

Synopsis of the species of CYCHRUS inhabiting Boreal America.

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THE generic name *Cychrus* in the title is used in a general way to include all the species described from time to time under the names *Sphæroderus* and *Scaphinotus* as well as *Cychrus*.

The generic characters of these have been so often made known in the books that it seems hardly necessary to repeat them in detail. I will therefore mention those which may be necessary to illustrate the meaning of various expressions made use of in the following pages.

The head is elongate, more or less constricted behind the eyes although at times hardly perceptibly, the eyes are more or less prominent and distant from the apical margin of the thorax except in *Sphæroderus* and *C. elevatus*.

The antennæ are slender and vary in length from a half to three-fourths the length of the body, the basal joint in several species becomes enlarged and stout in proportion to the other joints.

The genal margin of the head, that is the portion of the head which encloses the buccal cavity at the side and directly behind the base of the mandibles, shows some points of variation which are more than specific in their nature. In the *Scaphinotus* group alone this portion of the head is very feebly expanded, and as the base of the maxillæ is the portion immediately beneath this plate, when the latter is feebly developed the maxillæ become visible from above.

The parts of the mouth do not exhibit any striking differences. In *angusticollis* the inner lobe of the maxillæ is furnished on the inner side with a row of moderately long, stout bristles, while in all the other species there are merely hairs or pubescence.

The sexual characters are of the greatest importance in the arrangement of the species.

In those species grouped below under the name *Cychrus*, the anterior tarsi exhibit no sexual characters whatever, they are neither more dilated nor otherwise pubescent in the male than in the female. In *Sphæroderus* on the other hand, the anterior tarsi of the male are broadly dilated and densely spongy pubescent beneath. In the other divisions, *Pemphus*, *Brennus* and *Scaphinotus*, the anterior tarsi are moderately dilated in the male and may be either spongy pubescent

beneath or papillose, the distinction being for me of some importance and is made use of in several instances for the separation of species.

The characters above mentioned with others of minor importance have induced me to adopt nearly all the divisions which have already been proposed. *Sphæroderus* and *Scaphinotus* are in the books since many years, while *Brennus* and *Pemphus* are due to Motschulsky, who, while recognizing the fact that they should be distinct, gave no characters of value for their separation. I adopt the names in order that any further increase of nomenclature may be avoided.

Briefly defined these divisions are as follows :

Anterior tarsi broadly dilated in the male.

Genæ dilated covering the maxillæ.

Legs stout, femora subclavate.....SPHÆRODERUS.

Anterior tarsi narrowly dilated in the male, the dilated joints always longer than wide.

Genæ not dilated, maxillæ exposed, legs slender.....SCAPHINOTUS.

Genæ dilated, maxillæ covered.

Inner lobe of maxillæ with a row of long stiff bristles, legs very elongate, the posterior unequal in the sexes. Elytra very feebly sculptured.....PEMPHUS.

Inner lobe of maxillæ with at most a few hairs and some silken pubescence, legs moderate, similar in the sexes. Elytra striate or punctate.....BRENNUS.

Anterior tarsi of male not at all dilated.

Genæ dilated, covering the maxillæ, legs moderately stout.....CYCHRUS.

Regarding the validity of these divisions as genera, there has been and still may be some doubt. The characters seem to have full generic value and are so considered in other parts of the Carabide series. One thing appears quite certain; if either one of the above divisions is distinct from any other, they are all distinct among themselves, the only doubtful case being *Pemphus*.

SPHÆRODERUS Dej.

Head moderately elongate, more or less constricted behind the eyes, gula deeply transversely impressed; genæ moderately expanded covering the base of the maxillæ with very feeble trace of incisure. Antennæ slender, about half the length of the body, first joint moderately stout and longer than the third. Legs stout, the femora moderately clavate. Elytra regularly oval or oboval, striate striæ punctured. Anterior tarsi of male broadly dilated and densely spongy pubescent beneath on the first three joints, the fourth with a few papillæ.

The elytral sculpture exhibits a tendency to vary from the striate style

to the granular, resulting from a gradual breaking up of the intervals and the formation of elongated tubercles. This change begins at the sides and declivity of the elytra and finally invades the entire surface.

The species are not numerous but not readily distinguishable by description, the following characters seem to be the most constant.

Basal impressions of thorax broad and deep and with coarse deep punctures more or less confluent.

Elytra oboval, sculpture decidedly granular.....**nitidicollis**.

Basal impressions of thorax linear and not very deep, the punctures rather fine and not confluent.

Hind angles of prothorax very obtuse.....**stenostomus**.

Hind angles of prothorax well defined.....**canadensis**.

C. (Sphæroderus) nitidicollis Chev. Guer. Icon. Reque An. p. 24, pl. 7, fig. 1, a—c; *niagarensis* Cast. Ann. Fr. 1832, p. 390; Lacord. Genera Atlas, pl. 2, fig. 3; *Brevoorti* Lec. Ann. Lyc. iv, p. 443; *Schaumi* Chaud. Bull. Mosc. 1861, ii, p. 499; *granulosus* Chaud. loc. cit. p. 497; *palpalis* Motsch. Bull. Mosc. 1865, iv, p. 312.—Moderately elongate, surface with cupreous or violet tinge. Head feebly elongate, genæ moderately dilated concealing the base of the maxillæ. Thorax broader than long, base and apex equal, sides arcuate, slightly oblique posteriorly, hind angles obtusely rounded, margin with a thickened bead, disc convex, anterior and median impressions feeble, basal transverse impression moderately deep, angular impressions broad and triangular, these and the transverse impression coarsely and deeply punctured. Elytra oval, usually broader behind the middle, surface variably sculptured, inflexed portion coarsely punctate. Length .48—.64 inch; 12—16 mm.

