

The species of AGRILUS of Boreal America.

BY GEORGE H. HORN, M.D.

The first attempt at a comparative study of our species was made by Dr. LeConte in his "Revision of the Buprestidæ of the United States (Trans. Amer. Philos. Soc. xi, 1859)," in which thirty-two species were recognized and eight previously described enumerated as unknown. In this essay we find an important use of the form of the claws as the basis of a primary division of the genus in groups. Singularly the study of the claws was carried no further, owing probably to the small material which furnished the basis of the work. It is also to be regretted that but little attention was paid to the sexual characters, and, as if by accident, only an occasional allusion is made to the form of the prosternal lobe. Of the thirty-two species described, twelve were represented by single examples, and of the remaining twenty nearly half were represented by not more than two. While this condition rendered the study at the time easy and satisfactory, the further accumulation of material makes it absolutely necessary to refer to the types for determination.

In 1873 (Proc. Acad. Nat. Sci. Phil.), Mr. G. R. Crotch attempted a brief review of our species, which is notable for the insufficiency of his comments in one portion of the paper and the numerous inaccuracies throughout, especially in the analytical table. The value of the carina of the pygidium was first recognized in his paper, and some attempt made to use the sexual characters as a means of separating the species.

The species of the regions to the south of our limits have been studied by Mr. Waterhouse (Biol. Cent. Amer. vol. ii, pt. 1) with fairly good results, but the species of that region are so entirely different from our own in facies and depend for their separation on characters not applicable in our fauna, that his work has been of no assistance in the preparation of this. In this essay Mr. Waterhouse has separated one of our species (*pulchellus*), which has an equivalent in Mexico, from *Agrilus* under the name *Engyaulus*, but for reasons which will be found under our species, the genus is not considered well founded.

The species described by Gory are barely recognizable, and the figures give but little aid. He seems not to have known of the species described by Say, or else purposely disregarded them.

It being very evident that the unsatisfactory work previously done with our species was due to insufficient material, and the neglect of an examination of the sexual characters, no attempt has been made by me to record my observations until reasonably full series had been obtained with the sexes of each species represented. In the following pages but one species is represented by a single specimen, and of about four others two of each have been examined.

As a general rule, our species are not marked by any great surface irregularities, such as deep thoracic depressions and strongly elevated elytral costæ. The only exceptions are *cavatus* and *Couesii*, the former being represented in Mexico and the other may also be. At tip the elytra are simply acute or rounded, never divergent, and variously formed as in many of the Mexican species. The colors are never very brilliant, nor is the ornamentation by pubescent spots very striking. The monotonous aspect of our species has compelled a search for structural characters with very encouraging results, for with such characters, the limits of species may be more accurately defined notwithstanding any variation which may occur.

In order that the systematic portion of this work may be the better understood, the various portions of the body showing important modifications will be reviewed consecutively.

ANTENNÆ. — The form of these organs seems to have been entirely neglected. In some species the antennæ are slender and long (Pl. viii, figs. 11–13), in others short and comparatively stout (Pl. viii, figs. 12–14), in the former case the joints are longer than wide, and in the latter as wide, or even wider than long. The most important modification observed is in the mode of their serration. By far the larger number of our species have the antennæ serrate beginning with the fourth joint (Pl. viii, figs. 11, 12); in the others the serration begins at the fifth joint (Pl. viii, figs. 13, 14). There may be at times a question with those who study this character for the first time and in some species it might be difficult to determine to which series it should be referred, but whenever the fourth joint resembles the fifth more nearly than it does the third, the species belongs to the first series, but when the third and fourth joints are similarly cylindrical then the species belongs to the second series.

HEAD.—The front may be flat, moderately convex, or very convex. In the latter case the mouth seems more retracted and inferior, as will be observed in the species from *pulchellus* to *muticus*, but varying in degree, so that this character fails to be useful for generic separation. In nearly all the species the head has a median impressed line beginning at the occiput, but this varies both in extent and depth, forming in several species a deep frontal depression or even concavity. The clypeus varies somewhat in form, but not to the extent observed in *Chrysobothris*, so that no use has been made of it in the table. Sexually the head varies in sculpture and color, as will be found recorded, but the differences between the sexes are not by any means as well marked as in *Chrysobothris*, or in the more closely allied *Anthaxia*. Other characters of more restricted occurrence will be found under the species in which they occur.

PROTHORAX.—The usual thoracic characters based on color, sculpture and the depressions require no special comment. The carina of the hind angles has nearly always been mentioned from the earliest descriptions, and its presence or absence regarded as an infallible sign of specific distinction. It remains now to be recorded that in a number of species the presence or absence of the carina is often purely sexual, the male being without it. This is well shown in a series of *acutipennis*. In all cases the presence or absence of carina must not be assumed to be of specific value, except when accompanied by other characters.

The lateral marginal edge of the thorax assumes two forms when viewed from the side, the sinuate and straight. The former is the more usual, and is well illustrated by *macer* (Pl. viii, fig. 9), while the straight form is mostly seen in the cylindrical species, such as *lacustris*, etc. (Pl. viii, fig. 10).

PROSTERNUM.—The prosternal lobe varies in length and form, sometimes almost entirely concealing the mouth. Its anterior margin may be broadly rounded as in *cavatus* (in which the mouth is nearly concealed), truncate as in *bilineatus*, or emarginate, as is the more usual occurrence. Various forms of emargination will be observed, the most irregular being in *difficilis*, in which the notch is small, and on each side there is a situation.

The tip or apex of prosternum is subject to great modification. In many species the tip is continuous with the intercoxal portion and enters the metasternum by a triangular notch, while in others the tip is abruptly bent upwards and enters the metasternum concealed.

This structure has been well described by Mr. Waterhouse. When the tip of the prosternum is closely applied to the metasternum, the portion of the apex not concealed assumes various forms, being triangular, rounded, truncate or dilated (see *muticus* and species near). For convenience of expression in the analytical table, the visible free portion has been assumed to be the tip, and is so spoken of in the table.

SCUTELLUM.—The two forms observed are characterized by the presence or absence of a transverse carina. This structure seems to have been considered as invariable as the angular carina of the thorax, but in several of our species the carina may be distinctly present in some specimens and entirely absent in others.

ELYTRA.—In nearly all of our species the sides of the elytra are slightly sinuate behind the humeri, and then more or less dilated before finally narrowing to the apex (Pl. viii, fig. 7), but in many others the elytra narrow from the humeri to the apex almost without sinuation as in *difficilis* (Pl. viii, fig. 8). In the former case the sides of the abdomen are much less visible from above than in the latter. As a rule the elytra are narrower in the male. The disc is not often costate and then only in the species of the tropical type, as in *Couesii*, *cavatus* and *macer*, but in very many species there is on each elytron a very vaguely indicated costa.

The surface sculpture is practically the same in type in all our species, and is derived from a form described as imbricated, resembling, when magnified, a series of pointed tiles, closely placed, in which the points are somewhat elevated. The sculpture in some species might be described as closely mucronate.

The apices of the elytra are not, in any of our species, provided with the curious prolongations and modifications seen in the tropical forms. The tip is rarely very acute (*nevadensis*), usually rounded. The edge is usually serrulate, and in a few species entirely simple (*muticus*, etc.).

PYGIDIUM.—In very nearly all our species the pygidium is provided with a median smooth or elevated line, in many species forming quite a ridge, and in a good number the ridge is prolonged, forming a spine sometimes emarginate at its apex (*macer*). The presence or absence of the prolongation is one of the most constant of the structural characters, although specimens of *ruficollis* are occasionally seen without it. The pygidium of *pulchellus* is acute at tip, the carina well marked, but not independently projecting.

ABDOMEN.—The principal modifications of the abdomen are due to sexual peculiarities of the male, which are sufficiently described under the species in which they occur. Several peculiarities have been observed which are not sexual. In *ventralis* the middle of the posterior edge of the second segment is free and prolonged slightly over the next segment; the same is observed in the third segment, but in a less degree. The sides of the last ventral segment are usually simple, but in a few species (*obolinus*, *Walsinghami*) the edge is distinctly serrulate. The apex of the segment is rounded or oval, except in a few species (*concinus*, *acutipennis*), in which it is truncate. In none of our species is the last ventral emarginate, as in many European species.

Along the side of the abdomen there will be observed a well elevated ridge, which is sometimes interrupted on the first or second segments, usually more or less sinuous in front. Although variable within certain limits it is not sufficiently so to warrant any use of it in the grouping of species. This line divides the ventral segments, so that the upper portion, usually sub-elytral, has been called, for convenience, the "vertical portion of the segments;" it is often differently clothed from the inferior part of the segment.

The suture between the first two segments is usually entirely obliterated, but in *Walsinghami* is visible at the sides; in some specimens of *acutipennis*, and more rarely *bilineatus*, the suture is faintly indicated. The presence of this suture has afforded Mr. Waterhouse the means of separating a small number from the mass of species in Mexico.

LEGS.—The legs in all the species are slender, and afford very few characters useful in separation. In a good number sexual differences have been observed in the tibiae, consisting of a short spine or mucro at the inner apical angle of the anterior tibia and sometimes (*otiosus*, etc., Pl. viii, fig. 18) on all the tibiae of the male; the female tibiae are simple in all the species. The tarsi vary, apparently, in length. Apparently, because in estimating their length some comparison must be made with adjacent parts, and it will be found in nearly every case the tarsi bear the same relation in length to the tibia.

The claws vary greatly in form, affording useful characters in grouping the species, although the demarcation is not so sharply defined as to render differences primarily useful.

In no case are the claws simple, or even approaching that condition. Mr. Crotch remarked that while the claws of many European species

were bifid, they were not so in any American form that he had seen. It seems to me that a careful homological study of the claws shows that in all our species these members are either bifid, or of a modified bifid form. While they are usually called cleft, there is no truly cleft claw in any species. If we examine the species related to *politus* and those near *torpidus*, the claws will be found so nearly of the true bifid type that they should be called so. Tracing the modifications of this form it will be observed that the inner member of the bifid tip gradually shortens and broadens, while it preserves its lateral position in relation to the other part, although becoming quite a broad tooth.

It seems not to have been noticed that in the group above indicated the claws are not only different in the two sexes, but, especially, in the male, different on the three pairs of feet. This effectually prevents anything but the most restricted use of the forms of the claws in separating either groups of species or species themselves.

As the descriptions of the modifications of the claw would be an unnecessary repetition at this time, the student is referred to the remarks under each species.

At this time I desire to acknowledge the assistance received, without which this essay would have fallen short of its present completeness. The Museum of Comparative Zoology has permitted the free use of the LeConte collection for comparison, without which the names here used would have less certain value. The National Museum, through its Curator, Dr. C. V. Riley, has loaned its material, which has in one case removed a doubt from my mind, and in several others prevented the necessity of describing from uniques. The cabinet of the American Entomological Society has also been freely used. To Messrs. Ulke, Liebeck, Seeber, Wenzel and Henshaw, I am indebted for the free use of their material and the gift of specimens. Finally, to Mr. Fred. Blanchard, of Lowell, I am under especial obligations for his many useful suggestions, and for his having very kindly studied several difficult questions regarding the *otiosus* series on the carefully collected material in his cabinet.

The meaning of the expressions used in the subsequent pages of the essay having been sufficiently explained, the following table is presented to enable the species to be, at least approximately, determined. The arrangement of the species by the sequence in the table does not in all cases approximate those having a superficial resemblance. The object of this study is to enable the determination of

the species and the minor detail of a cabinet arrangement can be left to the judgment of those who possess a sufficient number to make it desirable.

Analytical table of *Agrilus*.

- Antennæ serrate beginning at the *fourth* joint. Pl. viii, figs. 11, 12.....2.
 Antennæ serrate beginning at the *fifth* joint. Pl. viii, figs. 13, 14.....24.
 2.—Claws cleft in such a manner that the lower portion is turned inward, nearly or quite touching that of the opposite side. Pl. viii, fig. 15.....3.
 Claws simply cleft, or even almost bifid, the lower portion not inverted. Pl. viii, figs. 16, 17..... 8.
 3.—Prosternum parallel between and behind the coxæ, the apex obtuse or truncate.....4.
 Prosternum gradually narrowing, the apex acute..... 6.
 4.—Front flat, occiput feebly impressed; thorax not impressed at middle, carina of hind angles distinct, the marginal line (seen laterally) sinuous; pygidium carinate, not projecting.....**difficilis**.
 Front concave, or deeply impressed; median line of thorax more or less deeply impressed, the carina feeble or absent.....5.
 5.—Front impressed from the occiput to the clypeus; thorax with a rather broad and deep median impression, marginal line straight; pygidium carinate, not projecting; color dull bronze.....**obtusus**.
 Front deeply concave; median line of thorax impressed, marginal line sinuous; pygidium feebly carinate; head and thorax cupreous, elytra black**fuscipennis**.
 6.—Pygidium carinate, the carina prolonged at tip.
 Front deeply impressed; hind angles of thorax not carinate in either sex. **ruficollis**.
 Front feebly impressed; hind angles of thorax feebly carinate in female only..... **lateralis**.
 Pygidium not carinate, at most a smooth median line.....7.
 7.—Scutellum distinctly transversely carinate; hind tarsi slender, very nearly as long as the tibia.
 Tibiæ of male on all three pairs of feet mucronate at the inner apical angle. Males flattened on the median line of under side and usually pubescent. Pl. viii, fig. 18..... **otiosus**.
 Males with the last ventral truncate and fimbriate..... **defectus**.
 Antennæ very slender, ciliate on the posterior side with relatively long hairs in both sexes..... **crinicornis**.
 Posterior tibiæ of males not mucronate; sometimes all three pairs are scarcely mucronate.
 Head not, or feebly impressed.
 Males with a densely pubescent space on the prosternum. **masculinus**.
 Males with prosternum slightly pubescent..... **arcuatus**.
 Head deeply impressed (facies of *ruficollis*)..... **cupricollis**.
 Scutellum not transversely carinate; hind tarsi rather stout, obviously shorter than the tibiæ; form robust; elytra scarcely serrate at tip. **angelicus**.

- 8.—Pygidium with a projecting carina.....9.
 Pygidium without a projecting carina.....15.
- 9.—Elytra with a well defined costa.....**macr.**
 Elytra without distinct costa.....10.
- 10.—Front deeply impressed; head and thorax coppery red, elytra black; hind angles of thorax not carinate.
 Pro-, meso- and metapleuræ and coxæ densely pubescent.....**audax.**
 Pleuræ and coxæ not pubescent**vittatocollis.**
 Front convex, or feebly impressed; color uniform.....11.
- 11.—Sides of thorax with yellowish pubescence, elytra with a vitta of similar color; hind angles of thorax not carinate.....**bilineatus.**
 Thorax and elytra without pubescent spaces12.
- 12.—Elytra with more or less evident pubescent spots, or with small, densely, finely punctured spaces indicating them.....13.
 Elytra without pubescent spaces.....14.
- 13.—Last ventral segment oval at tip; second segment only, of male, feebly grooved.
 Apices of elytra very acute; underside of body not conspicuously pubescent; scutellum not carinate**nevadensis.**
 Apices of elytra of usual form; sides of body beneath conspicuously clothed with dense white pubescence; scutellum transversely carinate.....**niveiventris.**
 Last ventral segment obtuse or truncate; the first two ventrals of male grooved.....**granulatus.**
- 14.—Last ventral segment obtuse or truncate.
 First ventral of male flat, second grooved.....**pensus.**
 First and second ventrals of male with a smooth and deep groove.
Blanchardi.
 Last ventral segment oval at tip.
 Hind angles of thorax carinate in both sexes; first ventral of male broadly grooved, the second more deeply, the groove narrow and smooth.
anxius.
 Hind angles of thorax not carinate, at most an obtuse elevation; first ventral of male nearly flat, the second with a deep smooth groove.
acutipennis.
- 15.—Thorax with a deep and broad, somewhat oval depression; front concave..16.
 Thorax with, at most, a simple, straight, median impression.....17.
- 16.—Elytra costate and with pubescent spots; hind angles of thorax feebly carinate.
 Scutellum concave, without transverse carina; elytra with a well marked costæ, nearly entire.....**Couesii.**
 Scutellum transversely carinate; elytral costa feeble and not entire.
cavatus.
 Elytra not costate and without pubescent spots, hind angles of thorax not carinate; scutellum not carinate; last ventral truncate.
concinus.
- 17.—Suture between the first two ventrals plainly indicated at the sides; last ventral serrulate.
 Thorax grooved at middle; elytra ornate, with pubescent spots; pygidium obtuse**Walsinghami.**

- Thorax not grooved; elytra not ornate, with pubescent spots pygidium subacute.....**pulchellus.**
- Suture between the first two ventrals entirely obliterated at the sides....18.
- 18.—Scutellum not carinate; pygidium feebly carinate.....19.
- Scutellum transversely carinate.....20.
- 19.—Prosternal lobe truncate or emarginate.
- Prosternum at tip obtusely rounded; elytra at tip not distinctly serrulate; thorax with deep median impression.....**obolinus.**
- Prosternum at tip emarginate; elytra at tip not serrulate; last ventral feebly serrulate; thoracic depression feeble.....**muticus.**
- Prosternal lobe rounded, the tip squarely truncate; elytra scarcely serrulate at tip; no thoracic depression, hind angles feebly carinate.
jacobinus.
- 20.—Elytra with pubescent spaces.....21.
- Elytra without pubescent spaces; prosternal lobe truncate, or feebly emarginate; claws of front tarsi of male nearly bifid.....**politus.**
- 21.—Prosternal lobe deeply emarginate.....22.
- Prosternal lobe entire.....**fallax.**
- 22.—First joint of hind tarsi longer than half the tibia; legs and antennæ slender.....**obsoletoguttatus.**
- First joint of hind tarsi not as long as half the tibia; legs and antennæ of usual form.....23.
- 23.—Hind angles of thorax sharply carinate, the median thoracic depressions feeble.....**scitulus.**
- Hind angles of thorax without trace of carina, disc convex, without depression; entire apical third of elytra with whitish pubescence.
ornatulus.
- Hind angles of thorax not carinate, disc convex, without depression; elytra with an indistinct subsutural vitta; second and third ventral segments slightly prolonged at middle over the following segments.
Pl. viii, figs. 21, 22.....**ventralis.**
- 24.—Hind angles of thorax not all carinate.....25.
- Hind angles of thorax distinctly carinate.....28.
- 25.—Upper surface with pubescent spots or spaces.....26.
- Upper surface without pubescent spaces.....27.
- 26.—Thorax convex, with at most a feeble median depression, sides scarcely explanate.
- Thorax simply punctate, no median depression, sides clothed with white pubescence; on each elytron a white vitta.....**blandus.**
- Thorax very roughly strigose, a feeble median impression, not pubescent at sides; elytra with three faint spots each side.....**abjectus.**
- Thorax slightly depressed, the sides slightly explanate, surface distantly strigose, a moderately deep and broad median impression; elytral pubescence forming a distinct design.....**subcinctus.**
- 27.—Elytra vaguely costate; thorax transversely strigose and punctate; lower angle of eye acute; scutellum carinate.....**putillus.**
- Elytra not at all costate; thorax very obliquely strigose, with a reticulate appearance, not punctate; lower angle of eye rounded, scutellum not carinate.....**abstersus.**

