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REVISION OF THE GENERA AND SPECIES OF THE TRIBE
HYDROBIINI.

BY GEORGE H. HORN, M. D.

(Read before the American Philosophical Society, February 21, 1873.)

The tribe Hydrobiini comprises all those genera of Hydrophilidae in which the middle and hind tarsi have the first joint very short, and all the joints are of cylindrical form, or at least not compressed and oar-like. The thorax at base is always as wide as the base of the elytra, and the metasternum never prolonged into a spine behind the coxæ. The genera may thus be tabulated :

Head in front of eyes narrow ; labrum visible.....	HYDROBIINI.
Fifth abdominal segment emarginate ; antennæ 7-jointed	BEROSUS.
Fifth segment entire.	
First two segments concealed by plates.....	CHÆTARTHRIA.
Abdominal segments not concealed.	
Abdomens with more than six segments.....	LIMNOCHARIS.
Abdomen with five segments, tip of sixth frequently visible.	
Antennæ 8-jointed.....	LACCOBIUS.
Antennæ 9-jointed.	
Maxillary palpi with fourth longer than third joint.....	HYDROBIUS.
Maxillary palpi with fourth joint shorter....	PHILHYDRUS.
Clypeus broadly dilated at sides ; labrum concealed....	HELOPELTINI
Margins of thorax and elytra broadly expanded ; maxillary palpi very long.....	HELOPELTIS.

In *Berosus* the sixth abdominal segment is always visible in the emargination of the fifth, it has also seven-jointed antennæ, an elongate scutellum and ciliate tibiæ and tarsi. *Limnocharis* and *Laccobius* have eight-jointed antennæ, the latter has large trochanters to the hind femur while the former has eight very distinct segments to the abdomen. All the other genera have nine-jointed antennæ.

BEROSUS. Leach.

From all the genera of the group Hydrobiini, *Berosus* may be known by the seven-jointed antennæ, the elongate scutellum and the hind pair of tibiæ and tarsi pilose. Certain characters common to all the species appear to have been entirely overlooked by previous authors, or at least no mention made of them. The under side of the head behind the mentum is provided with a longitudinal carina, more or less evident according to the species, and as this ridge is more or less developed, so also is the middle of the anterior edge of the prosternum notched for its reception when the head is in repose. The mesosternum is always more or less cristate and the free angle of the crest with an acute prolongation

also variable. The fifth segment of the abdomen is always deeply notched, the sides of the notch being straight and slightly reflexed, the bottom either truncate (*pugnax*), broadly lobed (*styliferus*), unidentate (*peregrinus* group), or bidentate (*striatus* group). Beyond the fifth segment the sixth is usually plainly visible, especially in the males. Between the hind coxæ the first segment is distinctly carinate, the carina extending frequently the entire length of the segment. In many species the males have the second, third and fourth segments elevated at middle, sometimes forming merely an elevated line, at others a triangular carina. The species in our fauna may be divided into three sub-genera, the last of which might with propriety be received as distinct.

Epistoma prolonged, eyes large, prominent.

Elytra at apex, spinous or emarginate..... *Enoplurus*.

Elytra not spinous, rarely acutely prolonged..... *Berosus*.

Epistoma short, broadly rounded, eyes not prominent.

Form very convex, strongly compressed at sides..... *Volvulus*.

The species of the sub-genus *Enoplurus* are :

Elytra unispinous at apex, spine not sutural..... *punctatissimus*.

Elytra bispinous at apex.

Fifth abdominal segment bidentate at middle..... *miles*.

Fifth segment truncate at middle..... *pugnax*.

Elytra emarginate at apex.

Fifth segment bidentate ; male abdomen not carinate beneath..... *emarginatus*.

B. punctatissimus, Lec. Ann. Lyc. V, p. 211 ; Proc. Acad. 1855, p. 363.

Head black, surface with brilliant cupreous metallic lustre, coarsely and densely punctured, vertex finely carinate. Thorax coarsely punctured, testaceous, a median elongate oval space with cupreous lustre, divided longitudinally and an irregular small patch on each side. Elytra striate, more deeply toward the sides and apex, striæ coarsely punctured, interspaces densely punctulate. Body beneath black, opaque. Legs testaceous, femora black, opaque and pubescent at base. Length .24-.30 inch ; 6-7.5 mm.

Male. Second and third joints of anterior tarsi more dilated, third segment of abdomen with feebly elevated line, fourth with moderate triangular crest, fifth with strong crest, first segment feebly carinate between the coxæ.

The mesosternal crest is not very prominent and has a small tooth at middle. The mesosternum in front of hind coxæ is carinate at middle and on each side dentate. The color of the upper surface is testaceous, the elytra irregularly maculate with fuscous. Elytra at apex unispinous, spine not sutural. California and Arizona.

B. miles, Lec. Proc. Acad. 1855, p. 363.

Head with aeneous tinge, coarsely not densely punctured, vertex finely carinate. Thorax minutely alutaceous, sparsely punctured. Elytra

finely striate, striæ externally deeper, punctured, intervals sparsely punctulate, surface very minutely alutaceous; apex bispinous, the outer spine longer. Pectus black, abdomen pale rufo-testaceous or black. Legs entirely testaceous. Length .28 inch; 7 mm.

Male. Tarsi as in *punctatissimus*. Fourth and fifth segments of abdomen also similar. Abdomen black or piceous margined with testaceous.

Female. Abdomen rufo-testaceous.

The form of this species is similar to the preceding, the surface smoother, more shining. Its color is pale testaceous with irregular spots.

Occurs in Texas and Arizona, Lower California.

B. pugnax, Lec. New Species, 1863, p. 24.

Head with aeneous surface, coarsely but not densely punctured. Thorax coarsely punctured, with median divided aeneous vitta. Elytra rather deeply striate, striæ coarsely punctured, intervals punctured, nearly as densely as in *punctatissimus*. Body beneath piceous, legs pale testaceous. Fifth segment of abdomen emarginato-truncate at middle, the side teeth of the emargination short and widely distant. Elytra bispinous at apex, the outer spine long and slender. Length .20 inch; 5 mm.

The two sexes have no special distinction beneath, the abdomen being entirely simple.

Occurs in Illinois and Missouri.