The elytral sculpture varies so that it is almost impossible to give any general description.

var. **Brevoorti** Lec.—Elytra at base deeply striate, striæ coarsely crenately punctured, intervals at sides and apex broken into numerous granules and elongate tubercles.

var. **nitidicollis** Chev.—Striæ of elytra almost entirely wanting, the intervals tuberculate, the tubercles forming three rows of larger ones between the smaller rows and the entire surface of the elytra with numerous small granules.

In all the species of this subgenus the sculpture tends to vary from the striate to the tuberculate, and thus to reproduce the characters of the true *Cychrus* form as represented in our fauna by *tuberculatus*.

On comparing this species with *stenostomus* there will not be found any great differences of general form; in the present the elytra are apt to be wider behind the middle, but this is by no means constant. The only character which seems to me to define the two is found in the fact that in this the impressions of the hind angles of the thorax are broad, deep and coarsely punctured, those of *stenostomus* are linear, less deep and scarcely at all punctate.

Occurs from the Hudson's Bay region to northern Virginia.

The figure given by Lacordaire is not characteristic, and I place that species here because the deep and coarsely punctured foveæ of the thorax are mentioned; *palpalis* Motsch., is not so described that it can be placed certainly in synonymy, but as the choice is between this and *stenostomus* it does not much matter where it is put as it is the youngest name in the entire synonymy. *C. Schaumi* Chd., belongs more especially to the var. *nitidicollis*, while *granulosus* is *Brevoorti*.

C. (Sphæroderus) stenostomus Weber, Obs. Ent. p. 43; Knoch, Neue Beitr. i, p. 190, pl. 8, fig. 13; var. *Lecontei* Dej., Species ii, p. 15; Lec. Ann. Lyc. iv, p. 442; var. *bicarinatus* Lec., Trans. Am. Philos. Soc. 1853, p. 399.—Thorax broader than long, sides arcuate, slightly oblique posteriorly, hind angles obtuse, basal transverse impression moderate, the longitudinal impressions rather sharply defined and moderately elongate, with very few punctures. Length .48—.60 inch; 12—15 mm.

These characters are the only ones capable of use for the separation of this and the preceding species, and it is moreover extremely difficult to determine at times whether specimens should be called *Lecontei* or *Brevoorti*.

The following are the variations:

var. *stenostomus* Weber.—Elytra oval, moderately convex, surface striate, striæ deep and with deep closely placed punctures, intervals convex, entire on the disc, very slightly confused at the sides and near the tip.

var. ———.—Elytra as above, intervals interrupted in the apical region one-third from apex, but without becoming granulate.

var. *Lecontei* Dej.—Intervals interrupted from the middle to the apex, at the apical third the interruptions assume the form of tubercles often elongated.

var. *bicarinatus* Lec.—Intervals interrupted except in the basal region, near the apex the tubercles forming three series of larger tubercles with the intervals filled with granules, on each elytron the intervals four and eight somewhat elevated the twelfth forming quite an elongate carina.

After a careful study of the above forms it seems to me impossible to separate them specifically, and I am prepared to say that the differences in elytral sculpture have no value as they merge insensibly from one form into another.

Occurs from Michigan to North Carolina.

C. (Sphæroderus) canadensis Chaud., Bull. Mosc. 1861, ii, p. 498.—Moderately elongate, violaceous, margin bluish. Thorax slightly wider than long, sides in front arcuate, posteriorly oblique, hind angles distinct, basal transverse impression feeble or entirely wanting, longitudinal impressions moderately long, sharply defined and with very few punctures. Elytra oval, surface deeply striate, striæ crenately punctured, intervals convex, slightly interrupted at the sides, more distinctly at apex, but not tuberculate. Length .44—.48 inch; 11—12 mm.

This species seems quite distinct from the others by the hind

angles of the thorax being distinct and not obtusely rounded, its more elongate form and by the smoothness of the basal sculpture of the thorax.

Occurs from Canada to Maryland.

SCAPHINOTUS Latr.

Head elongate, eyes usually moderately prominent, genæ not dilated, base of maxillæ exposed and visible from above, gula not transversely impressed. Antennæ slender, as long as three-fourths of the body, first joint longer than the third. Elytra striate, striæ punctured, intervals very slightly interrupted. Anterior tarsi moderately dilated in the male the first three joints either papillose or spongy pubescent beneath.

Irichroa Newm., is synonymous with the above.

The tarsal characters of the male are here useful in arranging the species.

Anterior tarsi ♂ moderately dilated, the first three joints papillose beneath.

Thorax very widely margined, the hind angles prolonged backwards.

First joint ♂ anterior tarsi papillose over three-fourths of its surface.....**elevatus.**

Thorax with moderately widely reflexed margin. First joint ♂ anterior tarsus with a slight papillose space at tip.....**viduus.**

Thorax with very narrow margin.

Anterior tarsus ♂ as in *viduus*.....**Guyotii.**

Anterior tarsus ♂ as in *elevatus*.....**Ridingsii.**

Anterior tarsi of ♂ more distinctly dilated and densely spongy pubescent beneath, the first joint so clothed over nearly its entire surface.