- 28.—Lateral marginal line of the thorax, as seen from the side, sinuous; elytra more or less ornate, with pubescent spots (except in some *addendus*).
Pl. viii, fig. 9.....29.
Lateral margin of thorax straight, deflexed only in front; elytra without pubescent spots. Pl. viii, fig. 10.....33.
- 29.—Front more or less concave and very distinctly impressed.....30.
Front convex, not impressed.
Prosternal lobe deeply emarginate.....**LeContei**.
Prosternal lobe entire, rounded or obtuse.
Thorax transversely strigose; elytral pubescence forming a design.
abductus.
Thorax finely and very obliquely strigose, shining; elytra spotted as in *fallax*.....**palmacollis**.
- 30.—Elytra vaguely channeled, the groove densely punctured and with a pubescence forming a not dense vitta.....**felix**.
Elytra not channeled, the pubescence arranged in three spots as in *fallax*..31.
- 31.—Pygidium carinate in both sexes.....**impexus**.
Pygidium not carinate.....32.
- 32.—Head not roughly sculptured, punctate, the punctures forming strigæ; color æneo-cupreous, as in many *politus***floridanus**.
Head roughly strigose, more pubescent and opaque, color dull bronze, as in *fallax*.....**addendus**.
- 33.—First two ventral segments of male conspicuously channeled and pubescent; the median line of body in male pubescent.....**lacustris**.
First two ventral segments of male flat or feebly channeled, not pubescent.....34.
- 34.—Antennæ slender, joints longer than wide**egenus**.
Antennæ shorter, the serrate joints wider than long.....35.
- 35.—Posterior border of hind coxal plate bisinuate, the outer free angle acute and somewhat prolonged; disc of thorax not transversely depressed; prosternal lobe not emarginate.
Head coarsely punctate; thorax without median depression; prosternal lobe rounded.....**imbellis**.
Head very indistinctly punctate in both sexes; thorax with feeble median groove; prosternal lobe truncate or feebly emarginate....**abditus**.
Posterior border of hind coxal plate rectilinearly truncate, the free angle rectangular and not prolonged; disc of prothorax transversely depressed posteriorly; prosternal lobe emarginate.....**pusillus**.

In order that there may be no misunderstanding, the species described by Say have been thought worthy of special reference, so that some previous erroneous determinations may be corrected.

For convenience the species will be given in the order described, and reference made to "The complete writings of Thos. Say on the Entomology of North America," edited by John L. LeConte, M.D., under the abbreviated title, "edit. Lec."

- Buprestis bilineata*, vol. i, p. 386. In vol. ii, p. 596, is correctly attributed to Weber.
- Buprestis arcuata*, vol. i, p. 387. Again referred to vol. ii, p. 596. Subsequently described as *torquatus* Lec.
- Buprestis polita*, vol. i, p. 387; vol. ii, p. 596.
- Buprestis pusilla*, vol. i, p. 388; vol. ii, p. 596. For this the name *parvus* Saund. was unnecessarily suggested.
- Buprestis lateralis*, vol. ii, p. 103. also p. 596. This species was not identified by LeConte. The name *Sayi* Saund. was unnecessarily suggested for it.
- Buprestis granulata*, vol. ii, p. 104. The description of this species was amended on p. 596. Was at one time supposed to be *quadriguttatus* Gory.
- Buprestis geminata*, vol. ii, pp. 105 and 595, is the female of *otiosus*. See remarks below.
- Agrilus ruficollis*, Fab. vol. ii, p. 595. From this time Say calls all the species *Agrilus*.
- Agrilus geminatus*, vol. ii, p. 595; see above.
- Agrilus politus*, vol. ii, p. 596; see above.
- Agrilus arcuatus*, vol. ii, p. 596; see above.
- Agrilus granulatus*, vol. ii, p. 596; see above.
- Agrilus bilineatus* Weber, vol. ii, p. 596; see above.
- Agrilus lateralis*, vol. ii, p. 596; see above.
- Agrilus pusillus*, vol. ii, p. 596; see above.
- Agrilus fallax*, vol. ii, p. 596.
- Agrilus putillus*, vol. ii, p. 597, was unknown to LeConte.
- Agrilus otiosus*, vol. ii, p. 597. This is clearly the male of *geminata*, described about thirteen years previously, but as the more recent name has been adopted, and in general use everywhere, it has been retained for the species. As Say described both, and as one or the other must be a synonym, it seems to matter but little which one is suppressed.

A. difficilis Gory.—Form elongate, piceous, with a faint greenish or cupreous surface lustre. Antennæ piceous, slightly bronzed, reaching beyond the middle of the thorax, serrate from the fourth joint; front flat, closely coarsely punctate, obsoletely bituberculate and with short pubescence, occiput slightly impressed. Thorax broader than long, slightly narrowed at base, sides slightly arcuate, the marginal line from the side slightly sinuous, disc convex, a feeble oblique lateral concavity, a faint ante-scutellar depression, surface rather finely transversely strigose, punctate at apex, hind angles with a rather strong arcuate carina; scutellum transversely carinate; elytra narrow, scarcely dilated behind the middle, apices rounded and serrulate, basal fovea rather feeble, disc convex, with faint costa, the surface punctate, but not close, becoming imbricate near the apex; body beneath with more decided metallic lustre; prosternal lobe rounded, with an acute emargination at middle, the inter-coxal process broad, parallel and obtuse at tip; prosternal pleuræ punctate and pubescent, meso- and metasternum at sides more densely punctate and similarly pubescent, along the middle much smoother; ventral segments along the middle sparsely punctate, first segment at sides densely punctate, strigose; the second, third and fourth segments with a more densely punctate spot conspicuously pubescent, the vertical portions of all the segments pubescent in front; pygidium coarsely sparsely punctate, with a median carina not projecting; claws similar on all the feet. Length .36—.52 inch.; 9—13 mm.

Male.—Front flatter, more densely, but more finely punctate, usually greenish in color; prosternum densely punctate along the middle with quite fine, sub-erect, silken pubescence; metasternum convex; ventral segments similar in the sexes, not impressed.

Female.—Front more coarsely punctate, color more or less cupreous; prosternum rather coarsely, not closely punctate, not pubescent.

Variations.—The only variations noted are those of size and color, which do not change the aspect of the species in any great degree.

Of the habits of this species nothing has been recorded. This is one of the larger species in our fauna, although several exceed it in size.

The claws are cleft, and with the lower portion incurved, as required in the group, although less incurved than usual, so that the points are quite distant. This divergence from the type of the group is the more marked in the male, the claws of the other sex being nearly contiguous.

Hab.—Occurs in the Mississippi Valley from Missouri to Texas.

A. obtusus n. sp.—Form robust, obscure æneous, opaque. Antennæ short, serrate from the fourth joint, slightly cupreous; head densely coarsely punctate, slightly strigose on the occiput, longitudinally impressed from the occiput to the clypeus. Thorax broader than long, slightly narrowed in front, sides straight, arcuate near the front, lateral line not sinuous, base slightly broader than the humeri, a moderately deep impression behind the front angles, which is entirely lateral, median line rather broadly and deeply concave, hind angles not carinate ♂, obsoletely carinate ♀; surface coarsely, closely and irregularly strigose, the intervals between the ridges punctate; elytra broadest at base, scarcely dilated behind the middle, apices separately rounded, scarcely serrulate, basal depressions almost obliterated, disc rather flat, vaguely concave along the middle of each side; surface densely granulate, strigose; body beneath similar in color, but very obtuse, intercoxal process rather broad, parallel and very obtuse at apex, propleuræ coarsely punctate, slightly strigose; abdomen finely punctate at middle, more densely and roughly at the sides, the lateral marginal line entirely obliterated on the first two segments; pygidium punctate, indistinctly carinate; claws similar on all the feet. Length .36 inch.; 9 mm.

Male.—Prosternum densely punctate and rugulose sparsely, finely pubescent. Ventral segments not impressed.

Female.—Unknown.

The two specimens before me show no variation.

The entire obliteration of the marginal line on the first two ventral segments is a character not observed elsewhere in our species.

In form and general appearance this species resembles *obolinus*, which is also remarkable in having the marginal line of the abdomen faintly indicated on the first segment.

Hab.—Texas, probably near the lower Rio Grande.

A. fuscipennis Gory.—Head and thorax cupreous, elytra black, opaque. Antennæ piceous with brassy lustre, nearly attaining the hind angles of the thorax, serrate from the fourth joint; head rather deeply concave from the occiput to the clypeus, closely coarsely punctate, slightly pubescent; across the base of the clypeus a slight carina, and above each antennal fossa a rather deep groove. Thorax nearly twice as wide as long, sides irregularly arcuate, lateral marginal line sinuous, disc irregularly convex; a broad, vague, lateral depression, median line rather broadly concave, slightly interrupted at middle, hind angles not carinate; surface with short, transverse, rather coarse strigæ, with granulate aspect at the sides; scutellum transversely carinate; elytra with slight post-humeral sinuation, behind which there is a slight broadening; apices rounded, minutely serrulate, basal depressions moderate, disc slightly flattened; surface closely, acutely granulate; body beneath more shining than above, olive-bronze, the sides of the sterna cupreous; prosternum rather broad between the coxæ, parallel, the apex obtuse, the lobe short and obtuse, propleuræ coarsely punctate, slightly strigose; metasternum coarsely punctate at middle, becoming strigose at the sides; abdomen rather coarsely and closely punctate, becoming strigose on the sides of the first two segments, the vertical portion of the segments sparsely golden pubescent their entire length; pygidium coarsely punctate, indistinctly carinate; claws similar on all the feet in both sexes. Length .40—.50 inch.; 10—12.5 mm.

Male.—Prosternum densely punctate and pubescent along the middle; metasternum convex; first ventral segment slightly depressed at middle posteriorly.

Female.—Prosternum more sparsely punctate and not pubescent, first ventral segment convex at middle, less closely punctate in the male.

Variations.—So few specimens have been collected that but little variation has been observed. The thorax is entirely cupreous, the median line more golden, and on each side of this is a longitudinal space of darker color, which varies in its intensity of color and extent.

Of its habits nothing is known.

Hab.—Tennessee and Georgia.

A. ruficollis Fab.—Black, or blue-black; head and thorax usually bright cupreous. Antennæ black, serrate from the fourth joint, the serrate joints as wide as long; occiput rather deeply impressed, the line extending to the base of clypeus, occiput somewhat strigose, front simply punctate. Thorax broader than long, apex slightly wider than base, sides regularly arcuate, disc convex, a moderately deep, oblique lateral depression; another, feeble, in front of scutellum; surface, in a general manner, transversely strigose; hind angles without trace of carina in either sex; margin, viewed laterally, strongly sinuous; scutellum transversely carinate; elytra slightly sinuate behind the humeri, a little broadened behind the middle, nearly entirely concealing the sides of the abdomen from above, apices separately rounded, distinctly serrulate; disc flat, a basal depression on each side; surface closely subgranulate, opaque, without trace of

costæ; body beneath piceous black, with faint bronze surface, shining; prosternum obtusely lobed in front with deep transverse impression, the process gradually narrowed, acute at apex; surface coarsely punctate, more rugose posteriorly; metasternum granulate; abdomen granulate at base, the sculpture becoming rapidly finer toward apex, where the segment is finely or sparsely punctate; pygidium carinate, the carina projecting in a spine; the vertical portion of the ventral segments punctate and sparsely pubescent; claws similar on all the feet in both sexes. Length .22--.28 inch.; 5.5—7 mm.

Male.—Front more deeply impressed, less coarsely punctate; elytra not wider at the post-median expansion than at the humeri; prosternum more coarsely punctate, metasternum slightly concave; first ventral segment concave along the middle, the second segment rather deeply grooved for three-fourths its length, the groove smooth.

Female.—Front flatter, more closely punctate, less deeply grooved; elytra wider at the posterior dilatation than at the humeri; prosternum more sparsely punctate, metasternum convex; first two ventral segments not grooved, the surface smoother than in the male.

Variations.—The normal and most common form has the head and thorax of bright cupreous color, the elytra black, sometimes with a slight tinge of blue. The color of the head and thorax is, at times, quite brassy shading gradually to green. Specimens more rarely occur with these parts quite black, although with more gloss than the elytra. In all other characters excepting size, the species is remarkably constant.

Habits.—The larva of this insect feeds in the stems of Blackberry and Raspberry, emerging in the early Summer. An excellent article illustrating the injuries done, together with a figure of the larva, will be found in "Insects Injurious to Fruits," by Wm. Saunders (J. B. Lippincott Company).

Hab.—Occurs from Canada and the New England States southward to Virginia and westward to Missouri.

A. lateralis Say.—Form of *ruficollis*. Head and thorax cupreous; elytra black, with slight æneous lustre. Antennæ piceous, slightly bronzed, scarcely attaining the middle of the thorax, serrate from the fourth joint; head impressed from the occiput to the clypeus, less deeply than in *ruficollis*, entire head rather coarsely and closely punctate. Thorax broader than long, not narrowed at base, sides moderately strongly arcuate, slightly explanate posteriorly, lateral edge slightly sinuous, hind angles with a slight tuberosity ♂, or subcarinate ♀; disc moderately convex, a vague median depression divided in two portions, a moderately deep oblique lateral depression; surface transversely strigose, subgranulate at middle in front; scutellum transversely carinate, less distinctly in ♂; elytra with a slight posthumeral sinuation, behind which there is a slight dilatation; basal depressions well marked, apices rounded, not distinctly serrulate,

disc moderately convex, without trace of costa; surface densely granulate, but less opaque than in *ruficollis*; body beneath piceous with æneous lustre; prosternal lobe slightly emarginate, the intercoxal process gradually narrowed, the tips acute; pro- and metapleuræ closely punctate, not pubescent; abdomen moderately closely punctate, more finely along the middle, more coarsely and roughly at the side of the first segment; pygidium coarsely punctate, carinate, the carina projecting at tip; claws similar on all the feet in both sexes, the lower portion of the cleft more nearly contiguous in the female. Length .25—.28 inch.; 6.25—7 mm.

Male.—Prosternum coarsely, not closely punctate, without pubescence; first ventral segment slightly depressed along the middle, second with a deep, smooth groove extending more than half its length.

Female.—Prosternum less punctate, smoother; first two ventral segments simple.

Four specimens have afforded the above description. Another specimen in Mr. Ulke's collection is of somewhat larger size, and with more even thorax, seems to belong here, although the discovery of the male may prove it distinct.

This species greatly resembles *ruficollis*, but may be distinguished by the less deeply impressed head and the presence of either a slight evidence, or a distinct carina, in the hind angles of the thorax. The sexual characters of the two are practically identical; several other species have also some resemblance, but these have no pygidial spine.

Habits.—The wood in which the larva lives is not known, but the imago has been taken on foliage of Poplar sprouts (Blanch. Ent. Am. v, p. 32, under the name *anxius*).

Hab.—Massachusetts (Blanchard), New Jersey (Liebeck), New Mexico (Ulke), Illinois (Dury), Missouri (Say).

A. otiosus Say.—Form slender, sometimes linear in the male, stouter in the female, usually dull greenish, sometimes slightly cupreous. Antennæ usually bluish, extending nearly to the hind angles of the thorax, a little shorter in the female, joints all longer than wide, serrate from the fourth joint; head viewed from above slightly convex, with a very slight occipital impression, front rather flat, coarsely and closely punctate, occiput faintly strigose. Thorax a little wider than long, slightly narrowed at base in the male, sides feebly arcuate, but more distinctly in the female, lateral edge straight ♂, or feebly sinuous ♀, hind angles obtusely or indistinctly carinate ♂, or usually with a well defined carina ♀, disc convex, an oblique lateral depression and on the median line two depressions, the posterior the larger; surface transversely strigose, with fine punctures between; scutellum transversely carinate; elytra slightly sinuate behind the middle, entirely concealing the abdomen from above, apices separately rounded, finely serrulate, elytra with a vague costa from the humeri behind the middle, between which the elytra are slightly flattened, and behind the middle the su-

tural edge is slightly elevated; basal depressions distinct; surface with a densely imbricate sculpture; body beneath usually bluish, more shining than above; prosternal lobe obtuse, vaguely emarginate, the intercoxal process gradually narrowed and acute at tip, propleuræ scabrous or subgranulate; metasternum coarsely punctate; abdomen punctate, more sparsely along the middle, quite coarsely along the side, the first segment quite rough; pygidium coarsely punctate, indistinctly carinate; tarsi slender, the first joint of the hind tarsi nearly half as long as the tibiæ; claws similar on all the feet in both sexes. Length .16—.22 inch.; 4—5.5 mm.

Male.—Form more slender, sometimes almost linear; front flatter, more densely punctured; hind angles of thorax less distinctly carinate; prosternum densely, finely punctate, finely pubescent, the pubescence usually extending along the median line of the body to the end of the second ventral segment; first two ventral segments vaguely sulcate on the median line. Inner apical angle of all the tibiæ spiniform and incurved.