B. emarginatus, n. sp.

Pale yellowish testaceous, moderately shining. Head black with bronzed surface, sparsely punctured. Thorax twice as wide as long, sparsely punctured with median fuscous stripe from apex to base. Elytra yellowish testaceous, maculate as in *striatus*, striate, striæ nearly equal, punctured, intervals sparsely punctured with punctures nearly as coarse as those of the striæ; apex of each elytron emarginate. Body beneath piceous. Legs testaceous. Length .20 inch; 5 mm.

The fifth segment of the abdomen is emarginate as usual and with two teeth at the bottom of the emargination. The male has the anterior tarsi dilated and the abdominal segments not carinate. This species resembles a small *B. miles*, but may be known by the simply emarginate elytra and the abdomen not carinate in the male.

One specimen, Texas.

B. maculosus, Mann. Bull. Mosc. 1853, III, p. 167; *tesselatus*, Motsch. Bull. Mosc. 1859, III, p. 180.

This species from Alaska remains unknown. From the description it closely resembles *punctatissimus*, but is smoother, and less punctured.

The species of the sub-genus *BEROSUS* are more numerous and may be arranged in the following manner:

Fifth segment of abdomen with broad short lobe at middle of emargination.

Mesosternal crest with a long acute spur..... *styliferus*.

Fifth segment of abdomen with one tooth at middle.

Elytra prolonged at apex especially in ♀.

Abdomen at middle cristate ♂ *aculeatus.*

Abdomen of ♂ not cristate..... *subsignatus.*

Elytra similar in the sexes, not prolonged.

Abdomen cristate ♂.

Elytra with well-defined black spots..... *pantherinus.*

Elytra with spots indistinct..... *peregrinus.*

Elytra entirely testaceous..... *immaculatus.*

Abdomen not cristate ♂.

Head testaceous; abdomen testaceous..... *exiguus.*

Head bronzed; abdomen piceous..... *exilis.*

Fifth segment of abdomen bidentate at middle; abdomen never cristate.

Thorax twice as wide as long, sides arcuate.

Striæ of elytra nearly obliterated on the disc..... *infuscatus.*

Striæ strongly impressed and punctured on the disc. *striatus.*

Thorax not twice as wide as long, sides nearly straight.

Striæ deeply impressed, very coarsely punctured... *rugulosus.*

B. styliferus, n. sp.

Head black with aeneous surface, coarsely punctured, vertex finely sub-carinate. Thorax more than twice as wide as long, sides nearly straight, anterior angles rounded, disc moderately punctured, shining with a median double vitta; color pale testaceous. Elytra shining, very finely striate, striæ finely punctured, punctures of the outer striæ coarser, intervals nearly smooth on the disc; color pale testaceous, obsoletely maculate with fuscous. Body beneath black, legs entirely pale testaceous. Mesosternal crest at apex produced into a long slender style. Abdominal segments not carinate in the male, fifth segment at apex emarginate, middle of emargination with broad short lobe not dentiform. Length .20 inch; 5 mm.

Very closely resembling superficially the California varieties of *B. infuscatus* (*var californicus*), but may be at once distinguished by the rounding of the bottom of the emargination of the fifth abdominal segment, and by the long slender style into which the mesosternal plate is produced.

One ♂ specimen, Colorado, kindly loaned by Mr. G. R. Crotch.

B. aculeatus, Lec. Proc. Acad. 1855, p. 363.

Color pale testaceous, head black with bronzed surface, coarsely punctured, vertex sub-carinate. Thorax less wide than twice the length, sides nearly straight, surface coarsely but sparsely punctured but more densely at the sides; color testaceous, immaculate. Elytra deeply striate, striæ coarsely punctured, those at the sides deeper and more coarsely punctured, intervals feebly convex, irregularly biserially punctulate; apex acute ♂ and more decidedly prolonged ♀; color testaceous with four indistinct fuscous spots on each elytron, one humeral, two at the middle

on the second and third intervals and one lateral. Body beneath pale rufo-testaceous. Legs pale testaceous. Length .16 inch ; 4 mm.

Male. Third and fourth segments of abdomen slightly carinate, apex of elytra acute.

Female. Abdominal segments simple, apex of elytra acutely prolonged. Two specimens from North Carolina.

B. subsignatus, Lec. Proc. Acad. 1855, p. 364.

Head and thorax as in the preceding species, the thorax with two short fuscous patches. Elytra pale testaceous, deeply striate, outer striæ deeper, striæ coarsely punctured, intervals flat, finely alutaceous, irregularly punctured, punctures not deeply impressed. Body beneath and legs, pale rufo-testaceous. Mesosternal crest moderate, mucronate at apex. Abdomen simple in both sexes. Length .16 inch ; 4 mm.

Male. Apex of elytra obtuse.

Female. Apex of elytra very acute.

Not rare from Utah to Texas. The elytra are maculate in a manner similar to *B. aculeatus*.

B. pantherinus, Lec. Proc. Acad. 1855, p. 364.

Head as in *aculeatus*, thorax less densely punctured, sides apparently convergent in front, disc bimaculate. Elytra less deeply striate than either of the two preceding species, striæ coarsely punctured, intervals roughly punctured ; color pale yellowish testaceous, sutural interval frequently piceous, on each elytron ten black spots of moderate size, one humeral, another within and slightly below it, four arranged in a sinuous transverse band in front of middle, three arranged transversely behind the four and one sub-apical. Body beneath pale rufous, abdomen usually darker. Legs pale testaceous. Length .16 inch ; 4 mm.

Male. Segments 2-3-4 of abdomen slightly carinate.

Illinois, Missouri, Texas.

B. peregrinus, Hbst. (*Hydrophilus*) Col. VII. p. 314, pl. 114, pg. 12 ; *auritus*, Mels. Proc. Acad. II, p. 100 ; Lec. Proc. Acad. 1855, p. 364.

Resembles the preceding species in form and color, and differs as follows. Head slightly impressed between the eyes, vertex finely subcarinate. Elytra yellowish testaceous, striæ of the disc less distinct than those of the sides, intervals more finely punctured ; spots very indistinctly defined. Body beneath variable in color from pale rufo-testaceous to piceous without reference to sex. Sexual characters as in *pantherinus*. Length .16 inch ; 4 mm.

Occurs from Massachusetts to Missouri, Florida and Arizona.

