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Study of the aquatic and semiaquatic coleoptera in the state of Utah

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Study of the Aquatic and Semiaquatic Coleoptera

In the State of Utah

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OBJECTIVES

The purpose of this paper is to discover and make known the species of aquatic and semiaquatic Coleoptera of the sub-order ADEPHAGA which occur in Utah and to give something of their distribution, environment and habits whenever possible. When ever possible the original description or a description from a recent revision has been included for each species. Descriptions given in recent revisions have been regarded as more desirable because they describe the species in comparison with its nearest relatives, while many of the original descriptions were very incomplete and could not be used to separate many of our present species or even genera, if the types were not known.

This study has been based on the Brigham Young University collection which includes about 800 specimens and a collection made by the author during the course of study, consisting of about 1,400 specimens. In the authors collection it has been attempted to lable each specimen with such information as date, elevation, and locality, and to give each specimen a number.

It was intended at first to include all of the aquatic and semiaquatic coleoptera in this paper but due to lack of space and time as well as literature dealing with some of the genera it was thought better to add those falling in the suborder POLYPHAGA in list form only.

STUDY OF THE AQUATIC AND SEMIAQUATIC COLEOPTERA IN THE STATE OF UTAH

INTRODUCTION

The water beetles represent one of the most interesting groups of the entire insect world. Their claims to this distinction are many. First is the great amount of modification which they show. Insects it is believed, evolved from aquatic ancestors. The Coleoptera probably separated from the other stocks after the entire life history had become that of a land dweller. From this point some of the families have readapted various stages of their life history to water environment. In general most of the families treated here have adapted the active stages of their life history to the water. The pupal stage has remained terrestrial but this is to be expected because the pupa is the inactive stage where little change is likly to occur. Although the active stages have adapted themselves to the water, they are, with only a few exceptions, dependent on air obtained at the surface for oxygen. The modifications resulting from this requirment are many. There must be structures or means of breaking the surface film, reservoirs for storage of enough air to last a short time, a means by which this air may reach the spiricals of the body and all the time the insect must preserve a favorable relationship between the weight of its body and the boyancy of the air.

The modifications for locomotion are many. Some of the water beetles are quite agile at running and jumping. Most of the adults have not lost their power of flight. The membraneous wings are inclosed in a water tight chamber formed by the elytra which are strengthened and firmly fitting to the sides of the abdomen and thorax and to each other. The legs show a great amount and variety of modification. Either one or two pair of legs may be modified into swimming legs or they may have the claws enlarged so as to serve to cling to the rocks and vegitation in swift streams. The modification into swimming legs may be accomplished in several ways, it may be the result of plate like enlargment and flattening (as in Gyrinidae) or by moderate flatening with the sides margined with long swimming hairs.

The swimming forms are usualy more modified than the clinging or crawing forms. The trend of this fodification is toward a streamlined form which results in a great deal of apparent simularity, even in forms which are taxonomically quite widely separated. As Sharp states in his work on the Ditiscidae "there is too a great monotany of shape or form; indeed we may say that just as the various ships and boats devised by man have a greater resemblance to one another than have the various carriages and machines for travelling on land, so do the species of water beetles show a less variety in these respects than do the dwellers on land. The discrimination of the species of Dytiscidae is therefore not an easy task, and recourse must be had for the purpose

to differences in the minor structural peculiarities." This was written in 1882 long befor the age of streamlining. The streamline form of these beetles which makes their classification so difficult also give rise to a modification which is very useful in their identification. Due to the difficulty of the male in grasping the female the protarsus and usualy the mesotarsus to a lesser extent are variously modified. They may be expanded, thickened, the underside with glandular hairs or pallets or with large suction disks.

Another reason for intrest in these insects is the large field for research. They were fairly well studied in the large collections in the east by LeConte, Horn, and Crotch and a little later in England by Sharp who wrote the huge volume "On Aquatic Carnivorous Coleoptera or Dytiscidae" and that pertaining to aquatic insects in the Biologica Centrâlia Americana. Since that time only a few of the smaller families and genera have been revised and many of the groups must be run with keys, as incompleat as they may be, which were writen in 1873 or before. The reasons for this lack of recent literature are several. Many of the early descriptions were writen by European workers and the types are in European museums. Many of the early American discriptions are in rare publications not available to most collectors. In general the water beetles are a very difficult group to work with because of the great simularity of shape, as a result many of the early descriptions are almost useless unless the

type is at hand. Distribution of the various species has been fairly well worked out for the eastern United States and the Pacific Coast but the intervening western plains and Rocky Mountains has been poorly studied. In many of the distribution lists not made by authorities of these groups, as many as half of the species may be misidentified and even these lists are few. All of this indicates that there is a great field for study in this group, especially in the Rocky Mountains.

Other reasons for interest are their aesthetic value, and there relationship to fish culture. A few of the larger larva are known to devour young fish while many of the smaller forms are used as food for the larger fish. Wilson in his article "Water Beetles in Relation to Pondfish Culture" gives a very good picture of the relation ship in Iowa.

ACKNOWLEDGMENTS

I wish to express my thanks to my major professor Dr. Vasco M. Tanner for numerous reasons. He has collected widely in the State of Utah especially in the Uinta Mt. and a large percentage of the specimens in the Brigham Young University collection which was at my disposal are the result of his efforts. I wish to thank him also for the use of his private library, and that of the University, also for his tireless efforts to secure for me literature dealing with my subject. I wish to thank Dr. D. E. Beck with whom I explored and collected in the Escalante region joining the Colorado River and who actively showed me about in the St. George region which he knows so well and who has given me much encouragement and advise. I wish to thank C. Lynn Hayward with whom I spent a very profitable week in the Uinta Mt. I am greatly indebted for the identification and verification of material to Hugh B. Leech of Vernon British Columbia and J. B. Wallis of Manitoba. I wish to thank my fellow students and especially James Bee who has encouraged me in the development of methods of recording data and has been of great encouragment.

Note; In the following paper the names Vasco M. Tanner and Harry P. Chandler have been abreviated to V.M.T. and H.P.C. respectively.

IMPORTANCE OF AQUATIC COLEOPTERA

There are about 669 species of water beetles (Adephaga) known from North America north of Mexico. Of these the life history of only about 35 have been described. The life histories, habits, and economic importance of the remaining species is little known. Wilson 1923-24 in his paper " Water Beetles in Relation to Pondfish Culture, With Life Histories of those Found in Fish-ponds at Fair,ort Iowa" reviews the known life histories and adds many more, giving also the economic importance in fish culture.

Aquatic Coleoptera are usualy most abundant in small ponds and according to Mr. Wilson are therfore of considerable importance in the culture of pond fish. The very large Dytiscids of the Genera Dytiscus and Cybister are knowen to capture occasionally very small fish. Many of the other water beetles serve as food of the older fish.

In running streams the water beetles are probably of less importance as preditors on or as food for fish.

The Dytiscids probably play a part in the aquatic balance of nature which is much the same as that played by birds onilland. That is to say that ordinarily they feed on the common aquatic animals which are available, some good and some bad and some neither good or bad. There chief value however occurs when some aquatic animal has become abnormally abundant and is upseting the balance in the pool. In this case their preditory habits may work as do those of the birds to reestablish the balance of nature.

Procedure, Methods and Equipment

The equipment for collecting aquatic beetles is not extensive. The usual insect net is very helpful for the larger insects and those which swim in open water. A large tea strainer will prove very useful for general collecting. The beetles may be collected in cynide jars or better in sixty percent alcohol. When collected in alcohol the pined specimens will be much cleaner, also the genitalia may be extracted without relaxing the specimens. Many of the outstanding collectors of water bettles now make it a practice to extract the male genitalia of all their specimens where size permits. The author has found that the flat cheap forceps often used in general entomology which have had the tips bent upward with a pair of pliers, then ground to a very fine point with a carbarundum stone, are more usable than the more expensive types. The specimens should be mounted in the usual manner. The lables should give the name of the collector, date collected, locality and elevation. Most larger collection give each specimen a number. This may be made quite simple if the collector number is combined with the date. If the genitalia have been extracted from relaxed specimens they may be placed on the same pin on a tip. When extracted from fresh specimens they may usualy be left in place in an exerted position. The protarsi should always be mounted so as to be easily seen. Insects mounted on tips should be glued from the side. This may be done by bending the end of the tip down. Specimens may be cleaned by brushing lightly with a camel hair brush diped in chloroform.

TYPES OF HABITATS

Utah is the tenth largest state in the United States having an area of 82,184 sq. mi. The state is devided into three quite di tinct geographic regions. The first and largest, the Great Basin division consist of the western portion of the state and includes most of the land at lower elevations which drain into the Great Basin. This division consist mainly of desert land and alkaline lakes including Great Salt Lake and Great Salt Lake Desert. The second division or the Colorado River Drainage Basin consist of the lower elevations of the Colorado River drainage. Most of the land consist of various outcropings of soft sandstone which is highly eroded, and desert valleys. The canyons are deep and the rivers are usually quite silt filled or muddy. The water is usually quite alkaline. The third division consist of the more or less connected mountain ranges and high plateaus which traverse the central part of Utah in a north and south direction and extend eastward in the northern portion of the state. It separates in the main the Great Basin from the Colorado Drainage Basin. Because of the higher elevation it receives more rain fall than the other two divisions which are deserts with little rain fall.

These divisions indicate the way in which our fauna may have been derived. First, native species which may have developed in the huge prehistoric lakes of the Great Basin would somewhat have been confined to the Great Basin by the surrounding mountain ranges on the east and the lack of water in the deserts to the

west. If any species be so inclined that it would tend to travel extensively in the deserts then it is possible that the deserts would serve as a means of entry of any species which might come from the deserts of Idaho, south eastern Oregon, Nevada and parts of California. However the above factors do not seem to be of any great importance. It appears that the Great Basin has few species which are confined to its drainage and the species which are found there may have entered in many different ways.

The Colorado Drainage Basin is a more definite avenue for the entrance of water beetles. A number of species are found on the lower portions of this drainage in the state which are found no place else in the state. This may be due however to the fact that it is only along the lower portion of this drainage that the lower Sonoran zone touches Utah.

The central mountain ranges and high plateaus gives very good evidence that it is an avenue of dispersal. Numerous species may be found in its streams and lakes from northern to southern Utah which are also found in Washington, British Columbia, and Alaska or even throughout the width of Canada from the east to the west coast and even into Asia.

All in all when we look over the distribution of our species one may feel that the avenues of dispersion mean little in their present distribution. We find the same species on the high mountain tops isolated a hundered miles from other mountain tops. We find the same species in small fresh water springs which are isolated again by long expanses of salt desert. All these are not characteristic of a new invading species but of old well established species.

The water beetles do not belong to any of the climax formations or biomes. The so called aquatic biomes to be found in the state are very few in types and very small in extent. They are so far as I know entirely lacking in water beetles and of little importance in any aquatic consideration. A great percentage of the lakes and all the streams, ponds, swamps and bogs of Utah would fall as classified by the biome theory under the early stages of the hydroseres of our various biomes. Since the hydrosere in its early stages is effected much less by climate than by geographic and chemical influence, this arrangment has little importance in explaining the distribution of the water beetles.

If our species of our various divisions are not equally distributed we must look for another answer to the limitations of distribution. As we check our check list from different localities the most obvious differences occur in those from high and low elevations. A large number of our species are characteristic of high elevations, a smaller number of our lower elevations and a few of intermediate elevations. It is the Life Zone Theory which explains most satisfactorily the limits of the distribution of our various species.

The life zones occuring in Utah include the Lower Sonoran, The Upper Sonoran, Transition, Canadian, Hudsonian and Arctic Alpine. Most species are not confined to one zone but may extend over several, however it is seldom that they are found in more than three zones.

In the above listed life zones are many types of associations such as springs, small streams large streams, slow streams, fast streams, ponds, swamps lakes and bogs. Some of these various associations will be discussed briefly. These associations fall into two classes, 1. running water; 2. still water.

Running water associations

Springs are usually somewhat colder than the temperatures at which water beetles are most active and are therefore usually quite lacking in life. Due however to the tendency for a number of water beetles to migrate up stream there is frequently an aggregation of various beetles a short distance below the spring.

Life in warm springs is quite different. There may be no life at all due to the toxic quality of the water or there may be a number of species not to be found elswhere in the region.

Small brooks may be modified in various ways and may contain a number of different species. If the brook is ddep the number will usually be small unless it be also slow. Due to the current which sweeps all specimens which swim into its grasp down stream, most of the species confine themselves to the trash and vegitation at the sides of the stream where the current is not so rapid or they cling to the algae coated rocks on the bottom with the aid of their enlarged claws. The following species are commonly found in such an environment, Brychius horni, Agabus cordatus, A. seriatus, A. semivittatus, Helichus striatus, and Helmis sp.

Several rather extreme modifications of the small brook environment occur which are probably more interesting than important.

The first was observed in the San Rafael Swell. It consisted of a rather broad but very shallow stream which was extreamly alkaline. The only plants were an occasional sedge and a sheet forming blue green algae (Oscillatoria) which was grayish white on the surface. This sheet was perforated at intervals with holes. In and out of these holes swam that beautiful blue green species Hydrophilus lineatus. However in the water in the live condition they were dark olive green to brown and turned blue only after being pined. The sheet of algae was pealed back revealing hidden channels beneath. Several sepcimens were collected in this manner.

In the Uinta mountains a small stream was found flowing down a moderately steep slope among large irregular rocks about ten inches in diameter. Among the large loose rocks the water could be seen only now and then. The stream might almost be called subterranean. After removing a number of the rocks so that a small pool of water was exposed it was noted tha a small greyish black Hydrophilid with a rather rough elytra was struggling helplessly at the surface of the water. This species proved to be the rather rare Hydrobius scabrosus. A number of specimens of this species were collected by disturbing the rocks so that they were washed down into

the open water. Also occuring in this habitat was Agabus austini.

Creek and rivers do not differ greatly from the small brooks. The current may be swifter with less vegitation in mid-stream. We still find the water beetles confined to the vegetation along the sides and clinging to the rocks along the bottom. aA new environment is found in the slowly circling movement of the water in the pools and backwashes. Due to the circular character and the slowness of the current several species are to be found here. Darting in and out of the holes and crevices of the rocks may be found Laccophilus, Hydroporus striatellus, Oreodytes and other species. On the surface or beneath may be found Gyrinus consobrinus, Gyrinus bifariuus and others.

Still Water

In still water habitats we find that the water bettles as a group are not found to any extent in the larger bodies of water but are confined to the shores, lagoons, and small ponds. Sherman (1913, p. 44) , in writing of the habits of the Dytiscidae writes " in the larger bodies of water it is very difficult to locate any beetles, and in them, whether swamps, ponds or rivers, the beetles seem to occur only in limited spots, which are usually separated from the main sheet of water, such as the eddies or small pools along the shore. In fact, the small water bodies are always best, and the time most favorable for collecting is when the water is low or almost dried up." Muttkowski (1918, p. 414) in discussing the fauna of Lake Mendota, said; "The difference between the lake and other aquatic communities is very marked in late summer,

when sheltered water, such as the lagoons in the parks and the several ponds and creeks about the lake, teem with young dytiscid larvae of several species, while such larvae are conspicuously absent from the lake." These same conditions exist in our lakes of Utah which I have visited.

Large low elevation lakes. In Utah due to the need of water for irrigation some means has usually been devised to sap them of at least a part of their stored water during the dry summer season. As a result most of them are what may be called reservoir lakes and have barren muddy shores. The salt content is high, and has risen sharply in the last 50 years do tbethe leaching effect of irrigation of the surrounding lands. This type of lake is as barren of insect life as its shores are of plant life. Hydroporus striatellus, Coleambus masculinus, C. tumidiventris, and C. impressopunctatus and a a few others are the only species found to any extent on the shores of such lakes and I know of no records from deeper water.

KEY TO THE FAMILIES OF AQUATIC COLEOPTERA
(Modified from Classification of Insects
by Brues and Melander)

1. First ventral segment divided by the hind coxal cavities
Suborder ADEPHAGA 2.

First ventral segment extending from side to side and not divided by the coxal cavities Suborder POLYPHAGA 6

2. Mentum and submentum not separated by a suture, with out swimming legs, black or dull brown species AMPHIZOIDAE

Mentum and submentum separated by a suture 3

3. Mehasternum with a transverse triangular antecoxal sclerite, separated by a well marked suture 4.

Metasternum without an antecoxal sclerite; usually prolonged into a triangular process posteriorly 5.

4. Antennae 10-jointed; hind coxae fixed, expanded into large plates so as almost to conceal the base of the abdomen
HALIPLIDAE

Antennae 11-jointed, inserted on sides of the head between the base of the mandibles and eyes; hind coxae simple, scutellum absent, larva aquatic, adults living on the banks
OMOPHRONIDAE

5. Antennae slender, filiform; abdomen with six visible tergites; eyes two DYTISCIDAE

Antennae very short, stout and irregular; eyes four; abdomen with seven visible tergites GYRINIDAE

6. Fourth tarsal joint small hidden between the lobes of the third, tarsus densely pubescent below, prosternum very narrow, body beneath clothed with dense silvery pubescence, first sternite as long as the others united (Chrysomelidae) DONACIIDAE

Fourth tarsal joint not small and hidden between the lobes of the third 7.

7. Maxillary palpi long and slender, almost always as long as or longer than the short antennae; antennae six to ten jointed, the outer joints forming a distinct, pubescent, sometimes asymmetrical club HYDROPHILIDAE

Maxillary palpi much shorter than the antennae, if rarely comparable to the antennae in length the last tarsal joint is abnormally long (Helmidae, Parnidae and Laridae) Dryopidae

FAMILY OMOPHRONIDAE

This family is cosmopolitan except Australia. There are 14 species and several subspecies in the United States. These fall into four genera. Two genera, four species, and one subspecies have been taken in Utah.

These interesting insects are found near wet sand along streams, ponds and lakes. They occupy holes in the sand or hide in cracks or under debus. They can be driven from their hiding places by throwing water over the sand. They do not fly and are easly captured. They are rapacious in food habits.

The group may be characterised as follows, form oval, convex, small 4 to 9 mm.; head held horizontally; antennae 11 jointed, inserted between the eyes and mandibles; mentum separated by a suture; pronotum narrowed anteriorly, arched transversely from side to side; elytra with 14 - 15 striae, striae at least partially punctured, the general pattern of the striae seem quite constant in the different species; scutellum absent; prosternum covering all but the tips of the mesosternum near the coxa; antecoxal sclerite extending to the edge of the metasternum; abdomen with six sternites the first divided by the hind coxal cavities.

The larva are aquatic.

KEY TO THE UTAH GENERA OF OMOPHRONIDAE

1. Elytra 15 striate 2

   Elytra 14 striate Prosecon

2. Intermediate coxae and hind coxae bearing a single seta

(this genus possibly occurs in Utah) Paramophron

Middle and hind coxae bearing two setae Homophron

Genus Homophron

This is the largest genus of the Omophronidae. It inclused ten of the species found in the United States. It is distinguished bytthe two setae on the hind and middle coxae.

Key to the Utah Species of Homophron

1. Pale areas of elytra predominating, no romboidal area on the suture of the elytra near the apex. 2.

   Dark areas of the elytra equal or predominating, elytra shining, with bright metallic luster. illustre Csy.