Female.—Form stouter, usually with more evident æneous surface lustre; front slightly more convex, more coarsely, but less closely punctate, the occipital impression extending slightly downward; hind angles of thorax quite distinctly carinate; prosternum much more sparsely punctate, not hairy; first two ventral segments not impressed and with smoother sculpture.

Variations.—The most striking structural variation is the hind angles of the thorax. The sexual variation has already been recorded, but specimens are before me as completely deprived of carina as any species in our fauna, not only males but females also. The smaller and less developed males have the ventral sexual characters less pronounced, so that the pubescence along the median line becomes less distinct and the sulcus of the first two ventral segments almost entirely disappears. The color variations are not great, the males, however, are in a great part dull bluish, while the females are slightly greenish or cupreous.

As this is a common and well known species, much space has been given to its description as a means of comparison for other species. Say's *A. geminatus* is undoubtedly the female of this, subsequently described by him as *otiosus*. The former name has priority by several years, but the latter name is retained from its having acquired general acceptance, and from the fact that both belong to the same author and no injustice is done. This is clearly one of those cases in which the law of priority should yield to that of convenience.

Habits.—Feeding on Oak shrubs (Blanch. Ent. Am. v, p. 32). I think it has been reared from Hickory twigs by Dr. LeConte.

Hab.—Canada and New England States; westward to Kansas; southward to Texas.

A. defectus Lec.—Form and colors of *otiosus*. Antennæ attaining the middle of the thorax, the joints scarcely longer than wide, serrate from the fourth joint; head slightly convex, with scarcely a trace of occipital impression, front and occiput punctate. Thorax wider than long, not narrower at base, sides arcuate from apex to base, hind angles obsoletely carinate in both sexes, lateral margin very nearly straight, disc convex, a vague oblique depression at the sides, two depressions on the median line, but feebler than in *otiosus*; surface transversely strigose, the grooves punctate, more distinctly than in *otiosus*; scutellum transversely carinate; elytra sinuate behind the humeri with the post-median dilatation concealing the abdomen, apices rounded, finely serrulate, disc with scarcely a trace of costa, the sutural border elevated behind the middle, basal depressions feeble; surface imbricately sculptured, but smoother near apex; body beneath more shining, dull bluish green; prosternal lobe obtuse, vaguely emarginate, the intercoxal process gradually narrowed and acute at tip, propleuræ moderately closely punctate; metasternum not closely imbricate. Abdomen sparsely punctate along the middle, a little more closely at the sides; pygidium coarsely sparsely punctate, feebly carinate; tarsi slender, as in *otiosus*; claws similar on all the feet. Length .16—.18 inch.; 4—4.5 mm.

Male.—Front more opaque and finely punctate; prosternum coarsely, not closely punctate, rather opaque. First two ventral segments faintly grooved, but not pubescent; last ventral truncate, with a marginal fringe of hairs, curved and directed downward. Inner apical angle of all the tibiæ spiniform, slightly incurved.

Female.—Front more shining and more evidently punctate; prosternum more shining. First two ventrals not grooved, last ventral oval at tip, not fimbriate.

Of the habits of this species I have no information. The only variations observed are those of color as in *otiosus*, the females rather more brassy.

There can be very little doubt that this species was originally instituted to contain all the small specimens of *otiosus* in which the carina of the hind angles of the thorax is nearly or quite wanting. An examination of the series showed, however, that, abstracting the true *otiosus*, there remained specimens, one of which bore the type label, which clearly indicated a distinct species. They were, however, females. A few days later Mr. Blanchard gave me a male, which was clearly a mate for the type. As might be inferred from the preceding remarks, the species very closely resembles small or starved specimens of *otiosus*. There need be no difficulty, whatever, in separating the males from any *Agrilus* in our fauna, but the females are more difficult. It will be observed, however, that in the

present species the median line of the abdomen is very smooth, almost without punctures. In fact, the entire abdomen is less sculptured than usual. When once a male is obtained there will be no great difficulty in separating the female from *otiosus*.

It is evident that LeConte had before him a male of this species which he mistook for the male of *lacustris*, but I failed to find the specimen at present associated with that species, and discovered that it had been removed and placed with the present species either by himself, or later by Crotch.

Hab.—Massachusetts (Blanchard); also near Philadelphia.

A. crinicornis n. sp.—Form slender, as in *otiosus*, color olive-bronze with a slight bluish tinge at the sides, slightly shining. Antennæ slender, bluish, passing the hind angles of the thorax, joints all longer than wide, serrate from the fourth joint, fimbriate on the posterior side with comparatively long, sparsely placed hairs; front rather flat, a slight occipital depression, subopaque, sparsely punctate, occiput faintly strigose. Thorax wider than long, slightly narrowed at base, sides arcuate, margin slightly sinuous, hind angles not at all or very feebly carinate, disc moderately convex, a deep oblique lateral and two median depressions as in *otiosus*; surface indistinctly transversely strigose on the disc with intervening punctures, at sides in front punctate; scutellum transversely carinate; elytra sinuate behind the humeri, slightly broadened behind the middle, apices very obtuse, serrulate, disc with a vague costa, the intervening space slightly flattened, sutural edge elevated behind the middle, basal depressions moderate, surface closely imbricately sculptured, rougher near the base; body beneath more shining than above, blue; prosternal lobe obtuse, vaguely emarginate, the intercoxal process gradually narrowed, acute at tip, propleuræ opaque, scabrous; metasternum more roughly scabrous. Abdomen sparsely, finely punctate at middle, more coarsely at the sides; pygidium coarsely punctate, not at all carinate; tarsi slender, claws similar on all the feet. Length .17 inch.; 4.25 mm.

Male.—Front subopaque, alutaceous, sparsely punctate; prosternum rather flat, opaque, sparsely punctate, not pubescent; first two ventral segments rather flat, not grooved nor pubescent; inner apical angle of the tibiæ spiniform and slightly incurved.

While closely related to *otiosus*, the male gives evidence that the species is quite distinct. Females have not, with certainty, been separated, consequently it is not possible to assert that the pilosity of the antennæ is peculiar to the male.* The antennæ are certainly longer and more slender than any species in the vicinity of *otiosus*.

Hab.—Massachusetts (Blanchard), Pennsylvania (Liebeck), Illinois (Strumberg), Virginia (Ulke).

* Since the above was written females have been obtained having the antennæ similarly pilose.

A. masculinus n. sp.—Form rather slender, but more robust than *otiosus*, color dull green or slightly brassy, feebly shining. Antennæ greenish, serrate from the fourth joint, these longer than wide, tip reaching the hind angles of the thorax; head slightly convex, a very feeble occipital impression, more distinct in the female, front densely punctate, occiput slightly strigose. Thorax wider than long, slightly narrowed at base, sides in front arcuate, a slight sinuation posteriorly, lateral margin sinuate, hind angles with a sharply defined carina in both sexes, disc convex; an oblique, but not deep impression at the sides, two depressions on the median line as in *otiosus*, but much less distinct; surface not coarsely transversely strigose, with fine punctures on the intervals; scutellum transversely carinate: elytra slightly sinuate behind the humeri, then somewhat dilated, concealing the abdomen, apices rather obtusely rounded, finely serrulate, disc with a vague costa on each side, the intervening space rather flat, sutural margin elevated behind the middle, basal depressions shallow, surface closely imbricately sculptured; body beneath more shining than above; prosternal lobe obtuse, broadly and rather deeply emarginate, the intercoxal process gradually narrowed, acute at tip, propleuræ closely punctate; metasternum at sides densely submuricately sculptured. Abdomen closely punctate, and on the first two segments denser and submuricate; pygidium sparsely punctate, indistinctly carinate; hind tarsi slender, as long as the tibiæ, the first joint as long as the four following; claws similar on all the feet in both sexes. Length .24 inch.; 6 mm.

Male.—Front flatter, more opaque and more densely punctured, usually greenish; prosternum with a space in front densely covered with short erect pubescence, the intercoxal process smoother, with a median longitudinal elevation. First two ventral segments flattened, or vaguely concave along the median line, not pubescent. Inner apical angle of the front and middle tibiæ spiniform and incurved, posterior tibiæ simple.

Female.—Front more convex, more coarsely and less densely punctate, usually brassy; prosternum not hairy, the intercoxal process flat. Abdomen not impressed, and less roughly sculptured.

Of the habits of this species I have no information. The four specimens examined show no variation beyond that given in the detailed description.

It is highly probable that this species is mixed with *otiosus* in those collections possessing it. In fact, so great is the superficial resemblance that with ordinary comparison they could not be separated. The males are, however, easily separated by the pubescent area at the front of the prosternum. The median subcariniform elevation of the intercoxal process bifurcates about the middle of the sternum like a broad letter **Y**, and in the bifurcation behind the emargination of the lobe the pubescent area is placed. The females, if I have correctly separated them, are not so easily distinguished from the larger females of *otiosus*, but I observe that in both sexes the elytra

are much more obtuse at apex than in that species, and the sutural angle rather better defined.

Hab.—Canada, New York and Illinois. The two supposed females are from Mt. Tom and Tyngsboro, Mass., and were collected by Mr. Blanchard, who separated them as not being fully in accord with normal females of *otiosus*.

A. arcuatus Say.—Moderately elongate, not more robust than *ruficollis*; head and thorax brassy, cupreous, or slightly greenish; elytra varying from dark olivaceous to bright brassy or cupreous. Antennæ piceous, slightly bronzed, passing the middle of the thorax, serrate from the fourth joint; front moderately impressed from the occiput nearly to the base of the clypeus; surface coarsely, moderately closely punctate, somewhat strigose on the occiput. Thorax one-fourth wider than long, not narrowed at base; sides regularly arcuate, the margin slightly sinuous, disc convex, the median line with an anterior and posterior depression, an oblique depression at the side nearly reaching the median line; surface transversely strigose, with punctures in the depressions and more numerous near the apex, hind angles with an arcuate carina, rather sharp ♀, or obtuse ♂; elytra slightly sinuate behind the humeri and dilated behind the middle, nearly concealing the abdomen, apices separately rounded, finely serrulate, disc slightly flattened at middle, basal depressions moderately deep, sutural ridge elevated behind the middle; surface rather densely imbricate, but not opaque; body beneath usually cupreous; prosternal lobe broadly emarginate, the intercoxal process gradually narrowed, acute at tip, propleuræ scabrous, slightly strigose; metasternum coarsely punctate-strigose. Abdomen moderately finely punctate, more coarsely at the sides of the first two segments; pygidium coarsely punctate, not carinate. Length .20—.36 inch.; 5—9 mm.

Male.—Front flatter and more usually greenish, the impression less defined; prosternum closely punctate and slightly pubescent; metasternum longitudinally impressed; first ventral segment slightly flattened, not hairy; anterior and middle tibiæ with a slight mucro at the inner apex, the posterior simple.

Female.—Head more convex, the frontal impression deeper and sometimes bifurcate near the clypeus, color coppery or brassy; prosternum more shining, less closely punctate, not hairy; metasternum feebly impressed; abdomen simple; tibiæ not mucronate.

Variations.—The variations of this species are so pronounced that, with a limited series, three species might be indicated, as has in fact been done. These are as follows:

Var. *torquatus* Lec.—Head and thorax brassy, or slightly coppery or greenish, elytra dark olivaceous.

This form is widely distributed: Massachusetts, Michigan, Montana, Illinois, Kansas, Kentucky, Pennsylvania. There is often a great resemblance between some of the smaller females of this and

the larger females of *otiosus*, and at present I am unable to give any positive means of separating them, except the experience gained in handling large numbers of specimens.

Var. *fulgens* Lec.—A little more shining than normal.

Var. *coryli* Horn.—Color uniformly bright brassy.

This form occurs in Massachusetts, Illinois, Missouri, Florida.

Var. *obliquus* Lec.—Color uniformly coppery.

The type of this form, as remarked by Crotch, is founded on a large female; in fact, all the specimens I have seen are of that sex. These resemble some of the forms of *politus*, but the structure of the claws will separate them.

Habits.—The only information possessed of the habits of this species concerns the var. *coryli*, which lives on the Hazel (*Corylus*) according to Mr. Blanchard (Ent. Am. v, p. 32).

Hab.—Massachusetts to South Carolina, westward to Kansas and Montana.

A. cupricollis Gory.—Form of *ruficollis*; black, subopaque; head and thorax brassy or cupreous, as in *ruficollis*. Antennæ black, slightly bronzed, scarcely reaching the middle of the thorax, serrate from the fourth joint, joints 4–10 as wide as long; occiput very deeply impressed, front not impressed, surface coarsely punctate, sparsely on the front, more closely on the vertex. Thorax broader than long, not narrowed posteriorly, sides feebly arcuate, the marginal line strongly sinuous, hind angles with an obtuse elevation; disc convex, with a median, rather sharp impression posteriorly, broadly transversely impressed in front, at sides a deep oblique impression almost reaching the dorsum, surface coarsely transversely strigose, without punctures; scutellum transversely carinate; elytra very feebly sinuate behind the humeri and with a feeble posterior broadening, the abdomen concealed, apices separately rounded, serrulate, disc slightly flattened with very feeble trace of costa, the sutural edge slightly elevated behind the middle, basal depressions not deep; surface closely finely granulate; body beneath black, slightly violaceous; prosternal lobe broadly emarginate, intercoxal process gradually narrowed, acute at tip; propleuræ finely scabrous, opaque; metasternum at sides roughly scabrous, somewhat strigose. Abdomen transversely strigose with fine punctures along the edge of the strigæ, smoother along the middle and at apex than at the sides; pygidium coarsely punctate, not carinate; claws similar on all feet. Length .20 inch.; 5 mm.

Male.—Prosternum opaque, sparsely punctate, with short pubescence, ventral segments not impressed nor flattened. Metasternum longitudinally impressed. Anterior tibiæ with an extremely feeble incurved mucro at tip, middle and hind tibiæ simple.

Female.—Unknown.

So closely does this species resemble *ruficollis*, that at first glance it might readily be supposed to belong to that species. They are

easily separable by the fact that the former has a well marked projecting carina, while this has not. The occipital impression gives the appearance from above of a bilobed head, and the impression does not extend downward on the front, while in *ruficollis* the occiput is rather concave and the impression reaches the clypeus.

Occurs in Florida at St. Augustine.

A. angelicus n. sp.—Form rather robust, as in *muticus*; color brassy, moderately shining. Antennæ piceous, bronzed, not reaching the middle of the thorax, serrate from the fourth joint. Head slightly convex, a finely impressed line from the occiput to the clypeus, surface finely, not closely strigose, sparsely punctate, clypeus much broader at base than long at middle. Thorax broader long, base and apex equal, sides arcuate in front, sinuate behind the middle, hind angles rectangular with a short, acute, straight carina, disc convex, a vague median depression, another broad depression at the sides; surface transversely, not coarsely strigose with intermediate sparse punctures; scutellum not transversely carinate; elytra distinctly sinuate behind the humeri and broader behind the middle, the apices separately rounded and very feebly serrulate; disc convex, without trace of costæ, the basal depressions moderate, surface rather finely imbricately sculptured; body beneath more shining than above; prosternal lobe obtuse, broadly but feebly emarginate, the intercoxal process gradually narrowing, the apex acute, propleuræ with reticulate sculpture; metasternum coarsely punctate, reticulate. Abdomen finely punctate-strigose at middle, a little more coarsely at the sides, the first segment but little more rugose; pygidium coarsely punctate, feebly carinate; claws similar on all the feet. Length .25 inch.: 6.5 mm.

The only specimens seen are females, and show no secondary sexual characters. The lower appendage of the claws is less incurved than usual, reaching the form seen in *difficilis*. Should the form of claws induce one to place it elsewhere, it would be placed in the series near *muticus*, from any of which it will be known by the acute prosternum.

One specimen collected by Mr. D. W. Coquillett near Los Angeles; Sta. Cruz Mountains, Cal. (Nat. Mus.)

A. macer Lec.—Elongate, cupreo-æneous, feebly shining. Antennæ piceous, with brassy lustre, nearly reaching the middle of the thorax, serrate from the fourth joint; front flat, or slightly concave; occiput feebly impressed, the line extending to the middle of the front, surface rather uneven, densely coarsely punctate, slightly strigose on the occiput, a well marked transverse ridge at the base of the clypeus. Thorax nearly a third wider than long, very slightly narrowed at base, sides feebly arcuate, margin slightly sinuate, hind angles rectangular, the carina well marked and directed internally, disc convex, a vague median depression near the base, lateral depression broad, but not deep; surface not deeply transversely strigose, punctate between the strigæ, near the sides and front angles more densely strigoso-punctate; elytra narrowed from the base with a very feeble post-median broadening, the apices rounded, rather strongly serrate, disc with a well marked costa extending from the humeri nearly to apex, the interval quite flat, the sutural border elevated slightly from apex, two-

thirds to base, basal depressions shallow, surface punctate-granulate, rather densely between the costæ, more sparsely at the sides; body beneath similar in color; prosternal lobe broadly emarginate, the intercoxal process broad with parallel sides, very abruptly narrowed at the apex, where it enters the metasternum; propleuræ closely punctate, finely fulvo-pubescent; metasternum at sides very densely punctured and subopaque, finely pubescent. Abdomen densely punctured at the sides, especially in front, rather sparsely along the median line; last segment very obtuse, subtruncate, the vertical portion of the segments rather densely fulvo-pubescent; pygidium carinate, the carina projecting and emarginate at tip; claws divaricate, broadly toothed at base. Length .35—.58 inch.; 9—15 mm.

Male.—Front slightly concave; scutellum scarcely visibly carinate. Prosternum densely punctate and slightly pubescent along the middle. Ventral segments simple; anterior tibiæ feebly mucronate.

Female.—Front flat, but irregular; scutellum distinctly carinate; prosternum not densely punctate nor hairy; tibiæ simple.

No variation worthy of note has been observed in this species.

In the original description the scutellum is said to be not carinate, but this proves in this instance to be merely a sexual peculiarity, as it is quite certain that Dr. LeConte had a male before him.

No difficulty need be experienced in recognizing this species, as it is one of but few having a well defined elytral costa, and for this reason, especially, seems rather out of place among our species.