B. immaculatus, Zimm. Trans. Ent. Soc. 1869, p. 249.

Smaller and more slender than the preceding, and totally yellowish testaceous with but slight traces of spots on the elytra. The elytra are more deeply striate and comparatively more coarsely punctured, the intervals convex and approaching *pantherinus* in rugulosity. Sexual characters as in the preceding species. Length .12-.16 inch ; 3-4 mm.

The three species above form a series that may possibly unite as varieties of *peregrinus* when a large series of specimens has been studied. Occurs in North Carolina, Illinois and Missouri.

B. exilis, Lec. Ann. Lyc. V, p. 211; Proc. Acad. 1855, p. 366.

Head brilliantly cupreous, moderately coarsely and densely punctured. Thorax twice as wide as long, surface coarsely punctured, brilliantly cupreous, lateral and apical margins testaceous. Elytra yellowish testaceous, very indistinctly maculate, surface rather deeply striate, outer striæ deeper, striæ coarsely and serrately punctured, intervals slightly convex, sub-rugulose and with a row of moderate punctures. Mucro of mesosternal crest broad at apex. Body beneath piceous black, legs pale testaceous, femora piceous. Length .10-.12 inch; 2.5-3 mm.

The mesosternal mucro when seen on its tip apparently splits into two parts in the form of a V, the open portion being posteriorly.

Gila River, Arizona.

B. exiguus, Say, (*Hydrophilus*) Journ. Acad. V, p. 189; *pallescens*, Lec. Proc. Acad. 1855, p. 366.

Color above and below yellowish testaceous. Head coarsely but sparsely punctured. Thorax twice as wide as long, surface very minutely alutaceous, coarsely and rather densely punctured. Elytra with moderately deep striæ, those of the outer series deeper; striæ coarsely punctured, intervals slightly convex, punctured. Mesosternal mucro at apex acute.

Pennsylvania to Louisiana.

B. infuscatus, Lec. Proc. Acad. 1855, p. 365; *punctulatus*, Lec. Ann. Lyc. V, p. 211; Proc. Acad. 1855, p. 365; *californicus*, Motsch. Bull. Mosc. 1859, III, p. 179.

Color yellowish testaceous above. Head black with bronze lustre, surface very minutely alutaceous, punctulate more densely in front, vertex sub-carinate. Thorax twice as wide as long, surface finely alutaceous, sparsely and equally punctured, color testaceous at middle with a divided fuscous spot. Elytra striate, striæ of disc replaced by rows of fine punctures, outer striæ moderately impressed, punctured, intervals flat very sparsely punctulate, color testaceous obsoletely piceo-maculate. Body beneath piceous, middle and hind femora at base also piceous. Length .20-.24 inch; 5-6 mm.

Male. Surface shining.

Female. Surface minutely alutaceous between the punctures.

I am entirely unable to separate the Pacific forms from those found on the Atlantic slope.

Occurs in all the Gulf States, Colorado, Arizona, and thence to south-eastern California.

B. striatus, Say, (*Hydrophilus*) Journ. Acad. V, p. 188; *ordinatus*, Lec. Proc. Acad. 1855, p. 365; *fraternus*, Lec. loc. cit. p. 364.

Resembles the preceding closely but differs in having the striæ of the disc of the elytra distinctly impressed. It is always smaller and more robust than *infuscatus*. Length .16-.20 inch; 4-5 mm.

In the males of clearly punctured surface, the third interval of the elytra has coarse punctures interspersed among the usual punctures; in the female this is rarely seen.

Occurs in the Middle and New England States.

B. rugulosus, n. sp.

Form resembling *peregrinus*, color pale piceo-testaceous. Head black with brilliant aeneous surface, densely and coarsely punctured. Thorax coarsely punctured, with median piceous space with aeneous lustre: not twice as wide as long, sides nearly straight slightly convergent. Elytra deeply striate, striæ very coarsely serrately punctured, intervals moderately convex, punctato-rugulose; color pale piceo-testaceous maculate with piceous spots similar to *pantherinus* but less distinct. Body beneath rufo-testaceous, legs paler. Length .20 inch; 5 mm.

Easily known from *striatus* by its more robust form, and more roughly sculptured thorax.

Peninsula of Lower California, W. M. Gabb.

The sub-genus *VOLVULUS* contains in one fauna but one species.

B. altus, Lec. Proc. Acad. 1855, p. 366.

Oblong oval, narrower behind, sides strongly compressed, transversely very convex, higher than wide; color piceous black with slight bronze lustre. Head coarsely punctured, sparsely on the vertex, more densely on the clypeus. Thorax nearly crescentic in form, the sides and base forming a continuous curve, anterior angles obtusely rounded, apex emarginate, surface sparsely punctured. Elytra striate, striæ of the disc faint and finely punctured, those of the sides deep and coarsely punctured, intervals biserially punctulate on the disc, uniserially at the sides. Body beneath black, legs rufous, femora very narrowly pubescent at base. Length .08 inch; 2 mm.

The fifth segment of the abdomen is deeply emarginate as in all the preceding species of *Berosus*, but whether there is any tooth at the bottom of the emargination, I am at present unable to determine. The sexual characters have also not been seen. *Volvulus* appears to me worthy of being considered a distinct genus from the form of the front, and the short and robust hind femora.

Occurs in Louisiana.

CHÆTARTHRIA. Steph.

Cyllidium, Erichs.

In this genus the first joint of the antennæ is long. The first two or three segments of the abdomen concealed by plates which meet on the median line. The prosternum in front of the coxæ is always short and the under side of the head in repose rests upon the anterior coxæ. The species are partially contractile in the manner of certain of the forms of *Agathidium*.

Three species exist in our fauna.

Body above piceous black.

Sutural stria obliterated at basal third..... *nigrella*.

Sutural stria very fine at basal third, but visible... *atra*.

Elytra testaceous, head black..... *pallida*.

These species are all very convex, shining, scarcely punctulate, the first two piceous black, the sides of the thorax piceo-testaceous and partially diaphanous, the sides of elytra are similarly margined, the extent of the pale portion becoming greater toward the apex. The third species is entirely pale piceo-testaceous, the head alone being black and shining.

C. nigrella, Lec. (*Cyllidium*) Proc. Acad. 1861, p. 342.

The sutural stria of the elytra is rather deeper than in the following species, but without any trace at the tarsal third. Length .06 inch ; 1.5 mm.

Occurs in California, at San Diego and Visalia.

C. atra, Lec. (*Cyllidium*) New Species, 1863, p. 24.

Length .08 inch ; 2 mm.