Thorax very narrowly margined.....**Andrewsii.**

C. (Scaphinotus) elevatus Fab., Mant. i, p. 198; Knoch, Neue Beitr. i, p. 188, pl. 8, fig. 12; Lac. Genera Atlas, pl. 2, fig. 4; *unicolor* Fab., loc. cit.; Oliv. Ent. iii, 35, p. 47, pl. 6, fig. 62; *flammeus* Hald., Proc. Acad. ii, p. 54; Lec. Ann. Lyc. iv, p. 440; *dilatatus* Lec., Trans. Am. Philos. Soc. x, p. 398; *var. heros* Harris, Bost. Journ. ii, p. 196; Lec. Journ. Acad. iv, pl. 4, fig. 13.—Form moderately robust, color variable from bluish to bright cupreous. Head moderately elongate, eyes prominent. Thorax (less the margin) cordate, sides in front arcuate posteriorly oblique, margin broad more or less reflexed, much wider posteriorly, the hind angles prolonged over the elytra, disc of thorax variable in convexity and impressions, surface slightly wrinkled, margin more or less punctate. Elytra broadly oval, moderately convex, margin reflexed, gradually narrower towards the tip, surface moderately deeply 16—18 striate, striæ crenately punctured, intervals moderately convex slightly confused at the sides and tip. Inflexed portion of elytra moderately densely punctate. Body beneath and legs smooth, shining. Length .60—1.12 inch; 15—28 mm.

The color is variable as already stated. The differences in appearance between *heros* and the ordinary forms of the species, which have

caused it to be separated, are practically of no moment whatever. The relative width of the true disc to the dilated margin remains the same while the extent to which it is bent upward varies, so that quite a different appearance may result.

The differences between this species and *viduus* are found in the thoracic margin and the anterior tarsi of the male. Here about one-half the first joint is papillose while in *viduus* merely a small space near the tip.

Occurs from the Middle Atlantic States to Colorado and thence southward, as a general rule the further south the larger the specimens.

C. (Scaphinotus) viduus Dej., Species ii, p. 12; *unicolor* ‡ Knoch, Neue Beitr. i, p. 187, pl. 8, fig. 11; Say, Trans. Am. Phil. Soc. ii, p. 71; *Leonardi* Harris, Bost. Journ. ii, p. 195; *violaceus* Lec., New Species, 1863, p. 4.—Body black, thorax purplish, elytra purplish or cupreous. Head elongate smooth, eyes moderately prominent. Thorax as wide as long, sides in front moderately arcuate, posteriorly oblique, margin moderately wide, broader at base than apex, hind angles arcuate, variably reflexed, disc at middle nearly smooth, at sides and on the margin sparsely punctate. Elytra ovate narrowed toward the tip, moderately ventricose, margin narrowly reflexed but a little wider near the base, surface deeply striate, striæ crenato-punctate, intervals convex, slightly confused at sides and more so at apex, inflexed portion of elytra punctate. Body beneath smooth, shining. Length .70—1.16 inch; 18—29 mm.

After an examination of the type of *violaceus*, I became convinced that it is merely a specimen of the present species whose development has been retarded. It agrees in all essential particulars excepting that it is much smaller. The specimen is a male and its tarsal characters are those of *viduus* and not at all of *Andrewsii*.

The States of New York, Pennsylvania and Virginia, are the habitat of this species, especially in the mountainous regions.

C. (Scaphinotus) Guyotii Lec., Proc. Acad. 1866, p. 363.—Moderately elongate, black, surface with violaceous tinge. Head elongate, smooth. Thorax as wide as long, cordate, sides in front moderately arcuate, posteriorly oblique, hind angles obtuse, margin narrowly reflexed, disc smooth at middle, punctured at sides and base, basal impression deep. Elytra oval, moderately convex, surface deeply striate, striæ crenately punctured, intervals at sides very feebly at apex more distinctly confused, margin very narrow, inflexed portion punctured. Body beneath smooth, shining. Length .90 inch; 22.5 mm.

This species greatly resembles *Andrewsii* but is of more robust form, and is in fact intermediate between that species and *viduus*. The margin of the thorax is a little more reflexed than in the former and very much less than in the latter.

Occurs in the mountainous regions of North Carolina.

C. (Scaphinotus) Ridingsi Bland., Proc. Ent. Soc. Phil. i, p. 353.—Moderately elongate, black, upper surface distinctly violaceous. Head elongate, smooth. Thorax cordate, a little longer than wide, sides in front feebly arcuate, posteriorly oblique, hind angles obtuse, margin narrowly reflexed, disc feebly convex, impressions moderate, surface not punctured. Elytra oval, moderately convex, margin very narrow, surface striate, striæ crenately punctured, intervals convex, slightly confused at the tip, inflexed portion sparsely punctate. Body beneath smooth. Length .50 inch; 12.5 mm.

For a long time I had been unwilling to recognize this as a distinct species, preferring to consider it a diminutive *Andrewsii*, but whatever its affinities may be they are certainly more removed by its male tarsal characters from that species than from *Guyotii*. The first three joints of the anterior tarsi ♂ are papillose beneath, and the first joint is so clothed over three-fourths of its surface.

The specimens I have seen were all collected by Mr. Ulke, near Cresson Springs, Pennsylvania.

C. (Scaphinotus) Andrewsii Harris, Bost. Journ. ii, p. 195; *Germari* Chaud., Bull. Mosc. 1861, ii, p. 495.—Form slender, moderately elongate, surface more or less cupreous. Head elongate, eyes moderately prominent. Thorax longer than wide, subcordate, sides in front feebly arcuate, posteriorly oblique, hind angles obtuse, disc feebly convex, impressions moderate. Elytra oval, usually broadest behind the middle, moderately convex, margin very narrow, surface deeply striate, striæ crenately punctured, intervals somewhat confused near the tip, inflexed portion of elytra moderately densely punctured. Body beneath smooth, shining. Length .74—.86 inch; 19—22 mm.

This species is nearly as slender as *angusticollis*. Its thorax is much narrower than in *Guyotii* which it also resembles otherwise. The only character on which any positive reliance can be placed is in the sexual peculiarities of the anterior tarsi of the male.

Occurs from Pennsylvania to North Carolina.