2. Tips of mandibles short and stubby (Fig. 2.), dorsal ridge of mandibles evenly curved to meet lateral edge, ground color testaceous, with ambulatorial setae on fifth abdominal sternite. tanneri *sp. nov.*

   Tips of mandibles long and pointed (Fig. 3.), dorsal ridge sharply bent upon fusion with lateral edge, ground color cream; maculations more confined, rarely with ambulatorial setae on fifth abdominal sternite. tanneri var *proximum sp. nov.*

Homophron illustre Csy

Evenly and broadly elliptic, convex and shining, integuments with a glassy appearance; dark areas predominating with a bright dark green luster. Mandibles short and stubby similar to

Fig. 2.; pronotum strongly punctate, less closely so toward the middle and margins, pale along the lateral edge extending inward a short distance at the apex; striae of elytra not coarse or much impressed. Pattern of the elytra same as in Fig. 1., but the maculations much more expanded. Male length 6. mm., Width 4. mm.

Habitat- I washed one specimen from the sand near the mouth of Provo River. One specimen was taken in good condition from the stomach of a frog from near Vinyard.

Distribution- The type locality of this species is Vinyard Utah. The types were collected by Tom Spalding. Vinyard is on the north east shore of Utah Lake. All of the seven specimens I have before me are from the east and north east sides of the lake and may be considered from the type locality. The species is apparently quite rare as a great deal of collecting has been done in the area and there are only seven specimens to show for it .

New Records;

Locality	Date	Elev.	No.	Collector
East side of Utah Lake, Ut.		4,500	5(?)	V.M.T.
Mouth of Provo River, Utah	5/2/39	"	1	H.P.C.
Vinyard, Utah		"	1	From frog stomach

Homophron tanneri Sp. nov.

Female, Length 5.8-7.0 mm.; Width 3.6-4.2 mm; General color, base color of the upper surface testaceous, maculations black with faint metallic green tint, becoming stronger anteriorly, pale area predominating but less so than in Fig. 1., under surface dark piceous red. Head with angular pale smooth frontal area, metallic green basal area with punctures and sculpturing, the posterior side of the clypeus is somewhat paraboloid, the lateral edges being darkened so as to make the curve seem more even. Mandibles (Fig. 2.) are short and stubby as in H. americanum, dorsal ridge evenly curved to join the lateral edge of the mandible. Eyes black, and prominent; antenna slender, flavo testaceous, basal four joints glaberous, distal joints pubescent; Pronotum predominantly dark, faint metallic green with pale lateral edges. Posterior and anterior arms of pale extend inward becoming quite dark in color. The lateral edge finely emarginate. Elytra 15 striate, striae finely impressed, intervals moderately convex, flatly so behind the posterior maculation. Punctures fine extending faintly behind the posterior maculations. Body beneath, prosternum marginate along the sides of the posterior process. Metasternum marginate along the anterior and lateral edges of the disk. Ambulatorial setae on segments 4, 5, and 6 of the abdomen.

Male, Length 5.2-5.9 mm., Width 3.3-3.6 mm. Prothorastic tarsi with the first segments enlarged and widened having a brush underneath, second joint with small brush.

Type locality- Moab, Utah.

Besides the holotype and alotype which are from Moab, there are also 35 females and 20 males from Moab Utah, collected by the following, James Hartchner, Anson Call Jr., Irwin Rasmussen and Dr. Vasco M. Tanner. Other localities represented are La Sal, Utah (Anson Call); Blanding , Utah (Vasco M. Tanner); Marysvale, Utah (Vasco M. Tanner); and Vernal, Utah (Rowland Rigby).

Habitat- This species is found in a sandstone desert area along the banks of rivers.

Remarks- This species is related to illustre but is less broadly oval and smaller, especially in the male. The maculations are more restricted and the upper surface less glassy and with out prominent metallic dark green luster.

Homophron tanneri *proximum* *ssp. nov.*

Female; Length 6.1-6.5 mm., Width 3.7-4mmm. General Color, base color of the upper surface is cream with bright metallic green maculations, pale area predominating. Under surface reddish brown. Head with angular pale impunctate frontal area, metallic green basal area with punctures and sculpturing; mandibles large with long sharp tips (Fig. 3.), the dorsal ridge sharply bent on fusing with the lateral edge. Pronotum predominatly bright metallic green with pale lateral edges. Posterior and anterior arms of the pale area running half way to the medial line, the lateral edges finely marginate; elytra 15 striate, striae weakly impressed, faintly extending beyond the posterior

dark spot, intervals flatly convex, punctures small and deep, not impressed behind the posterior dark spot, except rarely very faintly, Ambulatorial setae on segments 4 and 6 of the abdomen, rarely on the fifth. Genitalia Fig. 4.

Male; Length 5.7-6.1 mm., Width 3.3-3.7 mm.

Type Locality- Box canyon near the junction of Calf Creek and the Escalante River in Utah, (the first right hand canyon on the Escalante River above Calf Creek).

Habitat- A large number of this form were taken at the head of a box canyon in an isolated pool about 30 ft. in diameter with a small stream running out of it for about 100 feet. They were quite numerous and were found hiding in cracks and under the leaves rather than burrowing holes in the sand. This pond is about 2 miles from the Escalante river and has no water connections except possibly for a brief period durring the spring runoff or thunder showers. It appears that the species may have developed around these isolated shaded still water pools at the head of the boxcanyons of the vicinity. On the Escalante River proper the form seems to be very variable, approching H. tanneri with various combinations of the characters of each type. The individual characters do not seem to intergrade. Some of these so called hybrids are larger and more broadly oval than either tanneri or tanneri proximum

Genus Prosecon

This genus is more or less confined to the south western United States. It is characterized by having 14 striae on each elytron; the suture between the epimeron and the episternum is obliterated; the middle and hind coxae with two setae each.

Key to the Utah Species of Prosecon

Dark areas predominant, maculations black or with very faint metallic color, striae deep and rather coarsely and deeply punctured. *Obliteratum utense* Csy.

General color of upper surface pale, the dark markings small with out metallic color, or color very faint, luster dull *gilae pallidum* Csy.

Prosecon gilae var. *pallidum* Csy.

Narrowly oval, dark areas very restricted and pale brown in color with faint or no metallic tint. The striae very fine and feeble, with moderate and widely spaced punctures and flat intervals suturally, laterally the striae are a little coarser, more approximate rather coarsely and closely punctate and with feebly convex intervals. Length 5.7-6.5 mm., Width 3.5-3.8 mm.

Habitat- This species was found by the author on the sandy banks of the Santa Clara River. They seemed to favor areas with a small amound of gravel mixed with the sand. The gravel probably offers hidding places for them.

Distribution- This subspecies was described from specimens taken in southwestern Utah by C. J. Weidt.

New Records;

Locality	Date	Elev.	No.	Collector
Zion National Park, Ut.			2	V.M.T.
Santa Clara, Utah.	5/9/41	3,000	12	H.P.C.

Prosecon obliteratum var. utense Csy.

Oval in form the dark colors predominating and without or with but little metallic lustre. Striae fine and feeble, with rather strong but very widely spaced punctures throughout. The intervals only feebly convex; sutural stripe behind the third fasica narrower, more abruptly though very moderately romboidally expanded at apex. Length, Female 6.5 mm.; Width, female 3.7 mm.

Type locality- Leeds and St. George, Utah by Prof. Wickham.

Distribution- Reported only from type locality and Zion National Park (Tanner 28;271)

New Records;

Locality	Date	Elev	No.	Collector
Zion National Park, Utah			4.	V.M.T.

Family AMPHIZOIDAE

This family consists of only one genus (Amphizoa) which is confined to western North America and Tibet. The species are aquatic but are unable to swim. They are found creeping over the bottoms of streams or the under side of logs.

The family is separated by the following characters, the first ventral abdominal segment devided by the hind coxal cavities, six abdominal sternites; mentum and submentum not separated by a suture, head without antennal grooves beneath. Dull black or brown in color.

The species of thes family are quite rare. Only one species is found in Utah.

Amphizoa lecontei Matth.

Dirty brown to black in color, disk of elytra flat, the sides declevous; eyes not prominent; pronotum quite flat above; Elytra broadly rounded at humeri.

Habitat- Found under logs in running water and rocky shores of lakes. It is slow in movement and can not swim.

Distribution- This species has been recorded from British Columbia, Alberta, Washington, Idaho, Wyoming and Colorado. Needham and Christenson (27;27) list "the big black Amphizoa" from Utah. It was also recorded from the state by V. M. Tanner in 1931 under the name of Amphizoa insolens.

New Records;

Locality	Date	Elev.	No.	Collector
Mirror Lake, Uinta Mts., Ut.		10,000	2	H. M. Swallow
" " " " "		"	2	T. "

Lily Lake, Uinta Mts., Ut.	8/27/40	9,800	1	H.P.C.
Tea Pot L., " " "	8/28/40	9,800	1	"
Provo, Utah	9/ /39	4,500	1	"

Family HALIPLIDAE

This family was first placed in with the Dytiscidae. It was first separated as a family by C. G. Tomson in 1859. It contains only three genera all of which are represented in Utah. They consist of small aquatic beetles placed close to the Family Dytiscidae.

The adults may be described as follows. Antennae 10-jointed, inserted on the front between the eyes under a small ridge, filiform, almost smooth. Mentum and submentum separated by a distinct suture. Metasternum with a well marked antecoxal piece extending from one side to the other. Anterior and middle coxae globular. Hind coxae fixed, expanded into large plates so as to almost conceal the abdomen, with the outer anterior ends prolonged into knob-like structures, fitting into socket-like depressions in the elytra. First ventral segment divided by the hind coxal cavities. Males usually with the front and middle tarsus with joints shorter and a little expanded, pubescent beneath.

The air for respiration under water is carried under the coxal plates and gains entrance to the spiricles under the elytra by means of a groove in the pleurum near the base of the coxae.

The larvae are aquatic.

Key to the Utah species genera

1. Plate like hind coxae emarginate, covering all but the last abdominal sternite, last segment of the palpi larger than the penultimate, pronotum convex sides converging anteriorly
Peltodytes

Plate like hind coxae not covering the 4th, 5th and 6th sternites, last segment of the palpi smaller than the penultimate 2.

2. Pronotum flat sides parallel, narrowing anteriorly; hind claws about as long as the second tarsal segment; pronotum with basal longitudinal striae on each side, often reaching to the anterior fourth (Fig. 5) Brychius

Pronotum convex, sides converging anteriorly from base; claws about half as long as second tarsal segment; striae on pronotum short or lacking Haliplus

Brychius Thomson

The body is more elongate and spindle shaped; pronotum flat with the posterior sides parallel, rounded anteriorly, with two nearly parallel striae reaching to the anterior fourth; Elytra with ten rows of punctures; legs long, claws long as second segment of tarsus.

All knowen species inhabit running water where they creep about with the aid of their long legs and large claws.

There are only about eight known species, three ♂♂ which are found in Europe, onein Europe and Siberia, and four in western North America. Only one species, Brychius hornii, has been found in Utah.

Brychius hornii Crotch

Length, 3.3 to 3.75; Width 1.8 to 1.9; General color yellow with black markings; Head yellow, punctate, eyes black; Pronotum punctate, yellow with two very faint black basal spots, stiole incurved anteriorly; Elytra with ten rows of punctures rimmed

with black so as to make a continuous black stripe except in the light areas as shown in the left half of Fig. 5., inflexed portion of the elytra continuing almost to the apical angle; Prosternal ridge marginate, finely punctured, sharply dolevious in front, widest at base constricted between the coxae, expanding slightly anteriorly, lateral extentions of the prosternum very closly and coarsly punctate; Posterior ventral sternites often compleatly or partly colored.

Type locality; Kalispel, Montana.

Habitat; The author has collected this species beneath logs in running water, also two specimens were collected beneath a single rock in a dry irrigation canal. One specimen was observed in an aquaria. It remained always in the midst of the dense vegitation in the darkest corner of the aquaria. Since it was not observed to swim at any time an experiment was carried out to see if it could. It was placed in a bowl of water without a hidding place. It would swim laboriously to the surface of the water, cease its efforts, turn over backwards and settle to the bottom. It had a greater density than water, sinking if inactive, while Peltodytes calosus will float if inactive.

Distribution- This species is recorded from British Columbia Washington, Oregon, Montana and Utah (Ogden, by Carr).

New Records;

Locality	Date	Elev.	No.	Collector
Provo, Utah	3/29/38	4,500	2	H.P.C.
" "	3/16/40	"	1	"
" "	4/1/41	"	4	"
Richland, Oregon	6/19/40	2,200	3	"

Peltodytes Regimbart

The terminal segments of the palpi broadened at base, longer than the preceding, pronotum convex above, sides strongly converging anteriorly widest at base, elytra with 10-11 rows of punctures bee coming smaller in size behind, hind coxae covering all but last segment of abdomen, first tarsal joint longer than the fourth, claws small.

The genus contains fourteen species from the United States, eight from Europe, two from the East Indes and one from Central Africa. Two species have been collected from Utah.

Eggs of two species of Peltodytes observed by Mr. Matheson were fastened to the strands of filamentous algae (Nitella and Chara). The larva were hairy in appearance due to long jointed spines containing tracheae by means of which the larva obtain oxygen. When mature the larva leaves the water and pupates in a chamber in damp soil. Spines keep the pupa from touching the soil.

KEY TO THE UTAH SPECIES

Each elytron with a prominent tubercle callosus

Elytra without tubercles, no subhumeral spot, 4th striae compleat, apex of prosternal process distinctly margined dispersus

Peltodytes callosus Lecont

Length, 3.5; General color, pale yellow with black markings; Pronotum with two large black coarsely punctate basal spots, coarse basal punctures black in color; Prosternal ridge narrow, margined on sides but not across the front, constricted between the front legs; Each elytron with a prominent tubercle, eleven rows of punctures, becoming smaller in size behind, apices of elytra obliquely truncate, straight or barely sinuate; Metsternum with punctures large as or larger than the diameter of the hind tibia near its base.

Habitat- Found in still, fresh water among a moderate amount of vegitation.

Distribution- British Columbia, Washington, Oregon, NewMexico, California and Utah. Roberts (1913) records this species from provo, Ut. (H.Soltau), Virgin River (G. Weidt) and from Mill Creek Ut. (Hum. & Sz.). Tanner (40;120)reports specimens collected by the author from the mouth of Calf Creek on the Escalante River.

New Records;

Locality	Date	Elev.	No.	Collector
Weber Ri., Riverdale, Ut.	6/ /26		1	V.M.T.
Provo, Utah	4/25/36	4,500	3	H.P.C.
"	10/10/36	"	1	"
"	4/30/39	"	7	"
"	5/14/39	"	1	"
"	4/1/41	"	27	"
Spanish Fork, Utah			2	Agnes Hardy
Salem Pond, Utah	8/22/40	"	30	H.P.C.
Lynndyl, Utah		"	1	V.M.T.
St. George, Utah	12/7/40	2,800	3	H.P.C.

Remarks- The seven specimens from the Escalante River are very dark in color seemingly due to the transparent condition of chitin.

Peltodytes dispersus Roberts

Length 3.5 to 3.75 mm.; Width 2. to 2.5 mm.; General color above greenish yellow with black dots; beneath legs ferruginous; Pronotum with two black coarsely punctate basal spots, coarse punctures along base other than the two spots not colored black; elytra with apices obliquely truncate-sinuate, with eleven rows of coarse, blackened punctures becomming smaller in size behind; Prosternal process broad at base, finely but distinctly marginate laterally and at the apex, shallowly concave or channelled, narrowed between front coxae; Metasternum and coxae with median punctures smaller than dimeter of hind tibia near its base; Penultimate sternite with median spine.

Habitat- This species was numerous in the shallow swamps and pools along the edge of Washington Creek near St. George.

Distribution- It is recorded from Arizona and Utah (Provo, Utah; H. Soltau).

New Records;

Locality	Date	Elev.	No.	Collector
Lower Escalante River, Utah			1	H.P.C.
St. George, Utah	12/16/40	3,000	40	"

Remarks- Although I have seen several hundred Haliplidae from the Provo vicinity I have not collected or seen this species. The Soltau record for Provo must be a general locality lable for Provo and points south, the specimen actually being collected some distance to the south of Provo or the species is extreamly rare this far north.

Haliplus Latreille

Terminal segment of the palpi shorter than the preceding; Pronotum arched, sides strongly converging anteriorly; Elytra with rows of punctures regularly arranged, intervales often with smaller rows of punctures; Posterior coxae conceals the frist three segments of the abdomen, leaving three exposed; Hind tarsi as long as or longer than the tibia, first tarsal joint longer than the fourth; claws small.

Habitat; Usually found in still water pools, where they feed mostly on filamentous algae.

Life history- Mating occures early in the spring (there may be more thon one brood a year). Eggs of H. Immaculicollis were observed by Matheson to be placed within the dead stems of Nitella. The larva are without conspicuous hairs, they obtain oxygen by means of spiracles, feed on filomentous algae (congugate), from which it sucks the cell contents by means of its hollow mandibles. It has three instars. (For compleat details of the life histories of Haliplidae see "Haliplidae of North America" by Matheson; Jour. N.Y. Ent. Soc., Vol. XX p. 186)

Distribution- Haliplus is world wide in distribution. It contains more than one hundred and fifty species of which about 40 are found in North America and seven in Utah.

KEY TO THE UTAH SPECIES OF HALIPLUS
(Modified after Wallis 1933, pp. 5-11)

1. With basal pronotal plicae 2.

   Without basal pronotal plicae 4.

2. Basal pronotal plicae shorter, less than one quarter the length measured from base of plica along the plica to the anterior margin of the pronotum 3.

   Basal pronotal plicae longer, more than one-quarter the length measured from base of plica along plica to anterior margin of pronotum, prosternal process evidently channelled, mid metasternum evidently longitudinally obliquely impressed at sides
   distinctus

3. Prosternal process rather deeply channelled longitudinally especially over declivity. Width of head between eyes less than one-half the total width of head, elytral maculation usually distinct, consisting of six black spots in a half ellipse, enclosing a common sutural blotch. In extream cases the maculations may almost entirely disappear
   immaculicollis

   Prosternal process rather feebly and narrowly channelled. Width of head between eyes one half or a little more than the total width of head, elytra without black markings of any kind, the more widely spaced punctures are a little darker than the ground color and occasionally some of their color extends from clusters of punctures to form indefinite brownish spots robertsi

4. Prosternal ridge plainly margined at sides, sides parallel, smaller species, length 2.5 to 3.1
   concolor

   Prosternal ridge not margined, sides concave, larger species, 4 - 4.5 mm. long 5.

5. Subsutural rows of interstrial punctures irregular and more or less double throughout, or at least with an occasional misplaced puncture throughout their entire length, color testaceous
   leechi

   Subsutural rows of interstrial punctures usually quite regular and single at least basally, color typically ferruginous
   subguttatus

Haliplus robertsi Zimm.

(Haliplus pallidus Robts.)

Oval, pale greenish yellow; Pronotal basal plica, short, rather deep; Elytral apices very feebly, if at all sinuate, the angle about right, elytral strial punctures small and shallow, not crowded, of a deeper shade than the ground color, except those of the 9th and 10th striae, which are much finer, more or less confused, and not darkened. Elytra immaculate, except that in some specimens small clusters of darker punctures give an indefinite suggestion of spots. Prosternal process narrowly channelled, and with large punctures usually so confluent as to give the roughened appearance mentioned in the original description, mid-metasternum depressed between and behind middle coxae, especially deeply longitudinally at sides. Length 3 mm. (From Wallis 33;12)

Distribution- Wallis records this species from California, Oregon, British Columbia, Wyoming, and Colorado.

New Records-This is a new record for Idaho

Locality	Date	Elev.	No.	Collector
Oakley, Idaho			1	V.M.T.

Remarks- Oakly, Idaho is less than twenty miles from Utah. While I have seen no specimens from Utah, the species doubtlessly occures here.