Occurs in New York.

C. pallida, Lec. (*Cyllidium*) Proc. Acad. 1861, p. 342 ; *nigriceps*, Lec. loc. cit.

Length .04-.06 inch ; 1-1.5 mm.

Occurs in California and also at Lake Superior. I find it impossible to separate the types of the two above noted.

LACCOBIUS. Er.

Two species are described in our fauna.

L. agilis, Rand. Bost. Journ. 2, p. 19 ; *punctulatus*, Mels. Proc. Acad. 2, p. 100 ; Lec. Proc. Ac. 1855, p. 363.

Length .08-.12 inch ; 2-3 mm.

Extends from the Middle States westward to California and Oregon.

L. ellipticus, Lec. Proc. Acad. 1855, p. 363.

Length .10 inch ; 2.5 mm.

These two species resemble each other very closely. The latter is less broad and the punctures of the disc of the elytra less distinctly arranged in rows, being in the large majority of specimens very confused.

Occurs in the southern regions of California and in Arizona and Lower California.

The two genera which follow, *Philhydrus* and *Hydrobius*, differ in the relative length of the joints of the maxillary palpi, the terminal joint being shorter than the preceding in the former and longer in the latter. By an error on the part of the compositor the two genera are transposed on page 47 of the Classification of the Coleoptera of North America, characters the reverse of those above indicated are thus presented to the student. The genus *Sperchopsis* there indicated will be found included in *Hydrobius* as the palpi are absolutely identical.

PHILHYDRUS. Solier.

Our species may be divided into two sections :

Mesosternum with longitudinal crest.....	<i>Philhydrus.</i>
Mesosternum simple, rarely with transverse carina.	<i>Helochares.</i>

The section *Philhydrus* is again divisible in the following manner :

Prosternum elevated in form of crest.....	<i>Group I.</i>
Prosternum simple.....	<i>Group II.</i>

The first group contains comparatively few species.

Prosternum feebly cristate.	
Elytra with rows of large punctures.....	<i>normatus.</i>
Elytra densely punctulate.....	<i>carinatus.</i>
Prosternum strongly cristate, crest more elevated in front.	
Elytra distinctly punctulate.	
Mesosternal crest at free angle mucronate. {	<i>fucatus.</i>
	<i>nebulosus.</i>
Elytra nearly smooth.	
Mesosternal crest acute but not mucronate. {	<i>cristatus.</i>
	<i>pectoralis.</i>

P. normatus, Lec. Proc. Acad. 1861, p. 341.

Oblong oval, narrower in front, moderately convex, shining. Head moderately but not densely punctured. Thorax gradually narrowed to the front, sides moderately arcuate, surface more finely punctured than the head, punctures at sides more distinct but not denser. Elytra broadly oval, broadest behind the middle, surface shining and with ten entire striæ of coarse punctures, of which the outer two are closer and slightly sinuous, and a short scutellar stria of smaller punctures, marginal space smooth; interstitial spaces very minutely and sparsely punctulate. Body beneath black, shining, sparsely punctulate and pubescent. Femora piceous, pubescent except at tip, tibiæ and tarsi piceous-rufous. Palpi and antennæ testaceous, the club of the antennæ darker. Mesosternum with a crest not very prominent, prosternum moderately cristate, crest not more prominent in front. Length .20-.22 inch; 5-5.5 mm.

Var. Piceous, disc of thorax somewhat darker. (Type, discolored.)

Var. Ochraceous, with labrum, frontal suture, occiput and large discal space of thorax black. Elytral punctures surrounded by a transverse quadrate piceous space.

The latter variety is the normal coloration of the species, the type being a discolored specimen.

Occurs from San Francisco southward to Cape San Lucas, and thence eastward to Arizona.

P. carinatus, Lec. Proc. Acad. 1855, p. 370.

Oblong oval, slightly narrower in front, convex, black, very shining, thoracic margin piceous, surface equally punctured with moderate punc-

tures not densely placed, elytra with three rows of nearly obsolete coarser punctures, the first near the sutural stria, the second at the middle and the third lateral. Body beneath as in *normatus*. Mesosternal crest acute at tip, under edge sinuate and with the tip pointing downwards. Prosternum feebly cristate. Length .20 inch ; 5 mm.

Occurs from Oregon to San Francisco.

P. fucatus, n. sp.

Oblong oval, slightly narrower in front. Head black, thorax and elytra ochraceous, surface very shining, more finely and less closely punctulate than the preceding, but more distinctly punctured on the thorax than the elytra. Body beneath black, finely punctulate and very sparsely pubescent. Femora, black, opaque, punctured and pubescent except at tip. Tibiæ and tarsi rufous. Palpi and antennæ testaceous, the club of the latter somewhat darker. Mesosternal crest prominent, slightly mucronate at tip. Prosternal crest moderate, more prominent in front. Length .20 inch ; 5 mm.

Broader and less convex than *carinatus* and scarcely narrowed in front. The sculpture is similar in both, but the thorax is rather more distinctly punctured in the present species. From the four species which follow, it differs by its larger size and more prominent mesosternal crest slightly mucronate at tip.

Utah and Arizona.

P. nebulosus, Say. (*Hydrophilus*,) Long's Exped. 2, 277.

Oblong, equally narrowed at each extremity. Head black, clypeus on each side ochraceous. Thorax and elytra pale ochraceous, the former usually paler. Surface finely and sparsely punctulate, head more distinctly punctured than the thorax, and the thorax than the elytra. Body beneath black, sparsely punctulate and pubescent and feebly shining. Femora black, tibiæ and tarsi piceo-testaceous. Palpi and antennæ testaceous the club slightly darker. Mesosternal crest with angle acute but not mucronate, prosternal crest moderate, more strongly elevated in front. Length .16 inch ; 4 mm.

Occurs from Canada to Georgia and Kansas.

Closely resembles *ochraceus*, but may be distinguished by the more prominent mesosternal crest as well as by the presence of the prosternal elevation. The three rows of nearly obsolete larger punctures on the elytra of most of our species, are scarcely visible in the present one.

P. pectoralis, Lec. Proc. Acad. 1855, p. 370; *maculifrons*, Motsch. Bull. Mosc. 1859, III, p. 179.

Similar to the preceding, but smaller, more elongate, more shining, punctures of surface scarcely visible. Clypeus testaceous with narrow median fuscous band. Head black. Length .11 inch ; 3 mm.