Hab.—Texas, at Eagle Pass, and other localities in the southwestern portion of the State.

A. vittatocollis Rand.—Form generally resembling a large *ruficollis*; head and thorax coppery, subopaque, elytra black, opaque. Antennæ passing the middle of the thorax, serrate from the fourth joint, piceous, faintly bronzed; front slightly concave, the occiput more deeply impressed, the median impressed line extending to the base of the clypeus, surface rather closely strigose and punctate, clothed with golden-yellow pubescence, except near the upper half of the eye. Thorax fully one-third wider than long, sides rather strongly arcuate, the margin sinuate, disc convex, with a median shallow impression extending from base nearly to apex, lateral depressions vague, hind angles not carinate. surface closely strigose, the strigæ oblique in front, transverse near the base, a median band of golden pubescence extending from the basal to the apical margin, a broader band of similar pubescence adjacent to the lateral margin, the hind angle, however, not pubescent; scutellum transversely carinate; elytra distinctly sinuate behind the humeri, broadened behind the middle, nearly concealing the abdomen, apices rounded, serrulate; disc slightly flattened, without trace of costæ; the sutural edge slightly elevated at apical third, basal foveæ moderate; surface densely granulate and opaque; body beneath black, slightly æneous, with very sparse, fine golden pubescence; prosternal lobe obtusely truncate, the intercoxal process broad, very little narrowed, except at apex, where the narrowing is abrupt, at which point the sides are slightly bent downward forming a tooth; the surface, with the propleuræ, closely punctate; metasternum at sides densely

punctate and strigose. Abdomen finely punctate, sparsely along the median line, more densely at the sides, especially on the first two segments, which are also slightly strigose, the vertical portion of the segments densely clothed with golden pubescence; last segment obtuse at tip; pygidium coarsely punctate, rather strongly carinate, the carina projecting and truncate at tip; claws dissimilar in the sexes. Length .31—.37 inch.; 8—9.5 mm.

Male.—Prosternum densely punctured and opaque, not pubescent. First ventral segment slightly flattened at middle and rugulose, the second with a very feeble longitudinal depression; tibiae of all three pairs distinctly mucronate at the inner apical angle; claws of front feet almost truly bifid, middle feet less so, posterior feet nearly toothed.

Female.—Prosternum less densely punctate and more shining. Ventral segments not impressed; tibiae not mucronate at tip; claws rather broadly toothed on all three pairs of tarsi.

Among the numerous specimens examined no variation worthy of mention has been observed. Resembles *fuscipennis*, but the color of the thorax of that species is due to varying color of the surface, and not to the presence of pubescence, as in the present species.

Hab.—Massachusetts, westward to Illinois. A specimen (♀) in my cabinet from Nevada is at present not separable, but the male may show it to be distinct when discovered.

A. audax n. sp.

The species for which this name is proposed so closely resembles *vittatocollis*, that it seems unnecessary to repeat the description, only the points of difference will be given.

Thorax similar in color, but rather more evidently transversely strigose, the median line of golden pubescence does not reach the apical margin, the lateral pubescent area is separated from the margin by a naked edge, but the pubescence extends to the hind angles; body beneath more brassy, the propleuræ, mesopleuræ, metapleuræ and outer half of coxal plate with golden pubescence. Length .35—.40 inch.; 9—10 mm.

Male.—Prosternum closely punctate, not pubescent, the intercoxal process gradually narrowed without dentiform reflexion of the edge. First ventral segment slightly flattened at middle, the second with a rather deep smooth groove, which is wider in front, extending three-fourths to the posterior edge of the segment; anterior and middle tibiae feebly mucronate, the posterior simple; claws nearly as in *vittatocollis*.

Female.—Prosternum less closely and deeply punctate. Ventral segments simple; tibiae not mucronate; claws as in *vittatocollis*.

This species presents the closest resemblance that it seems possible

for one species to have to another. The males are abundantly distinct by the ventral characters, but both sexes can be separated from *vittatocollis* by the hairy pleuræ and coxal plates.

Hab.—Texas.

A. bilineatus Weber.—Black, with sometimes a slightly greenish tinge, opaque; sides of thorax clothed with yellow pubescence, and a vitta of same from the humeri three-fourths to the tip of the elytra. Antennæ slightly æneous, extending beyond the middle of the thorax, serrate from the fourth joint; front slightly convex, densely coarsely punctured, occiput impressed, the line extending to the middle of the front. Thorax one-third wider than long, distinctly narrower at base, sides nearly straight anteriorly, sinuate near the hind angles, which are sharply rectangular and not carinate, margin sinuous; disc convex, a very vague median depression, the lateral oblique impression short; surface rather finely transversely strigoso-punctate, the sides broadly clothed with golden, rarely whitish pubescence; scutellum transversely carinate; elytra sinuate behind the humeri, broadened behind the middle, apices rounded, serrulate; disc flattened, the basal depressions moderate, sutural edge slightly elevated at apical third, surface densely granulate and subopaque, with a vitta of yellow or whitish hairs extending from the basal depression three-fourths to apex; body beneath more shining than above and more greenish; prosternal lobe truncate, intercoxal process rather broad, gradually narrowed to apex, propleuræ granulate, sparsely pubescent; meso- and metapleuræ and outside of coxal plates rather densely pubescent. Abdomen finely and sparsely punctate along the middle and more densely and coarsely at the sides, the first segment rougher and strigose, the vertical portions of the segments densely pubescent; pygidium coarsely punctate, with a strong median carina, which projects at apex; claws dissimilar in the sexes. Length .22—.37 inch.; 5.5—9.5 mm.

Male.—Head more or less green, more densely punctate and opaque. Prosternum densely punctate and subopaque, especially between the coxæ, not pubescent. First ventral segment slightly flattened at middle, the second with a deep smooth groove; anterior tibiæ slightly mucronate at apex, the others simple; anterior and middle claws almost truly bifid, the posterior claws with a slender, acute tooth.

Female.—Head more convex, less densely punctured, more shining, with brassy or cupreous lustre. Prosternum more shining, less densely punctured. Ventral segments simple; tibiæ not mucronate; claws with a slender acute tooth on all the feet.

Variations.—The hair forming the lateral space of the thorax and the vittæ on the elytra is usually golden-yellow in color, but specimens often occur with hair quite white with intermediate shades. More rarely specimens occur without any pubescent markings above, the absence of hair not being due to abrasion, as might be suspected, but seems to be the result of starved development, as all the specimens seen are of the smallest size.

Habits.—Not rare on Oak foliage, logs, stumps, etc., July ; Massachusetts (Blanchard, "Ent. Am." v, p. 32). Taken on White Oak, June (Tolman, "Insect Life," i, p. 343).

Hab.—Occurs from Maine westward to the Rocky Mountains, and south to Texas.

A. granulatus Say.—Form rather slender, color brassy bronze, each elytron with three indistinct pubescent spots—basal, median and ante-apical, the first often wanting. Antennæ slender, nearly reaching the hind angles of the thorax, serrate from the fourth joint, slightly greenish ; front rather flat, occiput with a linear impression extending to the middle of the front ; surface coarsely closely punctate, occiput slightly strigose. Thorax wider than long, scarcely narrowed at base, sides regularly arcuate, lateral margin faintly sinuous, disc convex with three depressions, the one larger in front of scutellum, the two others in front on each side of middle less distinct, or even absent, the lateral oblique impression well marked, hind angles with a well defined, arcuate carina ; surface transversely strigose, punctate in front ; scutellum transversely carinate ; elytra feebly sinuate behind the humeri, slightly broadened behind the middle, apices acute, serrulate ; disc slightly flattened at middle, the sutural margin elevated behind the middle, basal foveæ moderate, surface rather coarsely imbricate ; body beneath darker than above ; prosternal lobe emarginate, the intercoxal process rather broad, parallel, acute at tip, the propleuræ with the entire side of body densely clothed with yellowish pubescence. Abdomen not very closely punctate, the sides of each segment with a more densely punctured spot clothed with pubescence, the vertical portion of the segments, except the second, densely pubescent ; pygidium coarsely punctate, with a strong median carina, which projects at tip ; claws dissimilar in the sexes. Length .30—.35 inch. ; 7.5--9 mm.

Male.—Front somewhat greenish. Prosternum quite densely punctured between the coxæ, more sparsely in front ; first ventral segment longitudinally impressed with a smooth median line, second segment more deeply impressed, the impression smooth and extending nearly to the suture ; anterior and middle tibiæ feebly mucronate, the posterior simple ; anterior and middle claws almost bifid, being cleft at the tip, posterior claws broadly toothed.

Female.—Front cupreous. Prosternum coarsely punctured between the coxæ, much smoother in front. Ventral segments simple ; tibiæ simple ; claws broadly, but acutely toothed on all the feet.

Variations.—In all well preserved specimens there will be observed a line of pubescence extending from the front angles of the thorax to the base, passing inside of the carina. The pubescent spots of the elytra are at most faint, and are easily removed by abrasion, but their position is always indicated by a small and more densely punctured area. The three discal impressions of the thorax are variable. The

position is always distinct, but the two in front may escape observation.

Of the habits of this insect nothing is certainly known. Care must be taken not to confound small specimens of this with *oblongoguttatus* (*interruptus*) or *fallax*, but neither of these has the pygidial spine.

It is quite clear that this is the species Say had before him from his remarks in the original description, and a subsequent note (vide edit. Lec. ii, pp. 104 and 596). LeConte, in his "Revision," p. 245, admits both *granulatus* and *quadriguttatus*, but it is very clear that he has used the female as his type of the former and a male for the latter.

Hab.—New England States westward to Missouri.

A. nevadensis n. sp.—Form elongate, elytra very acute at apex, piceous, subopaque, with feeble violaceous lustre beneath. Antennæ nearly attaining the hind angles of the thorax, with bronze lustre, serrate from the fourth joint; front feebly convex, a moderately impressed line extending from the occiput to middle of front, surface closely punctate, a vague fovea each side of middle. Thorax nearly a half wider than long, sides arcuate with a slight sinuation near the hind angles, these with a strong arcuate carina, disc convex, with a broad, but vague median impression consisting of an anterior and posterior division, lateral depression shallow, surface comparatively smooth each side of middle, some vague strigæ posteriorly and punctate near apex, at sides densely punctate; scutellum not transversely carinate; elytra scarcely sinuate behind the humeri, without post-median dilatation, the sides of the abdomen exposed, apices separately acute and somewhat prolonged, serrulate, disc slightly flattened at middle, a vague costa on each side and three depressions, which are slightly pubescent; basal, median and one-third from apex, surface vaguely not closely imbricate, less closely than in *cavatus*; prosternum closely punctate, the lobe distinctly emarginate, intercoxal process gradually narrowed, acute at tip, propleuræ closely punctate, scabrous, sparsely pubescent; metasternum at middle comparatively smooth, at sides closely punctate and slightly strigose. Abdomen nearly smooth at middle, very sparsely punctate at sides, even on the first two segments, very sparsely pubescent, the vertical portion of segments sparsely pubescent; pygidium coarsely punctate, with a median carina, which projects rather strongly at apex. Length .40 inch.; 10 mm.

Male.—Unknown.

Female.—Tibiæ not mucronate, claws similar on all the feet, cleft posteriorly to the tip, the lower portion forming an acute tooth.

This species is totally unlike any other in our fauna from the acute and somewhat prolonged elytra. Its general form is not very unlike *macer*. It will be known, however, among the species with projecting carina by its feeble sculpture, the presence of the three pubescent

spots (although these are not very distinct) and the comparatively smooth abdomen without conspicuous pubescence.

Hab.—Western Nevada (Morrison).

A. niveiventris n. sp.—Form rather more slender than *politus*; color bright coppery, with the thorax slightly brassy, varying to olivaceo-cupreous. Antennæ æneous, attaining the middle of the thorax, serrate from the fourth joint. Head feebly convex, a slight median impressed line from the occiput to the middle of the front, the latter densely punctate, occiput slightly strigose. Thorax one-third wider than long, sides regularly arcuate, lateral margin slightly sinuate, hind angles with a strong, arcuate carina, disc convex, with a vague median depression composed of an anterior and a posterior depression, lateral depression feeble; surface transversely strigose, with punctures between the strigæ; in some specimens the strigæ are very feeble; scutellum transversely carinate; elytra sinuate behind the humeri, slightly broadened behind the middle, apices separately rounded, finely serrulate, disc slightly flattened at middle with an extremely vague costa; surface with imbricate sculpture, less close and more shining than in *politus*, with three indistinct pubescent spots, often merely indicated by a slightly denser punctuation, these spots placed as in *nevadensis*; prosternum densely punctured, the lobe acutely emarginate at middle, the intercoxal process parallel, acute at tip, propleuræ densely punctured with conspicuous whitish pubescence; metasternum at sides densely punctate and transversely strigose, pubescent as in the propleuræ. Abdomen sparsely punctate at middle, more densely at the sides and finely strigose, especially on the first two segments, vertical portions of the segments densely white pubescent; pygidium coarsely punctured with a strong median carina, projecting at apex. Length .25—.37 inch.; 6.5—9.5 mm.

Male.—Front slightly flatter; tibiæ not distinctly mucronate; claws cleft one-third from apex, forming an acute tooth; first ventral segment flattened at middle, the second with a slightly depressed, smooth space at anterior half of middle.

Female.—Front slightly convex; tibiæ not mucronate; claws cleft at middle, forming an acute tooth. Ventral segments convex at middle, the first much smoother than on the male.

Variations.—The color variation has been referred to. In many specimens there is on each side of the median line, nearer the front, a fovea which is as often absent. In very carefully collected specimens the sides of the thorax above have a white efflorescence, and the body beneath, at sides, seems very densely pubescent, owing to the efflorescence between the hairs. This is, however, so easily lost, one might readily suppose two specimens to be distinct species which had been unequally handled in collecting.

The three pubescent spots on the elytra are, at best, very feeble, and some care must be used in their observation.

Habits.—Nothing is known to me.

Hab.—Western Nevada; Los Angeles, Cal., and Arizona, near Yuma.

A. pensus n. sp.—Form of *arcuatus*; color slightly cupreous, feebly shining. Antennæ rather slender, passing the middle of the thorax, slightly greenish, serrate from the fourth joint. Head feebly convex, occiput slightly impressed, the line extending to the middle of the front, the front coarsely and closely punctate, occiput less closely. Thorax broader than long, not narrower at base, sides regularly arcuate, lateral margin sinuate, hind angles with a fine, short carina; disc convex, but irregular, a vague depression in the front and base of the median line, sometimes a fovea on each side; lateral oblique impressions distinct, but short; surface vaguely transversely strigose and punctate; elytra slightly sinuate behind the humeri, and a little broadened behind the middle apices subacute and serrulate, disc slightly flattened, the sutural edge elevated from the middle to the apex; surface imbricate, more closely at apical third and in the basal foveæ, which are moderately deep; body beneath similar in color to the upper surface, but more shining; prosternal lobe feebly emarginate at middle, the intercoxal process moderately broad, acute behind the coxæ, the propleuræ granulate-imbricate, sparsely pubescent; metasternum at sides roughly imbricate. Abdomen finely punctate, very sparsely at middle, more closely at the sides, the first segment finely strigose, the outer surface including the vertical portion of the segments finely and sparsely pubescent; last ventral segment very obtuse or truncate; pygidium coarsely punctate, with a strong carina, which projects at tip; claws dissimilar. Length .30—.32 inch.; 7.5—8 mm.

Male.—Front more or less greenish. Prosternum roughly punctured, more sparsely in front, not pubescent; first ventral segment flattened at middle, the second with a smooth but not deep groove extending two-thirds the length of the segment; anterior tibiæ feebly mucronate, middle and posterior tibiæ simple; claws of front tarsi cleft close to apex, almost bifid, middle or hind claws broadly toothed.

Female.—Front cupreous, and somewhat more convex. Prosternum but little smoother than the male. Ventral segments simple; tibiæ not mucronate; claws broadly toothed on all the feet.

The six specimens before me show no variation. In its general appearance the species greatly resembles some of the forms of *politus*.

From the species which seem most closely related to this (*anxius* and *Blanchardi*) the present differs primarily in color, this being cupreous, they olivaceous. Color characters are, however, not greatly to be regarded, as great variations do occur. On the male sexual characters it is better to place more reliance, as these are far more constant.

Hab.—Massachusetts (Blanchard).

A. Blanchardi n. sp.—Form moderately robust, olivaceous bronze, subopaque. Antennæ scarcely passing the middle of the thorax, serrate from the fourth joint, surface bronzed. Head rather flat, occiput highly impressed, the

line extending to the middle of front; surface closely punctate, more densely in male. Thorax one-third wider than long, not narrowed at base, sides regularly arcuate, margin sinuous, hind angles with a strong arcuate carina in both sexes, disc convex, with a median shallow depression formed by two foveæ, on each side of middle usually a smaller fovea, lateral depression moderately deep, but short; surface finely transversely strigose with fine punctures between; scutellum transversely carinate; elytra slightly sinuate behind the humeri, slightly broadened behind the middle, apices subacutely rounded, serrulate, disc somewhat flattened with a vague costa, the sutural margin elevated behind the middle, basal depressions moderately deep; surface rather densely imbricate-granulate; body beneath more shining than above; prosternal lobe subtruncate, intercoxal process moderately broad, acute at tip, propleuræ granulate, finely pubescent; metasternum at sides roughly transversely strigose. Abdomen finely punctate, sparse along the middle, closer along the sides and dense at the side of the first segment; vertical portions of the segments finely pubescent, apical segment truncate; pygidium coarsely punctured and with a median carina projecting strongly at apex; claws dissimilar on the feet. Length .35 inch.; 9 mm.

Male.—Prosternum densely punctured between the coxæ, more sparsely in front; surface not pubescent; first and second ventral segments each with a deep, smooth median groove, that on the second segment extending nearly to the suture posteriorly; anterior tibiæ very distinctly mucronate, middle less distinctly, posterior tibiæ simple; claws of middle and anterior tarsi cleft so close to the tip as to seem bifid, posterior claws broadly toothed at base.

Female.—This sex has not, with certainty, been found among my specimens. It probably differs from the male in the manner usual in the group.