PEMPHUS Motsch.

Bull. Mosc. 1865, ii, p. 312.

Head elongate, eyes not prominent, genæ moderately dilated covering the base of the maxillæ and with a slight incisure. Gula not transversely impressed. Inner lobe of maxillæ armed with rather long stout spines. Anterior tarsi of male with three joints dilated and densely spongy pubescent beneath, the first joint so covered over nearly the entire surface, the fourth with a few papillæ at middle. Legs long and slender and varying in the sexes, the posterior longer in the male.

The general appearance of the species belonging here is totally different from any other in the entire series and marks it as a very

distinct type. The surface is opaque and of velvety aspect, the elytra varying in color from reddish brown to deep black, the margin from purple to golden and with large punctures; the surface of the elytra has extremely feeble sculpture in which faint traces of striæ are visible with obsolete punctures. Three of the intervals are very slightly wider and somewhat more convex. The difference in length between the posterior femora of the two sexes is partly real and partly apparent only, a measurement in two specimens of equal size shows that in the male the femora are .40 inch long, in the female .35 while in the former sex they appear to project at least one-third behind the tips of the elytra, this results from the greater abruptness and less prolongation of the tip in the ♂.

The maxillary character is of the greatest importance in separating this species. Everywhere else in the *Cychrus* series the inner lobe of the maxillæ has merely silken hairs with a few shorter and stiffer hairs placed in a row, corresponding with the row of long stiff spines noticed here.

One species in our fauna possesses the above characters.

C. angusticollis Fisch., Ent. Russ. ii, p. 46, pl. 46, fig. 2; loc. cit. iii, p. 143; Dej. Spec. v, p. 526; *velutinus* Menet. Bull. Ac. Petrop. 1844, ii, p. 53.—Form elongate. Head elongate, genæ broadly notched. Thorax elongate cordate, sides in front feebly arcuate, posteriorly feebly sinuate, hind angles rectangular, disc nearly flat, impressions feeble. Elytra elongate oval broadest behind the middle, feebly convex, margin bluish or golden and with large punctures, surface very obsoletely striate, punctures obsolete, three of the intervals somewhat more distinct, inflexed portion not distinctly punctate. Length .66—1.00 inch; 17—25 mm.

Under this name I think it advisable to unite the two species above cited. The Arctic forms have a slightly shorter thorax and the elytra brown and the margin more golden; those from northern California and Oregon, are of velvety black color and with the margin black or bluish, the thorax is also longer.

Occurs from Alaska to northern California.

BRENNUS Motsch.

Bull. Mosc. 1865, ii, p. 311.

Head elongate, neck not dilated, genæ in front of eyes dilated, covering the base of the maxillæ and divided by an incisure varying in extent in the species; gula either plane or transversely impressed, front moderately convex or cristate. Eyes feebly or moderately convex, usually distant from the thorax. Antennæ slender longer than half the body, the basal joint usually normal but in several species stout,

always decidedly longer than the third. Tarsi slender in both sexes, the anterior slightly dilated in the male and with two or three joints spongy pubescent beneath.

In this genus the elytra are either striate or striato-punctate, the inflexed portion either smooth or obsoletely punctate, the apex usually gradually declivous. The palpi of the male have a broader terminal joint than those of the female, and the tarsi slightly dilated with a variable number of joints pubescent.

This genus is composed of species peculiar to the true Pacific Coast fauna of North America, which extends from Alaska to San Diego, and is limited on the east by the snow-clad Sierras of California and their extension northward to Alaska.

The species are again capable of subdivision on characters not sexual, as follows :

Head cristate to a greater or less extent, gula deeply transversely impressed.

Three joints of anterior tarsi ♂ pubescent beneath.

Basal joint of antennæ very stout and longer than the third, genæ deeply incised.....GROUP I.

Head feebly convex, gula not transversely impressed, genæ more or less incised.

Basal joint of antennæ normally slender.....GROUP II.

GROUP I.

Head cristate, gula deeply transversely impressed, antennæ slender, basal joint much stouter than normal, genæ beneath the eyes incised. Anterior tarsi with three dilated joints, which are spongy pubescent beneath, fourth joint without brush of hairs.

Two species occur in our fauna.

Front strongly cristate, occiput deeply transversely impressed, basal impression of thorax deep. Elytra with rows of moderate punctures which are often more or less confused.....**cristatus.**

Front feebly obtusely carinate, occiput not impressed, basal impression of thorax feeble. Elytra striate, striæ distantly punctured.....**rugiceps.**

C. cristatus Harris, Bost. Journ. ii, p. 200; *reticulatus* Mots. Käfer Russ. p. 90; Mann. Bull. Mosc. 1852, ii, p. 292; 1853, iii, p. 121.—Moderately elongate, black, shining. Head moderately elongate, vertex cristate, crest irregular at summit in front, suddenly declivous posteriorly by a deep occipital impression, supra-orbital ridges strongly elevated, genæ dilated and beneath the eyes very deeply incised so as to appear bilobed, surface impunctured. Antennæ slender, the basal joint large and stout. Thorax cordate, posteriorly constricted, hind angles rectangular, sides in front arcuate, disc moderately convex, anterior and posterior impressions deep, the median less impressed, apical bead posterior to the apical margin, side margin with a moderately thickened bead, surface smooth. Elytra oval, convex, margin very narrow, surface faintly

striate, striæ often entirely obsolete and replaced by moderately large punctures, the regular striæ with smaller punctures, intervals near the sides and tip more or less interrupted and subgranular, inflexed portion of elytra obsoletely sparsely punctate. Body beneath and legs impunctate. Length .58—.72 inch; 15—18 mm.