P. cristatus, Lec. loc. cit.

More elongate than *pectoralis*, and more narrow in front than behind. Sides of thorax feebly arcuate. Elytra more distinctly punctured than

pectoralis but less so than *nebulosus*. Head black, clypens black, except a small space in front of the eyes. Disc of thorax clouded with fuscous. Length .13 inch ; 3.3 mm.

This and the preceding occur in California.

The species in which the mesosternum is cristate and the prosternum simple, are not so readily distinguished.

Elytra striate, mesosternal crest spiniform..... *bifidus*.

Elytra not striate. Mesosternal crest very short..... *ochraceus*.

Mesosternal crest produced, with acute free angle.

Elytral margin slightly but distinctly explanate.

Color entirely testaceous..... *reflexipennis*.

Elytral margin not reflexed ; color never entirely testaceous.

Very convex species, sides of elytra almost vertical, color usually very black, and shining.

Under edge of mesosternal crest oblique, body above entirely black, shining..... *consors*.

Under edge of mesosternal crest horizontal, thickened, body with piceous margin..... *cinctus*.

Feebly or moderately convex species, sides of elytra gradually descending, color above rarely black, usually pale piceous.

Mesosternal plate having the anterior edge sinuous in front, the angle very acute and not mucronate..... *diffusus*.

Mucronate..... *fuscus*.

Mesosternal plate with the anterior edge oblique not sinuous, the angle very broad.

Elongate oval..... *perplexus*.

Broadly oval..... *latiusculus*.

P. bifidus, Lec. Proc. Acad. 1855, p. 371.

Elliptical, moderately convex, black, shining, thorax and elytra with piceous margin. Surface moderately densely punctulate, punctures of elytra coarser than those of thorax. Elytra with ten moderately deep striæ, the outer deeper than the inner, striæ four to ten nearly entire, the inner three striæ gradually shorter, sutural stria at one-fourth from apex dividing into two rows of fine punctures. Body beneath black, moderately shining. Mesosternal crest acute, spiniform. Legs piceous black, tarsi paler. Second joint of maxillary palpi scarcely longer than the third. Length .28 inch ; 7 mm.

Resembles several of the species of *Hydrobius* but differs in the short terminal joint of the palpi. The character shown by the inner stria is not very evident except in immature specimens. In only one of the mature specimens are there punctures, slightly coarser than those of the

surface generally, diverging from the tip of the sutural stria, a character of frequent occurrence in *Hydrobius*.

Occurs from Canada to Georgia.

P. ochraceus, Mels. Proc. Acad. II, p. 101; Lec. Proc. Acad. 1855, p. 371; *simplex*, Lec. New Species, p. 24.

Oblong oval, equally narrowed in front and behind, pale piceo-testaceous, vertex and middle of clypeus usually piceous, surface moderately shining, rather coarsely punctured, the punctures of the thorax finer and denser than those of the elytra. Body beneath black, legs piceous tarsi paler. Length .14 inch; 3.5 mm.

Resembles *nebulosus* and *reflexipennis* but may be distinguished from the former by the absence of prosternal carina and from the latter by the very narrow crest of mesosternum which does not form an acute free angle. *P. simplex*, Lec. is a small form differing only in size and in being somewhat smoother.

Occurs from Massachusetts to Florida.

P. reflexipennis, Zimm. Trans. Am. Ent. Soc. 1869, 250.

Pale piceo-testaceous. Resembles the preceding species in all the characters of the upper surface except that the head is never piceous. Body beneath black. Femora at base piceous tibiæ and tarsi pale testaceous. Elytral margin especially at apex sub-explanate. Mesosternal crest acute at tip and mucronate. Length .14-.18 inch; 3.5-4.5 mm.

Specimens are from New Jersey and Delaware.

P. consors, Lec. New Species, p. 24.

Oblong, black, shining, finely and densely punctured, transversely strongly convex, sides nearly vertical. Anterior edge of mesosternal crest oblique. Sutural stria faint scarcely deeper at apex. Body beneath and legs entirely black. Length .28-.32 inch; 7-8 mm.

Louisiana.

P. cinctus, Say (*Hydrophilus*) Long's Exped. 2. 276; Lec. Proc. Acad. 1855, p. 371; *limbalis* Mels. Proc. Acad. 2, p. 101.

Broadly oval, black, shining, entire margin piceous, surface finely punctulate. Mesosternal crest with lower margin horizontal, anterior edge vertical, angle scarcely mucronate. Length .26 inch; 6.5 mm. Shorter and broader than the preceding species and resembling therefore (*Helochares*) *rotundatus*, Say.

Occurs from Canada westward to Kansas and southward to Georgia.

The four species which follow are all so clearly allied that nothing in addition to the characters in the synoptic table need be given. They are feebly or moderately convex, surface punctulate always more densely and finely on the thorax than the elytra. In color individual variations occur, from testaceous to dark piceous in each species.

P. diffusus, Lec. Proc. Acad. 1855, p. 371.

The largest species of the series. The mesosternal crest is deeply sinu-

ate in front, the angle very acute and prominent forward and not mucronate as in the next species. Length .18-.24 inch ; 4.5-6 mm.

Nebraska.

P. fuscus, Motsch. Bull. Mosc. 1859, III, p. 178.

Smaller than the preceding and with rather finer punctuation, differs principally in the form of the mesosternal crest, which is more acute at tip and with the point strongly bent downwards. Length .16-.18 inch ; 4-4.5 mm.

San Francisco, California.

P. perplexus, Lec. Proc. Acad. 1855, p. 371.

The mesosternal crest in this and the next species is not sinuate on the front edge and the angle formed by the union of that edge and the lower, is broad and not acute as in most of the species which precede. As compared with the other three species of this small group the present one is usually more elongate and transversely more convex, and when perfectly mature the color is almost entirely black, with merely a narrow piceous limb as in *cinctus*.

Length .17-.20 ; 4.5-5 mm.

This species is of almost universal distribution in our country extending from the Middle States to Florida and westward to California.

P. latiusculus, Motsch. Bull. Mosc. 1859, p. 178.

Broader and more depressed than any species of the group, the breadth being always greater than half the width. The appearance of the species recalls *fuscus*. The mesosternal crest is similar to that of the preceding species. Length .18 inch ; 4.5 mm.

California.