Haliplus distinctus Wallis

Length 3.1 mm. Width 1.65 mm. Head reddish, conspicuously brownish between the eyes, which are widely separated. Labrum feebly emarginate; Pronotum with basal plicae long and prominent. Elytra yellowish, paler than pronotum, with blackish maculation, the surface especially in the female with a minute punctuation or reticulation; strial punctures mostly black and deep; Prosternum rather narrow, margined almost from base, channelled from between the fore coxae, the side margins narrower than in immaculicollis; Mid-metasternum depressed and emarginate at base, obliquely impressed at sides behind middle coxae; claws of male protarsi unequal.

Habitat- This species was taken at high elevation in a small morainal lake. It was swimming freely in the open water and among the water plants.

Distribution- The only previously known record or location for this species is Goat Mountain in British Columbia.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Salamander Pond, Mt. Timpanogos, Ut. Co., Ut.	8/1/38	7,500	2	H.P.C.
	5/15/40	"	23	"

Remarks- This identification was verified by Wallis.

Haliplus immaculicollis Harris

(Haliplus ruficollis Crotch)

Ovate; yellow to reddish; elytra usually with the basal margin, a common sutural blotch and six spots grouped around it in a half-ellipse, black, all this maculation subject to partial or entire disappearance; strial punctures sometimes in part surrounded by dark colouring which extends to form dark lines along the striae. Prosternal process rather deeply longitudinally channelled; mid-metasternum quite strongly impressed behind the coxae; male protarsal claws equal. Length 2.5mm. to 3 mm. (From Wallis 33;21)

Habitat- This species is quite common and is usualy found in still water with a moderate amount of vegitation.

Distribution- This species is common every where in North America north of Mexico.

New Records- This is a New record for Utah.

Locality	Date	Elev.	No.	Collector
Provo, Utah	4/21/39	4,500	9	H.P.C.
" "	5/1/39	"	1	"
" "	5/14/39	"	3	"
" "	4/1/41	"	27	"
Utah Lake, East side, Utah			1	L. E. Perry
Springville, Utah	5/15/40	2	3	H.P.C.
Payson Canyon, Utah	7/10/37		1	"
Blue Lake, La Sal Mt., Utah	7/25/34		1	D. E. Beck

Remarks- Matheson gives the life history of this species in the Jour. N.Y. Ent. Soc., Vol. XX pp. 186 to 190

Haliplus concolor Lec.

Oval; dark ferruginous; usually concolorous, occasionally with indistinct maculation. Elytral margins feebly serrulate, humeri not in the least asperate but shining and almost smooth, with a few fine punctures only; basal punctures of lateral rows not conspicuously enlarged, though evidently larger than those near the suture, and decreasing in size apically less suddenly and greatly than in tumidus. Prosternal process with sides scarcely divergent apically, nearly parallel; acutely margined; very feebly convex throughout and not hollowed out apically. Mid-metasternum with a deep pit on each side, the margins very slight but long. Length 2.5 mm. to 3 mm.

Habitat- Our single specimen was taken from a very small shallow pool of water in a swampy area near a canal.

Distribution- Recorded from the Colorado River and California.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Provo, Utah	6/7/36	4,500	1	H.P.C.

Haliplus subguttatus Robts.

Oval, convex, ferruginous; Length 3.75 mm. to 4.25 mm. Head wide between the eyes, very nearly twice the width of the eye as seen from the same point above; finely evenly, closely punctate. Pronotum without an apical infuscate area. Elytra oval, striae of deep blackened punctures, not notably large, decreasing somewhat in size apically and nearing the margins; sutural row of small [illegible] small punctures almost perfectly single, at least basally, small and evenly spaced. Prosternal ridge just visibly convex, constricted before front coxae where it is about three-fifths the width of the base; apex almost exactly the same width as base; sides not margined, apex evidently and acutely though not very strongly so; closely deeply and moderately punctured. Mid-metasternum just perceptibly convex from side to side, but not tumid; not margined, smooth or with a small fovae at middle; punctulation a little finer than on the prosternal process.

Habitat- This species is found in small Mountain Lakes.

Distribution- Wallis records this species from "Nova Scotia, and New England States to British Columbia", also from California.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Salamander L., Mt. Timp., Ut.	5/18/40	7,500	3	H.P.C.
Spanish Fork, Utah	4/19/41	4,500	1	K. Hardy

Haliplus leechi Wallis

Very similar to subguttatus in general appearance. Length 4.16 mm. Width 2.18. Moderatly elongate oval, sides of elytra little curved, greatest width well towards middle of elytra, Testaceous with brownish or blackish maculations. Head wide, the width of an eye seen from above being approximately 3/5 the width of the head between the eyes; vertex infuscate. Pronotum with anterior margin broadly rounded, infuscate at middle. Elytra punctures of the subsutural rows about as large as those of the interstrial rows, rather closely set and irregularly double throughout. Diameters of the interstrial punctures about one-third that of the adjacent strial punctures.

Habitat- I found these insects in the Uinta Mt. living most abundantly in the small vegitated lakes, with deep boggy banks. Those collected on Oct. 15, 1939 were found beneath logs broken out of the ice along the shore. They moved about but were not as active as those collected in Aug. I have never seen the species swimming actively of its own accord except in aquaria. It is usualy found in the cracks beneath floating logs.

Distribution; This species is recorded from British Columbia, Washington and Oregon.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Mirror Lake, Uinta Mts., Ut.		10,000	5	V.M.T.
Tryol " " " "		9,600	1	"
Dimond Lake, Uinta " "	8/27/40	9,700	4	H.P.C.
Lily " " " "	10/15/39	9,700	21	"
" " " " "	8/26/40	"	5	"
Lost L. env., " " "	8/26/40	10,500	3	"

Family DYTISCIDAE

This is the largest of the families of water beetles. There are about 500 species of this family in the United States and about 2,000 species in the world. The family as a whole is widly distributed, being found from above timber line to the equator.

Most of the species are quite rapid swimmers. Only the hind legs are used in swimming. Some of the species fly and a few are found at lights at night.

The family may be separated by the following characters, Antennae slender, filiform; eyes two; mentum and submentum separated by a suture; metasternum without an antecoxal sclerite, usually prolonged into a triangular process posteriorly; abdomen with six visible tergites; first ventral sternite divided by the hind coxal cavities.

KEY TO THE GENERA OF DYTISCIDAE FOUND IN UTAH

1. Scutellum fully covered . . . . . 2.

   Scutellum entirely free . . . . . 5.

2. Base of the prosternum in the same plane as its process; fore and middle tarsi distinctly five segmented, the fourth segment approximately as long as the third, hind tarsi with a single straight claw, hind margin of the apical tarsal segments produced into lobes.
   LACCOPHILINAE — Laccophilus

   Base of the prosternum not on plane with its process which is strongly bent downwards; anterior and middle tarsi usually with the fourth segment minute and usually hidden between the lobes of the third. . . . . 3.
   HYDROPORINAE

3. The broad apex of the hind coxal process divided into three parts by two oval emarginations, namely two smaller, somewhat divergent lateral wings, and a broad depressed middle piece, triangular at its tip.
   HYDROVATINI — Hydrovatus

   Hind coxal process short, flat, almost in plane with the ventral segments, without lateral wings, so that the bases of the trochanters are entirely free, hind tibia slightly arched; size very small.
   BIDESSINI — Bidessus

   The hind coxal process not on a level with the first ventral sternite, but somewhat raised, its sides divergent, more or less produced into lobes which cover the bases of the trochanters.
   HYDROPORINI . . . . . 4.

4. Epipleura of elytra with a basal excavation which receives the middle knee; the epipleura appearing obliquely truncate, and with an oblique carina at base. Coelambus

Epipleura not excavated and without oblique basal carina. Hydroporus

5. Eyes not emarginate; first three segments of the tarsi of the male tarsi widened, but not forming a round adhesion-disc.
COLYMBETINAE 6.

Eyes not emarginate; first three segments of the tarsi of the male forming a round or oval adhesion-disc.
DYTISCINAE 10.

6. Hind claws of equal length, and usually of similar form; the hind margin of the posterior tarsal segments straight or some times slightly oblique on the outer angles; hind femora with a group of ciliae near the apex on the posterior ventral side.
AGABINI 7.

Hind claws of unequal length, and the outer more sharply bent at the tip than the inner, with or without ciliae near the apex of hind femora. 8.

7. Hind coxal processes with sides not straight but enlarged and knob-like at tip, narrowest point just anterior to enlarged tips.
Agabus

Hind coxal processes with sides straight, diverging posteriorly, narrowest point at base, sides groved for reception of femur.
Agabinus

8. Hind femur, on the inner half of the apical angles, with a linear group of cilia, color black. Ilybius

Hind tibiae without ciliae, at most with a few setigerous punctures on the middle of the apex of the tibiae, never on the hind margin of the inner apical angle. 9.

9. Metasternum between the mesocoxal cavities with a grove for the reception of the prosternal process pronotum usually margined.
Rantus

Metasternum between the coxae flat, or with a small indistinct longitudinal impression; pronotum not margined. Colymbetes

10. The hind margin of the first four segments of the posterior tarsi beset its entire length with a coarse fringe of golden yellow flat cilia. THERMONECTINI 11.

The hind margin of the first four segments of the hind tarsi without such a fringe, or only with cilia on the outer apical angle. 13.

11. Body almost smooth, with scarcely observable micropunctulation;

the adhesion-disc of the male tarsi with a few large and many smaller sucking cups. 12.

Body beneath, elytra and pronotum coarsely punctate; adhesion-disc of tarsi of the male with a large basal, and two small median sucking cups, in front of which is a thick transverse brush of stout bristles each of which bears on its tip a round adhesive plate; female often with canaliculate elytra. Acilius

2. Elytra black, with yellow maculae or transverse bands, or yellow with black spots; middle tarsi of the male simple, without adhesion-disc; elytra of the female sculptured with short grooves. Thermonectes

Elytra yellow with uniform confluent black speckles, but without maculae or bands; middle tarsi of the male with rounded adhesion-discs in a row; elytra of the female either without sculpture or very coarsely granular. Graphoderes

3. Hind tibia distinctly longer than broad, its outer apical spur slender, not broader than the inner; adhesion-discs of the male round, with two large basal cups in front of which are numerous little discs. DYTISCINI Dytiscus

Hind tibia almost as broad as long, its outer apical spur basally strongly expanded; adhesion-discs of the male transversely oval, with three or four transverse rows of petiolate adhesive plates, behind which is a fringe of bristles. CYBISTERINI Cybister

LACCOPHILUS

This group includes about 19 species from North America, and about 80 species in the world. Most of the species are more or less confined to the warmer parts of the world.

The genus is separated from the other Dytiscids by the following characters, the scutellum absent or concealed; the base of the prosternum on the same plane as its process; the pro and mesotarsi both evidently five jointed, the fourth joint not small or hidden between the lobes of the third; the hind tarsi with the distal margin produced in to lobes on the outer dorsal side, last joint with single well developed claw. Other characteristics of the genus are, the dorsal surface polished, with out sculpture; ventral segments with long, oblique scratches; hind coxae are very large, length one fourth the length of the body. The outline is very continuous. All the males of the Utah species have a strigulating structure consisting of a curved row of parallel grooves on the hind coxa, against which a small elevation on the dorsal side of the metafemur rubs to produce a vibration. This strigulating structure is often called the coxal file.

Key to the Utah Species of Laccophilus

Size larger ($5\frac{1}{2}$ - 6 mm.); elytra with light spot on suture just behind the middle, other spots larger and more conspicuous; undersurface testaceous. decipens Lec.

Size smaller ($5\frac{1}{2}$ - 6 mm.); elytra without a discal sutural spot, spots variable but usually not well developed, marking of male and female different; under surface with ventral segments, hind coxae and metasternum black or dark brown. atristernalis Crotch

Lacoçophilus decipiens Lee.

Head and thorax testaceous; elytra testaceous with small black dots covering most of the elytra except the outer margins making it appear darker, the absence of the small black dots causes the elytra to appear to be spoted with white, the ground color is also usually lighter in these spots.

These spots are very variable in development, the most constant spots are located as follows, on the outer margin near base of elytra, at middle, at posterior fourth, and near apex, on the suture just behind middle and near the apex, sometimes there is a transverse series of longitudinal spots at the base of the elytra; margin of the elytra with a row of long hairs on the posterior half; color beneath testaceous; coxal file present in both male and female, very fine and quite faint in female. Length $5\frac{1}{2}$ - 6 mm.

Habitat-

Distribution- Sharp records this species from California and Utah.

New Records;

Locality	Date	Elev.	No.	Collect.
St. George, Utah	12/6/40	2,800	17	H.P.C.
San Rafael Swell, Ut.	5/11/40		1	H.P.C.
Price, Ut.	4/14/18		1	A. M. Woodbury
Vernal, Ut.			1	R. Rigby
Enterprise, Ut.	6/ /25		1	V. M. T.
Salem Pond, Ut. Co., Ut.	9/22/40	4,500	15	H. P. C.
Springville, Utah	5/15/40	"	4	"
Provo, Utah	4/8/36	"	4	"

Provo, Utah	10/10/36	4,500	1	H.P.C.
" "	4/23/39	"	2	"
" "	8/21/40	"	2	"
" "	12/2/40	"	1	"
Vinyard, Ut.			4	V.M.T.
Riverdale, Ut.			1	V.M.T.
Lake Town, Ut.			1	

Laccophilus obristernalis Crotch

Head and thorax very short, strongly deflexed, the vertex of the head infuscate; Elytra of female with ground color brownish testaceous, side margins lighter, male with ground color lighter, spots usualy faint, when present they are located on the outer margin at middle and posterior fourth, the tips of the elytra often pale; mesosternum, metasternum, hind coxal plates and the ventral segments dark brown or black.

Habitat- This species is found along the edge of slow streams, and standing water in the Lower Sonoran to the Transition zones.

Distribution- Sharp records this species from California and Mexico.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
St. George, Utah	12/7/40	2,800	8	H.P.C.
Salem Pond, Utah	9/22/40	4,500	7	H.P.C.
Provo, Utah	8/4/36	"	1	"
" "	8/2/36	"	1	"
" "	4/23/39	"	1	"
" "	4/30/39	"	1	"
" "	5/14/39	"	1	"
" "	4/25/40	"	2	"
" "	5/ /2	"	2	C."Cottam
" "	9/4/40	"	1	L. Jeppsen

HYDROVATUS

This group consist of about forty species of which only six are found in the United States. The majority of the species are tropical in distribution. Of the six occuring in the United States five are southern in distribution.

This genus is characterized by the following characters, size small, under 5 mm. (Utah species only 2¼ mm.); form rotundate, convex; scutellum hidden; epiplura with an otlâque carina at base; prosternal process is strongly bent downward from the plane of the base; the metacoxal process with the hind margin divided into three parts by two emarginations, the outer extentions quite narrow and diverging, projecting over the bases of the trochanters; the center extention broad, adpressed to meet the ventral segments.

Only one species of this genus has been taken in Utah.

Hydrovatus brivipes Sharp

Head and thorax testaceous; Elytra brown, rather closly punctate, less so toward apex, surface faintly alutaceous; under surface testaceous; joints of the pro-and mesotarsi with segments of different shapes. Length 2 - 2¼ mm.

Habitat- Our single specimen was taken in a slow moving small rather deep stream.

Distribution- Sharp reports this species from California (type locality).

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
St. George, Utah	12/7/40	2,800	1	H.P.C.

BIDESSUS

This genus includes about eighty species, with about twenty species being found in the United States. The genus is widly distributed in both hemispheres.

Usualy they may be recognized by their very small form. The largest of the species is only about 3 mm. long (in the United States most of the species are 2 mm. or less in length). Other characters which help separate them from the other genera are as follows, form oblong; thorax with a basal plica or longitudinal fold on each side about one fith the width of the thorax from the edge; scutellum hidden; prosternal process raised from the plane of the prosternum; metasternum long at middle, sides greatly narrowed; hind coxal plates with sides greatly elongated, coxal processes rather weakly raised, slightly adpressed to join the ventral segments, coxal lines straight except at very tip, coxal articulation open, not covered by the coxal process; pro and mesotarsi apparently four jointed; claws equal.

KEY TO THE UTAH SPECIES OF BIDESSUS

1. Elytra without sutural stria; spots if present numerous and narrowly longitudinal — affinis Say

   Elytra with a sutural stria; spots large, few in number — 2.

2. Size smaller (1.7 mm. long); head black, prothorax with two transverse pale spots; plica on elytra evidently longer than that on the thorax; elytra with narrow subbasal and to small subapical spots; finely pubescent, punctures fine — subtilis Lec.

   Size larger (length 2 mm.); head and thorax testaceous or brown; elytra with large subbasal spot which extends posteriorly along the suture, often meeting the large subapical spot — sp. ?

Bidessus affinis Say

Head usualy with vertex somewhat infuscate, sometimes entirely black; thorax with the discal portion usually infuscate; plica of the thorax and elytra nearly equal in length; elytra varying greatly in markings, when present they consist of longitudinal pale spots separated by dark lines of various stages of development, the sutural stria is lacking, elytra finly punctured with a short fine pubescence; ventral surface variously colored, usualjy somewhat infuscate on the metasternum, coxal plates and the ventral segments. Length 2 mm.

Habitat- This species is usually found in the quiet eddyes of streams at all elevations.

Distribution- Hatch and Zimmerman give North and South America as the distribution for this species.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Lost Lake, Uinta Mts., Ut.	8/26/40	9,800	3	H.P.C.
Logan, Ut.			5.	L. Hayward
Provo, Ut.	1/25/36	4,500	1	H.P.C.
" "	10/17/36	"	1	"
" "	4/10/37	"	1	"
" "	4/29/39	"	4	"
" "	3/9/41	"	3	"
Utah Lake, Ut.	5/2/39	"	2	"
Salem Pond, Ut.	9/2/40	"	3	"
Richfield, Ut.	8/15/39		2	(Light trap)
Lower Escalante Ri., Ut.	8/4/39		1	H.P.C.

Remarks- There are probably several closly related species and a number of varieties going under this name, all of which are very difficult to separate.

Bidessus subtilis Lec.

Head and thorax black, the later with two rather large transverse pale spots extending from the margin almost to the meson; plica on both thorax and elytra both well defined, elytral plica about a third longer; Elytra with a broad fiant sutural stria, punctures fine, pubescence distinct, elytra with subbasal irregular rather narrow transverse pale spot extending from margin to sutural stria, with a small marginal spot at posterior two fiths and a small subapical spot; body beneath black except for prosternum. Length 1.7 mm.

Habitat- The author collected this species in still water just below a very alkaline spring in the SanRafael Swell desert region. This location is in the Upper Sonoran Zone.

Distribution- Hatch list this species from California.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
SanRafael Swell, Emery Co., Ut.	5/11/40	5,000	1	H.P.C.

Bidessus sp.

Head testaceous or light brown; thorax testaceous with basal portion light brown; plica of thorax and elytra about equal in length; Elytra with about equal amounts of pale and dark markings, The outer margin pale, broad transverse subbasal pale spot extending from margin to the sutural stria, then posteriorly, sometimes uniting with the posterior spot, thus forming a large discal dark

spot; the posterior spot sometimes separated from the pale margin at the apex by a dark band, broadly extending anteriorly along the margin, sometimes united with the subbasal spot; Elytra more coarsely punctate than in subtilis; pubescence short and not very evident; under surface testaceous. Length 2 mm.

Habitat- This species was taken in still water from a spring in the Escalante river bed in the east Escalante desert region. This location is on the lower boarder of the Upper Sonoran Zone.

