a closer examination shows that all have the anterior coxal cavities open, except *externa*, which will alone represent the genus in our fauna.

G. externa Say, *Journ. Acad.* iii, p. 458; edit. *Lec.*, ii, p. 222; *rudis* Lec., *Pacif. R. R. Rep.* p. 69.—Form rather broadly oval, moderately robust, piceous-black, feebly shining, the side margin and apex of elytra yellowish testaceous. Head cribrate-punctate. Thorax more than twice as wide as long, slightly narrowed in front, sides arcuate, parallel behind the middle, hind angles distinct, but obtuse; base oblique each side, disc convex, a vague median depression, surface very coarsely and closely punctate. Elytra on each side quadricostate, often the third entirely absent and the first abbreviated, intervals coarsely and closely punctate, the surface between the punctures alutaceous. Body beneath

shining, very sparsely pubescent; met-episterna densely granulate punctate. Abdomen sparsely punctate, transversely wrinkled at the sides. Length .27—.44 inch.; 7—11 mm.

Male.—Last ventral segment broadly, but not deeply emarginate, a depression or fovea at middle of emargination.

Female.—Last ventral truncate.

Very little variation has been observed, and consists in the varying degree of coarseness of the punctuation and the greater or less development of the elytral costæ.

Occurs in Kansas, Utah, Nevada, Oregon, Washington and Idaho.

CEROTOMA Chev.

Head free, the muzzle somewhat prolonged. Antennæ slender, first joint rather long, second short, third nearly as long as the first, fourth shorter, joints 5—11 nearly equal; maxillary palpi rather stout, the last joint elongate-conical, shorter than the preceding; anterior coxæ contiguous, their cavities closed behind; epipleuræ moderately wide, extending three-fourths to apex; tibiæ slender, each provided with a terminal spur; first joint of hind tarsus as long as the following joints together; claws broadly appendiculate at base.

One species occurs in our fauna:

C. trifurcata Forst., Nov. Spec. Ins. 1771, p. 29; *caminea* Fab., Syst. El. i, p. 459; Oliv., Ent. vi, p. 656, pl. v, fig. 73; Lec., Proc. Acad. 1865, p. 205; var. *furcata* Oliv., loc. cit. 643, pl. iii, fig. 50.—Oval, narrower in front, moderately convex, body beneath and head black, above yellow. Elytra with black, forming a narrow basal band extending in a triangle about the scutellum and prolonged along the sides nearly to apex, sometimes broken, three black spots on each side of and close to the suture, the posterior smaller. Antennæ pale, darker externally. Head black, clypeus very coarsely punctured. Thorax nearly twice as wide as long, slightly narrowed in front, sides feebly arcuate, margin broader posteriorly, disc moderately convex, finely alutaceous, very obsoletely, finely and sparsely punctate; scutellum black. Elytra irregularly subseriately punctate, the punctures not large nor closely placed. Body beneath black, meso- and metapleuræ punctate; abdomen nearly smooth. Legs yellowish testaceous, the front and middle tibiæ in part, the posterior tibiæ entirely black, the femora of the latter black at apex. Length .14—.20 inch.; 3.5—5 mm.

In the male the antennæ do not differ notably from the female, although they are shorter and stouter. The entire front of the male is yellow, only the portion behind the eyes is piceous; the last ventral segment is truncate.

In the female the last ventral is oval and granulately punctate.

The usual coloration of the elytra consists of a triangular scutellar spot, which often sends a narrow stripe along the base to the humeri.

From the umbone a moderately wide stripe extends nearly to apex; this stripe is often interrupted. Near the suture are four subquadrate spots arranged in a quadrangle; near the apex are two smaller spots.

The variation from this observed are as follows: The larger spots forming the quadrangle may be divided longitudinally, producing two linear spots in the place of one. On the other hand, these spots may be longitudinally confluent, so that the two on each elytron form a short vitta. Specimens may occur with pale elytra with merely a small scutellar triangle and a small humeral black spot.

This insect is widely distributed. Specimens are known to me from Canada, Kansas, Texas, North Carolina and New York. None have been reported from the New England States.

ANDRECTOR Horn.

Head free, front vertical, a deep transverse depression just beneath the eyes. Antennæ more than half the length of the body, first joint long, second very short, third longer than the first, dilated and emarginate at apex, fourth triangular, with an emargination, the free angle acute, joints 5-11 nearly equal in length; maxillary palpi stout, the last joint conical, shorter than the preceding and slightly narrower at its base; anterior coxæ contiguous, their cavities closed behind; epipleuræ extending three-fourths to apex. Legs as in *Cerotoma*, the posterior and middle tibiæ with spurs; posterior tarsi with first joint as long as the three following united; claws broadly appendiculate at base.