The number of striæ cannot be definitely stated, it is however over sixteen, the punctures of the normal striæ appear to become smaller while near the tip those of the intervals become somewhat larger and the count thereby is apt to be confused. The hind angles of thorax are sometimes slightly divergent. The males have the first three joints slightly dilated and papillose beneath, the space so clothed being very small on the first joint.

Occurs not uncommonly near San Mateo, southward of San Francisco, California.

C. rugiceps Horn, Trans. Am. Ent. Soc. iv, 1872, p. 143.—Form moderately elongate, black, feebly shining. Head moderately elongate, vertex elevated into an irregular obtuse crest, supra-orbital ridges well defined, front transversely impressed between the base of the antennæ, occiput not impressed, genæ moderately dilated, incised beneath the eyes. Antennæ slender, basal joint large and stout. Thorax cordate, moderately constricted posteriorly, sides in front arcuate, posteriorly sinuate, hind angles rectangular, margin with a slightly thickened bead, disc feebly convex, anterior, median and basal lines not deeply impressed. Elytra regularly oval, margin narrowly reflexed, disc moderately convex, surface with about eighteen moderately deeply impressed striæ in which the punctures are coarse but not approximate, intervals convex, inflexed portion nearly smooth. Body beneath and legs smooth. Length .54—.66 inch; 14—17 mm.

The sculpture of the head recalls that seen in certain species of *Clivina* but with a more elevated carina. The thorax by its more feebly impressed line recedes from the other cristate species and approaches *punctatus*. The male characters are as in *cristatus*.

I have seen but two specimens one of each sex, both collected by Lord Walsingham, in Oregon. The male is now in my cabinet.

GROUP II.

Head not cristate, antennæ slender, basal joint not thickened, genæ moderately explanate and more or less incised, gula not transversely impressed. Anterior tarsi of male with either two or three joints papillose or spongy pubescent beneath, sometimes with the fourth joint slightly papillose.

This group contains the larger number of species which represent more definitely the generic idea than those of the other two groups, and by their homogeneity of appearance and general characters they form a very natural assemblage, with such close resemblances that the

females of several species can only be distinguished by considerable experience.

The further distribution of the species is as follows:

- Anterior tarsi of male with the first three joints papillose beneath, the fourth also with a few papillæ.....A.
 Anterior tarsi of male with the first three joints papillose beneath, the fourth without papillæ.....B.
 Anterior tarsi of male with the first two joints only papillose.....C.

A.

Under this head we have species remarkable by their much less convexity, the rather deep longitudinal impressions in the thoracic angle which extend considerably forward, the smaller number of elytral striæ which do not exceed fourteen, by the marginal series of punctures being larger than those of the striæ, and finally by the color of the elytra departing from the normal black becoming slightly bluish, cupreous or violet.

Three species belong here distinguished as follows:

- Thorax much wider than long, strongly constricted posteriorly, disc of elytra not much convex.....**cordatus**.
 Thorax cordate, not wider than long, elytra with convex disc.
 Sides of thorax posteriorly oblique with scarcely a trace of sinuation, elytra cupreous with greenish or golden margin.....**marginatus**.
 Sides of thorax distinctly sinuate, hind angles rectangular, elytra slightly purplish.....**dissolutus**.

C. cordatus Lec., Trans. Am. Philos. Soc. 1853, p. 399.—Black with slight tinge of purplish, moderately elongate, subdepressed. Head moderately elongate, smooth, shining, genæ very slightly incised. Thorax transversely cordate, broader than long, sides strongly arcuate, posteriorly deeply sinuate, hind angles subrectangular, disc nearly flat, basal transverse impression deep, longitudinal impressions deep near the base, gradually feebler in front, anterior and median impressions feeble, surface smooth, shining. Elytra elongate oval, more attenuate toward the tip, disc subdepressed, margin narrowly reflexed, surface striate, striæ with deep coarse punctures which are often confluent and invade the intervals, inflexed portion of the elytra very obsoletely punctate. Body beneath smooth and shining. Length .48—.56 inch; 12—14 mm.

This species has at a glance much the appearance of a *Nebria*. As in the other species of this group the lateral striæ of the elytra are not confused.

Occurs near San Mateo, California; rather rare.

C. marginatus Fisch., Ent. Russ. i, p. 79, pl. 7, fig. 1; Dej. Spec. ii, p. 12; Esch. Mem. Mosc. 1823, vi, p. 98; Mann. Bull. Mosc. 1843, p. 185.—Moderately elongate, black, elytra cupreous with greenish-golden margin. Head moderately elongate, smooth shining, genæ distinctly incised. Thorax cordate, scarcely wider than long, sides in front arcuate, posteriorly oblique very feebly

sinuate, disc nearly flat, subopaque, impressions moderate. Elytra oval scarcely more attenuate posteriorly, margin narrowly reflexed, disc convex, surface striate, striæ deep and with coarse punctures, intervals convex and often interrupted so as to become subgranular on the declivity. Body beneath smooth shining. Length .50—.64 inch; 12—16 mm.

var. Fulleri.—Under this head I place certain specimens from Oregon, of larger size and rather more robust form than the above, in which the surface is black with very slight purplish tinge, the margin of the elytra being merely slightly more purple. The sides of the thorax are scarcely sinuate and resemble the normal form above described, otherwise I would have considered the specimens to be *dissolutus*. Length .60—.64 inch; 15—16 mm.

This species is very common in Alaska and to the southward, variety *Fulleri* occurs in Oregon.