In well preserved specimens of this species the underside of the body is more or less clothed along the side with a whitish efflorescence, whereby the pubescence is made more evident, and apparently more dense.

This species closely resembles *pensus* and *anxius*, so that it will be difficult to separate the females, especially from the latter, but the ventral characters of the male will enable it to be at once recognized.

Hab.—Lake Superior region, New York, Massachusetts.

A. anxius Gory.—Form moderately robust, olivaceous bronze, subopaque. Antennæ attaining the middle of the thorax, serrate from the fourth joint, slightly bronzed; front rather flat, occiput slightly impressed, the line scarcely reaching the middle of the front; surface roughly punctured, somewhat strigose. Thorax wider than long, not narrowed at base, sides regularly arcuate, margin sinuous, hind angles with a strong arcuate carina in both sexes, disc convex, a vague median depression composed of two parts, on each side often a small fovea, lateral depression moderate, surface indistinctly transversely strigoso-punctate; scutellum transversely carinate; elytra slightly sinuate behind the humeri, a little broader behind the middle, apices subacute, serrulate; disc

slightly flattened with a vague costa, sutural edge elevated behind the middle, basal depressions moderate, surface closely imbricate-granulate; body beneath more shining than above and more greenish; prosternal lobe distinctly emarginate at middle, the intercoxal process moderately broad, acute at tip, propleuræ not closely punctate, very little pubescent, sides of metasternum densely, not coarsely, asperate. Abdomen moderately closely punctate, less so at middle, dense at sides of first segment: last segment truncate, vertical portion of ventral segments sparsely pubescent; pygidium coarsely punctate, the median carina produced at apex; claws dissimilar on the feet. Length .30—.45 inch.; 7.5—11.5 mm.

Male.—Front more densely punctured, usually greenish. Prosternum densely punctured between the coxæ, more sparsely in front, not hairy; first ventral segment vaguely depressed along its middle, but not smooth, the second with a smooth, deep impression extending two-thirds to the suture; anterior tibiæ feebly mucronate, middle and posterior tibiæ simple; claws of anterior and middle feet cleft at apex, apparently bifid, posterior claws cleft near base, forming a short, acute tooth.

Female.—Head somewhat cupreous, less densely punctate. Ventral segments simple; tibiæ not mucronate; claws broadly toothed at basal half.

The color of this species is remarkably constant, varying but little from olivaceous, becoming but slightly green or plumbeous, resembling closely both *pensus* and *Blanchardi*, from either of which reference must be had to the male characters for separation, although the carina of the hind angles of the thorax is, in both sexes, stronger and more arcuate than in any species related here. In my cabinet a male specimen from an unknown locality agrees in all particulars, except that the hind claws have the same form as on the middle and front feet, and the angular carina is much less distinct. While it may represent a different species, it seems preferable to allow it to pass with mere mention.

A careful examination of the types of *torpidus* and *gravis* prove them identical with the present species. Both were founded on female specimens.

Hab.—Massachusetts and New Hampshire; westward to Colorado.

A. acutipennis Mann.—Form moderately robust, color variable from blue, or blue-black to olivaceous; surface feebly shining. Antennæ slightly passing the middle of the thorax, bluish or greenish, serrate from the fourth joint. Head densely coarsely punctured, front rather flat, with a vague crescentic depression, occiput rather concave, the median impressed line extending to the middle of the front. Thorax one-fourth wider than long, not narrowed at base,

sides arcuate, lateral margin sinuate, hind angles not at all, or only very obtusely carinate; disc convex, with a vague median depression divided at middle, usually on each side a fovea, lateral depression well marked; surface transversely strigose, but not coarsely, with finer punctures in the intervals; scutellum transversely carinate; elytra sinuate behind the humeri, slightly broadened behind the middle, apices subacutely rounded, serrulate, disc flattened at middle, sometimes with a vague costa. basal fovea moderate, suture elevated behind the middle, surface densely imbricate-granulate; body beneath more shining than above; prosternal lobe subtruncate, vaguely emarginate, intercoxal process broad, nearly parallel, acute at tip, vaguely impressed longitudinally, propleuræ densely punctate and rather densely clothed with whitish pubescence, sides of metasternum, metapleuræ and outer side of coxal plates densely punctate and with whitish pubescence. Abdomen moderately closely punctate, at sides of first ventral strigose, last segment oval at tip, vertical portion of the ventral segments densely clothed with whitish pubescence, except sometimes on the second segment; pygidium coarsely punctate, the median carina prolonged at apex; claws variable on the feet. Length .32—.40 inch.; 8—10 mm.

Male.—Front less irregular, the median impression well defined, but with feeble traces of oblique depressions; anterior and middle tibiæ feebly mucronate, posterior tibiæ simple; claws of anterior and middle tarsi cleft very near the apex, nearly bifid, posterior claws acutely cleft, but less close to apex; first ventral segment convex at middle, the second with a deep, smooth, abruptly formed groove extending from the first suture more than half to the second.

Female.—Front more irregular, the median groove less sharply defined, the oblique depressions more evident; tibiæ not mucronate; claws similar on all the feet, cleft behind the apex, forming an acute tooth. Ventral segments convex at middle, not grooved.

Variations.—Two well marked varieties may be indicated based on color, between which there are, however, distinct intermediates.

Var. acutipennis Mann.—Color deep blue, becoming blue-black in one direction, or slightly olivaceous in the other.

This form is usual in the more southern regions, although my darkest specimen is from Massachusetts, as well as that intermediate between the blue form and the next variety.

Var. ———.—Color olivaceous, the thorax somewhat brassy.

This variety seems confined to the more northern regions of the country; in fact, all I have seen are from Massachusetts.

Habits.—Mr. Blanchard states that he has taken the *acutipennis* form on the foliage of Oak shrubs, the other on foliage of Poplar sprouts. These observations do not give any positive indication of the wood into which they bore.

While I have united the two forms with some reluctance I will admit that I have been unable to find any structural character separating them. The extremes are quite distinct in color, but the intermediates form a complete union.

Hab.—Massachusetts to Kansas, Florida and Texas.

A. Conesii Lec.—Elongate, somewhat depressed, slightly concave on the dorsal line when viewed laterally, color golden-green, moderately shining, sides of thorax and elytral vitta pubescent. Antennæ rather short, not attaining the middle of the thorax, æneous, serrate from the fourth joint. Head broadly concave, more deeply impressed along the middle, a tubercle each side of middle of front, a rather deep transverse groove above the base of clypeus, between the antennal fovea, surface very coarsely punctate, occiput slightly strigose. Thorax one-third wider than long, slightly narrowed at base, sides feebly arcuate, margin sinuous, hind angles rectangular, with a slight obtuse elevation in the male and a feeble carina in the female; disc moderately convex, with a broad and rather deep groove extending from base to apex, sides obliquely depressed, surface punctate and rather coarsely strigose, except on a space each side of median groove, broadly clothed with yellowish white pubescence at sides; scutellum not transversely carinate; elytra slightly sinuate behind the humeri, feebly broadened behind the middle, apices obtusely rounded, serrulate, disc somewhat flattened, with a very well defined costa extending from the humeri very nearly to apex, in latter region slightly sinuous; surface pubescent, but forming a distinct vitta within each costa, extending from the feeble basal depression to apex and near the latter region twice interrupted, punctuation dense and fine between the costæ, coarser exterior to them; body beneath more shining than above; prosternum sparsely punctate in both sexes, the lobe emarginate, intercoxal process broad, obtusely pointed at apex, propleuræ densely punctate, somewhat strigose, distinctly pubescent; metasternum at middle sparsely punctate, at sides more densely and finely and with the episterna and outer half of coxal plate pubescent. Abdomen very sparsely punctate at middle, first and second segments with a densely punctured and pubescent stripe at a distance from the lateral margin, the next three segments with a pubescent triangular spot at sides, the lateral marginal line on the first two segments indistinct and sinuous, the vertical portions of the segments densely pubescent; pygidium with a feeble carina, which does not project; claws cleft, forming a broad tooth in both sexes. Length .38—.44 inch.; 10–11 mm.

Sexual characters.—The sexes are differentiated with some difficulty. I observe that the male has the dorsum less depressed and the carina of the hind angles merely a feeble elevation.

Very few specimens have been seen, and no variations observed.

This species and *cavatus* are of an entirely different facies from the remainder of our species, being of the type more commonly observed in Mexico. It has been supposed to be identical with *perlucidus* Gory, an opinion which Crotch thought not well founded.

Occurs in Arizona and southern New Mexico (Snow).

A. cavatus Chev.—Elongate, much narrowed posteriorly, cupreous or cupreo-æneous, shining; elytra with pubescent spaces. Antennæ æneous, attaining the middle of the thorax, serrate from the fourth joint. Head deeply excavated, forming two tubercular elevations at lower inner border of eye, a deep transverse depression above the base of clypeus, surface coarsely not closely punctate. Thorax nearly a half wider than long, slightly wider at base than apex, sides feebly arcuate, margin sinuate, hind angles rectangular, with a slight tuberosity replacing the carina, disc convex, with a deep oval depression widest posteriorly, lateral depressions moderately deep, surface punctate and transversely strigose; scutellum transversely carinate; elytra parallel for a short distance behind the humeri, then slightly sinuate and gradually narrowed to apex, apices rounded and serrate, disc slightly depressed with a vague costa extending from the humerus two thirds to apex, less distinct in the female, basal depression moderate, surface not closely punctate, somewhat imbricate at the sides, a sparsely pubescent vitta from the humeral depression two-thirds to apex, a small spot posteriorly; body beneath more brassy than above; prosternum sparsely punctate, the lobe rounded, intercoxal process rather broad, obtusely pointed at apex, propleuræ more closely punctate, strigose and sparsely pubescent; metasternum sparsely punctate, the episternum and outer half of coxal plate densely pubescent. Abdomen sparsely punctate, somewhat strigose on the sides of the first two segments, third segment with a densely pubescent spot at side; vertical portion of the segments densely pubescent, except the second; pygidium coarsely punctate, the carina not projecting. Length .36—.56 inch.; 9—14.5 mm.

Sexual characters.—The males may be known by their smaller size, more slender form, the abdomen less dilated beyond the sides of the elytra, the elytral costa better defined, and the tuberosity in the hind angles of the thorax less so. There are no ventral characters. The claws are cleft quite near the tip, forming an acute tooth in the front and middle claws, more broadly toothed on the posterior. The tibiæ are not mucronate. The female claws do not differ.

Variations.—When carefully collected specimens are at hand the elytral vitta extends from the humerus two-thirds to apex, forming at its end a denser spot, on each side there is a short pubescent vitta opposite the end of the former and a short distance in the front of the apex a small pubescent spot. By abrasion the greater part of the vitta is often lost, and there then remains a basal spot, the denser end of the vitta and the ante-apical spot.

Hab.—Southwestern Texas, extending well into Mexico.

A. concinnus n. sp.—Form somewhat resembling *macer*, but more obtuse posteriorly, thorax more or less cupreous, elytra bicolored, the outer side brassy green, the middle on each side of suture dull olive-bronze, almost black. Antennæ attaining the middle of the thorax, piceous, slightly bronzed, serrate from the fourth joint, the serrate joints wider than long. Head not deeply concave, a vague median depression and a feeble transverse depression slightly above the middle of the front, surface not closely punctate, vaguely strigose, more evi-

dently strigose on the vertex. Thorax one-third wider than long, slightly narrowed at base, sides in front very feebly arcuate, thence nearly straight to hind angles, which are rectangular and without trace of carina, lateral margin slightly sinuous, disc feebly convex, a rather deep elongate oval median depression, widest near base, lateral oblique depressions moderate, color cupreous, the sides æneous, surface closely punctate, scarcely at all strigose, the sides with a broad band of yellowish pubescence covering the brassy margin; scutellum not carinate; elytra feebly sinuate at the sides, very slightly broadened behind the middle, apices rounded and minutely serrulate, disc depressed, vaguely channeled each side of suture, color dark olive-bronze or nearly black in the channel, brassy at the sides, surface punctate and feebly imbricate; body beneath piceous, slightly æneous, metasternum slightly cupreous; prosternal lobe deeply emarginate, with a deep transverse depression, intercoxal process broad, acutely oval at tip, propleuræ roughly strigose; metasternum at sides transversely strigose. Abdomen sparsely finely punctate, somewhat strigose at the sides of the first segment, vertical portions of the segments densely pubescent; last ventral segment truncate and feebly emarginate; pygidium sparsely punctate, not carinate; claws broadly toothed. Length .50 inch.; 12.5 mm.

In the five specimens examined no sexual differences have been observed.

The posterior tibiæ have a form which has not been observed in any other of our species. Near the apex the tibia is rather abruptly narrowed. The fringe of short bristly hairs which is observed along the posterior edge of the tibiæ in all the species in a varying degree is here present, but ends abruptly at the point at which the tibia is narrowed.

The facies of this species is so unlike the style of those of our fauna, that I remained for some time in doubt as to the correctness of the locality. Recently, however, a specimen has been sent me from the National Museum removing all doubts.

Hab.—Georgia, Florida (Nat. Mus.).

A. Walsinghami Crotch.—Moderately elongate, of rather robust facies, but little narrowed posteriorly, color variable from bluish to cupreous and brassy. Antennæ short, joints longer than wide, color variable, serrate from the fourth joint. Head convex, with a median depression from the occiput, which becomes broader on the front, a deep transverse depression at base of clypeus, surface coarsely and closely punctate. Thorax one-third wider than long, sides feebly arcuate, lateral margin nearly straight, hind angles rectangular, without trace of carina; disc convex, with a median depression extending from base to apex, lateral depressions feeble, surface coarsely moderately closely punctate, without trace of strigosity; scutellum very indistinctly carinate; elytra feebly sinuate behind the humeri then nearly parallel, narrowed at apical third, apices rounded, feebly serrate, disc rather convex, basal depressions feeble, on each side two fine vague costæ extending two-thirds to apex, surface closely imbricately sculptured and with small white pubescent spots arranged as follows: in the basal depression, one in front of middle inside of the costæ, at middle exterior to the costa,

one-fourth from apex within the costa; body beneath more shining than above; prosternum sparsely punctate, lobe deeply emarginate, intercoxal process broad, very obtuse at tip, propleuræ densely punctate and clothed with white pubescence; metasternum densely punctate at the sides and with the episternum and coxal plate clothed with white pubescence. Abdomen not closely punctate, except at the sides of the first segment, the suture between it and the second well marked at the sides, segments two to five with a pubescent space at sides placed transversely, vertical portion of the segments with white pubescence: last segment serrate at sides near apex; pygidium coarsely punctate, the carina not projecting; claws cleft behind the apex, forming an acute tooth. Length .40—.50 inch.; 10—13 mm.

Sexual characters.—Although both sexes are before me, there seem to be no external characters by means of which they can be separated, excepting that all the tibiæ of the male have a short mucro at tip on the inner apical side, while in the female they are simple.

Variations.—Beyond the color nothing has been observed. The pubescent spots may be abraded, although they seem unusually persistent. The smaller spots, posterior to the base, form on the elytra an elongate hexagon.

Hab.—Oregon and northern California; Boise City, Idaho; Luna, N. Mex.; following the distribution of *Melanophila miranda*.

A. pulchellus Bland. —Subcylindrical, moderately robust, dorsum slightly depressed, head brassy, thorax green, elytra bicolored, the sides cupreo-æneous, a broad common stripe green or purple. Antennæ rather robust, scarcely attaining the middle of the thorax, usually cupreous, serrate from the fourth joint, the serrate joints wider than long. Head deeply impressed along the median line, almost bilobed, surface coarsely punctured and somewhat strigose, clypeus very narrow between the antennæ, mouth inferior. Thorax quadrate, nearly as long as wide, sides scarcely at all arcuate, margin straight, hind angles rectangular, with a slight elevation, but not truly carinate; disc convex, with a median depression variable in form, lateral oblique depression not deep, surface coarsely strigose, obliquely at the middle of base, transverse in front and at sides; scutellum not carinate; elytra scarcely sinuate at sides, and but feebly broadened behind the middle, the abdomen distinctly exposed at sides in the female, apices rounded, feebly serrulate; disc slightly flattened, not sulcate, basal depressions feeble, surface relatively coarsely and closely granulate-muricate, slightly strigose at the sides; body beneath æneous or cupreous, the entire side broadly clothed with silvery-white, scale-like hairs, with intermixed efflorescence, except the met-episternum and the posterior angles of the first four ventral segments; prosternal lobe emarginate, intercoxal process parallel, obtuse at apex; met-episternum and hind angles of first four ventral segments roughly granulate-strigose. Abdomen submuricately punctate, not closely, last segment serrulate at sides; pygidium subacute at apex, the carina well marked, but not projecting; claws dissimilar in the sexes. Length .25—-.36 inch.; 6.5—9 mm.

Male.—Head brightly æneous or cupreous; prosternum closely punctate and slightly hairy. Ventral segments not impressed; claws

of anterior and middle feet cleft close to apex almost bifid, those of the posterior feet cleft more nearly the middle.

Female.—Head dull cupreous or purplish; prosternum sparsely indistinctly punctate, scarcely pubescent; claws acutely toothed a little in front of middle.

In the two females before me the underside is purplish black, including the legs, while all the males are brassy.

Variations.—In the males the thorax is green, inclining somewhat to purplish occasionally, while the two females are deep purple. The sides of the elytra in both sexes are cupreous, sometimes æneous in the males, the intermediate space green, varying to purple in the male, and purple in the female.

For this species and one closely allied from Mexico, Mr. Waterhouse (Biol. Cent. Am. vol. iii, pt. 1, p. 50) has suggested the generic name *Engyaulus*, which he separates from *Agrilus* by the convex front, and the mouth consequently more inferior, and the short first joint of the posterior tarsi. In a study of our species these characters are shown to have no value, as will be seen by an examination of the form of the head in the species near which *pulchellus* is placed—*Walsinghamsi*, *obolinus* and *muticus*. While the first joint of the hind tarsus is short, it is still equal in length to the next two, so that when compared with these or with the tibia the length is scarcely less than in very many species before me. From the fact that there are no valid characters for retaining *Engyaulus* apart from *Agrilus* our species is returned to the latter genus.