Above the deep transverse depression of the front and below the insertion of the antennæ, is a short laminiform prolongation, obtusely tridentate, the lower edge of the depression has, at middle, an obtusely conical elevation.

By the characters above given it will be seen that the genus is a member of the group *Cerotomites*, as defined by Chapuis. As in *Cerotoma* the third joint is longer than the fourth. It differs from that genus in the presence of tibial spurs on the middle and hind tibiæ, and by the deep, transverse depression of the front.

In the "Catalogus" Baron Harold has placed this genus in synonymy with *Cerotoma*, but in view of the characters considered valid for generic separation this course cannot be followed.

One species is known to me.

A. sexpunctatus Horn, Trans. Am. Ent. Soc. iv, p. 152.—Oblong-oval, narrower in front, pale yellow above and beneath, each elytron with three small

piceous spots arranged in a line from the umbone to the apex. Antennæ pale yellow. Head smooth. Thorax nearly twice as wide as long, slightly narrowed in front, the lateral margin wider posteriorly, surface smooth. Elytra moderately closely, but feebly punctate. Body beneath smooth, shining, the posterior coxæ and the front of met-episterna piceous. Length .22 inch.; 5.5 mm.

This insect is not unlike *Diabrotica 12-punctata* in form, but somewhat smaller.

Occurs in Texas, locality unknown (A. S. Fuller).

AGELASA Motsch.

Head oval rather broad, inserted as far as the posterior border of the eyes, which are slightly oval, prominent and entire. Antennæ slender, longer than half the body, joints two and three subequal, together a little longer than the fourth, fourth longer than fifth, joints five to ten equal, eleventh longer; maxillary palpi moderately stout, the last joint shorter and more slender than the third; labrum transverse, emarginate. Thorax transversely quadrangular, slightly narrower at base, sides feebly arcuate, hind angles distinct, disc impressed. Elytra oval, broader behind; epipleuræ nearly reaching the tip; anterior coxal cavities closed behind, the prosternum narrowly visible between the coxæ. Legs moderate; tibiæ slightly broader toward tip, the outer edge rounded, not carinate, the middle and posterior tibiæ with a single spur; tarsi moderate, the first joint as long as the next two; claws broadly appendiculate.

A. halensis Linn., Syst. Nat. ed. xii, 1767, p. 589; Fairm., Gen. Col. Eur. iv, pl. 69, fig. 330; Lec. (*Agelastica*), Proc. Acad. 1865, p. 210; Chapuis (*Sermyla*), Gen. Col. xi, p. 225.—Form oval, moderately convex, pale yellowish, the elytra metallic-blue or greenish, resembling *Oedionychis gibbitarsis* in form and color. Antennæ piceous. Head yellow, smooth, an occipital band of metallic-blue or green. Thorax rather more than twice as wide as long, sides feebly arcuate in front, disc moderately convex, not visibly punctate, but with a depression each side midway between the median line and side margin. Elytra oval, broadest a little behind the middle, the surface moderately coarsely not closely punctate, punctures irregularly placed and somewhat finer toward the apex. Body beneath honey-yellow, sparsely pubescent, tips of tibiæ and tarsi infusate. Length .20—.28 inch.; 5—7 mm.

The specimens studied are unfortunately all females which present no special sexual characters.

The specimens on which Dr. LeConte indicated the occurrence of this insect in our fauna were given him by Mr. Edw. Norton as having been collected at Farmington, Conn. For various reasons not necessary to record at this time, the validity of that locality seemed doubtful to me, and of sufficient moment to have caused me

to omit the species from our list, but recently Mr. Ulke has received a specimen from Wisconsin. The species is doubtless an introduced one, and not a member of the sub-arctic fauna common to both continents.

DOUBTFUL SPECIES.

Galeruca fibulata [Germar]; testacea, antennis apice pectoreque fuscis, elytris linea rectangula baseos maculaque ante apicem nigris. Habitat in America septentrionali.

Affinis *G. quadrimaculatæ*, caput flavo-testaceum, oculis antennarumque apice nigris. Thorax subquadratus, marginatus, punctulatus flavo-testaceus. Coleoptera thorace latiora, apice obtuse rotundata, oblongo-quadrata, punctata testacea; linea utrinque basali in humero ramum rectangulum emittente; macula magna ante apicem nigris. Corpus subtus testaceum, pectore fusco.