New Records

Locality	Date	Elev.	No.	Collector
Calf Cr., Escalante Ri., Ut.	8/4/39		1	H.P.C.
Lower Escalante Ri., Ut.	8/12/39		9	H.P.C.

Remarks- This species was unknown to H. B. Leech who states that it is not cinctellus (to which it runs in Hatch's key 28;217), and that it may be undescribed.

Genus COELAMBUS

This is one of our larger genera including about 45 of our North American species of water bettles. It is well represented in Utah with about eight species known from the state.

This genus is distinguished from the next (Hydroporus) by the presence of a raised line obliquely crossing the base of the epipleurae. Other characters are the small size (usualy less than 6 mm.), lack of pubescence, scutellum hidden, prosternal process not on the same plane as the prosternum, episterna of the metathorax reaching the middle coxal cavities, the hind coxal process raised above the abdominal sternites, its apex not divided into three parts.

The species of this genus are mostly northern in distribution. They are usually found in still water which is somewhat stagnate, or may be brackish or even salty.

Several more species of Coelambus probably occur in Utah. Examples of some of these are present in our collection but not in sufficient numbers so that they can be identified or described as new with any certainty.

The following descriptions and key were taken or modified from H. C. Fall's "The North American Species of Coelambus" 1919.

KEY TO THE KNOWEN SPECIES OF COELAMBUS IN UTAH

1. Clypeus margined along anterior edge. 2.

   Clypeus not margined 3.

2. Body broadly ovate and very convex beneath, color beneath entirely rufous or rufotestaceous punctatus

Form less broadly ovate and convex, body beneath black, elytra vittate masculinus

3. Last ventral with oblique tumidity on each side, more prominent in male tumidiventris

Last ventral segment with out tumidity 4.

4. Elytra with distinct vitiform markings, ground color fulvo- or rufotestaceous 7.

Elytra often with broad nubilous markings which are never distinctly vittate, color above flavo-, rufo- or piceotestaceous, or piceous brown. 5.

5. Front tarsi of male at most only moderately dilated 6.

Front tarsi of male broadly dilated, nearly or quite as wide as the apical width of the tibia. patruelis

6. Color above testaceous with large elytral cloud extending nearly to base, elytral markings very variable in development, sometimes nearly wanting. medialis

Elytra with faint posterior cloud virgo

7. Elytra with more or less evident impressed lines in basal half at least in the male, feeble or wanting in female, punctures coarse impressopunctatus

Elytra with out impressed line, punctures fine. unguicularis

Coelambus punctatus Say

Broadly rotundate ovate; very convex, especially beneath, head, thorax and body beneath rufotestaceous, the elytra usually duller brownish yellow, the disk with obscure fuscous markings which are sometimes feebly defined, but usually broadly suffused; base and apex of thorax blackish; antennae and legs entirely rufotestaceous. Punctuation above strong, close and nearly uniform, beneath coarse and close. Tarsi narrow, not appreciably broader in the male. Length 2.8 to 3 mm.; width 1.7 to 1.9 mm. (From Fall 1905)

Type locality; "Northwest Territory".

Habitat- This species is found in shallow still water which may be freash or somewhat stagnant. They usually prefer situations where thereis a fair amount of vegitation and may often be collected admantageously by raking the vegitation from the pool onto the bank.

Distribution; This species extends acrost North America in the northern United States and Canada. It is also very closly related to inaequalis in Europe. It has been recorded from the following localities, Maine, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Wisconsin, Indiana, Ontario, Manitoba, British Columbia, Washington and Nevada.

New records; This species is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Raft Ri. Mt., Idaho			1	V.M.T.
Riverdale, Weber Ri., Ut.	6/ /26		1	"
Provo, Ut.	4/23/39	4,500	1	H.P.C.
" "	3/9/41	"	34	"
Springville, Ut.	5/15/40	"	1	"
Salem Pond, Ut.	9/22/40	"	16	"
" " "	1/19/41	"	3	"
Lynndyll, Ut.			2	V.M.T.

Coelambus virgo Fall

Moderately elongate oval, both sexes shining; head and thorax brownish, the former with pale vertex spot, the latter with sides paler; elytra luteous, the dorsal cloud broad but faint, abbreviated in front. Punctuation above moderately close, the series of coarser elytral punctures visible but not conspicuous. Beneath black, coarsely but not very closely punctate. Front tarsi moderately dilated, the first and second joints subequal in width, anterior claw slightly thicker, more strongly bent and a little shorter than the posterior one. Length 3.6 to 3.7 mm.; width 1.9 to 1.95 mm. (From Fall 19;12)

Type locality; Vergin River, Utah.

Habitat- This species was found in still pools near the inlet of an almost dry reservoir near Santa Clara Ut. The water was quite alkaline and little vegitation was present.

Distribution; The only record of this species is that of the description. It was described from one male and three females from the Vergin River, Utah; Which were in the Roberts Collection.

New Records;

Locality	Date	Elev.	No.	Collector
Santa Clara, Wash, Co., Ut.	12/6/40	3,000	11	H.P.C. & Beck
Calf Cr., Escalante Ri. Ut.			2	D. E. Beck
" " " " "	7/31/39		1	H.P.C.
Richfield, Ut.	7/15/29		4	(Light Trap)

Remarks; Most of the specimens which I have seen ranged from 3.2-3.5 mm. in length, This is somewhat smaller than the size given in the description.

Coleambus medialis Lec.

Oval, color varying from abbotestaceous to brownish yellow above, black beneath; head more or less infuscate at sides; prothorax with a small median fuscous spot, rarely entirely lacking, front and rear margins slightly of scarcely infuscate, more rarely broadly so; elytra with broad suffused fuscous markings, which usually fail to attain the base, and are not infrequently so faint as to be only traceable in certain lights. Punctuation moderately close, becoming gradually a little coarser and denser posteriorly on the elytra, the sutural and first discal series of coarser punctures quite irregular and conspicuous, the second (intrahumeral) usually less marked; beneath coarsely punctate. Length 3.2 to 3.5 mm.; width 1.75 to 2 mm. (From Fall 19;12)

Type locality; San Diego, Cal.

Distribution; This species is recorded in literature form California, Nevada, Arizona, and Texas.

New Records;

Locality	Date	Elev.	No.	Collector
Lynndyll, Ut.			2	V.M.T.
Salem Pond, Ut. Co., Ut.	9/22/40	4,500	1	H.P.C.

Remarks; The separation of this species from virgo by the elytral maculation is in my opinion not to reliable. When large enough series of these two species have been collected to determine the relationship, we may find that our Utah specimens placed in medialis are more closely related to virgo.

Coelambus patruelis Lec.

Moderately elongate oval, color as a rule, rather clear flavo-testaceous with usual elytral cloud; the outer antennal joints, sides of the front, small discal spot and basal margin of the prothorax infuscate. Surface shining in the male; shining or dull in the female. Body beneath black, polished, with the usual coarse lateral punctuation. Front tarsi of male strongly dilated, the second joint perceptibly wider than the basal one. Length 3.6 to 3.9 mm.; width 1.8 to 2mm.

Type locality; Fort Laramie, Nebraska.

Distribution; This species is recorded in the literature from Nebraska, Wyoming and Manitoba.

New Records;

Locality	Date	Elev.	No.	Collector
Lost Lake, Uinta Mt., Ut.	8/26/40	9,800	5.	H.P.C.
Sheep Cr., Uinta Mt., Ut.	6/ /26	8,000	3	V.M.T.
Salamander L. Mt.Timp., Utah		7,600	1	"
" " " " "	8/26/40	"	3	H.P.C.

Remarks; The single specimen of this species which we have from Minnesota does not agree to well with our Utah specimens which may prove to be new.

Coelambus tumidiventris Fall

Oval, moderately convex; head, thorax and legs rufotestaceous, elytra pale flavotestaceous to dull yellow, body beneath black. Head black or fuscous at sides and vertex; prothorax with basal

and apical margins sometimes narrowly infuscate, a small fuscous discal spot, rarely lacking; elytra with variable blackish or fuscous markings, which in the type consist of four well defined vittae on each, the two inner ones entire, the two outer interrupted; but in the greater number of specimens the vittae are more or less completely fused posteriorly or even throughout. Antennae with the outer joints lightly infuscate at their apices. Integuments polished in the male, in the female the surface may be either shining like the male or finely alutaceous and dull both above and beneath. Head and thorax finely sparsely punctate, elytra with intermixed fine and coarser punctures, the suture and two discal series of coarser punctures distinct as far as the middle. Beneath moderately punctate; last ventral obtusely tumid each side, the tumidity stronger and more punctate, in the male. Front and middle tarsi of male rather strongly dilated, the second joint widest, but less conspicuously so than in the three preceding species. Length 4.2 to 4.5 mm.; width 2.15 mm.; to 2.4 mm. (From Fall 1913)

Type locality; "Stony Mountain, Man."

Habitat- This species was found abundant in the latter part of April in the shallow protected waters of Utah Lake.

Distribution; This species is recorded in literature from Manitoba; Alberta; Colorado; and the Virgin River, Utah

New Records;

Locality	Date	Elev.	No.	Collector
Bear Lake, Idaho	6/ /26		1	V.M.T.
Provo, Utah Lake, Ut.	5/2/39	4,500	3	H.P.C.
" " " "	5/21/39	"	2	"
" " " "	4/24/41	"	50	"
Willow Cr., Castlegate, Ut.	6/15/39		1	"

Remarks- Those specimens collected at Utah Lake had the vittae one to five of the elytra united into a solid cloud, hence would not run to this species in Falls key. The tumidity of the last ventral and the male reproductive organs show that they are that species.

Coelambus masculinus Cr.

Elongate, slightly obovate, elytra pale flavotestaceous, head and thorax a little more rufous, beneath black. Surface shining in the male, finely alutaceous and dull in the female. Punctuation of head and thorax fine, not dense, very slightly coarser along the base of the latter; elytra finely, quite densely and very evenly punctate, the series of coarser punctures entirely lacking. Head entirely pale, clypeus finely margined. Prothorax a little narrower at base than the contiguous base of the elytra, sides feebly arcuate or nearly straight, not very strongly convergent in front and not continuous with the sides of the elytra; base very narrowly dusky at middle, otherwise entirely pale. Elytra each with four narrow vittae and the suture, black; vittae 1 and 3 abbreviated at base, 4 abbreviated apically, 3 and 4 with a tendency toward interruption at middle. Body beneath finely alutaceous, sides of metasternum, sides of abdomen at base, and last ventral segment more coarsely punctate, elsewhere sparsely finely punctate. Anterior tarsi of male rather strongly dilated, the claws very long, broadly laminiform, dilated at middle, the anterior one a little shorter and less acute at tip. Length 4.5 mm.; width 2.3 mm. (From Fall 19;17)

Type locality; Lake Lebache, British Columbia ?

Habitat- I have seen this species with tumidiventris in the temporary pools and shallow protected waters near the shores of Utah lake in the spring. These pools were lacking in vegitation and the habits of this species were much like those of Hydroporus striatellus Lec.

Distribution- This species is recorded in literature from British Columbia, Manitoba and Dakota.

New Records; this is the first time it has been reported from Utah.

Locality	Date	Elev.	No.	Collector
Utah Lake, Provo, Ut.		4,500	2	V.M.T.
" " " "		"	3	L. Hayward
" " " "		"	2	C. Cottam
" " " "		"	1	D. E. Johnson
" " " "		"	1	H.P.C.
" " " "	4/24/41	"	25	"

Coelambus unguicularis Cr.

Form oval, not or scarcely twice as long as wide, fulvotestaceous above, black beneath. Male shining, female dull. Head at the extream base, a small discal spot and the middle of the base of the prothorax, and the suture and four vittae on each elytron blackish or fuscous. The elytral vittae are rather wide, the outer most one shortest, interrupted at middle and often more or less confluent with the next inner one. Head and thorax not very closely punctulate, the punctures a little closer along the thoracic

base; elytra densely, rather finely punctate, without series of coarser punctures. Beneath alutaceous in both sexes, punctuation moderate in coarseness, typical in distribution. Front tarsi of male broadly dilated, the second joint, not or only just perceptibly wider than the first both claws stout, acuminate, the anterior one but little more than half as long as the outer. Length 5 to 5.5 mm.; width 2.6 to 2.8 mm.

Type locality; British Columbia.

The Utah specimens in our collection are somewhat smaller (4.7 to 5.2) than the examples from British Columbia which range from 5.4 to 5.7 mm.

Distribution- This species is recorded in literature from British Columbia, Manitoba, and Colorado.

New Records; This is the first record of this species From Utah.

Locality	Date	Elev.	No.	Collector
Sheep Cr., Uinta Mt., Ut.	6/ /26	8,000	1	V.M.T.
Aquarius Plateau, Ut.	6/ /36	9-10,000	10	W.W. Tanner

Remarks; Our Ut. specimens are somewhat smaller in size than the average from British Columbia.

Coleambus impressopunctatus Schall.

Oblong oval, above yellowish testaceous to dark ferruginous, head at sides and behind, and base of thorax more or less infuscate; elytra either more or less evidently vittate or with the vittae suffused into a broad dorsal cloud, or with the entire surface brownish piceous; beneath black. Head finely punctate; prothorax unevenly punctured, finely so in front, with numerous coarser punctures conspicuously intermixed with the usual discal lines of

coarse punctures regular and impressed in basal half, becoming obsolete at or behind the middle. In the female the elytra are generally more densely punctate and dull, the intermixed fine punctures less evident and the impressed discal lines feeble or wanting; some females, however, have the elytra shining and punctate as in the male. Beneath moderately coarsely punctate, alutaceous opaque in the dull females, more shining in the males. Tarsi rather broad in both sexes, but evidently wider in the male, the basal joint slightly narrower than the second, the anterior claw of the front tarsus of male thicker and more strongly curved, apparently shorter than its fellow when viewed from the front. Length 4.5 to 5.4 mm.; width 2.3 to 2.7 mm. (From Fall 19;20)

Habitat- This species was taken among the weeds and trash along the banks of the slow moving stream between the marsh south of Provo and Utah Lake.

Distribution; This species is circumboreal. It has been reported from Europe, Siberia, and Northern United States and Canada

New Records- This species is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Provo, Ut.	6/7/36	4,500	1	H.P.C.
" "	2/28/38	"	1	"
" "	7/10/37	2	2	"
" "	4/21/39	"	1	"
" "	4/23/39	"	3	"
" "	6/21/39	"	1	"
" "	3/9/41	"	1	"
" "	3/24/41	"	2	"
Aquarious Plateau, Ut.	6/ /38	8-10,000	1	W.W.Tanner

Remarks; Ther are mayy varieties of this species as one would expect of a species with such wide distribution. At least two distinct varieties occur in Utah.

Genus Hydroporus

This is the largest genus of all the Dytiscidae or of all the water bettles. It includes 130 - 150 species from North America. Many of these are similar in color and form and are very hard to separate. In most collections they are usualy sadly neglected because of smallness of size, failure to recognise the number of species present and difficulty of classification.

The genus is characterized by its small size usually under 6 mm., by the absence of the scutellum, elytra rounded behind, epipleura with out an oblique basal carina, the base of the prosternal process depressed to the leval of the prosternum, the hind coxal process raised above the sternites, the apex of the hind coxal processes truncate or emarginate medianly, but not with two emarginations on each side of the center, front and middle tarsi with fourth joint small and hiddem between the lateral lobes of the third, the posterior femur not obtaining the coxal processes but separated by the trochanters.

KEY TO THE UTAH SPECIES OF HYDROPORUS
(Modified from Fall 1923)

1. Mesial lone between posterior coxal processes not in the least abbreviated behind, the apex either truncate or more or loss angularly prominent at middle (Fig // &/2), elytra rarely relieved by any definite markings subgenus Hydroporus 2.

   Mesial line between the posterior coxal processes more or less abbreviated behind, the lateral lobes more produced posteriorly (Fig./3) Often with conspicuous vittae or spots 3.

2. Posterior coxal processes conjointly more or less angulate medially at tip. (Fig.//) Metasternum not sulcate, elytra nearly uniform in tint, species small, more depressed than usual; pubescence almost wanting; body beneath generally black or fuscous, at least in part.

Hind trochanter elongate, their posterior margin more nearly in line with that of the femur and not very much shorter than the length of the latter between their apex and the knee; prosternal intercoxal prominence obsolete. vilis Group

Posterior coxal processes truncate at apex or very nearly so (Fig. 12) the tip at most only very slightly more advanced at middle than at sides. Body above commonly brown to black, body beneath wholly or predominantly black; metasternum not sulcate at summit niger-tenebrosus Group

3. Body beneath excessively densely micro-punctulate but without scattered larger punctures; hind thighs densely punctate over their entire surface, pronotum without sublateral impressed line or fovea. Sub genus Deronectes

Body beneath more or less punctate as usual; hind thighs with a median line of setigerous punctures, otherwise sparsely punctate or nearly smooth; pronotum with sublateral longitudinal impressed line or fovea. subgenus Creodytes

Vilis Group

This small group of rather closely allied species is typically Western in distribution. There are seven known species all of which are not longer than 4 mm.. They are inconspicuous in color, the upper surface varying from yellowish brown to fuscous brown. The thorax is usually a little darker than the elytra. The form is depressed, the thorax and elytra are continuous in out line. Pubescence is almost wanting. The pronotum is gradually declevious toward the front, the intercoxal prominoe and anterior file obsolete or only faintly indicated; the metasternum is not sulcate; the coxal lines are parallel or nearly so, the posterior trochanters are longer in proportion to the length of the femur than elsewhere in the genus. There is little or no appreciable difference in the tarsi and none in the surface luster of the sexes.

KEY TO THE UTAH SPECIES OF THE VILIS GROUP

1. Size larger (3.75 - 4 mm.), elytra very finely punctate
hardyi

Size rarely over 3.5, elytra more widely punctate
planiusculus

Hydroporus hardyi Sharp

Sharps discriptions were in latin. I quote here his discription and remarks.

"Ovalis, minus convexus, latiusculus, sine pubescentia, submitidus, abdomine pectore nigris, antennis pedibusque rufis; elytris sparsim subtilissime punctatis; prosterni processu latiusculo; coxis posterioribus subtiliter punctatis; abdomine segmento ultomo confertim subtiliter punctato. Long. 4, lat. 2¼ mm."

"I have seen only one individual of this largest species of the group, it is rather larger than our European H. lituratus."

"North America (California, found by Mr. Hardy)."

This species was unknown to Fall(23; 57), who remarks as follows "Very little may be gathered from the description except that the species is of rather broad form, with exceptionally finely punctate elytra, and of large size for the group; which characters may indeed be quite sufficient for its recognition when it again turns up."

Among the large series of Hydroporus planiusculus which I collected at the mouth of Calf Creek on the Escalante river were three specimens easily separated from the others because of their larger size. Upon comparison it was found that the punctures were

much finer and somewhat lengthened longitudinaly, with the tendency to arrange themselves in short longitudinal rows. The integument is more evidently alutaceous. The punctures beneath are lightly impressed. The coxal lines do not reach the metasternum. This species does not agree very well with the above description in the matter of size which is as follows- Length 3.7-3.8 mm.; Width 1.8- 1.9 mm. Due to its agreement in the matter of punctation and larger size I have placed my specimens for the present in hardyi rather than describe them as a new species.

New Records- This is the first record of theis species for Ut.