Hab.—Arizona and Colorado.

A. obolinus Lec.—Facies rather robust, color from æneo-cupreous to plumbeous, feebly shining, sparsely finely pubescent. Antennæ short, scarcely attaining the middle of thorax, æneous, serrate from the fourth joint; front concave, coarsely closely punctured. Thorax very little wider than long, sides feebly arcuate, margin sinuate, hind angles rectangular without trace of carina, disc convex, with a median impression extending from base to apex, widest posteriorly, lateral oblique depression moderate, surface punctate, rather coarsely not closely, without strigosity; scutellum without trace of transverse carina; elytra feebly sinuate behind the humeri, slightly broadened behind the middle, apices obtuse without serrulation, disc moderately convex, with feeble basal depressions and two very vague costæ on each side, surface moderately closely imbricately punctate; body beneath scarcely more shining than above; prosternal lobe broadly emarginate, the intercoxal process broad and very obtuse at tip; propleuræ coarsely punctate and slightly strigose; metasternum densely and more finely punctate, slightly strigose. Abdomen finely punctate, sparsely at middle, more densely at the sides, especially on the first two segments; last ventral seg-

ment serrate at sides near apex, vertical portion of segments sparsely pubescent; pygidium coarsely punctate, the carina not projecting; claws cleft near the tip, forming a broad tooth. Length .32—.36 inch.; 8—9 mm.

Male.—Prosternum rather flat, densely punctate, finely pubescent.

Female.—Prosternum more convex, more sparsely punctate and shining, not pubescent.

Variations.—Nothing has been observed, except in the color.

The elytra have been described as serrulate, but this is an error of observation, from the fact that the sides of the last ventral are rather strongly serrate, a rather unusual character not heretofore recorded in our species.

Hab.—Kansas, Texas, Arizona and southern California (Ulke).

A. muticus Lec.—Form rather robust, color plumbeous, or with slight bluish lustre. Antennæ scarcely attaining the middle of the thorax, piceous, serrate from the fourth joint; head convex, front alone impressed along the middle, the surface densely punctate. Thorax nearly square, sides slightly sinuous, margin sinuate, hind angles slightly everted and with a feeble straight carina, disc convex, a vague median depression near the base, lateral depressions feeble, surface densely punctate with a finely strigose arrangement; elytra sinuate behind the humeri, very feebly dilated behind the middle, apices slightly sinuate, not serrulate, disc slightly flattened, basal depressions feeble, surface densely, finely, imbricately granulate; scutellum not transversely carinate; body beneath more shining than above; prosternal lobe truncate, or slightly emarginate, intercoxal process broad, slightly broader at apex and emarginate; propleuræ and sides of metasternum densely punctate, the latter slightly strigose. Abdomen finely not closely punctate, more closely at the sides and on the first segment, vertical portion of segments pubescent, but not conspicuously; last segment very finely serrulate at sides near apex; pygidium punctate, indistinctly carinate at middle; claws cleft, the lower portion forming an acute tooth. Length .28—.35 inch.; 7—9 mm.

Male.—Prosternum more densely punctured and subopaque, pubescent; metasternum flat, first ventral segment vaguely sulcate at middle, densely punctate, slightly pubescent.

Female.—Prosternum less closely punctate and less pubescent; metasternum less flattened; first ventral convex at middle.

Variations.—This species seems remarkably constant in form and color, varying only in size. The carina of the hind angles is at most feeble and specimens occur without any trace of it.

Hab.—Kansas to Texas.

A. jacobinus n. sp.—Form cylindrical, moderately robust in facies, faintly cupreous, inclining to plumbeous, subopaque. Antennæ rather short, scarcely attaining the middle of the thorax, piceous, slightly cupreous, serrate from the fourth joint; head convex, with a slight median depression from the occiput to

the clypeus, densely and rather roughly punctate, sparsely pubescent. Thorax very little wider than long, sides feebly arcuate, margin sinuate, hind angles rectangular, with a distinct, nearly straight carina, disc convex, without median dorsal impression, lateral depression feeble, surface rather roughly granulately sculptured; scutellum rather uneven, but without distinct transverse carina; elytra slightly sinuate behind the humeri, then nearly parallel, gradually narrowed at apical third, apices rounded, indistinctly serrulate, disc slightly flattened with a vague costa each side, between which and the suture the surface is somewhat concave, basal depressions very feeble, surface rather densely granulate, more finely in the dorsal groove, surface sparsely clothed with short, fine pubescence, apparently closer in the groove, giving an appearance of a vitta; body beneath more brassy than above; prosternal lobe rounded, intercoxal process broad, with its apex squarely truncate, propleuræ densely granulate-punctate; metasternum at sides closely punctate. Abdomen rather coarsely and moderately closely punctate, very little more densely at the sides, surface sparsely pubescent, vertical portion of the segments sparsely pubescent; last segment finely serrulate at the sides near apex; pygidium coarsely punctate, feebly carinate; claws dissimilar in the sexes. Length .24—.28 inch.; 6—7 mm.

Male.—Prosternum densely punctate and with silken hair, which extends along the middle of the metasternum; first two ventral segments slightly flattened, a little more pubescent along the middle; claws cleft close to the apex, almost bifid.

Female.—Prosternum less densely punctate and less hairy; ventral segments convex at middle; claws cleft at middle, forming an acute tooth.

No variations have been observed.

The structural characters of this species will enable it to be readily placed among those with more or less serrulate last ventral segment, non-carinate scutellum, elytral apex nearly without serrulation and hind angles of thorax but feebly carinate.

Hab.—San Diego, Cal.

A. politus Say.—Moderately elongate, slightly depressed on the dorsum, color variable from rather bright brassy to cupreous, purplish, plumbeous, bluish or greenish, moderately shining. Antennæ rather short, not reaching the middle of the thorax, variable in color, serrate from the fourth joint; head slightly convex, a feeble median depression from the occiput to the middle of the front; front coarsely granulate, occiput strigose. Thorax one-third wider than long, sides slightly arcuate, margin feebly sinuate, hind angles feebly carinate in both sexes, disc convex with two feeble median depressions, one near base and one smaller near apex, lateral oblique depression feeble, surface rather coarsely transversely strigose, punctate between the strigæ; scutellum transversely carinate; elytra sinuate behind the humeri, dilated behind the middle, more notably in the female, slightly sinuate near the apices, which are rounded and serrulate; disc slightly flattened, sometimes with a very vague costa in the male, basal depressions feeble, surface closely imbricate-granulate; body beneath more shining than above; prosternal lobe truncate or vaguely emarginate, intercoxal process

moderate, acute at tip, propleuræ densely punctate granulate; metapleuræ rugose, somewhat strigose. Abdomen finely punctured and finely transversely strigose, more densely at the sides, especially on the first two segments, vertical portion of the segments sparsely pubescent; last ventral segment finely serrulate at sides near the apex; pygidium coarsely punctate, feebly carinate along the middle: claws dissimilar in the sexes. Length .20—.34 inch.; 5—8.5 mm.

Male.—Front more densely punctured and flatter; prosternum densely punctured, hairy; claws of anterior and middle feet cleft near the apex, nearly bifid, posterior claws cleft at middle, forming a broad tooth.

Female.—Front more shining, more convex; prosternum less punctate, with short, sparse hair; claws of all the feet cleft at middle, forming a tooth.

Variations.—In recent specimens the surface is clothed with a very fine, short pubescence, which gives them a pruinose aspect, the vast majority of cabinet specimens have no pubescence.

The differences of color have given rise to several names which do not seem to be worthy of retention, even as varietal names inasmuch as the intergrading of color is so gradual as to render it impossible to separate them.

A. cupreolus Lec. was founded on a unique of rather larger size than usual, æneo-cupreous in color.

A. politus Say, is the more common form of cupreous color.

A. plumbeus Lec. founded on specimens of a dull leaden color; these intergrade with the cupreous and the green forms.

A. desertus || Lec. was founded on a single specimen of smaller size and more brilliant color than the preceding forms. The sculpture is less dense. These may be either bright brassy, blue or green.

Habits.—This species lives on Willows in whatever part of the country it is found.

Hab.—Canada and the New England States westward to the Pacific coast, Kansas, Colorado, New Mexico, Arizona, Nevada and throughout California. In the Atlantic region it extends as far south as Maryland, but no specimens have been seen from any of the southern Atlantic or Gulf States nor from the region south of the Ohio River.

A. fallax Say.—Form moderately elongate, dark olivaceous, sometimes greenish, each elytron with three small pubescent spots. Antennæ slender and long, reaching to the hind angles of the thorax, usually greenish, serrate from the fourth joint; head rather flat, with a feeble median impression from occiput to clypeus, front granulate and alutaceous, occiput slightly strigose. Thorax

very little wider than long, arcuate in front, slightly sinuate in front of the hind angles, which are acutely rectangular and with a sharply defined straight carina, margin feebly sinuate; disc convex, with a vague median depression posteriorly, lateral oblique depressions moderate, surface transversely strigose with fine, distant punctures between; scutellum transversely carinate; elytra slightly sinuate behind the humeri, feebly dilated behind the middle, apices rounded and serrulate, disc slightly flattened with a very vague costa, basal depression feeble, surface imbricate, on each elytron three round pubescent spots, basal, ante-median and one-third from apex; body beneath more brassy than above; prosternal lobe entire or subtruncate, intercoxal process gradually narrowed, acute at apex, propleuræ scabrous in sculpture, sparsely pubescent; metasternum subgranulate and transversely strigose. Abdomen sparsely punctate at middle and alutaceous, at sides somewhat strigose, vertical portion of the segments sparsely pubescent; pygidium coarsely punctate, carinate at middle anteriorly; claws dissimilar. Length .16—.24 inch.; 4—6 mm.

Male.—Head flatter, more opaque and more granulate, usually green; prosternum densely punctate and with rather long pubescence; metasternum flat, densely punctured; first two ventral segments longitudinally impressed at middle, their entire length, sparsely pubescent; claws of anterior tarsi cleft very near the apex, nearly bifid, middle and posterior claws cleft at middle, forming a broad tooth; anterior and middle tibiæ slightly mucronate.

Female.—Head cupreous or brassy, less distinctly sculptured, more convex; prosternum sparsely punctate, not hairy; metasternum slightly convex, simply punctate; first two ventral segments convex at middle; claws cleft at middle, forming a broad tooth; tibiæ not mucronate.

Variations.—Slight variations in color will be seen as usual in the dark species. The median impression of the thorax may consist of an anterior fovea or a feebly impressed median line.

When the pubescent spots are removed by abrasion, this species, especially the smaller specimens, greatly resembles *egenus*, and great care must be used in separating them, but the serration of the antennæ is quite different in the two species.

Of its habits I know nothing.

Hab.—Canada southward to Louisiana and Texas, westward to Nebraska.

A. obsoletoguttatus Gory.—Form slender, elongate, color brassy black or dark olivaceous, feebly shining, each elytron with three pubescent spaces, the middle one elongate. Antennæ slender, passing the middle of the thorax, more or less æneous, serrate from the fourth joint; head coarsely punctate, occiput strigose, front flat, with a depression at its upper part in chevron. Thorax very little wider than long, slightly narrowed at base, sides feebly arcuate, slightly sinuate near the hind angles, which are sharply rectangular and with a well

defined, straight carina, margin sinuate, disc convex, a median depression near the apex, lateral oblique depressions feeble, surface transversely strigose and punctate between the strigæ; scutellum transversely carinate; elytra slightly sinuate behind the humeri, feebly dilated behind the middle, apices rounded and serrulate, disc slightly depressed, a very vague costa each side, basal depression moderate, on each side, within the costa, are three pubescent spots, one at base, an elongate spot in front of middle, a smaller oval spot one-third from apex, usually also a small spot exterior to the costa near the end of the middle spot, surface rather closely imbricate-granulate: body beneath more shining than above; prosternal lobe rather deeply emarginate, intercoxal process parallel between the coxæ, acute at tip, propleuræ closely punctate; metasternum at sides densely and rather finely granulate-punctate. Abdomen sparsely finely punctate and alutaceous, a much denser spot of punctuation at the side of the third segment; suture between the first two segments evident at the sides, vertical portion of segments not conspicuously pubescent; pygidium coarsely punctate, carinate at middle; claws cleft near the middle, forming a broad tooth. Length .24—.32 inch.; 6—8 mm.

Male.—Front usually green, more densely punctate; prosternum densely punctured and pubescent, anterior portion of metasternum hairy; anterior and middle tibiæ distinctly mucronate; first and second ventrals rather roughly granulate at middle.

Female.—Front less closely punctate, æneous or cupreous; prosternum more shining, not hairy; tibiæ not mucronate; ventral segments simply punctate.

Variations.—No variation of moment has been observed. Badly preserved specimens are often without spots, but the elongate narrow form of the insect will make it easily known.

This species is especially notable in the long slender legs. The hind tarsi are especially elongate, being longer than the tibia, the first joint longer than half the tibia.

Habits.—Found on the foliage of Oak shrubs.

Hab.—Massachusetts westward to Illinois, south to N. Carolina.

A. scitulus n. sp.—Form of *fallax*; head and thorax brassy, elytra dark olivaceous, with pubescent spots as in *obsoleto-guttatus*. Antennæ slender, reaching the hind angles of the thorax, serrate from the fourth joint, more or less æneous; head viewed from above slightly convex, front with a broad, but shallow depression punctate and obliquely strigose, occiput longitudinally strigose, front beneath pubescent, a transverse carina at base of clypeus. Thorax a little wider than long, sides irregularly arcuate, hind angles rectangular, with a sharp, straight carina, margin sinuate, disc convex, a faint ante-scutellar depression, another more faint near the apex, lateral oblique depression moderate, surface shining, transversely strigose at middle, obliquely at the sides, finely punctate between the strigæ, a narrow pubescent area along the side; scutellum transversely carinate; elytra sinuate behind the humeri and somewhat broadened behind the middle, apices rounded and serrulate, disc slightly flattened at middle

with a vague costa each side, basal depression feeble, surface imbricately sculptured with a pubescent spot in the basal depression, a larger spot behind this not reaching the middle, exterior to the end of which is a very small spot, one-third from apex a small round spot; body beneath more shining than above; prosternal lobe rather broadly and deeply emarginate, intercoxal process broad, parallel and with rounded apex, propleuræ finely punctate and strigose, sparsely pubescent; metasternum at sides densely punctate and with the outer half of coxal plate sparsely pubescent. Abdomen sparsely punctate, more densely at sides of first two segments and somewhat strigose, with sparsely pubescent spaces on the first two segments midway between the middle and side and on the third segment at the side, vertical portion of segments sparsely pubescent; pygidium coarsely punctate, indistinctly carinate; claws broadly toothed at middle. Length .18--.20 inch.; 4.5--5.5 mm.

Male.—Prosternum densely punctate, finely pubescent, the pubescence extending on the front of the metasternum; first ventral segment slightly flattened at middle, not pubescent; anterior and middle tibiæ distinctly mucronate.

Female.—Unknown.

This species is not especially conspicuous among those with ornate elytra. With the form of *fallax* or *egenus*, the markings, when perfect, resemble those of *obsoleto-guttatus*, and from any of them the structural characters either of the antennæ, legs or prosternum will separate.

Hab.—The few specimens examined were collected by Belfrage in Texas, probably at Waco.

A. ornatulus n. sp.—Form of *egenus*, but a little stouter, piceous, elytra somewhat shining, ornamented with pubescent spaces, thorax opaque. Antennæ attaining the middle of the thorax, piceous, serrate from the fourth joint; head convex, with a very feeble impression of the occiput, front convex, indistinctly punctate, smoother at middle. Thorax a little wider than long, sides regularly arcuate, margin absolutely straight, not deflexed in front, hind angles rectangular, without trace of carina, disc convex without depressions, merely slightly concave along the side, surface punctate, obliquely strigose at middle, longitudinally at the sides; scutellum transversely carinate; elytra sinuate behind the humeri, broadened behind the middle, apices rather obliquely rounded without serrulation, disc depressed at middle, a very vague costa each side, basal depressions feeble, surface indistinctly imbricate, slightly strigose at the sides, with pubescent spaces of sparsely placed silvery white hair in the basal depression, a transverse band behind these, then a longitudinal band reaching the middle bending obliquely outward and backward, apical third entirely pubescent, the anterior edge oblique on each side; body beneath with distinct æneous lustre; prosternal lobe broadly and deeply emarginate, intercoxal process slightly broadened behind the coxæ and obtuse at apex, propleuræ feebly punctate; metasternum at sides asperately punctate. Abdomen sparsely finely punctate, a slight pubescent area at the sides of the third segment, the vertical portions of the

segments pubescent; pygidium sparsely punctate, finely carinate along the middle; claws broadly toothed at base. Length .14 inch.; 3.5 mm.

Sexual characters.—The only points noticed in the numerous specimens examined are found in the more opaque and somewhat rugulose prosternum of the male, while it is sparsely punctate and smoother in the female.

No variations have been observed, the markings seeming very constant. In some specimens there will be observed a golden hue about the margins of the pubescent spaces.

Hab.—Southwestern Texas, no precise locality known.

A. ventralis n. sp.—Form oblong, subcylindrical, cupreo-æneous, moderately shining, elytra with faint subsutural pubescent vitta. Antennæ piceous, faintly bronzed, attaining the middle of the thorax, serrate from the fourth joint; head convex, with a faint median impression from the occiput to the clypeus, coarsely not closely punctate. Thorax nearly square, sides feebly arcuate, margin straight, deflexed in front, hind angles rectangular, without trace of carina. disc convex, without depressions either at middle or sides, not concave along the margin, surface punctate along the middle, vaguely strigose at the sides; scutellum indistinctly carinate; elytra slightly sinuate behind the humeri and dilated behind the middle, apices rounded, finely serrulate, disc convex, the basal depressions feeble, surface rather coarsely and roughly imbricate with a sparsely pubescent subsutural vitta extending from the base nearly to the apex; body beneath æneous; prosternum acutely but not deeply emarginate at middle, not wide between the coxæ, tip not acute, propleuræ punctate, sparsely pubescent; metasternum at sides transversely strigose, somewhat reticulate in certain lights. Abdomen sparsely punctate, with distant strigæ at the sides of the first two segments, subreticulate in appearance, the posterior edge of the second, and to a less degree the third segment, prolonged at middle in a short laminate process, which occupies one-third the width of the segment; claws toothed near the base. Length .13 inch.; 3.5 mm.