This description seems to apply very well to some of the varieties of the male of *Cerotoma trifurcata*, and the name would have been placed in synonymy with that did not certain remarks of Dr. LeConte (Proc. Acad. 1865, p. 209) require explanation.

There exists in the LeConte cabinet a specimen which is undoubtedly *Galeruca quadrimaculata* Oliv., and which came originally from the Melsheimer cabinet, and to this Dr. LeConte has attached the name *fibulatus*, and applied the remarks above cited. The specimen has remained unique for at least fifty years. That Olivier might have been in error in his locality is suggested by Dr. LeConte, but it is also possible that Melsheimer may have been in error as other Javanese insects were in his cabinet (see *Pachyurgus æreus* Mels. = *Encyalesthes brevicornis* Motsch. from Java, etc.). *Galeruca quadri-notata* Oliv. seems to have been omitted in the "Catalogus."

G. dorsata [Say].—Pale yellowish, elytra blue, with a yellow outer margin and tip. Inhabits Arkansa.

Body pale yellowish; head black on the vertex; antennæ black brown; thorax immaculate; punctures obsolete; scutell blackish bronze; elytra irregularly punctured, greenish blue; exterior margin and tip yellow; an indented, abbreviated line on the basal middle; feet with blackish line above. Length one-fourth of an inch.

Found on the banks of the Arkansa above the Verdigris. This insect, if it be a Chrysomelidæ at all, has not been identified.

G. janthina Lec., Ann. Lyc. 1, p. 173, is *Haltica chalybea* Illig.

SUPPLEMENTARY NOTES.

The following notes have been prepared as a supplement to preceding papers on the Chrysomelidæ with the view of correcting errors, supplying omissions, or describing new forms:

SYNETA Esch.

In my essay on this genus (Trans. Am. Ent. Soc. xix, p. 3) an error has occurred owing to the improper recognition of the actual type of *simplex* in the LeConte cabinet.

The species cited above as *simplex* should be called *hamata*, from the structure of the male hind tibiæ.

S. simplex Lec.—Entire body yellowish testaceous, sometimes with the head and thorax slightly brown. Head coarsely punctate. Thorax strongly angulate at the sides not denticulate, coarsely punctate. Elytra with confused coarse punctuation without serial arrangement and without trace of costæ.

Male.—Last ventral segment deeply sinuate each side, the middle projecting as a rounded lobe; hind tibiæ gradually broader to apex as in *albida*, and with terminal spur.

Female.—Last ventral with a semicircular pubescent concavity at apex; hind tibiæ less thickened than in the male and with a spur.

In this species the antennæ are formed as in *albida*, that is the joints 8–11 are shorter than the joints 4–7. It may be separated from *albida* by the more strongly angulate thorax, the entire absence of costæ and the confused punctuation.

The type specimen came from Steilacoom, in Oregon; others have been given me by Mr. E. A. Schwarz from Astoria and Tenino. To him I am indebted for having my attention called to the mistake above mentioned.

OOMORPHUS Curtis.

O. floridanus n. sp.—Oval, convex, piceous black, shining, recalling *Orphilus* in form. Head very finely alutaceous, indistinctly sparsely punctate, a short linear frontal impression. Thorax more than twice as wide as long, the sides nearly straight and rapidly divergent from apex to base, disc convex, sparsely indistinctly punctate. Elytra with rows of moderately coarse punctures not closely placed, the intervals with a single series of irregularly placed, smaller punctures. Body beneath piceous black, abdomen finely transversely alutaceous. Length nearly .10 inch.; 2.5 mm.

No sexual peculiarities have been observed.

The genus *Oomorphus* is one of those genera which have been assigned various relationships by those who have studied them. For an interesting recital of those of *Oomorphus* the student may consult the "Genera" x, p. 219.

At present the position usually accepted is in relationship with *Lamprosoma*. The Lamprosomini form a tribe of the Cyclique division of the Chrysomelidæ, taking position between the Cryptcephalini and Eumolpini. From all the other tribes of Cycliques the Lamprosomini are distinguished by the presence of grooves at

the sides of the prosternum for the lodgement of the antennæ in repose. *Oomorphus* has the eighth joint of the antennæ much smaller than either the seventh or ninth, after the manner of some of the genera of Silphidæ.

Our species is about the size of the European, and seems to differ, as far as the descriptions and figures permit comparison, by the sides of the thorax being straight and divergent, the intervals between the series of elytral punctures not being moderately densely punctured, but by the presence of a single series of irregularly placed punctures.

For this very interesting addition to our fauna we are indebted to E. A. Schwarz, who collected them in some numbers at Biscayne, Fla.