C. dissolutus Schaum, Berlin Zeitschr. 1863, p. 72, pl. 3, fig. 6.—Form moderately elongate, black with slight tinge of blue. Head moderately elongate, shining, slightly transversely wrinkled and behind the eyes a faint trace of constriction, genæ rather deeply triangularly incised. Thorax cordate as long as wide, sides in front arcuate, posteriorly moderately sinuate hind angles rectangular, basal transverse impression deep, the others moderate, surface nearly flat very feebly shining. Elytra oval slightly attenuated at tip, disc convex, surface deeply striate, striæ punctured, intervals convex often interrupted near the sides and declivity, inflexed portion obsoletely punctate. Body beneath smooth shining. Length .64 inch; 16 mm.

This species differs from the preceding species principally in the sinuate sides of the thorax and the more deeply incised genæ. In general appearance it resembles the variety *Fulleri* above noted. The interruption of the intervals near the tip in some specimens causes a granulated or tuberculate appearance, as is the case in Schaum's type and another in Leconte's cabinet.

Occurs in California.

B.

The following series contains species with elytra much more convex than in the preceding, the longitudinal impressions of the thorax much feebler. The color is always deep black, moderately shining. The striæ are usually very numerous about sixteen or eighteen in number, but it is almost impossible to count their number as those near the margin in several species become confused. In one species (*interruptus*), the striæ do not exceed fourteen in number and the marginal series of punctures is large as in *marginatus*, but the tarsi are as in the other species, that is, there are three joints papillose beneath in the anterior pair ♂, and the fourth joint is glabrous at middle and with merely a few short spinous hairs at the sides. By its sculpture *interruptus* unites series B and A, in the same manner that *mimus* does B and C.

The species here included are five in number.

Elytral striæ not exceeding 14 in number.....**interruptus**.

Elytral striæ 16—18 in number.

Sides of thorax posteriorly oblique.....**obliquus**.

Sides of thorax posteriorly sinuate.

Elytra striate punctures rather fine.

Thorax usually longer than wide, feebly sinuate posteriorly, margin very narrow and very feebly or not at all reflexed, elytral striæ scarcely at all confused at the sides.....**striatus**.

Thorax wider than long, sides posteriorly deeply sinuate, margin wider and distinctly reflexed, outer three or four elytral striæ much confused behind the middle.....**ventricosus**.

Elytra with extremely fine striæ punctures large.....**mimus**.

C. interruptus Menet., Bull. Ac. Petrop. 1844, ii, p. 54; Motsch. Bull. Mosc. 1859, iii, p. 162, pl. 3, fig. 10; *ventricosus* ‡ Motsch. Bull. Mosc. 1845, iv, p. 338; 1859, iii, p. 162, pl. 3, fig. 9; *constrictus* Lec. Trans. Am. Philos. Soc. 1853, p. 398.—Form moderately robust, black, shining. Head moderately elongate, smooth, frontal margin with slight longitudinal impression, genæ rather deeply incised. Thorax broadly cordiform, sides arcuate in front, deeply sinuate posteriorly, hind angles rectangular, disc feebly convex, impressions moderate. Elytra rather broadly oval, convex, margin narrowly reflexed, disc deeply 14-striate, striæ with coarse deep punctures invading the intervals, the latter convex and smooth, inflexed portion of the elytra sparsely obsoletely punctate. Body beneath smooth, shining. Length .56—.64 inch; 14—16 mm.

This species in common with nearly all in the subgenus has given considerable trouble in its proper definition. With both sexes the difficulty is narrowed down to its separation from *ventricosus*, from which it may be known by the lesser number of the elytral striæ with those at the sides, entire or very nearly so. Its smaller size and more constricted thorax are also tolerably constant characters. It also resembles in form *dissolutus*, but the form of thorax, in the absence of the male, will separate it.

The species determined by Motschulsky to be this, and so figured, is undoubtedly correct, the second reference may be in doubt, as his very bad figure vaguely represents one of the many variations of *ventricosus* in my cabinet, although I do not believe that he would have considered one the female of the other without good reason, for with all his synonymical faults he was a close observer.

Occurs at San Mateo, California, and rather common.

C. obliquus Lec., Trans. Am. Ent. Soc. 1868, p. 61.—Form moderately robust, black, slightly shining. Head moderately elongate, genæ feebly notched or sinuate. Thorax cordate, as wide as long, sides in front arcuate, posteriorly oblique, not sinuate, disc feebly convex, impressions feeble. Elytra rather broadly oval, convex, deeply striate, striæ punctured, intervals feebly convex, somewhat interrupted at the sides and apex, inflexed portion sparsely punctate. Body beneath smooth, shining. Length .54—.64 inch; 13.5—16 mm.

This species is easily known in this group by the oblique sides of the thorax, in this respect however it resembles *marginatus* var. *Fulleri*, but from this it may be known by the elytral striæ numbering eighteen.

The specimens I have seen have been reported from Sacramento, San Diego and Los Angeles.

C. striatus Lec., Proc. Acad. 1859, p. 69; *crenatus* Motsch. Bull. Mosc. 1859, iii, p. 161, pl. 3, fig. 8.—Moderately elongate, black, shining. Head elongate, smooth, genæ deeply incised. Thorax somewhat variable in form, usually elongate cordate, sides in front arcuate, posteriorly moderately sinuate, hind angles rectangular, margin very narrow, disc feebly convex, impressions moderately deep. Elytra oval, moderately ventricose, surface deeply striate, striæ rather closely but not coarsely punctured, intervals convex, feebly interrupted at the sides and near the tip, inflexed portion obsoletely punctate. Body beneath smooth, shining. Length .60—.84 inch; 15—21 mm.

The elongate form of thorax is the essential character of this species, and although somewhat variable never approaches the form of *ventricosus*. The elytra are moreover more deeply striate and with finer punctures than in *ventricosus*. The form of thorax as given by Motschulsky for this species is a caricature, but that given of *ovalis* is accidentally quite near what belongs to this species.