P. obtusiusculus, Motsch. loc. cit. p. 179.

Unknown. California.

The second section *Helochares* has been by some students retained as a genus separate from *Philhydrus*, a view which can scarcely be adopted with our species, as the tendency to the obliteration of the carina is very evident in *nebulosus*, while several in the present section have a transverse ridge more or less elevated. The species are as follows :

Prosternum carinate.

Elytra with ten entire, punctured striæ..... *maculicollis*.

Prosternum not carinate.

Elytra entirely or in part striate.

Form very broadly oval ; entirely striate..... *punctatostriatus*

Form elongate oval ; striate at the sides..... *imbellis*.

Elytra not striate or with mere traces at apex.

Elytral punctures coarser toward the apex.... *lacustris, fimbriatus*.

Elytral punctures obliterated toward apex.... *rotundus*.

P. maculicollis, Mels. Ann. Sc. Phys. Nat. Lyon. 7, 379 ; Lec. Proc. Acad. 1855, 370.

Oblong oval, more attenuate in front, piceous, margin paler, moder-

ately shining. Head dark piceo-testaceous, occiput piceous. Thorax piceo-testaceous, large discal spot nearly black. Elytra with ten entire striæ, coarsely punctured, outer striæ less deep but with coarser punctures, intervals flat very finely and sparsely punctulate. Body beneath and legs piceous. Mesosternum simple, prosternum finely longitudinally carinate. Length .20-.22 inch ; 5-5.5 mm.

This species represents among those of the present section *P. nomatus* of the preceding.

Specimens occur from North Carolina, Missouri, Illinois and Louisiana.

P. punctatostriatus, n. sp.

Broadly oval, piceo-testaceous, gradually paler toward the margins. Head moderately punctured, occiput and middle of clypeus piceous. Thorax finely and densely punctured. Elytra scarcely longer than wide, feebly convex, with ten entire striæ coarsely punctured, the external more coarsely punctured. Intervals flat densely punctulate, the fifth with an irregular row of coarser punctures. Body beneath nearly black. Meso- and prosternum simple. Length .20 inch ; 5 mm.

The most broadly oval species of the genus.

One specimen Fort Tejon, California.

P. imbellis, Lec. Proc. Acad. 1861, p. 341 ; ? *dorsalis* (*Hydrob.*) Motsch. Bull. Mosc. 1859, III, p. 177.

Oblong oval, more narrowed in front, piceous, margin paler, surface moderately densely punctulate and shining. Outer four striæ of elytra represented by four entire rows of large punctures, discal striæ obliterated except at apex. Mesosternum with transverse elevated line in front of coxæ. Body beneath piceous, tibiæ somewhat paler. Length .20-.22 inch ; 5-5.5 mm.

The typical specimen is immature and the colors as described are therefore much paler. *Hydrobius dorsalis*, Motsch. agrees exactly in description with this species, and should they be identical the name should be used.

California and New Mexico.

P. fimbriatus, Mels. Proc. Acad. II, p. 101 ; Lec. Pr. Acad. 1855, p. 369 ; *semistriatus*, Zimm. Trans. Ent. Soc. 1869, p. 250.

Oblong oval, similar in color to the preceding, more finely and less densely punctured. Lateral striæ of elytra replaced by sparsely and very irregularly placed coarser punctures, striæ scarcely evident at apex. Mesosternum with faintly elevated transverse carina. Body beneath and legs piceous. Length .20 inch ; 5 mm.

The striæ at apex at best are scarcely visible and at times are entirely obsolete, the apex being punctured like the rest of the surface. The *semistriatus*, Zimm. is an exact reproduction of the Melsheimer type.

Canada and the Middle States.

P. lacustris, Lec. Proc. Acad. 1855, p. 369.

Differs from the preceding by its smaller size, more elongate form, less dense punctuation and by the surface being nearly evenly punctured, the

punctures at the sides and apex of elytra somewhat coarser but not forming rows. Length .14 inch ; 3.5 mm.

Occurs in the Western Canada region.

P. rotundus, Say (*Hydrophilus*), Journ. Acad. V, p. 188 ; Lec. Proc. Acad. 1855, p. 369 ; *nitens*, Zimm. Trans. Ent. Soc. 1869, p. 250.

Broadly oval, convex, black, shining, sides of elytra feebly explanate and piceous. Surface finely but not very densely punctured, punctures of the elytra coarser and gradually evanescent toward the apex, at sides with a few coarser punctures sparsely and irregularly placed. Body beneath and legs black, mesosternum with a distinctly elevated transverse line. Length .28 inch ; 7 mm.

Resembles superficially *P. cinctus*, but may be known by the smoother surface and absence of any mesosternal crest.

Middle States and North Carolina.

HYDROBIUS. Leach.

The species of this genus are more heterogeneous than those of Phillydrus, and a close resemblance may be noticed in superficial characters between several species of the two genera which will be noticed in their proper places.

Notwithstanding the very odd appearance of *Sperchopsis tesselatus*, Lec., I can find no character by which it may be separated from *Hydrobius*. The genus *Paracymus*, Thoms. appears to be merely a section, as I find the hind femora varying in punctuation in several of the species from the type of *Hydrobius* leading directly to the form seen in *Paracymus*.

Hydrobius may be known from Phillydrus by the fourth joint of the maxillary palpi longer than the preceding and very nearly equal to the second. In the section *Paracymus* the palpi are somewhat shorter and stouter.

The species may be divided in the following manner :
Hind femora densely punctured, pubescent and opaque at

base.....

Hydrobius.

Hind femora sparsely punctured and glabrous.....

Paracymus.

The species of *HYDROBIUS* proper are,

Prosternum carinate or acutely elevated at middle in front.

Mesosternum simple ; elytral intervals unequally convex.

Very convex, shining ; elytral intervals smooth..

tesselatus.

Depressed, opaque ; elytral intervals scabrous....

scabrosus.

Mesosternum prominent ; intervals flat.

Surface feebly shining ; elytral intervals finely scabrous.....

latus.

Surface shining ; mesosternum strongly cristate ; intervals punctulate.....

tumidus.

Prosternum not carinate.

Form globose ; elytra with rows of puncture....

globosus.

Form oblong ; elytra more or less striate.....

fuscipes.