LUPERALTICA Crotch.

Head oval, inserted nearly as far as the eyes, which are rather prominent and slightly oval, front carinate between the antennæ, with flattened tubercles and a transverse sinuous line between the eyes; labrum rather prominent, entire at tip; maxillary palpi not stout, the terminal joint half the length of the preceding, acutely conical. Antennæ slender, longer than half the body, first joint stout, second small, oval, third twice as long, joints three to ten equal, eleventh longer. Thorax quadrangular, the angles distinct, and with a small piliferous tubercle, disc convex, with a vague transverse impression in front of the base; scutellum triangular. Elytra oblong-oval; epipleuræ moderate in extent, reaching nearly the sutural angle; prosternum either narrowly separating the coxæ, not visible between them, but forming a tubercle at apex, in the latter case the coxæ absolutely contiguous, coxal cavities open behind. Legs moderate in length, the femora all thickened; tibiæ slender, not carinate externally and without terminal spur; tarsi moderate in length, the first joint of the posterior pair as long as the next three; claws appendiculate and divergent; body glabrous.

It is generally admitted that the line of demarcation between the Galerucini and Halticini is not very well marked. The form of the posterior femora of the latter group, constructed for the purpose or with the result of giving a saltatory power to the insect, has been relied upon as the main point of distinction between the two series. As a rule the Halticini have the anterior coxæ well separated by the prosternum, the reverse being the case in the Galerucini, but exceptions occur to the normal character in both groups. It is also rare

to find the tibiæ, especially the posterior pair, without terminal spurs, the mechanical reasons for which in saltatory insects being very evident. One group admitted by Chapuis, the Elithiites, has no spurs, and from the tenor of his remarks it is evident that he has had considerable difficulty in becoming satisfied as to the systematic position the genera of that group should occupy.

The genus *Luperaltica* is equally perplexing. It is composed of two species, in one of which there can hardly be any doubt as to its position, the posterior thighs being well thickened and much stouter than the two anterior pairs, and the anterior coxæ are distinctly separated by the prosternum as required by the normal condition of the Halticini. On the other hand the second species has all the femora slightly thickened, the posterior pair not much more so than the others, but the anterior coxæ are absolutely in contact, the prosternum not prolonged between them. The thickening of the femora in this species (*fuscula*) is scarcely greater than has been observed in many genuine Galerucini.

Both species are deprived of a terminal spur to the posterior tibiæ, a character of rare occurrence in the Halticini, but quite common in the Galerucini.

In further evidence of the difficulty of placing the genus it will be remembered that Dr. LeConte placed the species in *Malacosoma*.

At the time of my study of the Halticini (Trans. Am. Ent. Soc. xvi, p. 271) it was suggested that *Luperaltica* should be dropped from our literature from the very faulty nature of the description, but to avoid confusion the name has been retained and the description amended. *L. senilis* was erroneously referred by me to *Systema*, which it greatly resembles, but the front coxal cavities are open.

Two species are known.

Anterior coxæ contiguous; elytra very indistinctly punctate, color above varying from yellow testaceous to dull blue.....	fuscula.
Anterior coxæ separated; elytra very evidently punctate, elytra bright metallic-blue.....	senilis.

Luperaltica cannot well be placed in any of the groups suggested by Chapuis. It will take a place in his table near the Elithiites by the absence of posterior tibiæ spurs, differing from that in the form of the claws. In a natural arrangement the group might be well placed after the Crepidoderites.

L. fuscula Lec., Proc. Acad. 1865, p. 206; Crotch, *ibid.* 1873, p. 70.—Form oblong, resembling *Systema*, moderately convex, surface rather dull, color yellow-

ish testaceous, shading to brownish, with blue surface lustre. Antennæ pale palpi piceous. Head piceous, the front and labrum pale. Thorax broader than long, not narrowed in front, sides feebly arcuate, angles all distinct, disc moderately convex, with a vague ante-basal impression and sometimes a faint median line, surface indistinctly punctate and alutaceous. Elytra oblong-oval, widest at middle, surface minutely alutaceous, sparsely indistinctly punctate, a marginal series of punctures larger. Body beneath colored as above, sparsely pubescent. Length .10—.15 inch.; 2.5—4 mm.

Male.—First joint of anterior and middle tarsi distinctly dilated. Last ventral segment flattened, truncate at apex with a broad process from the middle of the apical edge and at right angles with it, this process is either obtuse or incised at apex; first ventral between the coxæ convex.

Female.—Tarsi not dilated; first ventral not convex. Last ventral truncate, leaving a small retractile segment exposed.