Locality	Date	Elev.	No.	Collector
Escalante Ri., Calf Cr., Ut.	8/1/39		1	H.P.C.
E " " " " "	8/2/39		2	"

Hydroporus planiusculus Fall

Length 2.9 - 3.3 mm.; Width 1.4 --1.6 mm.; Ovate oval, quite depressed, surface finely alutaceous but more or less shining, pubescence almost wanting, the side margins of the thorax continuous in width; Head and thorax ferruginous brown, the color diluted along the margins; Antennae rufous, not or scarcely darker apically.

Elytra yellowish brown or brownish ferruginous, varying considerably in depth of tint, punctation rather fine, not close, nearly evenly dispersed. Body beneath black, finely alutaceous, moderately punctate at sides; Legs rufous.

Type locality- Mt. Adams, White Mt. of New Hampshire.

Habitat- The author took a large series of these from beneath a rock on the bank of a small pool left by the short floods due to rain storms in one of the dry canyons on Calf Creek near the Escalante River. They werealso taken from a small pond near Provo.

Distribution as listed in literature- New Hampshire, Quebec, Mich., Iowa, Minn., Manitoba, British Columbia, Idaho, Colorado, and New Mex. Tanner (40;120) lists this species from the Escalante River and the Uinta Mt. The exact records are included in the new records below.

New Records;

Locality	Date	Elev.	No.	Collector.
Tryol L., Uinta Mt., Ut.		9,600	1	V.M.T.
" " " " "	8/29/40	"	5	H.P.C.
Payson Can., Ut.	7/22/39		2	H.P.C.
Provo, Ut.	10/ /38	4,500	1	"
" "	4/21/39	"	1	"
" "	5/14/39	"	1	"
" "	3/9/41	"	14	"
Willow Cr., Castlegate, Ut.	5/15/39		1	"
Calf Creek, Escalante Ri., Ut.	8/1/39		19	"
"	8/2/39		1	"
"	8/4/39		1	"
St. George, Utah.	12/7/40	2,800	2	"

NIGER-TENEBROSUS GROUP

This subdivision of Hydroporus includes 43 of the total number of Hydroporus. The group may be easily recognized by the following characteristics, a monotonous uniformity of color, brown or blackish, entirely unrelieved by bright markings; the truncate posterior ocxal process; form moderately convex; integuments evidently pubescent, some species rather conspicuously so. The prosternal anterior intercoxal prominence is present, as is the file like declivity in front. The prosternal process is elongate and convex; the metasternum without the median sulcus. The females are duller in surface luster than the males in a few species. The pro- and mesotarsi of the males are wider than those of the females although sometimes this is scarcely detectible. The anterior claw of the protarsus of the male is often modified in any or all of the following manners, a little thicker, more abbuptly bent at base or tip, with the inner edge somewhat sinuate, or shorter than the posterior claw.

Key to the Utah Species of the NIGER-TENEBROSUS GROUP

1. Large size (4.6 to 5.6 mm.), form more ovate, elytra slutaceous or chargrined faintly minutely punctate, epipleura rufous. 2.

   Size large or small (3.3 - 5.2 mm.), elytra more distinctly punctate, 4.

2. Anterior tibiae rather strongly sinuately narrowed within at base in both sexes, larger broader, punctures hardly visible
   sinuatipes

   Anterior tibiae with inter edge straight, more elongate form, the punctures small but visible. [illegible] 3.

3. Legs, epipleura, prosternum, mouthparts rufous axillaris

Femur, epipleura, prosternum and mouth parts black or piceous, the minute punctures of the elytra arranged in transverse rows. transpunctatus sp. nov.

4. Size moderate, 3.5 - 4.5 5.

Size rarely as great as 3.5 6.

5. Smaller (3.9 - 4.1 mm.) Anterior claw of male protarsus short, third joint noticeably narrower than first and second. pervicinus

Larger (4. 4.5 mm.) sides more parallel despectus

6. Side margins of elytra strongly arcuately ascending at base (2.8-3.2 mm.) tristis

Side margins of elytra not strongly ascending, the angle made with the side of the thorax much more obtuse (3.3-3.5 mm.) occidentalis

Hydroporus axillaris Lec.

Length, 4.6-5.2 mm.; Width, 2.35-2.7 mm. Moderately elongate, oval, widest at middle. Upper surface feebly shining, rather densely finely pubescent, minutely alutaceous and very finely not closely punctate. Head fuscous, front and rear margins rufescent. Antennae fuscous, paler at base; Prothorax black.; Elytra dark brown to black, humeral margin pale, the pale color not infrequently extending along the base in a more or less interrupted fascia nearly to the suture. In some specimens there are also indistinct transverse series of small pale spots just before the middle, at posterior third and at apex. Body beneath black, the coxal plates finely sparsely punctate, metasternum and abdomen more coarsely so, the punctures becoming quite dense at the ventral apex. Legs rufous or rufopiceous. Front and middle tarsi rather broad in both sexes, slightly wider in the male; claws of the front tarsus of male rather small and slender, the

anterior one a little more curved and distinctly shorter, but scarcely stouter, and not sinuate on its inter margin

Type locality- "Colorado River"

Distribution in literature; Texas, New Mexico, Arizona, California and Oregon.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Santa Clara, Utah	5/9/41	3,000	2	H.P.C.

Hydroporus sinuatipes Fall

Length, 5.25-5.75 mm.; Width, 2.7-2.85 mm. Oblong oval, widest at middle, nearly or quite twice as long as wide. Upper surface rather feebly shining, distinctly grayish ochreous pubescent and finely nearly evenly punctate, as in the allied species. Head and thorax piceous black, the margins obscurly r rufous or rufescent. Antennae with outer joints piceous except at base, basal joints pale. Thorax with side margins narrower than in niger; Elytra brown or piceous brown, margins indefinetely paler. Body beneath blackish to rufopiceous, the sides of the ventral segments sometimes obscurely marked with rufous. Punctation rather sparse, not coarse, the punctures of the coxal plates just perceptibly finer than those at the sides of the ventral segments. Legs rufous, front tibiae in both sexes distinctly sinuate within basally, making them appear subpedunculate. Front tarsi moderately strongly dilated in the male, the claws equal, slightly stouter than in the female, not appreciably sinuate within.

Type locality- Described from a series of specimens from Corvallis, Oregon; Olympia, Washington; Fraser Valley and Bon Accord, British Columbia.

New Records; This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Salem Pond, Ut.	9/22/40	4,500	1	H.P.C.

Remarks; This species agrees only moderately well with our Utah specimens.

Hydroporus despectus Sharp.

Length, 4-4.5 mm.; Width, 2.15- 2.25; Elongate oval, widest at or very near the middle of the length pubescence rather long conspicuous, ochreous grey in color; without apparent sexual difference in surface luster; Head and prothorax black, the fromer with front and gear margins rufescent. Antennae piceous, paler at base. Elytra piceous brown, throughout indluding the epipleura, rather finely and evenly punctate, the punctures separated by about 1½ to 2 times their width. Body beneath black, the sides of the ventral segments sometimes with obscure rufous spots. The posterior coxal process is not at all prominent medially, being usually barely perceptibly arcuatotruncate, without trace of sinuation on either side of the middle. Legs rufous, thighs more or less piceous in basal half or two thirds. The third protarsal joint of the male is a little smaller, not at all wider than the preceding joints, and a little longer than wide.

Type locality- Canada

Distribution in literature; "Canada", Massachusetts, New Hampshire, Michigan, Alberta, British Columbia, and Idaho.

New Records; This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Provo, Utah	4/25/36	4,500	1	H.P.C.
Provo, "	6/15/36	"	1	"
" "	3/19/37	"	1	"

Remarks; As in the following species, this species is very difficult to separate and could well be studied further with more material.

Hydroporus previcinus Fall

Length 3.9 - 4.1 mm.; Width, 1.85 - 1.05 mm.; Elongate oblong-oval, the form, color and sculpture very nearly as in despectus. Front tarsi of the two species are about equal, but the third joint is here sensibly smaller, scarcely as wide as the second, the claws distinctly unequal, the anterior one evidently shorter and thicker than the other.

Type locality- Lake Tahoe, California.

Distribution in literature; California, Colorado (8-9,000 ft.), British Columbia.

New Records; This is a new record for Ut.

Locality	Date	Elev.	No.	Collector
Aspen Grove, Mt. Timp., Utah	8/1/38	7,000	1	H.P.C.
Lost L., Uinta Mt., Ut.	8/26/40	9,800	5	"

Hydroporus occidentalis Sharp.

Length, 3.3 -3.6 mm.; Width, 1.6 - 1.7 mm.; Narrowly oblong oval, black or piceous, elytra often brownish; clypeal and occiptal margins of the head, and lateral margins of the thorax more or less obscurely rufous. Integuments distinctly alutaceous, surface moderately shining, the females usually somewhat duller; pubescence moderate. Upper surface moderately punctate, the thoracic disk more finely and sparsely so medially; body beneath more coarsely punctate. Antennae piceous with base more or less pale. Elytra uniformly piceous brown to black, faintly paler along margins. Body beneath is black. Legs rufous, front tarsi of male moderately dilated, third joint slightly narrower than the first or second; claws small, slender, not sexually modified.

Type locality- Lake Lebaohe, British Columbia.

Habitat- In Utah this is one of the mountainous species, occuring from 7,000 to 10,000 ft.

Distribution in literature; British Columbia, Montana, Idaho and Colorado.

New records; This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Mirror L., Uinta Mt., Ut.	8/23/40	10,000	8	H.P.C.
Lost L., " " "	8/26/40	9,800	2	"
Grandady L.s," " "			2	V.M.T.
Payson Canyon, Utah	7/12/39		3	H.P.C.

Hydroporus transpunctatus Sp. Nov.

Male length 5. mm.; Width 2.4 mm.

Female length 4.8 mm.; Width 2.35 mm.

General form evenly elyptical (Fig/4); integuments shining alutaceous, elytra of male less alutaceous. Ventral side almost entirely black.

Head black except for a sharply defined transverse fufous patch on the vertex, underside black. Antennae and mouth parts piceous, a little less so on the under side and at the base of each segment.

Pronotum alutaceous with disk finly and sparcly punctured, margins more closly and coarsly punctured especially in the male, lateral edges finely but distinctly margined.

Elytra a clear piceous brown; the suture black; the inflexed edge, which covers the black side pieces of the ventral segments, appearing black; a faint longitudinal row of coarser punctures about a third of the width of the elytra from the suture. Punctures of the elytra small arranged in transversly elongate reticulate rows,(Fig.), the distance between the rows about 2 - $2\frac{1}{2}$ the distance between the punctures in the same row. Pubescence fine, about twice the distance between the rows of punctures in length.

Prosternum and epipleura black.

Metasternum and coxal plates finely and sparsely punctured, punctures coarser at sides, less so in female.

Ventral segments faintly and sparsely punctured except the sides of the first and second segments of the male which are

coarsely and closely punctured and the posterior half of the last segments of the female with obscure rufous spots at sides.

Legs black except the inter sides of the tibia and tarsus, which may be obscurely rufous.

Pro- (Fig. 15) and mesotarsi of male broadly expanded, the second segment of the protarsus slightly wider than the first segment which is slightly wider than the third. The second joint twice as wide as long, the third with the lobes as long as the basal part. The claws large the anterior one shorter, stouter and more curved at tip. Male mesotarsus with joints 1 to 3 slightly decreasing in width. General form similar to protarsi, claws small, a little larger than those of the hind tarsi.

Female protarsi (Fig. 16) resembling somewhat the male in general form, but much reduced; the fourth segment completely reduced, the fifth united with the bilobed third, so that the third appears trilobed, the posterior lobe somewhat reduced, Only one claw is developed, it is stout, small and evenly curved. Female mesotarsus not widly expanded.

Type locality; The author collected both the male Holetype and the female alotype on Aug. 1, 1938 at Salamander Lake (pond), Mt. Timpanogos, Ut. Co., Utah.

The Holotype is labled "Aspen Grove Ut., No. A534, 8/1/38" It will be deposited in the collection at the Brigham Young University. The Alotype is labled "Aspen Grove Ut., No. A535, 8/1/38", it will remain in my personal collection.

The arrangment of the punctures of the elytra in lines is

more evident if a source of light from above is used. The punctures are quite small but quite evident if a good magnification is obtained. This species would likly be run to axillaris in Fall's key. It may easily be separated by the greater amount of piceousness of the under surface and mouthparts, and the arrangement of the punctures of the elytra. The modification of the female protarsus is quite unique.

Hydroporus tristis Payk.

Length 2.8 - 3.2 mm.; Width, 1.35 - 1.5 mm.; Narrowly oval, widest at or very near the middle of the length, outline not quite continuous, a very slight angle at the junction of the prothorax and the elytra. Integuments finely alutaceous; thinly pubescent moderately shining in both sexes.

Head large, rufous or rufotestaceous, sometimes feebly or vaguely clouded between the eyes, finely sparsely punctulate. Antennae rather slender, pale at base outer joints more or less dusky. Thorax similarly punctulate on the disk margins more coarsely and closely so, lateral bead fine; color black, varying to brownish to rufopiceous at sides or over the entire surface. Elytra reddish brown with the disk darker, especially posteriorly; moderately punctate. Body beneath black to redish brown, sides sparsely morecoarsely punctate than above. Tarsi a little wider in the male, but the difference is not very noticeable; protarsal claws small, equal, not sexually modified. Legs rufous.

Distribution in literature- Fall states "This species is

widly distributed throughout the circum polar regions of the earth". It is listed from Washington, British Columbia, Alaska, New Mexico and Verginia.

Remarks; From the distribution records it seep that this species should occur in Utah but I know of no record of it.

Subgenus DEROMECTES Sharp

This group includes 14 species from the United States, most of which are western in distribution. It is charaterised by the emarginate apex of the conjoined posterior coxal processes, the excessively dense and uniform micro-punctulation of the under side of the body, the more or less evident unevenness or wrinkling of the surface and by the lack of any ordinary punctures. The species of this group are usually more or less varigated with black, yellow or rufous. The sexual modifications of the tarsi are on the whole not very conspicuous.

KEY TO THE UTAH SPECIES OF SUBGENUS DEROMECTES

1. Elytra with more than two discal series of punctures or striae on each elytra 2.

   Elytra with only two faint discal series of punctures, the first or sutural half as far from the suture as the second is from the first. 3.

2. Form more broadly rotundate oval and strongly convex, middle coxae more widely separated, elytra with discal series of punctures somewhat confused, dark species with small yellow markings

   corvinus ?

Form broadly oval, elytra with several distinctly impressed and entire discal striae of equal distinctness *stritellus*

3. Form broader, less than twice as long as wide; sides of thorax and elytra less continuous in outline; lateral margin of thorax slightly increasing in width posteriorly; elytra striae more impressed *aequinoctialis*

Form narrower, twice as long as wide or very nearly so; sides of thorax and elytra continuous in outline; lateral margin of the thorax uniform width; elytral series of coarser punctures scarcely impressed 4.

4. Elytra vittae are usually separated and well difined, united only in two small discal and three submarginal spots, smaller size (3.9-4.25 mm.) *coloradensis*

Elytral vittae much more confluent size larger (4.3 -4.9 mm.) *griseostriatus*

Hydroporus (*Deronectes*) *corvinus* Sharp

This species is listed by Needham and Christenson 1927 from northern Utah, stating that it is very common. Fall (1923) records this species only from Arizona, Texas, and Northern Sonora Mex.??. I an inclined to believe that this Utah record is in reality *striatellus* Lec. *Hydroporus striatellus* Lec. would run to corvinus in Falls key if it were assumed that the form was "more broadly rotundate oval and strongly convex, with the middle coxae more widely separated". Since these are comparative terms it is easy to see how one not aquainted with the species might fall into error.

Hydroporus (Deronectes) Striatellus Lec

Length - 3.8 - 4.6 mm.; Width 1.9 - 2.4 mm.; Shape suboblong oval integuments densely finely punctate, upper surface varying from almost solid black through many modifications of black and yellow to solid yellow, densely clothed with fine appressed pubescence, lower surface black except the epipleura, hypopleura and legs which may be tinged with piceousness. Head with transverse reddish vertex spot, usually connected with a rounded central spot. Antennae with outer joints piceous. Pronotum with varying lateral dark spots connected anteriorly or sometimes compleatly connected. Elytra each with seven striae, the outer ones sometimes faint.

Type locality- San Diego and San Francisco.

Habitat- Found liveing in a great many different types of environments such as shallow alkali or acid lakes, reservoirs, springs, which usually have little vegitation other than diatomaceous sludge on the bottoms and banks. I have ovserved them in muddy water with a visability of about 1½ - 2 inches. They are active swimmers and as they have little place to hide they are continually to be seen moving about on the muddy bottoms, making an occational trip to the surface for air, than darting to the bottom again.

Distribution; This species is recorded from California, Arizona, New Mexico, Texas, Colorado and Montana. Tanner records it from Zion National Park, later from Moab, Mill Creek and Natural Bridges, Utah.

New Records;

Locality	Date	Elev.	No.	Collector
St. George, Ut.		2,800	6	V.M.T.
" " "	12/7/40	"	2	H.P.C.
Santa Clara, Ut.	12/6/40	3,000	6	"
Zion Nat. Park, Ut.			1	Woodbury, A. M.
Escalante Ri., Calf Cr., Ut.	8/2-14/39		14	H.P.C.
Ten Mile Escalante Des., Ut.	8/ /36		4	V.M.T.
Willow Tanks " "	"		1	"
The Hall " " "	"		4	"
Moab, Ut.			3	"
La Sal, Ut.			1	J. Kartchner
Nat. Bridges Nat. Mon., Ut.			15	V.M.T.
San Rafael Swell, Utah	5/11/40	5,000	8	H.P.C.
Cane Springs, Ut.	7/ /25		1	V.M.T.
Payson Canyon, Ut.	7/22/39		13	H.P.C.
Aspen Grove, Ut.	8/1/38	7,000	1	"
Daynes L., Uinta Mts., Ut.			3	V.M.T.
Granddady Lakes, Uinta Mt., Ut.			3	"
Clyde Lake, Uinta Mts., Ut.			1	"
Oakley, Idaho			2	"
Lower Gyser Basin, Yel.Stone Park, Wyoming			5	"

From the above list we may deduct that this species is one of the most widely distributed in the State of Utah. It is found from lower Sonoran alkali ponds to high elevation acid lakes and bogs.

Remarks- Our Great Basin form is somewhat narrower than the California Coastal form as pointed out by Fall. However some of the specimens from Santa Clara resemble the coastal form in width. This species is probably the most common of all the water beetles in Utah.

Hydroporus (Deronectes) aequinoctialis Clark

Length, 4.3 - 4.8 mm.; Width, 2.15 - 2.5 mm.; General color and shape oval moderately elongate, usually rather less than twice as long as wide; black, variegated above with rufotestaceous; evidently pubescent, feebly shining, ~~finely shining~~, finely very densely punctate throughout; Head black, with transverse vertical and rounded central spot, usually connected, rufous. Prothorax with short basal and longer lateral longitudinal rugae; rufous, the anterior margin and a large spot on each side of the middle connected along the basal margin, black. Elytra with sutural, two discal, and a feebler imprefect lateral series of coarser punctures, the inner ones more strongly impressed; thereare also a few interstrial coarser punctures, more evident toward the apex; color black, with basal, median, and subapical transverse series of more or less elongate yellow spots, which show a tendency to transverse confluence, more especially the lateral ones of the median series. Body beneath black, opaque, excessively densely micro-punctate and feebly irregularly ruguloso. Legs brownish red. (From Fall)

Type locality- Mexico

Distribution as recorded in literature includes Mexico, Arizona, New Mexico, Texas and Utah. The Utah record was collected by Wickham at St. George and reported by Fall.

Remarks- I Have not seen this species but is should not be hard to recognize.