H. tessellatus, Zieg. Proc. Acad. 1844, p. 44; Lec. (*Sperchopsis*) Class. Col. N. A. p. 47.

Pale castaneous, shining, elytra with small piceous spots irregularly disposed. Head coarsely and sparsely punctured. Maxillary palpi with the last joint longer than the third and nearly as long as the second. Thorax two and a half times as wide as long at middle, sides moderately arcuate, at anterior angles strongly arcuate, apex deeply emarginate, base broadly rounded; surface feebly convex, coarsely and sparsely punctured. Elytra broadly oval, nearly as broad as long, very convex transversely and longitudinally, margin explanate: surface striate, striæ coarsely punctured, intervals convex, the alternate intervals beginning with the first more convex at apex. Body beneath black, legs piceous, femora at apical half glabrous. Length .28 inch; 7 mm.

There are no characters by means of which this species can be separated from *Hydrobius*; the palpi are precisely those of well known species of that genus. The facies of the species is however totally unlike any thing else in the genus. The longitudinal aspect is very convex, the thorax strongly deflexed, the elytra more elevated behind the scutellum and then suddenly descending. Viewed laterally the elytral and thoracic margins are not continuous but form an angle with each other. The mesosternum is simple, the prosternum slightly carinate, the carina being much more distinct in front. The color is as described above; the spots of the elytra are not disposed over the entire surface, there being a broad triangular basal space entirely pale castaneous.

Middle States, Illinois and Canada, rare.

H. scabrosus, n. sp.

Oblong oval, more narrowed in front, surface opaque, color piceous. Head coarsely punctured and rugulose. Thorax twice broader than long, sides moderately arcuate and slightly narrower in front, surface opaque coarsely punctured and rugulose, and with a shallow broad impression at middle of base and another on each side very indistinct. Elytra slightly broader at base than thorax, sides gradually broader to middle then gradually narrowed to apex, moderately but unevenly convex, sutural region and fifth interval near apex, seventh interval at base and entire marginal space more convex, surface striate, striæ punctured, intervals opaque, scabrous. Mesosternum simple, prosternum with spiniform crest in front. Body beneath and legs piceous, femora pubescent and opaque at basal third only. Length .20-.24 inch; 5-6 mm.

Somewhat variable in form and sculpture. Specimens before me from Vancouver are less broad and so much smoother that almost all trace of scabrous sculpture has disappeared from the elytra. The space between the last stria and the margin is very convex, so that the margin is invisible from above. The sculpture of the species recalls that of *Amphizoa*, a rather remarkable resemblance, as both occur in the same waters.

Northern California, Oregon and Vancouver.

H. latus, n. sp.

Broadly oval, slightly narrower in front, piceous black, moderately

convex and shining. Head and thorax punctured with coarse and fine punctures intermixed. Thorax similar in form to the preceding species and with more traces of the foveæ there seen. Elytra regularly convex, striate, striæ punctured, less deeply on the disc, and strongly at the sides; intervals flat obsoletely scabrous. Mesosternum slightly prominent, prosternum carinate at its posterior half. Body beneath piceous, legs piceo-rufous. Femora at basal half pubescent. Length .30 inch; 7.5 mm.

Easily known by its broad moderately convex form, from any species in our fauna.

Occurs at Fort Crook, California, with the preceding.

H. tumidus, Lec. Proc. Acad. 1855, p. 372.

A broadly oval very convex species, black and shining, with very slight aeneous tinge. Head and thorax densely and finely punctured. Elytra with striæ of moderate punctures between which are fine punctures rather coarser and less dense than those of the thorax. Body beneath and legs black. Mesosternum with prominent crest, acute and slender at its free angle. Prosternum with very faint carina in front of coxæ and at anterior margin an acute elevation. Length .30-.34 inch; 7.5-8.5 mm.

Not common in the Middle States. Resembles *Philhydrus rotundatus* in form, but readily known by the generic characters. The femora are not at all pubescent, the only remaining pubescence being on the trochanters. This would seem to indicate that the species should be placed in the sub-genus *Paracymus*, but the very close relationship between this species and the following forbids their separation.

H. globosus, Say (*Hydrophilus*), Long's Exped. II, p. 276; Lec. Proc. Acad. 1855, p. 372.

Broader than the preceding species and smoother. The surface is similarly punctured but in each part more finely and obsoletely. Mesosternum with a thick pyramidal crest, broad on its lower face. Prosternum not carinate. Length .30 inch; 7.5 mm.

Occurs from the Middle States to Canada and more common than the preceding. The hind thighs have the basal third opaque and punctured, the opacity extending obliquely outwards on the anterior margin.

H. fuscipes, Linn. (*Dytiscus*), see Mulsant. Col. France, Palpic. p. 122; *seriatus*, *insculptus*, *regularis*, Lec. Proc. Acad. 1855, p. 372.

Oblong oval, piceous black, usually with tinge of bronze, surface moderately punctured, scarcely less densely on the elytra than thorax. Elytra striate, striæ punctured, the third, fifth and seventh intervals with a row of distantly placed coarser punctures. Length .28-.34 inch; 7-8.5 mm.

This species varies greatly as may be seen by consulting the remarks of Mulsant. The variation extends not only to the superficial characters of sculpture but the usually important mesosternal crest. The crest is usually of moderate size and acute at tip, but the size gradually dimin-

ishes so that in the form above cited as *regularis*, the crest is reduced to a mere tuberosity. The specimens from Oregon and Vancouver are usually slightly bronzed.

Its distribution extends from England eastward through Europe to Siberia, thence to Alaska and southward to California, and thence eastward to Pennsylvania.

The species referred to the sub-genus *Paracymus* are all small, usually very convex and semi-globose, and may be known as follows:

Body oblong, depressed; mesosternum simple.....	<i>dissimilis.</i>
Body broadly oval very convex.	
Mesosternum simple.	
Oblong oval, elytra nearly smooth.....	<i>suturalis.</i>
Broadly oval, elytra punctured.....	<i>rufiventris.</i>
Mesosternum protuberant.	
Prosternum simple.	
Color piceo-testaceous, indistinctly punctured..	<i>infuscatus.</i>
Black with aeneous tinge, punctured.....	<i>digestus.</i>
Prosternum carinate.	
Surface smooth sparsely punctured.....	<i>subcupreus.</i>
Surface finely alutaceous, indistinctly punctured.....	<i>despectus.</i>

H. rufiventris, n. sp.

Oval, very convex, piceous black, margins piceous, shining. Head and thorax finely and sparsely punctulate, elytra more coarsely punctured especially at the sides and apex. Body beneath and legs rufous. Mesosternum and prosternum simple. Length .09 inch; 2.25 mm.