The variation in color has been indicated above, some specimens being a dull indigo-blue, which gradually disappears, the sides and suture retaining the color the longest. The specimens more or less testaceous are the most abundant.

Longitarsis nigripalpis Lec., founded on a rather poor specimen, is doubtless synonymous with this species.

Occurs from Pennsylvania and Virginia to Iowa and Kansas.

L. senilis Say, Journ. Acad. iv, p. 87; ed. Lec. ii, p. 228; Crotch, Proc. Acad. 1873, p. 70; Horn, Trans. Am. Ent. Soc. 1889, p. 271; *tineta* Lec., Proc. Acad. 1865, p. 206.

As the species is described sufficiently as the last named citation it will not be reproduced here.

The male has a similar last ventral to that of *fuscula*, but the process is shorter and acute.

Occurs from Pennsylvania to Illinois.

MISCELLANEOUS COLEOPTEROUS STUDIES.

BY GEO. H. HORN, M.D.

The few pages which follow contain descriptions of some new Coleoptera, which, from their exceptional nature, seem worthy of separate treatment, although all of them are rare and from remote regions.

The discovery of a new genus allied to *Schizopus* and *Dystaxia* is very interesting, as these genera form a group of Buprestidæ peculiar to the extreme southwestern regions of our fauna.

The *Dacoderus*, from Texas, has also a special interest in bringing the genus further east and rendering the locality of *D. dominicensis* less improbable, doubt having been expressed by one of my valued correspondents in France of the correctness of the locality.

MECROSCAPHA Lec.

M. arctica n. sp.—Oval, convex, a little more acute posteriorly, not twice as long as broad, ferruginous brown, somewhat shining, sparsely clothed with recumbent brown hairs. Head sparsely indistinctly punctate. Thorax sparsely, but regularly punctate, punctures finer in front. Elytra a little more coarsely punctured than the thorax, the punctures sparse and a little more distant near the apex, each having a short hair; scutellum entirely invisible. Body beneath a little paler than above, sparsely pubescent, sparsely punctate, the punctures of the abdomen finer and closer than on the metasternum; mesosternum, as seen between the coxæ, cordiform. Length .09 inch.; 2.25 mm.

This species is larger, more oval and convex than in *clavicornis*, as well as different in color, the latter being piceous. In *arctica* the punctuation is far more distinct, both above and beneath. The following are the essential differences between the species:

Scutellum visible, base of thorax sinuate each side; mesosternum between the coxæ narrow; last joint of maxillary palpi oval, obliquely truncate, longer than wide; eyes moderately coarsely granulate.....**clavicornis**.
 Scutellum invisible, base of thorax regularly arcuate; mesosternum between the coxæ cordiform; last joint of maxillary palpi oval, squarely truncate, about as wide as long; eyes very coarsely granulate.....**arctica**.

These characters might be considered generic, but for the present the two species are but associated under one name. Should it be thought advisable to separate the two the name *Crioscapa* may be used for *arctica*.

In the original description of *Microscapha*, Dr. LeConte states that the frontal suture is distinct, but on examination no suture is visible in either of the above species.

Of *arctica*, two specimens were captured at Fort Wrangel, Alaska, by Mr. Wickham, who has kindly presented me with one of them.

EXPLANATION OF PLATE I.

- Fig. 1.—Elytral markings *Galerucella americana*.
 “ 2.— “ “ *sexvittata*.
 “ 3.— “ “ *integra*.
 “ 4.— “ “ *notulata*.
 “ 5.— “ “ *notata*.
 “ 6.— “ “ *xanthomelæna*.
 “ 7.—Middle tibiæ ♂ and ♀ of *Phyllethrus*.
 “ 8.—Antennæ ♂ and ♀ of *P. gentilis*.
 “ 9.—Antennæ ♂ and ♀ of *P. dorsalis*.
 “ 10.—Last ventral segments ♂ and ♀ of *Galerucella cavicollis*.
 “ 11.—Last ventral segments ♂ and ♀ of *Galerucella americana*.
 “ 12.—Outline of *Androlyperus fulvus* ♂.
 “ 13.—Ventral segments of the same.
 “ 14.—Elytral markings *Diabrotica connexa*.
 “ 15.— “ “ *picticornis*.
 “ 16.— “ *Malacosoma vittipenne*.
 “ 17.— “ *Triarius trivittatus*.
 “ 18.—Head and thorax *Dacoderus striaticeps*.
 “ 19.— “ “ *lævipennis*.
 “ 20.— “ “ *dominicensis*.