Hydroporus (Deronectes) griseostriatus De Geer

Length, 4.3 -4.9 mm.; Width 2.05 -2.5 mm.; Shape elongate oval, sides of thorax and elytra continuous in outline, surface dull or at most feebly shining, densely finely punctate and evidently pubescent. Head yellow, broadly black within the eyes, and narrowly along the middle of the base, leaving a transverse vertex spot narrowly connected with a triangular frontal area, pale; antennae pale at base, blackish beyond the middle. Prothorax yellow, with a black spot of variable size each side of the middle, sometimes confined to the disk, sometimes attaining basal and apical margins; sides margins narrow and of uniform width. Elytra yellow, each with seven blackish vittae, the one nearest the suture usually narrower and often subobsolete. In the typical form the vittae are quite regular, but there are all degrees of obliteration or suffusion, so that the elytra may become predominantly yellow, or with the disk almost totally black. The lines of serial punctures are not impressed, and the sutural and lateral series are especially feebly marked. Body beneath black, opaque, very densely micropunctate, coxal plates with traces of fine rugulosity. Legs rufous, thighs sometimes a little infuscate, tarsi darker. The anterior tarsi are slightly broader in the male, the claws not appreciably modified. (From Fall)

Distribution- This species is circumboreal in distribution. It is recorded in literature from northern Europe, Siberia, and N Northern America, extending south to Pennsylvania, Iowa, New Mexico, Arizona, and California.

New Records; The following ar the first records of this species from Utah.

Locality	Date	Elev.	No.	Collector
Tryol Lake, Ut.(Uinta Mts.)			1	V.M.T.
Hoewer Lake, Uinta Mts., Ut.	8/3/30		1	"
Soapstone, " " "			1	"
Sheep Cr., " 2 "	6/ /26	8,000	2	"
Aspen Grove, Ut. Co., Ut.	8/11/38	7,000	1	H.P.C.
Provo, Ut.	6/15/36	4,500	1	"

Remarks; The above specimen from Soapstone was taken from the stomach of a trout.

Hydroporus (Deronectes) coloradensis Fall

Length- 3.9 - 4.25 mm.; Width- 1.9 - 2.25 mm. General color and shape similar to griseostriatus in every respect, except for the smaller size, somewhat more oblong form and less elevated prosternal carina. Elytra vittae are typically well defined but are united in 2 small discal and three submarginal spots. In one or the five specimens there is a much more marked fusion of the vittae.

No appreciable sexual differences are observable.

Fall states after the discription "I am by no means certain that this will prove to be really distinct from griseostriatus, but it at present seems to be separable."

Type locality- "Copeland,Res.," Boulder Co. Colorado.

The large series of specimens which I assign to this species do not agree to well with the above description. They have the prosternal carina in general more narrow and smaller than in griseostriatus. The elytral maculation is as described and quite constant.

Habitat- I found this species very numerous in small ponds along the stream running into Lost Lake, Uinta Mts. These ponds were below the high water shore line of Lost Lake, which is a semi-reservoir. The ponds had muddy bottoms, with no plants except a few inconspicous algae.

Distribution in literature- This species is recorded only from Colorado.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Lost Lake, Uinta Mt., Ut.	8/26/40	9,800	25	H.P.C.
Bear Lake Valley, Ut.			1	

Remarks- Leech sent me examples of a similar but some what different different species? from Colorado and states that he is not sure which is the above species.

Subgenus Oreodytes Seidlitz

This group includs thirteen species from North America, most of which are found in the north western part. I know of only two species from Utah, others may occur here however.

The group is closly related to the Deronectes, with which it is seprated from the other Hydroporus by the emarginate apex of the conjoined posterior coxal processes (Fig. 13). They differ however by the presence of larger punctures on the under side, the longitudinal line of setigerous punctures on the under side of the femur, and the sublateral longitudinal impressed line or fovea on the pronotum.

KEY TO THE SPECIES OF THE SUBGENUS OREODYTES

1. Sides of metacoxae coarsely punctate; scattered punctures of elytra evident; length 3 -3.15 *crassulus* Fall

   Sides of metacoxae finely punctate or roughened, elytra without scattered punctures; length 2.6 - 2.85 *congruus* Leo.

Hydroporus (*Oreodytes*) *crassulus* Fall

Length, 3. 3.15 mm.; Width, 1.75 - 1.8 mm. Broadly ovate, pointed behind, rather strongly convex, feebly shining, glabrous. Above fulvotestaceous, with black or fuscous markings. Integuments minutely alutaceous, with scattered rather fine punctures on the thoracic and elytral disks, these becoming obsolete toward the lateral margins. Head entirely pale. Antennae pale, the outer joints infuscate. Thorax with the front margin and a transverse median fascia limited by the lateral striae, fuscous, the two connected at middle; Elytra with suture very narrowly dark, and each with four or five blackish vittae abbreviated at base, the outer one and sometimes the sutural one interrupted, with tendency at certain points to transverse coalescence, first discal elytral series of punctures visible, second very faint. Body beneath black, coarsely punctate at sides; Legs pale, with tarsi dusky.

Type locality- Western Montana .

Distribution in literature- Montana, Washington and Utah. The Utah record was in the Horn collection and was reported by Fall.

New Records-

Locality	Date	Elev.	No.	Collector
Provo, Ut.		4,500	1	T. Swallow
"Kill Bare"	8/10/30		1	V.M.T.

Hydroporus (Oreodytes) congruus Lec.

Length, 2.6 - 2.85 mm.; Width 1.5 - 1.75 mm.; Very close to both obesus and crassulus but rather smaller than either, less stout than obesus, simmilar in form to crassulus. Typically there is a slight break in the outline, due to the fact that here the base of the thorax is not quite equal in width to the contiguous base of the elytra, but it is possible that this inequality may constant. Thorax is less transverse than in obesus and is typically entirely reddish brown; elytral vittae more diffuse, the surface devoid of punctures except for the two discal series, which though fine are quite distinct. The prosternal process is narrower than in either obesus or crassulus. The posterior tarsal claws small, as in obesus.

Type locality- Florissant, Colorado.

Distribution in literature; New Mexico, Arizona, Colorado, Montana, Alberta, British Columbia, and Washington.

New records; The following is the first record of this species from Utah.

Locality.	Date	Elev.	No.	Collector
Soap Stone, Uinta Mts., Ut.			1	V.M.T.

Genus AGABINUS

This genus differs from the following (Agabus) in the form of the hind coxal processes, which have the sides nearly straight (Fig./9) rather than having the tips enlarged in to knob like processes as is commonly the case. The prosternal process is quite broad, the tip acuminate, the base is broadly and thickly margined. This is a small genus containing only two species, both confined to western North America.

Agabinus sculpturellus Zimm.

This rather small species (6 m.m.) has the appearance of a small shining black Agabus. The upper surface is smooth shining black, upone close examination it may be seen to be faintly reticulate with very fine lines, within the reticulations are several faint punctures. The head has two rufous spots on the vertex. The body beneath is black with rufous spots along the sides of the ventral segments. The legs are not greatly specialized, the male hind and mesotarsi very slightly inlarged and with only a small patch of pubescence on the under side of the basal two joints. The shortest distance between the mesocoxa and metacoxal plates less than 2/5 the width of the latter measured along the same line.

Habitat; Our specimens were taken in a very small stream. They were found while dredging among water cress.

Distribution- Leech (41;53) records this species from California, Oregon and British Columbia.

New Records- This is a new record For Utah.

Locality	Date	Elev.	No.	Collector
St. George, Ut.	12/7/40	3000	1	H.P.C.
" " "	5/9/41	3,000	7	"

Remarks- Our single specimen does not agree to well with the characters set forth by Leech in his key to this genus. The width of the metasternal wings between the mesocoxa and the metacoxal plates is not less but slightly mor than two-fiths the width of the latter, measured along the same line. Also the reticulations are not concave. However some variation might be expected because of the distance separating this record form the coast localities.

Genus Agabus

This is one of the large genera of the Family Dytiscidae and is the best represented of all the genera of water beetles in Utah with 15 species and one subspecies. The species are of medium size (from 5 to 13 mm.) and more or less oblong oval in form. They may be separated from the other genera by the following characters, the eyes emarginate in front; scutellum visible; hind coxal processes with sides more or les concave, the tip enlarged into a flat knob like structure; hind femur with a short row of cilia on the lower posterior margin near the tip; hind tarsal claws equal.

This genus is widely distributed, but is more abundant at northern latitudes or high altitudes.

KEY TO THE UTAH SPECIES OF AGABUS.

1. Posterior margin of the pronotum not as wide as the middle of the pronotum or the anterior margin of the elytra cordatus

   Posterior margin of the pronotum wider than the middle of the pronotum, sides more or less continuous with those of the elytra 2.

2. Elytra testaceous with black longitudinal vittae, some times the vittae are more or less confluent so that the elytra are almost black. Anterior protarsal claw of male with small sub-basal tooth. disintegratus

   Elytra of one color, sometimes the margins paler. 3.

3. Lower face of hind tibiae with a series of punctures extending along the posterior margin from the base nearly or quite to the apex. 5.

   Lower face of hind tibiae without a series of punctures on the posterior margin or with but a very few near the base; accessory discal tibial punctures few or lacking 4.

4. Prosternal process broad, flatly convex, the anterior margin of the expanded part thickly margined. Shining dark redish species

with a testaceous vittae running from about the middle of the elytra at sides almost to the apex, sometimes partly obliterated semivittatus

Prosternal process narrower, varying from moderately convex to angularly or acutely carinate 10.

5. Size smaller (6.6 mm.); fine punctures of the elytra occuring at the intersections of the reticulations; prosternal process quite broad and flatly convex and evenly and finely margined hypomelas

Size larger (8. mm or more), if the elytra is punctured the punctures are very fine and do not occur at the intersections of the reticulations; prosternal process narrow or broad but not as broad as above. 6. 6.

6. Prosternal process very short and bent inward toward the tip, bluntly carinate at center; anterior protarsal claw nearly straight, posterior sinuate on inter edge; body quite convex above as view from the side. nigroaeneus

Prosternal process longer, tip more acute; convex but not carinate; body of more flatened form. 7.

7. Elytra fine and more or less of uniform size; prosternal process broader and smoother; male protarsus slightly inlarged. 8.

Elytra somewhat duller, reticulations large, varied with location and sex; male protarsus thickened but only slightly widened, anterior claw toothed basally. 9.

8. Size smaller (8 mm.), elytra without longitudinal light spot shortest distance between the mesocoxal cavities and the metacoxal plates less than half the length of the later (measured along a continuemation of the same line). seriatus

Size larger (9.5 mm.), elytra usually with longitudinal light spot near the lateral margin just behind the middle; the shortest distance between the mesocoxal cavities and metacoxal plates more than half the length of the later lugens

9. Pronotum testaceous or rufous with thick transverse black bar; elytra brown to blackish brown tristis s. st.

Pronotum and elytra piceous with margins rufous tristis crotchi

10. Small species (less than 7 mm.). 11.

Larger species (more than 7 mm.); elytra finely and minutely reticulate in males, females more corsely so 13.

11.2Anterior protarsal claw of male conspicuously toothed near the apex; small species (less than 7 mm.); surface distinctly aeneous punctulatus

Anterior protarsal claw of male not conspicuously toothed near the apex 12.

12. Head and thorax black, elytra piceous brown with humeral angle quite pale; reticulation of elytra coarse and irregular prosternal process flat and elongate, protarsal claws with inner edge straight curved at tip, last joint of tarsus long strigulosus

Body above almost the same color through out, reticulation of elytra fine with punctures at the intersections of the lines, prosternal process narrowly dialated, protarsal claws curved on inter side kenaiensis

13. Head, thorax and elytra redish brown austini

Head and thorax black, elytra brown to black 14.

14. Protarsus of the male very widely dilated, third joint twice as wide as fourth; anterior protarsal claw of male toothed near the apex, almost bifid griseipennis

Protarsus of the male moderately dilated, third joint evidently wider than fourth but much lessthan twice as broad; epipleura piceous obliteratus

Protarsus very weakly dilated, third joint just perceptibly wider than fourth; epipleura pale approximatus

Agabus cordatus Lec.

Very easily recognized by the small subcordiform thorax, which is not approached by any other of our species except rectus. The color is not truly black, the upper surface being rather piceous, obscurely tinged with rufous, and feebly aenescent. The four anterior tarsi of the male are moderately dilated, the protarsal claws not sexually modified. Length 8.7 to 9.2 mm. (From Fall 22;9)

Type locality Santa Fe, New Mexico.

Habitat; This species is frequently found in small running stream among watercress.

Distribution: Fall (1922) records this species from New Mexico, Colorado, Montana, and Utah (Ft. Douglas). Tanner list it as a new record for Uthhin 1940, p. 1.21.

New Records:

Locality	Date	Elev.	NO.	Collector
St. George, Ut.	12/7/40	3,000	7	H.P.C.
Table Cliff Mt., Ut.	6/ /36	9,300	3	V.M.T.
Escalante, Ut.			11	W.W.T.
Bear Ears, Ut.			1	I. Rasmussen
Hanksville, Ut.			3	W.D. Stanton
Payson Can., Ut.	8/10/37		2	H.P.C.
Spanish Fork, Ut.		4,000	4	E.Hardy
Hobble Cr. Can., Ut.	4/26/39		1	H.P.C.
Aspen Grove, Ut.	7/29/38	7,000	1	H.P.C.
Salt Lake City, Ut.			1	W.J. Gertsch

Agabus semivittatus Lec.

A strongly shining black species of medium size, the elytra with a sublateral yellow vitta in nearly the posterior half, which is, however, sometimes interrupted or quite obscure. Elytral reticulation fine and feeble, the areolae unequal and of irregular form. All the essential characters are set forth in the table of species. The very broad flattish prosternal process, itself widely margined for some distance behind the coxae, combined with the very small area of the basal tarsal joint clothed with glandular hairs

in the male afford a reliable means of identification. The four anterior tarsi are only just visibly dilated in the male, the pads of adhesive pubescence narrow and densely set with moderately small pallettes. Length 7.5 to 8.6 mm. (From Fall 22;10)

Habitat; This species was found in a small running streams among water-cress. All Utah records are in the Lower Sonoran zone.

Distribution; Fall records this species from Ontario, Canada; Ohio; Illinois; Nebraska; Louisiana; Texas; Coloradp; New Mexico and Arizona.

New Records; This is a new record for the state of Utah

Locality	Date	Elev.	No.	Collector
St. George, Ut.	12/7/40	3,000	13	H.P.C.
St. George, Ut.			1	V.M.T.

Agabus hypomelas Mann

Oblong oval, piceous or brownish piceous, distinctly aenescent; head in front, sides of thorax except at the hind angles, and sides of elytra, diffusely rufous; beneath piceous; antennae, mouth, epipleura and legs, rufous, the thighs in part dusky. Head notably large, prothorax with sides rather straight, not quite as wide at base as the base of the elytra, the outline, therefore, somewhat discontinuous; general form feebly obovate, the maximum width being at a little behind the middle of the total length. Surface reticulation rather fine, the meshes unequal, and toward the sides and apex exhibiting a secondary system of minute reticulation. The usual dorsal series of punctures are present on the elytra together with numerous minute punctules atethe intersections of the reticulating lines. In the male the four anterior tarsi are slightly thickened, but the glandular hairs of the lower surface cover on the first joint only a small apical area. The protarsal claws of the male are slender, equal, and absolutely simple, and seem to be precisely alike in the sexes.

Length 6.6 (From Fall 22; 13)

Habitat; In Utah this species is found only at very high elevations or the Hudsonian Zone.

Distribution; This species has been recorded from Alaska British Columbia and Washington.

New Records; This species is a new record for Utah

Locality	Date	Elev.	No.	Collector
Dimond Lake, Uinta Mt., Ut.	8/27/40	9,600	1	H.P.C.

Agabus seriatus Say

Elongatus oval, black, aenescent, moderately strongly shining, the occipital and sublateral elytral spots obsolete; mouth and antennae rufous, legs obscure rufous or rufopiceous; elytral reticulation fairly strong, the mesh irregular in form; minute punctures sparse, and for the most part within the meshes. Front and middle tarsi of male perceptibly but not strongly incrassate, the anterior protarsal claw not very strongly arcuately dilated posteriorly. Length 8 to 9.5 mm. (From Fall 22; 14)

Habitat; This species occurs mostly in running water. It is quite common throughout Utah.

Distribution; Fall records this species from Newfoundland and Washington D.C. to British Columbia; Oregon; Nevada; California and New Mexico. Tanner (28;271) records this species from Zion National Park, latter from the Escalante region. Leech writes me that he intends to separate our western type from the eastern. Just where the division in distribution of these two species will be I do not know.

New Records

Locality	Date	Elev.	No.	Collector
Driggs, Idaho			1	J. Kartchner
Antelope Is., Great Salt L., Ut.			1	J. Bee
Sheep Cr., Uinta Mt., Ut.	6/ /27		1	C.Cottam
Aspen Grove, Utah	8/1/38	7,000	2	H.P.C.
Provo, Utah		4,500	10	Lowell Miller
Provo, Utah	3/14/36	4,500	1	H.P.C.
Provo, Utah	3/20/36	4,500	1	H.P.C.
Provo, Utah	3/29/36	4,500	2	H.P.C.
Provo, Utah	4/23/39	4,500	1	H.P.C.
Provo, Utah	4/30/39	4,500	3	H.P.C.
Provo, Utah	8//40	4,500	2	H.P.C.
Provo, Utah		4,500	4	J.C. Fechser
Provo, Utah			7	Others
Springville, Utah	5/15/40	4,500	2	H.P.C.
Payson Can., Utah	8/10/37	4,500	1	H.P.C.
Payson Can., Ut.	7/22/39		1	H.P.C.
Payson Can., Ut.	7/18/40		1	H.P.C.
Salem Pond, Ut.	9/22/40		1	H.P.C.
Salem Pond, Ut.	1/18/41		20	H.P.C.
Indianola, Utah			1	W.M.T.
Nat. Bridges Nat'l Mon., Ut.			1	V.M.T.
Escalante, Ut.			1	V.M.T.
Calf Cr., Escalante Ri. Ut.	8/4/39		22	H.P.C.
Lower Escalante Ri., Ut.	8/11/39		1	H.P.C.
Uta Mt., Ut.			1	I. Rasmussen
Zion Nat'l Park, Utah	8/ 25/		1	V.M.T.

Agabus lugens Lec.

The color is black, often slightly aeneous, the small sublateral yellow spot of the elytra usually evident though often quite obscure, the antennae darker rufous or rufopiceous, the legs nearly back. The elytral reticulation is typically fine, slightly scabrous toward the sides and apex, the small unequal areolae each as a rule with a single minute puncture. Metasternum between mesocoxae and coxal plates much longer than in the allied species. Male protarsi moderately incrassate, the anterior claw varying from almost perfectly simple to more or less distinctly arcuately thickened toward the base, in the same fashion as in seriatus and brevicollis, there being some degree of modification except in rare instances. Length 8.5 to 9.5 mm. (From Fall 22; 15)

Habitat; This species is found in southern Utah in the Lower

Sonoran and the lower part of the upper Sonoran Zones.