Unfortunately, the two specimens before me of this species present no special characters of a sexual nature. The prosternum is somewhat rugose and slightly pubescent, and the first ventral roughened at middle of base, and from these feeble characters they are assumed to be males.

The most curious character observed is in the ventral segments, and seems unique in the genus. The posterior edge of the second ventral segment is free and slightly prolonged in an arcuate manner over the next segment. The same in a less degree is observed on the third segment. This may prove to be a male peculiarity.

The sculpture of the disc of thorax viewed in certain lights seems reticulate, as in some *Anthaxia*, and the elytral sculpture very coarse for so small a species.

In general appearance the species resembles, somewhat, *Tuphrocerus agriloides*.

Hab.—New Mexico, no precise region known.

A. blandus n. sp.—Rather robust, subcylindrical, slightly narrowed behind, cupreo-æneous, sides of thorax with white pubescence, elytra with a vitta from base to near the apex. Antennæ passing slightly the middle of the thorax, æneous, serrate from the fifth joint; head slightly convex, a feeble median impression from the occiput to the clypeus, the latter broad at base, surface rather coarsely punctate and obliquely strigose. Thorax a little wider than long, sides regularly arcuate, slightly sinuate near the hind angles, which are rectangular and without trace of a carina, lateral margin sinuous, disc convex, without trace of median sulcus, lateral oblique impression feeble, surface rather closely punctate with feeble oblique strigæ, sides pubescent, more broadly behind; scutellum transversely carinate; elytra very slightly sinuate at middle and slightly broadened, apices rounded, serrulate, disc convex, basal depression feeble, surface rather coarsely imbricate and with a vitta of whitish pubescence from the base to the apex close to the suture; body beneath cupreo-æneous; prosternal lobe truncate, with a feeble emargination at middle, the intercoxal process narrowed from base to apex, the tip obtuse, propleuræ punctate, with scale-like white hairs and efflorescence; metasternum at sides imbricately sculptured and with the episternum and outer half of coxal plate clothed with white pubescence. Abdomen moderately closely imbricate, more roughly at the sides of the first two segments, clothed along the sides with whitish pubescence, vertical portion of first segment with white pubescence; pygidium coarsely punctate, feebly carinate; claws broadly toothed at middle. Length .25 inch.; 6.5 mm.

Male.—Prosternum coarsely punctured, sparsely pubescent; first two ventral segments roughly sculptured at middle; anterior tibia distinctly, middle tibia feebly mucronate, the posterior simple.

Female.—Prosternum less closely punctate, scarcely hairy; first two ventral segments simply punctate; tibiæ all simple.

Variations.—The three specimens before me seem to have been collected with care and have a rather dense efflorescence between the hairs, so that they seem very conspicuous. It is probable that specimens collected in alcohol or wet in any way, lose the efflorescence, and the pubescent spots will appear less distinct. There is no variation in the specimens examined.

Hab.—Tehachepi, Cal. Collected by H. F. Wickham.

A. abjectus n. sp.—Subcylindrical, slightly narrower behind, dull cupreous, each elytron with three faint pubescent spots. Antennæ scarcely passing the middle of the thorax, serrate from the fifth joint; head convex, with a broad depression from occiput to clypeus, surface rather coarsely punctate and obliquely strigose. Thorax fully as long as wide, widest one-third from apex, slightly narrowed to base, sides feebly arcuate in front, slightly sinuate posteriorly, hind angles rectangular without trace of carina, margin sinuate, disc convex, with a

linear median impression, lateral depressions feeble, the sides not explanate, surface transversely, rather roughly strigose, with punctures between the strigæ; scutellum transversely carinate; elytra very feebly sinuate at sides and very little dilated behind the middle, apices rounded, serrulate, disc very slightly depressed, basal foveæ feeble, surface imbricately sculptured and with three faint pubescent spots on each side, one at base, second in front of middle, the last one-third from apex; body beneath rather more shining than above; prosternal lobe truncate and broadly emarginate, intercoxal process very little narrowed to apex, the tip truncate, propleuræ punctate and subreticulate; metasternum at sides strigose, somewhat reticulate, pubescent at its posterior angle, as is also the outer side of the coxal plate. Abdomen sparsely punctate at middle, the sides of the first two segments strigose and somewhat reticulate, the vertical portion of first segment pubescent; pygidium indistinctly punctate, carinate along the median line; claws broadly toothed. Length .24 inch.; 6 mm.

The male differs from the female in having the prosternum slightly more densely punctate and the first two ventral segments more rugose at middle. Five specimens have been examined, four of which are in the National Museum.

This species is not conspicuously marked, but among those in which the antennæ are serrate from the fifth joint it may be known by the very convex thorax, with feeble median depression, the absence of angular carina and the feeble pubescent spots of the elytra.

Hab.—Texas, precise locality unknown.

A. subcinctus Gory.—Form relatively robust, piceous with faint bronze lustre, more evident on the thorax, elytra ornate with pubescent spaces. Antennæ scarcely reaching the middle of the thorax, piceous, slightly bronzed, strongly serrate from the fifth joint; head convex, with a median depression from the occiput to the clypeus, surface relatively coarsely strigose. Thorax wider than long, sides regularly arcuate, margin sinuate, hind angles rectangular, without trace of carina, disc convex, with a rather broad but not deep median depression extending from base to apex, lateral depression well marked, extending toward the base, surface transversely strigose at middle, obliquely at sides, punctate near the margin; scutellum transversely carinate; elytra slightly sinuate behind the humeri, dilated somewhat behind the middle, apices rounded, serrulate, disc slightly flattened with a vague costa, sutural margin elevated, except at basal fourth, surface coarsely imbricate, somewhat strigose at middle, smoother near apex, a pubescent space extending from the humeri to the middle, with two interruptions, then turning obliquely outwards, a second oblique band one-fourth from apex; body beneath more shining than above; prosternal lobe broadly emarginate, intercoxal process gradually narrowed, acute at apex, propleuræ sparsely punctate; metasternum transversely strigose, somewhat reticulate. Abdomen very sparsely, indistinctly punctate over its entire surface, vertical portion of segments not conspicuously pubescent; pygidium sparsely punctate, not distinctly carinate; claws broadly toothed at middle. Length .16—.18 inch.; 4—4.5 mm.

Sexual characters.—In the specimens before me I am unable to

find any well marked secondary sexual characters. One specimen, seemingly a male, has the prosternum somewhat more opaque and a little more pubescent.

Variations.—The usual variations dependent on abrasion must be expected here as elsewhere. While the vast majority of specimens have the antennæ serrate beginning with the fifth joint, one in my cabinet begins at the fourth, that is, the fourth joint more nearly resembles the fifth than the third. Such cases as this must be classed as abnormalities, and are very confusing to a systematist, or to one attempting to determine specific names with but little material.

Hab.—Canada to North Carolina, westward to Illinois. It is not recorded from the New England States, but probably occurs there.

A. putillus Say.—Form nearly of *subcinctus*; dark olivaceous bronze, moderately shining. Antennæ scarcely attaining the middle of the thorax, piceous, serrate from the fifth joint; head convex, with a feeble occipital impression, front sparsely indistinctly punctate, slightly alutaceous. Thorax one-third wider than long, sides regularly arcuate, margin sinuous, hind angles rectangular without trace of carina; disc convex, with a feeble linear median impression, lateral depressions deep along the side, surface transversely strigose, but more evidently punctate near the apex; scutellum transversely carinate; elytra extremely little sinuate at middle, apices rounded, serrulate; disc slightly depressed at middle, a feeble basal fovea, on each side a subcostiform elevation, between which and the suture on each side the elytra are vaguely channeled, surface imbricate, but not closely; body beneath usually darker, but more shining than above; prosternal lobe subtruncate, sometimes feebly emarginate, intercoxal process relatively broad, obtuse at apex; propleuræ comparatively smooth; metasternum at sides rather finely punctate and substrigose. Abdomen sparsely punctate over the entire surface and faintly alutaceous; pygidium very indistinctly punctate, not at all carinate; claws broadly toothed at middle. Length .12 inch.; 3 mm.

Male.—Front greenish, more opaque and more closely sculptured. Prosternum more closely punctate along the middle and slightly pubescent. Abdomen simple, not roughened at base.

Female.—Front æneous, more shining and more sparsely punctate. Prosternum not pubescent.

Variations.—The color is very constant. The discal costæ of the elytra vary considerably in their distinctness, and are sometimes nearly absent. In the outline of the upper surface, when viewed laterally, some are nearly straight, others quite arched.

This species is the smallest found in the Atlantic region proper, and is remarkable in having the lower angle of the eye acute.

Hab.—Canada (Pettit), Illinois, Indiana (Say).

A. abstersus n. sp.—Moderately elongate, subcylindrical, narrower behind, dark brassy bronze, moderately shining. Antennæ piceous, faintly bronzed, attaining the middle of the thorax, serrate from the fifth joint; head convex, without trace of impression, sparsely indistinctly punctate. Thorax a little wider than long, slightly narrowed at base, sides feebly arcuate, slightly sinuate in front of the hind angles, which are rectangular and without carina, margin nearly straight, feebly deflexed in front; disc convex, without impressions, either median or lateral, surface distantly obliquely strigose, with a reticulate appearance; scutellum not carinate; elytra scarcely sinuate at the sides, the apices rounded and serrulate; disc convex, without trace of costæ, basal depression feeble, surface imbricate, a little more roughly near the apex; body beneath as above; prosternal lobe truncate and broadly emarginate, the intercoxal process parallel and obtuse at tip, propleuræ widely reticulate; metasternum at sides with distant strigæ. Abdomen sparsely punctate, with a somewhat widely reticulate appearance; pygidium sparsely punctate, not distinctly carinate; claws broadly toothed. Length .12—.15 inch.; 3—3.75 mm.

Male.—Prosternum moderately closely punctate, sparsely pubescent; first ventral segment with a short, smooth, median groove at its posterior edge.

Female.—Prosternum sparsely punctate; ventral segments simple.

Variations.—None have been observed in the many specimens seen.

This species, like *ventralis* of the preceding series, resembles *Taphrocerus agriloides*, and in the present rather more so than in that from the fact that there is here no pubescent elytral vitta.

When the thorax is viewed from above and from behind, the sculpture has a reticulate appearance, but when seen from in front is very obliquely and not closely strigose.

Hab.—Southern Arizona. Collected rather abundantly by Morrison, and by him widely distributed in collections.

A. Lecontei Saunders.—Form rather more robust than *fallax*, dull olivaceous bronze, sometimes slightly brassy, elytra with pubescent spaces. Antennæ slightly passing the middle of the thorax, piceous with slight æneous lustre, serrate from the fifth joint; head slightly convex, or very feebly impressed median line, and a slight transverse depression below the middle of the front in some specimens, surface coarsely punctate, occiput slightly strigose; clypeus broad at base. Thorax a little wider than long, sides feebly arcuate, margin sinuate, hind angles rectangular, with a well defined straight carina; disc moderately convex, with a deep median impression composed of two fovea united by a groove, lateral oblique depression moderately deep, surface coarsely punctate, sometimes slightly transversely strigose; scutellum transversely carinate; elytra feebly sinuate behind the humeri, slightly broadened behind the middle, apices almost conjointly rounded, serrulate; disc slightly depressed at middle with a very vague costa each side, surface subgranulate, with pubescent spaces as follows: at basal depressions an indistinct broad band in front of middle, oblique

on each side, apical third vaguely pubescent, enclosing a naked spot on the suture; body beneath scarcely more shining than above, sparsely pubescent; prosternal lobe broadly and deeply emarginate, intercoxal process rather broad, narrowed at tip, propleuræ granulate-punctate, sparsely pubescent; metasternum closely punctate, slightly strigose. Abdomen sparsely punctate, slightly strigose at the sides of the first two segments, vertical portion of segments scarcely pubescent; pygidium coarsely punctate, feebly carinate; claws cleft at middle, forming a broad tooth. Length .18—.22 inch.; 4.5—5.5 mm.

Male.—Front rather more distinctly impressed. Prosternum densely punctured and pubescent. Metasternum concave, densely punctured and pubescent; anterior tibiæ distinctly mucronate, middle and posterior simple; first ventral segment slightly flattened at middle.

Female.—Front less impressed; in this sex the transverse depression is more often seen. Prosternum rather sparsely punctate, not hairy. Metasternum flat, not closely punctate, nor hairy; ventral segments simple; tibiæ mucronate.

Variations.—The color is but little variable, but the pubescence may be more or less abraded. The median dorsal depression of the thorax may be more or less deep, but still preserving the form of two foveæ united by a groove.

Nothing is known of the habits of this species, although rather widely distributed.

Hab.—Canada to Texas.

A. abductus n. sp.—Moderately elongate, dark olive bronze, feebly shining, elytra with sparsely pubescent areas forming a design. Antennæ piceous, slightly bronzed, attaining the middle of the thorax, serrate from the fifth joint; head convex, with a faint linear median impression, closely punctate and reticulately strigose. Thorax one-fourth wider than long, sides arcuate, slightly sinuate near the hind angles, these rectangular, and with a sharp, straight carina, margin sinuate, disc moderately convex, with a median broad depression, with a fine impressed line at bottom extending three-fourths from base to apex, lateral oblique depressions well marked, surface transversely and rather closely strigose; scutellum transversely carinate; elytra sinuate behind the humeri, then slightly broadened, obliquely narrowed to apices, these rounded and serrulate; disc slightly flattened, with a very vague costa each side, basal depressions well marked, surface closely imbricate, with the pubescent spaces arranged nearly as in *Lecontei*, but less densely pubescent; body beneath more shining than above and with scattered pubescence; prosternal lobe rounded, the intercoxal process moderately broad, slightly wider behind the coxæ and truncate at tip, propleuræ punctate and strigose; metasternum at sides finely punctate and not closely strigose. Abdomen finely punctate and finely strigose, the vertical portions of the segments more evidently pubescent; pygidium sparsely punctate, not distinctly carinate; claws broadly toothed. Length .18 inch.; 4.5 mm.

The three specimens of this species examined were all females, so that I am unable to state the sexual differences. They show no variation.

This species resembles *Lecontei* (*subfasciatus*) so closely, that I found it mixed with that species in my own and another cabinet. The form of the prosternal lobe will, however, separate them at once. Superficially, the sculpture of the middle of the thorax will distinguish them. In this species there is a straight depression, while in *Lecontei* there are two depressions, anterior and posterior united by a narrower depressed space.

Hab.—Texas, no special region known.

A. palmacollis n. sp.—Moderately elongate, piceous, with bronzed surface lustre, moderately shining, each elytron with three pubescent spots as in *fallax*. Antennæ piceous, slightly æneous, not reaching the middle of the thorax, serrate from the fifth joint; head convex, with a slight occipital impression, front rather coarsely punctate, occiput strigose. Thorax wider than long, sides feebly arcuate, sinuate in front of the hind angles, which are rectangular and rather feebly carinate, margin straight, scarcely deflexed in front; disc convex, without median impression, lateral depressions feeble, surface very obliquely strigose, but not closely; scutellum transversely carinate; elytra feebly sinuate at sides, slightly broader behind the middle then obliquely narrowed to apex, apices obliquely rounded, serrulate; disc slightly depressed, basal foveæ feeble, on each side three pubescent spots, as in *fallax*; body beneath as above; prosternal lobe obtusely rounded, intercoxal process relatively broad, truncate at tip, propleuræ punctate; metasternum at sides roughly punctate and substrigose. Abdomen sparsely punctate, strigose at sides of first two segments, vertical portion of first segment densely pubescent with white; pygidium sparsely punctate, feebly carinate; claws broadly toothed. Length .12—.18 inch.: 3—4.5 mm.

Male.—Head very densely punctate, cupreous. Prosternum sparsely pubescent; first two ventral segments impressed at middle, more deeply on the first.

Female.—Front less punctate, æneous. Prosternum scarcely pubescent; ventral segments simple.

The numerous specimens examined are constant in appearance, varying only in size.

There are but few species so obliquely strigose on the thorax as this one, the strigosity beginning at the middle and running diagonally forward. Those so sculptured are readily known by their structural characters.

Hab.—Western Texas and southern Arizona (Morrison).

A. felix n. sp.—Form moderately robust, subcylindrical, slightly depressed, cupreo-æneous, sides of thorax and vitta on each elytron clothed with whitish

pubescence. Antennæ short, scarcely reaching the middle of the thorax, piceous, strongly serrate from the fifth joint; head feebly convex, a vague median impression more evident in the female, surface rather roughly punctate-strigose. Thorax as long as wide (male), or a little wider than long (female), sides nearly straight ♂, or slightly arcuate ♀, hind angles rectangular, with a fine straight carina, more evident in the ♀, margin sinuous; disc regularly convex, without median or lateral depressions, surface rather coarsely transversely strigose, with a pubescent space at sides, broadest behind, enclosing the carina; scutellum transversely carinate; elytra scarcely sinuate behind the humeri, apices rounded, more acute and more distinctly serrulate in ♂; disc with a very vague costa, between which and the suture, in a slight channel, is the pubescent vitta; surface moderately closely imbricate; body beneath æneous, with fine short pubescence; prosternal lobe obtusely rounded, the intercoxal process rather broad, truncate at tip, propleuræ punctate and pubescent; metasternum at sides closely punctate and somewhat strigose. Abdomen moderately closely finely punctate, denser at sides of first segment; pygidium sparsely punctate, not carinate; claws dissimilar in the sexes. Length .22—.24 inch.; 5.5—6 mm.

Male.—Front flatter, the median impression feeble. Thorax as long as wide, the sides nearly straight. Prosternum roughly punctate, sparsely pubescent. Abdomen simple, the first segment rather rough at middle; claws on all the feet cleft very near the apex, almost bifid; tibiæ simple.