All the specimens I have seen are from Tejon and Santa Barbara, California.

C. ventricosus Dej., Spec. v, 1831, p. 527; Esch. Zool. Atl. 1833, p. 21, pl. 25, fig. 1.—Moderately elongate, black, shining. Head moderately elongate, genæ acutely notched at the sides. Thorax cordate, as broad as long, sides in front arcuate, posteriorly deeply sinuate, hind angles rectangular, margin moderately reflexed, basal impression moderately deep, the others feebler, disc feebly convex. Elytra oval, ventricose, multistriate, striæ with punctures moderate and rather approximate, intervals feebly convex, inflexed portion obsoletely sparsely punctate. Body beneath smooth, shining. Length .64—.86 inch; 16—22 mm.

The differences between this species and *striato-punctatus* when the females only are present are not easy to make known by description, and will be fully dealt with after that species. The males once known the other sex can be determined, but even then a practised eye is of more value than empirical characters.

Numerous specimens have been sent me from time to time by Messrs. Edwards and Behrens of San Francisco, all of them having been collected near San Mateo or Crystal Springs.

I have a specimen in which the elytra are elongate oval, twice as long as wide, it is the extreme of my series and if seen alone with one of the fully ventricose specimens, might be supposed to represent

a distinct species. In this instance my series is very large. In fact I have drawn the descriptions of all the California species from observation of at least two pairs of specimens, and from this of fifteen pairs.

C. mimus Horn, Trans. Am. Ent. Soc. 1874, p. 20.—Moderately elongate, black, shining. Head moderately elongate, subopaque, genæ feebly notched. Thorax cordiform as wide as long, sides in front moderately arcuate, posteriorly slightly sinuate, hind angles rectangular, margin very narrow, disc flat opaque, impressions feeble. Elytra oval moderately ventricose, surface finely striate, striæ not impressed but with large moderately closely placed punctures, intervals irregular at the sides, inflexed portion obsoletely punctate. Body beneath smooth, shining. Length .58—.64 inch; 14.5—16 mm.

This species is a close imitation of *punctatus*, and differs from that species only in its sexual characters and by the elytra being rather less ventricose.

The only specimens I have seen were those collected by Mr. G. R. Crotch at San Bernardino, California.

C.

In this series are contained those species in which the anterior tarsi of the males have but two joints papillose beneath, the third and fourth being entirely glabrous at middle. The color of the species is black, subopaque in two species and moderately shining in the third.

They may be separated in the following manner:

Thorax posteriorly slightly sinuate, not constricted, surface subopaque, elytra ovate.

Elytra finely striate, striæ with rather coarse deep punctures.

punctatus.

Elytra without striæ but with rows of rather fine punctures.....**subtilis.**
Thorax posteriorly constricted, sides posteriorly deeply sinuate, surface moderately shining, elytra longer oval.

Elytra finely striate, striæ finely punctured, the alternate intervals behind the middle with a row of punctures.....**striatopunctatus.**

C. punctatus Lec., Proc. Acad. 1859, p. 69; Mots. Käfer Russ. p. 90.—Moderately robust, black, feebly shining. Head moderately elongate, subopaque, genæ incised. Thorax cordate, a little longer than wide, sides in front moderately arcuate, posteriorly feebly sinuate, hind angles subrectangular, disc subopaque, feebly convex, basal impression deeper than the others, margin very narrow. Elytra oval, ventricose, with very fine scarcely impressed striæ which have deep and rather large punctures moderately closely placed, lateral intervals confused, inflexed portion of elytra very obsoletely punctate. Body beneath black, shining. Length .52—.70 inch; 13—18 mm.

This species and *mimus* of the preceding group resemble each other so closely that it is hardly possible to distinguish them. In

this species the hind angles of the thorax are less decidedly rectangular, in *mimus* very distinctly so.

Occurs rather abundantly at Tejon, two others were sent me from the Sierras, probably near Calaveras, by Henry Edwards, these latter are smaller and more convex.

C. subtilis Schaum, Berlin Zeitschr. 1863, p. 72, pl. 3, fig. 7.—Moderately elongate, black, subopaque. Head moderately elongate, smooth, genæ acutely incised. Thorax cordate, as broad as long, sides in front arcuate, posteriorly oblique with feeble sinuation, margin moderately reflexed, disc nearly flat, impressions feeble. Elytra oval moderately ventricose, not striate but with series of rather finely impressed punctures not closely placed, which are somewhat confused at the sides, inflexed portion sparsely punctate. Body beneath black, shining. Length .68—.80 inch; 17—20 mm.

This species has been supposed to be merely a variety of the next, but the narrower and not constricted thorax, with the elytral sculpture seem valid characters.

This species occurs at Los Angeles and Mariposa, California.

C. striatopunctatus Chaudoir, Bull. Mosc. 1844, iii, p. 476; *alternatus* Motsch. Bull. Mosc. 1859, iii, p. 162, pl. 3, fig. 12; *ovalis* Mots. loc. cit. fig. 11.—Moderately elongate, black, shining. Head moderately long, not punctured, genæ not incised but sinuate. Thorax broadly cordate, sides in front strongly arcuate, posteriorly deeply sinuate, hind angles rectangular, margin moderately reflexed, disc moderately convex, subopaque, anterior impression nearly obliterated, the median more distinct, the posterior deep. Elytra oblong oval, ventricose, margin moderately reflexed, surface with fine but distinctly impressed striæ with fine punctures, the intervals flat, each alternate interval near the apex ♂ or from behind the middle ♀ with a supplementary row of punctures, inflexed portion obsoletely punctured. Body beneath smooth, shining. Length .68—.96 inch; 17—24 inch.