Distribution: Fall (1922) records this species from British Columbia, California, Arizona, New Mexico, Colorado, Nevada and Utah (St. George). Tanner reports it in 1940 as a new record for Utah from the Escalante region. Several records of A. perplexus no doubt also belong here

New Records

Locality	Date	Elev.	No.	Collector
Zion National Park, Ut.	7/9/25		8	V.M.T.
Calf Cr. Escalante Ri,. Ut.	8/1/39		10	H.PC.
Escalante, Ut.			1	V.M.T.
Willow Tanks, Escalante Des. Ut.			1	D.E.Beck
Blanding, Utah			2	V.M.T.
Blanding ,Utah			4	Anson Call
Blanding, Utah			6	J.Kartchner
Blanding, Utah			4	I. Rasmussen
Moab, Utah			2	V.M.T.
Moab, Utah			2	J.Kartchner
National Briggs Nat. Mon. UT.			2	V.M.T.
National Bridges Nat. Mon. Ut.			8	J.Kartchner
La Sal, Utah			3	D.E.Beck
Ut Mt., Ut.			1	I.Rasmussen
Hanksville, Utah			1	W.D. Stanton
Moab, Utah			2	I. Rasmussen

Agabus nigrosenus Er.

Size large, oblong-oval; black, the margins sometimes very narrowly and obscurely ferruginous; antennae, palpi and anterior legs rufous, middle and hind legs darker rufous or piceous. Elytra strongly irregularly reticulate, the meshes of moderate size and having a secondary reticulato-alutaceous sculpture, more distinct toward the apex; dorsal series of punctures well marked, minute punctuation nearly lacking. Prosternal process short, angularly convex; metasternal sulcus rudimentary; metasternum between meso-coxae and coxal plates longer than half the length of the latter; apical ventral of male obliquely longitudinally strigose each side of the middle. Pro and mesotarsi of male distinctly inerassate, the palettes of the glandular pubescence elongate, small and of oblong form;; protarsal claws of male of moderate length, the anterior

one thickened basally, the posterior one more slender but more noticeably sinuate beneath.

Length 9.3 to 11.1 mm. (From Fall 22; 32)

Habitat; In Utah this species seems to be confined to the Hudsonian Zone. Tanner makes a note that he collected one specimen in a small pond.

Distribution; Fall states as follow, "One of our largest species and of wide northerly distribution, occurring from Labrador and the New England States to British Columbia.

New Records This is a new record for the state of Utah.

Locality	Date	Elev.	No.	Collector
Mirror Lake, UintanMt.s Ut.	6/21/31	10,000	1	V.M.T.
Tryol Lake, Uinta Mts. Ut.		9,600	1	V.M.T.
Tryol Lake, Uinta Mts. Ut.	8/29/40	9,600	1	H.P.C.
Mirror Lake, Uinta Mts. Ut.	8/27/40	10,000	1	H.P.C.
Grandaddy Lake, Uinta Mts. Ut.			12	V.M.T.

Agabus tristis Aube

A large species of elongate oval form, varying greatly in color from yellowish brown through various shades of brown to almost black, with or without paler lateral margins. The thorax varies from testaceous with a median transverse brownish discal fascia to entirely black, the intermediate forms having the lateral and apical margins, or the lateral margins alone more or less paler. Body beneath piceous varied with rufous; labrum, two vertex spots, antennae, palpi and legs rufous; the outer joints of the antennae, terminal joints of palpi, and posterior legs more or less dusky or infuscate. The primary reticulation of the uppersurface is rathr coarse, the areolae of the elytra large and irregular, with a tendency in the females to become obliquely longitudinal in the basal half. Length $9\frac{1}{2}$ to $10\frac{1}{2}$ mm.

Habitat; This species is generally found in the Canadian and Hudsonian Zones.

Distribution--Fall records this species from Labrador, New Hampshire, Lake Superior, British Columbia, Alaska, Colorado, New Mexico, California and Siberia.

New Records:

Locality	Date	Elev.	No.	Collection
Grandaddy L., Uinta Mts., Ut.			4	V.M.T.
Mirror L., Uinta Mts., Ut.		10,000	2	V.M.T.
Mirror L., Uinta Mts., Ut.	8/27/40	10,000	1	H.P. C.
Tryol L., Uinta Mts., Ut.		9,600	40	V.M.T.
Tryol L., Uinta Mts., Ut.		9,600	4	C.L.Hayward
Tryol L., Uinta Mts., Ut.	8/27/40	9,600	3	H.P.C.
Payson Canyon, Utah	8/10/37		2	H.P.C.

Remarks--A specimen of this species was taken from the stomach of a trout
a trout on the Provo River near its source.

Agabus tristis crotchi Zait.

This subspecies is quite different than our common form of the species. The body above is black with only the lateral margins of the thorax somewhat rufous. The form is more oval. All the specimens which I have seen from Utah were not from high elevations as is the common form but were from the lower border of the Upper Sonoran zone.

Distribution; Leech writes that this subspecies is common from the mountains of California.

New Records; This is the first time this subspecies has been reported from Utah.

Locality	Date	Elev.	No.	Collector
Calf Cr., Escalante Ri., Ut.	8/2/39		6	H.P.C.
Moab, Ut.			1	I.Rasmussen
Moab, Ut.			1	J. Kartchner

Agabus disintegratus Cr.

The head and pronotum are rufous to testaceous, the pronotum is margined on the front and back with black. The elytra are testaceous with longitudinal vittae which are sometimes more or less

united. The legs abdomen and the prosternum are red with the metasternum and coxal plates black. The basal joint of the middle tarsus of male is much shorter than that of the hind tarsus. Length 7 to 7.8 mm.

Habitat; This species was found in small still pools in the small stream which runs into a reservoir in southern Utah.

Distribution; Fall records this species from Massachusetts, New Jersey, Pennsylvania, North Carolina, Kentucky, Iowa, Missouri, Texas, New Mexico, California, Washington and Ontario.

New Records; This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Santa Clara, Utah	12/6/40	3,000	30	H.P.C.
Lynndyl, Ut.			5	V.M.T.
Spanish Fork, Utah		4,500	1	Hardy
Provo, Ut.		4,500	1	C. Cottam
Riverdale, Ut.			1	V.M.T.

Agabus punctulatus Aube

Size very small, form evenly oval; prothorax piceous with paler sides margins; elytra rufo testaceous or yellowish brown, the disk broadly more or less infuscate and usually with distinct aeneous lustere; body beneath piceous, the antennae, legs and epipleura rufous. Surface rather finely reticulate, with numerous very fine punctures at the intersections of the network, the areolae variable in size and form, in the male the lustre is moderately shining, in the female quite dull, owing partly to the deeper sculpture, but more especially to a secondary system of minute reticulat The areolae in the female are distinctly more longitudinal in the basal half of the elytra, not appreciably so in the male. The anterior tarsi of the male are distinctly inerassated, the glandular hairs beneath bearing minute palettes; the anterior protarsal claw is peculiarly toothed beneath, the proximal side of the tooth being parallel to, and the distal side perpendicular to the axis of the

tooth either rectangular or a little acute, and about twice as distant fr m the base of the claw as from the tip. The prosternal process is more narrowly (subangularly) convex than in any of the preceding species. Length 5.8 to 6.6 mm. (From Fall 22; 17-18)

Habitat;

Distribution: This species is of northern distribution. Fall records it from New England, Manitoba and Saskatchawan. Its southern distribution is evidently confined to high altitudes or the Hudsonian Zone or above.

New Records; This is a new record for Utah

Locality	Date	Elev.	No.	Collector
Sheep Creek, Uinta Mt., Ut.	6/ /36	8,000	1	V.M.T.
Pingree Park, Colorado			1	V.M.T.

Agabus strigulosus Cr.

Narrowly oval; black, head and thorax slightly bronzed; elytra fuscous or brownish with margins paler; legs rufous, hind thighs more or less infuscate, the others rarely so. Elytral reticulation lightly impressed, the meshes large and unequal, with a minute secondary reticulate ground sculpture. Hind thighs without, or with at most only a short basal row of punctures along the inner margin. Pro-and mesotarsi distinctly incrassae in the male, the glandular hairs tipped with a dense mat of minute palettes anteriorly and with much larger ones in posterior half. Protarsal claws of male slender, feebly sinuate. Length 6.2 to 6.6 mm. (From Fall 22;20)

Type locality--Lake Tahoe, California

Habitat; A large number of this species were collected under water-soaked logs in the small lakes of the Uinta Mt.

Distribution; Fall records this species from California, Oregon, Washington, British Columbia, and Colorado.

New Records; This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Tryol L. Uinta Mt. Ut.		9,600	1	V.M.T.
Star L. Uinta Mt., Ut.	8/27/40	9,600	40	H.P.C.
Lily Lake, Uinta Mt., Ut.	10/15/39	9,800	3	H.P.C.
Mirror L. Unita Mt. Ut.	8/27/40	10,000	6	H.P.C.
Soapstone, Uinta Mt., Ut.			1	V.M.T.

Agabus kenaiensis Fall

Obtusely oblong oval, black, antennae and legs brownish, the thighs darker, especially the posterior. Body only moderately convex, surface rather strongly shining, minutely alutaceous and with a feebly impressed system of much larger reticulations which are quite irregular in form. Punctuation apparently lacking, except for the usual irregular finely setegerous elytral series and similar irregular series along the front margin and the exterior third of the rear margin of the prothorax. Closer inspection, however, reveals numerous scattered very minute punctures mostly at the intersections of the fine reticulating lines. Head with two faint rufous occipital spots. Prothorax a little less than three times as wide as long, sides feebly arcuate, nearly continuous with the sides of the elytra. Margin moderate, base just preceptibly sinuate each side of the middle. Elytra two-thirds as long as wide, slightly wider at middle than at base, sides subparallel in basal two-thirds. Body beneath alutaceous-reticulate, with a few fine punctures; ventral surface with some widely spaced oblique very fine striae, especially on the second segmet. Prosternal process roof-shaped; hind coxal plates distant by rather less than half their own length from the middle coxal cavities; hind tibiae with a few punctures along their inner margin.

Male. Anterior tarsi feebly dilated, somewhat compressed, clothed beneath with rather long squamules bearing at their tips a few small inconspicious palettes; prosternal claws a little elongate, slender equal, the posterior with a more pronounced basal sinuatino of the

inner margin. Length, 6.25 mm.; width, 3. 3mm. (From Fall 26; 141-142)

Agabus austini Shp.

Form varying from oval to somewhat obovate; above brownish testaceous, the margins diffusely paler, at least in the darker specimens; surface shining, not or only slightly less so in the female; beneath piceous, prosternum and abdomen more or less paler, legs and antennae rufous. Elytral reticlation coarse, fine punctulation almost wanting. There is a minute obscure secondary system of reticulation visible only under considerable amplification. Pro- and mesotarsi of male narrowly dilated, the glandular hairs tipped with small rounded palettes; protarsal claws equal, elongate, nearly straight, feebly sinuate on their lower edge. Length 8 mm. to 9 mm. (From Fall 22; 20)

Type locality; British Columbia

Distribution; Fall records this species from British Columbia, Washington, Oregon, Idaho, California and New Mexico.

New Records; This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Tryol Lake, Uinta Mt., Ut.		9,600	1	V.M.T.
Tryol Lake, Uinta Mt., Ut.	8/29/40	9,600	9	H.P.C.
Mirrow Lake, Uinta Mt., Ut.	8/27/40	10,000	8	H.P.C.
Provo, Ut	4/4/36	4,500	1	H.P.C.
Provo, Ut.	4/25/36	4,500	2	H.P.C.
Provo, Ut.	4/29/39	4,500	2	H.P.C.
Enterprise, Ut.	7/24/26		2	V.M.T.

Remarks-- This species occurs over quite a range in elevation. There seems to be a slight difference in those specimens which we have in the collection from high and low elevations. We do not have enough material to say whether this variation will prove constant. Leech writes that these variations occur in British Columbia at about the same elevation.

Agabus griseipennis Lec.

Head and thorax black; elytra piceous brown, margins lighter, next to thorax and along the sides; epiplura light; body beneath black. The elytra in the male are smooth and shining, but with a very fine and feeble reticulation, of which the meshes are irregular. In the female the reticulation is coarse and deep and the surface is much duller. The male protarsus is very widely dilated for the genus. The pubescence bears quite large pale setae; the anterior claw of the male protarsus has a conspicious claw near the apex. Length 7.4 to 8.5 mm.

Distribution: Fall records this species from Montana, New Mexico, Nevada and California. Tanner records this species from La Sal Ranger Station, Ut.

New Records:

Locality	Date	Elev.	No.	Collector
Riverdale, Utah	6/ /26		1	V.M.T.
Vineyard, Utah		4,500	1	V.M.T.
Provo, Utah	4/25/36	4,500	5	H.P.C.
Provo, Utah	/ /39	4,500	1	H.P.C.
Provo, Utah			4	others
Provo, Utah	4/24/41		1	H.P.C.
Indianola, Ut.			2	V.M.T.

Agabus obliteratus Lec.

Length 7 to 8 mm.

Head and thorax shining black; elytra dark piceous brown, finely and irregularly reticulate epiplura black with outer margin paler body beneath black; legs rufous with discal part of femur piceous. Protarsi of male feebly dilated, the third joint scarcely or only just visibly wider than the fourth, the claws slender and only just perceptibly sinuate beneath; last palpal joint not entirely black.

Type locality--Ft. Laramie, Wyoming.

Habitat; This species is found in still pools where it crawls through the vegetation and swims short distances.

Distribution; This species occurs in the Rocky Mountain region. Fall records it from Wyoming, Colorado and New Mexico.

New Records; This is a new record for Utah and Idaho and Oregon

Locality	Date	Elev.	No.	Collector
Driggs, Idaho			1	J.Kartchner
Richland, Oregon	6/19/40	2,200	1	H.P.C.
Provo, Ut.	10/17/36	4,500	1	H.P.C.
Provo, Ut.	3/20/37	4,500	1	H.P.C.
Provo, Ut.	4/23/39	4,500	2	H.P.C.
Provo, Ut.	4/30/39	4,500	1	H.P.C.
Provo, Ut.	4/21,23,30/39	4,500	3	H.P.C.
Provo, Ut.	1/18/41	4,500	5	H.P.C.
Provo, Ut.	2/9/41	4,500	10	HH.P.C.
Provo, Ut.	4/24/41		6	HQP.C.
Provo, U .			3	V.M.T & others
Springville, Ut.	/ /39	4,500	2	H.P.C.
Indianola, Ut.				

Agabus approximatus Fall

Evenly oval, a little more broadly so than in congener, with which it is closely allied. In all specimens seen the elytra are yellowish brown, the disk much less deeply infuscate than is the rule in congener; elytral sculpture quite fine and unequal, sculpture and lustre not appreciably different in the sexes, epipleura pale. The coxal plates are sl ghtly larger than in congener, their distance from the middle coxae being about half their own length, this distance slightly greater in congener; other differences as indicated in the table. The male protarsi feebly dilated, the claws slender and only perceptibly sinuate beneath. Length 7 to 8 mm.

(From Fall 22;26)

Type locality--Horsefly Pk. divide, Placerville Rd. San Mig County, Colorado, 8,000 ft. July 13, 1885.

Habitat--This species is found at high altitudes.

Distribution--Falls records of this species are from Colorado and

"the top of Parowan Mts., 10,000 feet at "The Mammouth", Utah

New Records;

Locality	Date	Elev.	No.	Collector
Grandaddy lakes, Uinta Mts., Ut.			1	V.M.T.
Mirror Lake, Uinta Mts., Ut.		10,000	12	V.M.T.
Tryol Lake, Uinta Mts., Ut.		9,600	10	V.M.T.
Tryol Lake, Uinta Mts., Ut.	8/27/40	9,600	3	H.P.C.
Provo, Ut.	9/29/40	8,600	1	H.P.C.

ILYBIUS

This group of medium sized black convex beetles resemble somewhat some of the Hydrophilidae (Tropisternus) in general appearence. They may be distinguished from the other COLYMBETINI by the presence of the short row of cilia on the ventral posterior edge of the hind femur near the tip. Other characters are as follows, the anterior margin of the eyes emarginate; scutellum present; the integuments above are finely reticulate, the color black or dark brown, the elytra often with a longitudinal yellow spot just behind the middle near the outer margin (faint or absent in Utah specie); the prosternal process is in the same plane as the prosternum, it is sharply carinate and the apex is sharply acuminate, the distal margin of the hind tarsal segments are lobed on the outer ventral side, the metatarsal claws are unequal in length.

This genus is mostly nearctic in distribution.

Key to the Utah Species of Ilybius

Male posterior tarsal joints margined externally above, hind tibia of both males and females rather strongly punctured over much of their under surface — subaeneus

Male posterior tarsal joints not margined externally above, hind tibia not strongly punctured over most of the under surface, but with only a line of punctures on the anterior and posterior margin and one or two near the base. — fraterculus Lec

Ilybius subaeneus Er.

Upper surface black, the sides redish, sides of elytra just behind the middle with a longitudinal yellow spot, another

spot at the tips of the elytra, one or both of these spots may be obscured; under surface rufous or piceous; prosternal process with elongate arched tips; last ventral segment longitudinally strigose; the outer upper margin of the hind tarsi margined. Length 10 to 11 mm.

Habitat; This species is found at high altitudes in the Canadian and Hudsonian Zones.

Distribution- This species is recorded in the literature from Europe, Siberia, New Foundland, Labrador and Colorado. Tanner 34;43 records it form Zion National Park, Utah.

New Records

Locality	Date	Elev.	No.	Collector
Tryol Lake, Uinta Mts., Ut.		9,600	1	V.M.T.
Sheep Creek, Uinta Mts., Ut.	6/ /26	8,000	1	V.M.T.

Ilybius fraterculus Lec.

Upper surface black with the sides rufous; sides of elytra just behind the middle with a small longitudinal yellow spot, often obscure, no spot at the tips of the elytra; under surface piceous red, the prosternal process with elongate tip which is nearly straight and not arched; the last ventral segment smooth, emarginate in the female; hind tibia with discal area devoid of evident punctures; the hind margin of the hind tarsus not margined

Habitat- this species is usually found at lower altitudes. They are usually taken in still water.

Distribution- This species is recorded from the "North Red River"

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Powell Lake, Uinta Mts., Ut.	8/21/30		1	V.M.T.
La Sal Mts., Utah		9,500	1	D.E.Beek
Grandaddy L., Uinta Mts., Ut.			1	D. L.
Provo, Utah	4/ /	4,500	1	G. Cottom
" "	5/14/39	"	1	H.P.C.
Springville, Utah	5/15/40	"	1	"
Spanish Fork, Utah		"	3	H. Hardy
Salem Pond, Utah	9/22/40	"	1	H.P.C.
Zion National Park, Utah			1	V.M.T.

GENUS RANTUS

This group of mediam sized insects are quite monotonous in general appearance, there being only one or two which can be identified with out the aid of a lens. They are separated from the next or following group (Colymbetes) by the margination of the pronotum and the anterior portion of the metasternum between the meso coxal cavities is grooved for the reception of the prosternal process. Other characters separating it from other genera are, eyes marginate above the bases of the antennae, scutellum visible, prosternum on same plane as its process, sides of metasternum broad wedge shaped, protarsus of male with first three joints enlarged with small pallets on the under side, hind femur with out a row of saetae on the posterior ventral edge near the tip, the hind margin of the first four segments of the hind tarsus produced into triangular lobes on the outer ventral, claws unequal.

The clasification of this group is in a very bad state. Many of the types are in Europe and in normal times would be very hard to obtain information about. With the out break of the present war in Europe the material of the British museum was stored under ground and even members of the museum staff can not gain access to it. Much of our marerial has been studied by J.M. Wallis who has described several species in this group and who has studied it for some ti e. M. H. Hatch's "Key to the Nearctic Species of Rhantus" Bul. of the Br. Ent. Soc. 28;222-224" was used to determin some of the species.

Tanner (40;121) records Rhantus binotatus from the state. I have little doubt that this record is not valid. There are no Rantus binotatus in the Brigham Young Collection, second all records in the collection from the Aquarius Pleateau are notatus, a very distinct species.