Female.—Head more convex, the median impression deeper. Thorax a little wider than long, the sides moderately arcuate. Prosternum less rugose, scarcely pubescent. Abdomen less rugose; claws broadly toothed.

Variation.—In this species, as in others already noted, there is between the pubescence a whitish efflorescence, which makes the pubescence seem denser and whiter, but when this is removed by accidental moistening the reverse is produced.

This species resembles *jacobinus*, of the preceding series, in form and color, but differs in the form of the antennæ and the presence of the pubescent vitta. It resembles still more *blandus* but that has no trace, whatever, of carina in the hind angles, and the prosternal lobe is more distinctly emarginate.

Hab.—Arizona, probably near Tucson.

A. impexus n. sp.—Subcylindrical, slightly flattened above, dull cupreous-æneous, each elytron with three indistinct pubescent spots. Antennæ not reaching the middle of the thorax, piceous, with slight æneous lustre, serrate from the fifth joint; head broadly, but feebly concave, with a median impressed line, surface closely punctate-strigose. Thorax scarcely wider than long, the sides very feebly arcuate, slightly sinuate near the hind angles, which are rectangular and distinctly carinate, margin sinuous; disc convex, with a median depression variable in distinctness, and when well marked with an impressed line at bottom

extending from base nearly to apex, lateral oblique depressions moderately well marked, surface closely transversely strigose, becoming oblique and longitudinal toward the sides; scutellum transversely carinate; elytra feebly sinuate behind the humeri, the apices rounded, serrulate; disc slightly flattened, but not sulcate, basal depressions feeble, surface closely granulate-imbricate, somewhat strigose at sides in front, each elytron with three faint pubescent spots, one at base, one in front of middle, the posterior one-third from apex; body beneath more shining than above; prosternal lobe obtusely rounded, intercoxal process rather wide, parallel, truncate at apex, propleuræ closely strigose punctate; metasternum at sides coarsely transversely strigose. Abdomen moderately closely punctate, more or less strigose over the whole surface, but more coarsely at the sides of the first two segments; pygidium indistinctly punctate, feebly carinate; claws broadly toothed. Length .27—.29 inch.; 7—7.5 mm.

Male.—Front more closely punctate, but rather less concave. Thorax with a feebler median impression without impressed line. Prosternum densely punctured, sparsely pubescent, the pubescence extending on the metasternum, which is flattened and closely punctate; first two ventral segments vaguely sulcate their entire length and pubescent in the depression; tibiæ simple.

Female.—Head less closely punctate, the concavity a little more pronounced; median depression of thorax well marked with a fine impressed line at bottom. Prosternum less densely punctate, scarcely pubescent. Metasternum slightly convex; ventral segments not impressed.

Variations.—In the two specimens before me the variations have been alluded to, and seem to be sexual.

The pubescent spots of the elytra are not distinct in either specimen, except at base of elytra, but are very plainly indicated by the denser and finer punctuation. Closely resembles *floridanus*, but in the latter the pygidium is not carinate, and there is scarcely a trace of median impression of the thorax.

Hab.—Arkansas and Nebraska.

A. floridanus Crotch.—Moderately robust, subcylindrical, slightly depressed above, bright cupreo-æneous, each elytron with three pubescent spots. Antennæ attaining the middle of the thorax, piceous, serrate from the fifth joint; head slightly concave with a fine median impressed line, surface closely punctate-strigose. Thorax one-fourth wider than long, slightly narrowed at base, sides feebly arcuate, slightly sinuate near the posterior angles, which are rectangular, and with an obtuse, straight carina, margin sinuous; disc convex, a flattening or slight depression in front of the scutellum, lateral oblique impressions well marked, surface transversely punctate-strigose, but not roughly; scutellum transversely carinate; elytra scarcely sinuate at the sides, the apices rounded and serrulate; disc somewhat flattened, basal depressions feeble, surface closely and rather finely granulate-imbricate, on each elytron three faint pubescent spots

arranged in the usual manner; body beneath more shining than above; prosternal lobe truncate and vaguely emarginate, intercoxal process rather broad, truncate at apex, propleuræ coarsely punctate, sparsely pubescent; metasternum at sides rather roughly strigose and punctate. Abdomen moderately closely punctate, strigose at sides of first two segments; pygidium sparsely punctate, with a smooth median line; claws cleft, forming a broad tooth. Length .28 inch.; 7 mm.

Male.—Prosternum densely punctured, pubescent; first two ventral segments very feebly impressed along the middle, scarcely pubescent; tibiæ not mucronate.

Female.—Prosternum less roughly punctate, not pubescent; ventral segments not impressed.

The two specimens before me do not vary. The types are before me and show that while the species is fairly, but too briefly described by Crotch, its position in his analytical table is erroneous. He mentions pubescent patches at the sides of the last three ventral segments, but this is merely the result of a slightly denser punctuation.

Hab.—Northern Florida, probably near Jacksonville.

A. addendus Crotch.—Moderately robust, dull cupreo-æneous, subopaque, elytra with three pubescent spots on each side, sometimes absent or very faint. Antennæ piceous, serrate from the fifth joint, reaching the middle of the thorax; head, from above, concave, a moderately deep impression from the occiput to the clypeus, surface rather roughly granulate-strigose, sparsely pubescent. Thorax very little wider than long, slightly narrowed posteriorly, sides feebly arcuate, slightly sinuate in front of hind angles, which are rectangular and with a straight, well defined carina; disc convex, with at most a feeble median impression, which may be entirely absent, lateral oblique impression moderate, surface closely transversely strigose; scutellum transversely carinate; elytra feebly sinuate at sides and but little broadened, apices rounded, feebly serrulate; disc slightly flattened, a vague channel each side of suture, basal foveæ feeble, surface moderately closely, but not roughly imbricate, the pubescent spots, when present, as in *fallax*; body beneath more shining than above; prosternal lobe obtusely rounded, with a vague sinuation at middle, intercoxal process parallel, squarely truncate at apex, propleuræ shining, indistinctly reticulate; metasternum at sides roughly punctate-strigose and with the episternum and outer side of coxal plate pubescent. Abdomen sparsely punctate, strigose at sides of first two segments, the vertical portion of first two segments densely pubescent; pygidium sparsely punctate, not carinate; claws broadly toothed. Length .15—.24 inch.; 4–6 mm.

Male.—Front with simply the longitudinal depression. Prosternum densely punctured and hairy. Metasternum flat, as densely punctured as the prosternum; first two ventral segments feebly impressed along the median line.

Female.—Front often with a crescentic, transverse impression in addition to the median. Metasternum convex, sparsely punctate; ventral segments not impressed.

Variations.—Two forms may be separated in this species, those with the pubescent spots well marked and those without them. The former variety shows some pubescence at the sides of the thorax and at the sides of the last three ventral segments. Those without spots show in nearly all the specimens the spaces with denser fine punctation, but even this may be absent. In the typical specimens, as Crotch states, there is a tendency to form a basal and subapical spots. Between the specimens with no spots and the others I have every necessary link in my cabinet.

The median thoracic impression is, at best, faint, but in some specimens entirely wanting, in others represented by a slight antescutellar depression.

Hab.—Texas (Belfrage), Arizona.

A. lacustris Lec.—Moderately elongate, nearly parallel, slightly depressed above, color variable, dark bronze, green or blue. Antennæ piceous, not reaching the middle of the thorax, serrate from the fifth joint; head convex, a feeble median furrow from the occiput to the middle of the front, surface roughly punctate-strigose. Thorax scarcely wider than long, the sides feebly arcuate, slightly sinuate near the hind angles, these rectangular with a short fine carina, margin straight, deflexed in front only; disc convex, sometimes with a vague median impression, the lateral depressions absent, surface transversely and rather closely strigose, with fine punctures; scutellum variable, either carinate or not; elytra feebly sinuate at sides and but little dilated behind the middle, apices rounded, serrulate; disc slightly flattened, basal fovea feeble, surface closely and rather roughly imbricate; body beneath more or less blue; prosternal lobe broadly rounded, intercoxal process rather broad, truncate at apex, propleuræ strigose and punctate, sparsely pubescent; metasternum at sides transversely strigose, not roughly nor closely. Abdomen transversely strigose, not roughly nor closely; pygidium sparsely punctate, not carinate; claws broadly toothed. Length .16—.30 inch.; 4—7.5 mm.

Male.—Front somewhat more opaque. Prosternum densely punctured and hairy. Metasternum concave and hairy; first two ventral segments rather deeply impressed their whole length, the impression hairy; tibiæ simple.

Female.—Prosternum coarsely sculptured, transversely strigose, but not hairy. Metasternum slightly convex, transversely roughly strigose, not hairy; ventral segments not impressed.

Variations.—The color varieties have already been recorded. The blue forms are, however, very rare. The scutellum may be transversely carinate or not, sometimes the carina is interrupted in the middle. Fully developed specimens usually have the carina very distinct; in the small and feeble forms it is wanting. The same is true of the feeble median depression of the thorax.

This species was originally named from some small and feeble forms from the North, which, at first sight, are very unlike the larger forms from the Texan region. It is also evident that LeConte had specimens of another species along with his types as the so-called male is really that of *defectus*. At present the specimen is not found with the types, having probably been removed either by himself or Crotch.

The larger Texan forms were described by LeConte as *cuneus* from a single specimen in Ulke's cabinet. From not finding a type in the LeConte cabinet, Crotch subsequently named the specimens in my cabinet *pubiventris*.

Hab.—Illinois, Lake Superior region; Lapointe, Missouri; Texas, Arizona.

A. egenus Gory.—Moderately elongate, olive bronze, sometimes slightly greenish. Antennæ rather slender, reaching the middle of the thorax, joints longer than wide, the third obviously shorter than the fourth, piceous, slightly bronzed, serrate from the fifth joint; front flat, a very feeble median impression, densely punctate, occiput strigose. Thorax wider than long, sides not strongly arcuate, hind angles rectangular, with a well defined, slightly oblique carina, margin nearly straight, deflexed in front; disc convex, without median depression, lateral oblique depressions well marked, surface transversely strigose with fine punctures between; scutellum transversely carinate; elytra feebly sinuate at sides, slightly broader behind the middle, apices rounded, serrulate, basal foveæ moderate, disc slightly depressed, surface imbricate; body beneath rather more shining than above; prosternal lobe truncate, more or less emarginate, the intercoxal process narrowed at apex, propleuræ sparsely punctate; metasternum at sides asperately punctate. Abdomen very sparsely punctate; pygidium sparsely punctate, not carinate; claws broadly toothed. Length .14—.20 inch.; 3.5—5 mm.

Male.—Front more densely punctate, more opaque, bluish green. Prosternum densely punctured, hairy, the hair extending somewhat on the metasternum; first two ventral segments flat or feebly impressed at middle, slightly pubescent.

Female.—Front slightly more convex, the punctures coarser and less close, more shining, æneous. Prosternum not hairy; ventral segments not impressed.

Variations.—Notwithstanding the wide area over which this species is distributed, there seems to be no variation, except slightly in color and size. Some of the narrower forms with a slight greenish color resemble *otiosus* considerably, but the structure of both antennæ and claws will separate them. On the other hand, some of the forms of *fallax* deprived of pubescence are apt to be mixed with the present species, and are not easy to separate without great care, but the form of the antennæ and the flat base of clypeus in the present species will render them separable.

Of the habits of this species nothing is known.

Hab.—Canada, Massachusetts south to North Carolina, Texas and Arizona, Illinois, Dacota, Nebraska.

A. imbellis Cr.—Dull æneous, feebly shining, similar to *egenus*, but stouter. Antennæ passing the middle of the thorax, æneous, serrate from the fifth joint, the serrate joints wider than long; head convex, with a faint median furrow, surface very coarsely punctate, the occiput strigose. Thorax wider than long, slightly narrowed at base, sides feebly arcuate in front, oblique, with a slight sinuation posteriorly, lateral margin straight, deflexed in front, hind angles rectangular, with a moderately long, but not strongly elevated carina; disc convex, without trace of a median impression, lateral oblique impressions feeble, surface rather coarsely transversely strigose with punctures in the furrows; scutellum usually carinate, sometimes not; elytra faintly sinuate at the sides and scarcely dilated behind the middle, the apices rounded and serrulate, disc slightly depressed, the basal foveæ feeble, surface rather coarsely imbricate; body beneath colored as above; prosternal lobe broadly rounded, the intercoxal process rather wide and truncate at apex, propleuræ punctate, but not roughly nor closely; metasternum at sides coarsely transversely strigose. Abdomen feebly transversely strigose, more roughly at the sides of the first two segments: pygidium sparsely punctate, the median line smooth, not carinate; claws broadly toothed at middle. Length .18—.22 inch.; 4.5—5.5 mm.

Male.—Front rather less convex, with more distinct median impression and more coarsely punctate. Prosternum roughly and closely punctate, hairy. Metasternum closely punctate and slightly hairy; first two ventral segments flattened at middle, closely punctate and with short hairs.

Female.—Head more convex and more evidently strigose. Prosternum and metasternum transversely strigose, not pubescent; first two ventral segments convex, not closely punctate and not hairy.

The numerous specimens examined show no variation, except a little in size in specimens from the most remote localities.

The species resembles *egenus* somewhat, but is more robust, has shorter antennæ and an entire prosternal lobe. Specimens of *lacustris* have been seen which somewhat resemble this one, but the male characters will then readily separate them.

Hab.—Massachusetts, Dracut (Blanchard), Florida, Georgia and Texas.

A. abditus n. sp.

This species so closely resembles *imbellis* that it is deemed necessary merely to recite the differences:

Antennæ scarcely passing the middle of the thorax; thorax with a vague median depression; prosternal lobe truncate, or feebly emarginate. Length .18—.20 inch.; 4.5—5 mm.

Male.—Front greenish, subopaque, very indistinctly punctate, sparsely pubescent. Prosternum closely punctate, sparsely hairy. Metasternum slightly pubescent in front. Abdomen slightly flattened at middle of first two segments, rather roughly sculptured, not hairy.

Female.—Front brassy, more shining, feebly punctate, not pubescent. Prosternum rather sparsely punctate, not hairy. Abdomen convex at middle, sparsely punctate.

No variations have been observed. While resembling very closely *imbellis*, it will be at once known by the feeble sculpture of the head in both sexes, the median depression of the thorax and the sexual characters.

Hab.—Western Nevada (Morrison).

A. pusillus Say.—Form of a diminutive *ruficollis*; head and thorax usually æneous or cupreous, elytra purple-black (but variable), moderately shining. Antennæ reaching the middle of the thorax, piceous, serrate from the fifth joint, serrate joints wider than long; head convex, a feeble median impression from the occiput to the base of the clypeus, surface moderately closely coarsely punctate. Thorax wider than long, slightly narrowed at base, sides arcuate in front, slightly sinuate near the hind angles, which are rectangular and distinctly carinate, margin nearly straight, deflexed in front, disc convex, a broad transverse depression in front of base, so that, when viewed laterally, the median line of the thorax is more convex in the anterior half, lateral oblique depression moderately deep, surface moderately coarsely transversely strigose, with coarse punctures in the grooves; scutellum carinate or not; elytra sinuate at the sides, distinctly dilated behind the middle, apices rounded, serrulate; disc flattened, usually a vague costa on each side, a feeble concavity each side of the suture, basal depressions feeble, surface with imbricate sculpture, not rough nor close; body beneath piceous, shining, faintly bronzed; prosternal lobe truncate and broadly emarginate, the intercoxal process acutely oval at tip, propleuræ punctate and strigose; metasternum at sides strigose and subreticulate. Abdomen sparsely finely punctate, a little more coarsely at the side of the first segment; pygidium sparsely punctate, not carinate; claws broadly toothed. Length .12—.16 inch.; 3–4 mm.

Male.—Front flatter and more opaque; first ventral slightly flattened at middle and rugose.

Female.—Front more shining and rather more convex; first ventral convex and not roughened.

Variations.—The general aspect of this species is that of a diminutive *ruficollis* with the thorax less conspicuously cupreous. The thorax is often brassy with purplish spaces at the sides. Sometimes the elytra are æneous. These last forms resemble *putillus*, but these have no carina in the hind angles of the thorax, and the disc has a distinct median impression.

This species was placed by LeConte in the group with the incurved tooth of the claws, but the claws and antennæ are both different from that series.

The name *parvus* has been suggested for this species by Saunders in "Catalogus Buprestidarum," but there seems to be no valid reason for the the change. It is certainly permissible to use *pusillus* and *putillus* in the same genus.

Hab.—Kansas, Colorado and Arizona.

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aleus Gory, loc. cit. p. 250, pl. xli, fig. 242.
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impressipennis Uhler, Proc. Acad. vii, p. 415.
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nigricans Gory, loc. cit. p. 257, pl. xliii, fig. 250.
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EXPLANATION OF PLATE VIII.

- Fig. 1.—Elytral markings of *A. Couesii*.
 “ 2.— “ “ *A. fallax*.
 “ 3.— “ “ *A. obsoletoguttatus*.
 “ 4.— “ “ *A. ornatulus*.
 “ 5.— “ “ *A. Lecontei*.
 “ 6.— “ “ *A. Walsinghami*.
 “ 7.—Form of elytron of *A. politus*, etc.
 “ 8.—Form of elytron of *A. difficilis*.
 “ 9.—Profile of thorax of *A. macer* with sinuate margin.
 “ 10.—Profile of thorax of *A. lacustris* (*cuneus*) with straight margin.
 “ 11.—Antenna of *A. obsoletoguttatus*.
 “ 12.— “ *A. ruficollis*.
 “ 13.— “ *A. egenus*.
 “ 14.— “ *A. imbellis*.
 “ 15.—Claw of *A. ruficollis*, etc.
 “ 16.—Claws of *A. bilineatus*, etc.; a, ♂; b, ♀.
 “ 17.—Claws of *A. Lecontei*, etc.; a, ♂; b, ♀.
 “ 18.—Hind leg of *A. otiosus* ♂.
 “ 19.—Hind leg of *A. obsoletoguttatus*, etc.
 “ 20.—Middle tibia of *A. Walsinghami*.
 “ 21.—Abdomen of *A. ventralis*.
 “ 22.—The same in profile.