There is no species of this group with which the present might be confounded, but with *ventricosus* of the preceding group there might be some difficulty. On comparing the two superficially, the thorax of the present is always distinctly broader and the disc more convex. The elytra here are finely striate, in *ventricosus* more deeply, while in their outline the present species has nearly truly elliptical elytra scarcely more narrowed at apex than at base, while in *ventricosus* the elytra are oval. This latter character requires considerable experience. There need be no difficulty at all in separating the males. On comparing the females it will be seen that the elytral striæ become deeper, and the intervals narrower behind the middle in *ventricosus*, while in the present species the intervals have the supplementary row of punctures.

This species occurs in the coast range region south of San Francisco, and is not rare.

CYCHRUS Fab.

Head moderately elongate, neck subglobular, genæ in front of eyes dilated and concealing the base of the maxillæ, not or extremely feebly incised, gula between the eyes deeply transversely impressed. Eyes convex, moderately prominent. Antennæ very little longer than half the body, the basal joint stout not much longer than the third. Tarsi similar in the two sexes, simple.

The sexes are distinguished by the dilated palpi of the male and the more ventricose elytra of the female. The legs are moderately stout and less elongate than in *Scaphinotus* or *Brennus*, but less stout than in *Sphæroderus*. The apices of the elytra are rather suddenly declivous.

To this genus belong the species of Europe, and three from our own fauna distinguished as follows:

Front flattened, sides of thorax sinuate posteriorly, elytra with series of tubercles.....**tuberculatus.**
 Front transversely convex, sides of thorax oblique, elytra rugulose with traces of tubercles at declivity.....**Hemphillii.**
 Front carinate, thorax angulate at middle, base slightly prolonged, hind angles rectangular, elytra finely punctato-striate.....**angulatus.**

C. tuberculatus Harris, Bost. Journ. ii, p. 200; Lec. Pacific R. R. Reports, 1857, App. i, pl. 1, fig. 6.—Black, opaque. Head moderately elongate, front flattened rugose, occiput coarsely punctured. Thorax cordate, as wide as long, base and apex equal to two-thirds the length, sides in front arcuate, posteriorly sinuate, hind angles rectangular, apical and basal impressions moderately deep, median line feebly impressed, surface opaque and coarsely punctato-rugose. Elytra oval, apex feebly narrowed, disc slightly flattened, surface opaque and with three series of larger smooth tubercles, the largest tubercle being at the end of the second row at the declivity, between these larger tubercles are rows of smaller ones and in the intervals between them all are small granules; inflexed portion of elytra coarsely punctate. Body beneath black and shining, punctures coarse, sparse and subobsolete. Length .80—.90 inch; 20—23 mm.

This species occurs in Vancouver, and at the present time rare.

C. Hemphillii n. sp.—Black, shining. Head moderately elongate, front transversely convex, surface rather coarsely punctured, confluent near the sides, less densely in front and posteriorly. Thorax slightly wider than long, subcordate, base and apex very nearly equal to the length, sides in front arcuate, posteriorly obliquely convergent, hind angles obtuse, apical impressions feeble, the basal deeper, median line moderately impressed, disc slightly convex, coarsely and deeply punctured and intricately rugose. Elytra oblong oval, wider behind the middle, apex rather abruptly declivous, disc convex, surface shining and rugulose, the sculpture being formed of elongate tubercles variously confluent becoming distinctly granular towards the sides and apex; inflexed portion of elytra coarsely punctured. Body beneath black, shining, sides of prothorax with large but distant punctures, abdomen sparsely punctulate at the sides. Length .60 inch; 15 mm.

The elytral sculpture is related to that of the preceding species, but here the tubercles become more nearly equal in size and are confluent. There still remain however, two distinct but small tubercles on the declivity, and an extremely faint trace of a triseriate arrangement.

This species was collected by Mr. Henry Hemphill, Wahsatch Mts. near Ogden, Utah, and kindly sent to me by Mr. Henry Edwards, at whose suggestion I have given the above name.

C. angulatus Harris, Bost. Journ. ii, p. 200.—Form moderately elongate, black with tinge of blue or purplish, surface shining. Head elongate, front carinate, supra-orbital ridges strong, genæ moderately dilated, feebly incised beneath the eyes, surface impunctured. Eyes feebly prominent. Thorax a little longer than wide, posteriorly strongly constricted, in front of constriction hexagonal, the sides being angulate, hind angles rectangular, margin very narrow, disc convex, the anterior, median and basal impressions deep, surface smooth, shining. Elytra elongate oval, very slightly narrowed at tip, surface moderately deeply 16-striate, the outer three striæ somewhat confused, striæ punctured, intervals convex and smooth, margin very narrow, the inflexed portion of elytra smooth. Body beneath smooth, shining, impunctured. Length .80 inch; 20 mm.

From the time of its description this species remained unknown to us in nature until 1868, a period of nearly thirty years, when Dr. Leconte was enabled to study a specimen. It will be at once known by its carinate head and angulate thorax.

The anterior tarsi of the male are not dilated, the terminal joint of the palpi is however broader.

It is still very rare in collections, and is found in Oregon and Vancouver.

Synopsis of the species of STAPHYLINUS and the more closely allied genera inhabiting the United States.

BY GEORGE H. HORN, M. D.

THE genera here included form a portion of a subtribe of the more comprehensive tribe Staphylinini, the characters of which are sufficiently dwelt upon in the Classification Col. N. A. pp. 63—64. They differ notably from the Quediini by the double thoracic margin as well as by the disappearance of the infra-orbital line on the head, which attains its highest development in the Bolitobii, becoming less distinct in the Quediini and disappearing entirely in the genera here included, and very rarely existing in a mere trace in certain Philonthus.