Resembles *H. digestus*, but is more convex and much less distinctly punctured. Its simple mesosternum will at once distinguish it from all the very convex species in the sub-genus. There is almost no aeneous lustre.

One specimen from Southern Oregon.

H. infuscatus, Motsch. (*Brachypalpus*), Bull. Mosc. 1859, III, p. 177.

Similar in form and sculpture to the preceding. Color piceo-testaceous margins somewhat paler, head black, disc of thorax irregularly clouded with piceous. Body beneath piceous, legs rufo-piceous. Mesosternum with transverse carina, prosternum simple. Length .09 inch; 2.25 mm.

Occurs from California to the Indian Territory.

H. digestus, Lec. Proc. Acad. 1855, p. 373.

Rather less convex than any of the allied species and more coarsely punctured. Surface with very distinct aeneous tinge. Mesosternum feebly prominent, prosternum simple. Body beneath black, legs piceous. Length .09 inch; 2.25 mm.

Middle States and Canada.

H. subcupreus, Say (*Hydrophilus*), Journ. Acad. V, p. 189; Lec. Proc. Acad. 1855, p. 373.

Surface with distinct cupreous tinge, shining, thorax and elytra nearly equally punctured. Mesosternum distinctly protuberant, prosternum finely carinate. Body beneath and legs dark rufo-piceous. Length .06-.08 inch ; 1.5-2 mm.

Middle States and Canada to California and Oregon.

H. despectus, Lec. New Species, p. 25.

Closely resembling *subcupreus* but smaller and transversely more convex. Surface distinctly aeneous, very minutely alutaceous and with minute punctures sparsely placed. Mesosternum with short acute protuberance, prosternum finely carinate. Length .06 inch ; 15 mm.

Occurs in Pennsylvania and Illinois.

H. dissimilis, n. sp.

Oblong, sub-depressed, dark piceo-testaceous, margins paler. Head piceous moderately densely punctulate. Thorax more than twice as wide at base as long, sides feebly arcuate and slightly narrowed to apex, feebly convex, punctured similarly to the head ; color piceous, margins testaceous. Elytra oblong, parallel, feebly convex, with faint rows of punctures more distinct at the sides and apex, between which are fewer punctures, coarser than those of the thorax but less densely placed.

Body beneath piceous, femora piceous, tibiae piceo-rufous. Mesosternum and prosternum simple. Length .10-.12 inch ; 2.5-3 mm.

Two specimens, San Francisco, California.

H. suturalis, Lec. (*Limnebius*), Proc. Acad. 1866, p. 366.

Oblong oval, piceous black, shining, with very faint bronze tinge. Head and thorax scarcely punctulate except under very high power, sides of thorax testaceous and nearly transparent. Elytra at margins dark piceo-testaceous, surface almost entirely impunctured. Body beneath black, legs rufous. Mesosternum simple, prosternum in front of coxæ not carinate. Length .06-.08 inch ; 1.5-2 mm.

In this insect, as in most of the species of *Hydrobius*, the males have the sixth segment slightly visible at tip. In one specimen which I have examined there is an undue prominence of that segment possibly owing to injury, but in no specimen can there be seen any trace of a seventh segment. The species is therefore referred to *Hydrobius* from which it does not differ.

Middle States and Canada.

LIMNOCHARIS. Horn.

L. piceus, Horn. Trans. Am. Ent. Soc. IV, 1872, p. 144.

Oval, more attenuate behind, piceous, sparsely pubescent. Thorax finely and sparsely punctulate. Elytra finely alutaceous. Body beneath black, densely punctulate, sparsely pubescent. Legs testaceous. Length .06 inch ; 1.5 mm.

One of the most minute species in our fauna. The eight segments of the abdomen serve at once to distinguish this genus from any one previously known.

Occurs near Fort Crook, California.

The following genus presents so many characters at variance with our genera of the tribe *Hydrobiini* that it seems necessary to place it by itself as a distinct sub-tribe. From all *Hydrophilidæ* known to me it differs in having the genæ at the sides broadly dilated and the labrum entirely concealed beneath the clypeus in front. Excepting these two characters it is a true *Philhydrus*, with the last joint of the tarsi more elongated than usual.

HELOPELTIS, n. g.

Mentum transversely quadrate, slightly concave at middle, on each side an oblique impression continuing on the sub-mentum where the two join.

Maxillary palpi very long and slender, nearly as long as the head and thorax, second joint one-fifth longer than the third, third and fourth equal.

Labial palpi short, not longer than half the terminal point of the maxillary palpi, and with the terminal joint shorter than the preceding.

Head broad, clypeus broadly rounded, genæ broadly dilated at the sides and half dividing the eyes; labrum concealed beneath clypeus. Middle and hind tarsi with the first joint small, second equal to the two following, which are very short, fifth as long as all the preceding together.

Anterior tibiæ with outer edge not spinulose.

Thorax and elytra broadly margined, margin extending beyond the tip of the abdomen.

H, larvalis, n. sp.

Oblong, depressed, dark piceo-testaceous, opaque. Head opaque obsoletely rugulose, in front piceo-testaceous, occiput piceous. Thorax nearly three times as wide at base as long, sides moderately arcuate and feebly narrowed anteriorly, apex emarginate, base at middle broadly but feebly sinuous, surface opaque, obsoletely scabrous, smoother at the sides, margin slightly explanate. Scutellum elongate triangular. Elytra oblong, sides feebly arcuate, margins broadly produced and somewhat explanate, surface ten striate, the outer two indistinct, striæ gradually obsolete toward apex, punctulate, intervals flat, finely alutaceous and obsoletely punctured, color piceo-testaceous, paler at the margins and irregularly marked with small piceous spots. Body beneath piceous, opaque. Mesosternum and prosternum simple. Femora piceous, opaque and pubescent, apex smooth. Tibiæ piceo-rufous. Length .22 inch; 5.5 mm.

The broadly produced margins of the thorax and elytra give this insect a peculiar appearance recalling that of *Peltis feruginea*, as well as of the larvæ of some of our *Elmidæ*.

Two specimens are known to me, one from Louisiana in the cabinet of Dr. Leconte, and one from Sonora in my own. A closely allied if not identical species occurs in Cuba.