The species of this group are usually found in still water.

KEY TO THE SPECIES OF RANTUS

1. Hind coxal process or internal lamina pale for entire length, mesosternum black. Usually only one central spot on the pronotum. Female with basal two thirds of elytra sculptured
notatus

Only tips of hind coxal process pale if at all, two spots on pronotum, sometimes almost absent, female never sculptured 2.

2. Metafemur black with only the margins pale 3.

Meta femur pale or only lightly piceous 4.

3. Prosternum black, anterior male claw longer than basal four joints of the tarsus, both anterior claws weakly curved but not sinuate within, posterior one 2/3 the length of the anterior, pronotal spots often confluent. anisonychus Cr.

Prosternal process at leat partly pale, claws of protarsus both sinuate on inter side, posterior 3/4 the length of the anterior, anterior claw not as long as basal four segments.
divisus Aube

4. Protarsal claws of male both more or less straight with the inter margin of both sinuate, the posterior one more so. The posterior claw 3/4 the length of the anterior. Only prosternum pale, prosternal episternum black. longipes Shp.

The posterior protarsal claw of the male evenly curved, the prosternum and the prosternal episternum both pale 5.

5. Anterior protarsal claw of male sinuate within, as wide at middle as at base, black dots of elytra more vermiform, common in northern Utah. hoppingi Wallis

Anterior protarsal claw of male nearly straight within, curved only at tip, not as wide at middle as at base, black dots of elytra less united, or solid black, from southern Utah. 6.

6.

6. Basal 2/3 of elytra solid black — mexicanus

Elytra with black dots only — hubbelli Hatch ?

Pantus anisonychus Cr.

This species along with all the others found in Utah except notus and mexicanus can only be separated by small differences which are difficult to see with the naked eye. The dorsal surface is quite constant in markings and shape. The claws of the male are the best characters for separation. Head black with anterior margin and a transverse vertex bar pale sometimes connected at middle; Pronotum pale testaceous with two spots at middle each side of the meson, often united; Elytra pale testaceous with black dots forming vermiform markings except along the margins, with three longitudinal rows of faint punctures, these punctures or in bunches with the vermiform markings closer about them forming a larger spot. Integuments below black. Hind femur black with apex and margins somewhat pale, or rufous. Anterior claw of male protarsus quite long 3/4 as long as tibia, weakly curved, the posterior a little more curved, 2/3 as long as the anterior, both not sinuate on the inter side.

Habitat- This species has been found in Utah only in the Lower Sonoran zone.

Distribution- It is recorded in literature from Cal. and Wash. Tanner (28;271) records this species from Utah.

New Records;

Locality	Date	Elev.	No.	Collector
St. George, Ut.	4/26/25	2,800	1	V.L.T
" " "	12/7/40	"	1	H.P.C.

Rantus notatus Fab.

This is one of the few species which can be recognized on sight. The size is smaller than average (9 - 10 mm.). The pronotum with central spot, sometimes two small spots narrowly d devided. Elytra testaceous with rather coarse vermiform black dots. Three longitudinal narrow lines on each elytra, less obvious in female. These lines are formed by lack of maculations and do not differ in color from the ground color of the elytra. The elytra with basal 2/3 of the surface with short irregular longitudinal groves or sculpturing in the female. The hind coxal processes almost entirly pale, the rest of the hind coxae and the metasternum black. Ventral segments usually pale sometimes black with pale margins. Anterior protarsal claw longer than last segment of protarsus, almost straight, curved slightly at the tip, posterior protarsal claw somewhat similar to the anterior but only 2/3 as long.

Habitat; This species is evtdently confined to high elevations, or northern latitudes.

Distribution; This species is recorded in literature form the Palaearctic, Yukon Terr., Alta., B.C., and Kans.

New Records; This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Sheep Cr., Uinta Mts., Ut.	6/ /26	8,000	8	V.L.T.
Aquarius Plateau, Ut.	6/ /38	9-10,000	5	W. W. Tanner

Rantus divisus Aube

This species resembles anisonychus above except that the pronotal spots are never confluent and the maculations of the elytra are a little less strongly marked, a larger black spot is found 1/4 of the length of the elytra from the apex, it is quite variable in development. Integuments below black except for the prosternum which has at least a portion of the process somewhat pale, Legs more or less piceous, only the tip and sometimes the margin of the hind femur pale. Protarsal claws of the male a little less than half as long as the tibia, both more or less straight with the inter edge sinuate and the tip curved, the posterior one more so, posterior claw 3/4 or 4/5 the length of the anterior. Anterior mesotarsal claw tapered, curved toward the tip, posterior claw 1/2 as long and strongly curved.

Habitat; This species seems to be confined to the Hudsonian zone. It is found in the small still sphagnum pools which are so common in the Uinta Mt.

Distribution; This species is recorded in literature from Cal., Colorado, and Idaho.

New Records; This is a new record form Utah.

Locality				Date	Elev.	No.	Collector
Grandaddy L.s,	Uinta	Mts.,	Ut.			1	V.M.T.
Mirror L.	"	"	"		10,000	2	"
"	"	"	"	8/27/40	"	1	H.P.C.
Lost L.	"	"	"	"	9,8000	2	"
Tryel L.	"	"	"	"	9,600	6	"
"	"	"	"		"	1	V.M.T.

Remarks; Except for coloring this species is almost the same as the next species. Wallis states that our specimens are

probably a color variants of longipes. If this is the case it is probably of varietal ranking. However I have seen no intergradations and it seems to be very restricted in range being the oly Rantus other than notatus found at very high elevations. It is possible that we do not have the true divisus as the types are in Europe.

Rantus longipes Shp.

This species is very similar to divisus. The legs are entirly pale. The prosternum pale, episternum black. Ventral segments with lateral margins pale or rufous and some times the posterior margin narrowly rufous. Last ventral broadly pale at middle, less so a t sides. Claws as in divisus.

Habitat- This species is common in the Upper Sonoran and Transition Zones in Utah.

Distribution- It is recorded in Literature from California, and British Columbia.

New Records; This is a new record for Utah, Idaho and Colorado.

Locality	Date	Elev.	No.	Collector
Salt Air, Salt Lake, Utah			1	C. Cottam
Provo, Utah	4/18/36	4,500	2	H.P.C.
" "	10/10/36	"	3	"
" "	5/ /38	"	1	"
" "	9/20/38	"	1	"
" "	4/30/39	"	1	"
" "		"	4	others
Ut. Lake, Provo, Ut.		"	3	C. Cottam
" " " "		"	1	V.M.T.
Vineyard, Ut.		"	1	T. Swallow
Springville, Ut.	5/15/40	"	1	H.P.C.
Spanish Fork, Ut.		"	4	H.H. Hardy
Vernal, Ut.			1	Rigby
Indianola, Ut.			10	V.M.T.
Driggs, Idaho	6/ /28		2	J. Kartchner
Pingree Park, Colo.			2	C.L.Hayward

Remarks- Wallis writes that Balfour-Browne who had the types befor him said "longipes and obscurus can not be separated from binotatus". Wallis is of a different opinion.

Dantus hoppingi Wallis

Dorsal surface similar to longipes. Prosternum and all except the posterior margin of the prosternal episternum pale. Lateral margin of the ventral segments pale, the last segment with posterior half pale. Anterior claw of the male protarsus weakly curved, the inter edge sinuate, the middle portion expanded so that it is as wide as the base, posterior claw tapering, curved, 3/4 as long as anterior. Anterior mesotarsal claw tapering, weakly curved, more so at tip, posterior claw strongly curved but not as much as in longipes.

Type locality- Trinity Valley and Peachland, B. Columbia.

Habitat- This species is common in the Upper Sonoran and occurs in the Canadian zones in Utah.

Distribution- Wallis lists this species from British Columbia, Washington and California.

New Records- This is a new record for Utah and Wayoming

Locality	Date	Elev.	No.	Collector
Provo, Ut.	4/25/36	4,500	1	H.R.C.
" "	5/ /39	"	1	"
" "	5/14/39	"	1	"
" "	10/ / 38	"	1	"
" "			1	H.Thomas
" "			1	T. Swallow
Utah L., Provo, Ut.	4/3/26	"	1	C. Cottam
Lehi, Ut.			1	Kartchner
Vineyard, Ut.			1	Truman Swallow

Aspen Grove, Ut.		7,000	1	V.M.T.
Salt Lake City, Ut.	/ /97		6	J. E. Talmage.
Riverdale, Weber Ri., Ut.	6/ /26		1	V.M.T.
Fort Bridger, Wyoming	6/ /26		1	C. Cottam.

Rantus hubbelli Hatch ?

Very similar to hoppingi. The black dots of the elytra usually mor singly placed instead of being united into vermiform markings. Anterior claw of the protarsus weakly curved, the inter margin not expanded at middle but almost straight becoming curved at tip, posterior claw about 4/5 or more the length of the anterior, a little more curved than in hoppingi. Mesotarsal claws very similar to those of hoppingi.

Habitat- This species is restricted to the Lower Sonoran and the lower border of the Upper Sonoran in Utah. The author commonly found it in small alkaline pools or springs in the deserts of southern Utah.

Distribution- Hatch described this species from Oklahoma.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector.
Moab, Ut.			4	V.M.T.
" "			4	Irvin Rasmussen
" "			2	J. Kartchner
Natural Bridges Monument, Ut.			5.	V.M.T.
" " " "			2	J. Kartchner
Calf Cr., Escalante Ri., Ut.	8/1-4/39		8	H.P.C.
San Rafael Swell, Emery Co., Ut.	5/11/40	5,000	1	"
St. George, Ut.	12/6/40	3,000	4	"

Remarks; Wallis was not aquainted with our specimens which we sent under this species. He has in his collection a female paratype, but the females are very hard to separate. He writes

"I have not seen a male of hubbelli Hatch but I feel sure that this is not it." However this species runs to hubbelli in Hatches own key, and agrees with the discription as far as the description goes and the range is not improbable. I have therefore left our specimens in this species untill further information can be obtained.

Rantus mexicanus *Cast.*

This species resembles hubblii very closly except that the basal 3/4 of the elytra are solid black, except for the margins.

Distribution; Hatch lists this species from Mexico and Oklahoma.

New Records; This is a new record for Utah.

Locality	Date	Elev.	No.	Collector.
Moab, Ut.			1	J.Kartchner
Calf Cr., Escalante Ri., Ut.	8/1/39		1	H.P.C.
San Rafael Swell, Em. Co., Ut.	5/11/40	5,000	1	H.P.C.
The Hall, Escalante Des.,Ut.	8/17/39		1	"

Remarks; It is very posible that this species is an aberration of the species listed heme as hubbelli. Structurly it is the same and it agrees also in distribution. Balfour- Browne Suggests that mexicanus is an aberration of maculicollis.

Genus COLYMBETES

These rather large beetles are easly recognised by the fine transverse striae on the elytra. Other characters used to separate this genus are eyes emarginate above the bases of the antennae, pronotum not mergined, scutellum visible, prosternum on same plane as its process, sides of metasternum broad wedge shaped, the anterior portion between the mesocoxal cavities flot or only f faintly groved to recieve the prosternal process., protarsus of male with first three joints enlarged with small suction cups on the under side in the male; hind femur without a row of setae on the posterior ventral edge near the tip; the hind margin of the first four segments of the hind tarsus produced into triangular lobes on the outer ventral half, claws unequal.

The individuals of the species in this genus vary greatly. As a result the taxonomy is very confused and there are more names in synonymy than there are valid species. Also because of the absence of the types from this country no one knows exactly wich are synonyms and which are not. In Utah there are two species and possibly three. J.M. Wallis who has been studying this genus for some time and who has studied our material from Utah, states that he can not assign our Utah specimens to any valid species known to him but is not shre whether they are new. Rather than place them wrongly or describe them as new I will give a few notes and urge all readers to collect extensively in this genus.

Key to the Utah Groups (All Utah males have the protarsus with four rows of palettes beneath)

Larger (15- 16 mm.) occuring at low elevations, elytra of female deeply striate on basal 2/3. male less so, Palpus only faintly tiped with black. Legs partly piceous. Outter mesotarsal claw thick (Fig.) found around Provo Group 1.

Size smaller (13 - 15 mm.), occurring at high elevations. Elytra of female less deeply striate, ridges flat. Palpus tiped with black. Legs light, only faintly piceous. Outer mesotarsal claw thiner more tapered, found at high altitudes Group 2.

Group I. Mr. Wallis writes the following of this group, "Your female from Provo is nearest the females to rugipennis but I think distinct"

New Records- I have the following records of its occurence.

Locality	Date	Elev.	No.	Collector
Utah Lake, Provo Utah	5/2/39	4,500	1	H.P.C.
Provo, Ut.	5/ /38	"	2	"
" "	6/ /38	"	1	"
" "		2	1	"
" "		"	1	J. Smith

Group II Of this group Mr. Wallis states "Of these four (sculptilis, rugipennis, groenlandicus, and dolobratus) I have little doubt nose is represented among your species." Since the above list includes all the vallid species having four rows of palettes on the protarsus, it appears that our type may be new but since there are about nine synonyms under these four species, it may be well to leave this until more is known of this group.

New Records- I have the following records of its occurence.

Locality	Date	Elev.	No.	Collector
Sheep Cr. Uinta Mt., Ut.		8,000	2	V.M.T.
Grandaddy L., " " "			1	"
Clyde L., " " "	7/25/30		1	V.
Mirror L., " " "		10,000	4	"

Tryol L., Uinta Mt., Ut.		9,600	1	H.P.C.
Lost L., " " "	8/26/40	9,800	2	"
Bear Lake Valley, Utah			1	
Salt air, Salt Lake, Utah	6/ /26		1	Clarance Cottam
Payson Canyon, Ut. Co., Ut.	8/10/37		1	H.P.C.
" " " " "	7/22/39		1	"
Eureka, Ut.	7/2/		1	Tom Spalding
Indianola, Ut.			2	V.M.E.

GENUS DYTISCUS

This genus consists of about 28 species, all of which are confined to the Northern Hemisphere and most of which are quite n northern in distribution. They are all quite large in size, ranging from 25 to 40 mm. in length.

This genus may be separated from the others by the following characteristics, the clypeus yellow, seprated basaly by a sutmre; the front with an inverted yellow V; the eyes round, not emarginated in front, the thorax and elytra with a yellow band along the sides, sometimes the anterior and posterior margins of the thorax are also banded with yellow; most of the upper surface dark green or blackish; scutellum present; first three segments of the male protarsi greatly inlarged into a saucer like pad, the under surface with two large basal suction disks and many very small ones; hind tibia longer than broad the hind margin of the prosterior tarsi with cilia on the outer apical angle only.

KEY TO THE UTAH SPECIES OF DYTISCUS

Hind coxal processes bluntly pointed; females without deep longitudinal striae; ventral segments brown; *marginicollis* Lec.

Hind coxal processes acuminatly pointed; dimorphic, the females with the elytra deeply longitudinaly chanéled; ventral segments mostly pale, only the base dark *dauricus* Gebl.

Ditiscus marginicollis Lec

Color above green with yellow markings; the yellow V mark on the fornt of the head not reaching the yellow clypeus; the thorax margined on all sides with a broad band of yellow; elytra margined on the outer edge with yellow, the tip of the elytra irrorate with yellow; the ventral segments brown. Female with elytra smooth, thorax not conspicuously punctured. Length, male 28 -30 mm., female 27 -28 mm.

Habitat; Usually found in still water at lower altitudes, however this is not the most common palce for their collection. They are usually collected at electric lights at night to which they are very strongly attracted.

Distribution- Hatch records this species as occuring from Alaska to Alberta and Califorinia. Cpotch lists it from Kansas. Tanner (28;271) records this species form Ut.

New Records-

Locality	Date	Elev.	No.	Collector
Vineyard, Utah		4,500	1	J. Fechser
Provo, Ut.	4/25/36	"	1	H.P.C.
" "	10/13/36	"	1	"
" "	4/14/37	"	1	"
" "		"	5	others
Spanish Fork, Utah		"	2	H. H. Hardy
Indianola, Utah			1	V.M.T.

Ditiscus dauricus Gebl

Color above a bright green with yellow markings; the yellow V mark on the fornt reaching the clypeus; the thorax margined on all sides with a broad band of yellow; elytra margined on the outer edge with yellow, the tip of the elytra irrorate with yellow; the ventral segments pale with a narrow band of black at the base of each segment.

Female with thorax finely punctured, punctures yellow; elytra with deep longitudinal channales or grooves, the bottoms of the grooves yellow, the interspaces finely punctured, dark brown or green; the tips of the elytra more coarsely and very closely punctured. Length, male 30 - 32 mm., female 27 - 29 mm.

Habitat- This species is found in north eastern Asia and northern North America. Tanner (40;121) records this from the Aquarius Plateau.

New Records:

Locality	Date	Elev.	No.	Collector
Tryol Lake, Uinta Mts., Ut.	8/26/40	9,800	3	H.P.C.
Mirror Lake, Uinta Mts., Ut.	8/28/40	10,000	1	"
" " " " "		"	1	"
Donkey L., Aquarius Plat., Ut.			3	H. Thomas
Aquarius Plateau, Utah	6/ /36	9-10,000	1	W. W. Tanner

Genus THERMONECTES

This genus includes about 16 species which are confined to North and South America and most of which are found in the warmer parts of these two continents. The upper surface is polished and often quite colorfully marked.

The eyes are not emarginate in front; Pronotum not margined; the scutellum is visiable; the elytra black with yellow maculae or bands, the surface is smooth except for small elongate punctures at the base of the elytra in some of the females; prosternal process wide and very bluntly pointed; metasternum with lateral wings very narrow, the outer margin curved not straight; coxal plates very large, approching quite close to the middle coxae; male protarsi with first three joints widely dialated, under side with several largeand many small suction cups; middle tarsus of male simple; hind tibial spurs with tip blunt, usually emarginate; distal margin of the first four segments of the hind tarsi fringed with short flat yellow cilia; claws unequal.

This group usually inhabits still ponds. They are very rapid swimmers. Once disturbed it is hard to draw a net through the water with enough speed to catch them.

Key to the Utah Species of Thermonectes

Larger (length 13 - 14 mm.); black with large yellow spots on the elytra (10 or 11 in number) marmoratus Hope.

Smaller (10 - 11 mm.); elytra black with yellow margins and sometimes with a transverse yellow basal band or row of dots basilaris Harris

Thermonectes marmoratus Hope

Obovate in shape; clypeal region of head yellow, vertex black with a transverse spot; thorax black with yellow margins and discal spots each side of the meson, elytra black with margins and spots yellow, spots 10 or 11 in number on each elytron according to development; under surface redish in color. Length 13 - 14 mm.

Habitat- this species occurs in the Lower Sonoran and the lower part of the Upper Sonoran zone. It was found by the author in small pools in the side canyons of the lower Escalante River.

Distribution- This species is recorded from Arizona and Lower California. Tanner records this species form Zion National Park (34;43), Moab (34;217) and Willow Tanks Springs Utah (40;121)

New Records

Locality	Date Elev.	No.	Collector
Lower Escalante Ri., Utah	8/14/39	20	H.P.C.
" " " "	8/12/ 39	3	"
Willow Tanks, Escalante Ri., Ut.		1	D. E. Beck.
Moab, Ut.		3	I. Rasmussen
" "		3	J. Kartchner
" "		3	V.M.T.

Thermonectes bicilaris Harr.

Slightly obovate; clypeal region yellow, vertex of head black with narrow transverse yellow band; thorax black with yellow margins and usually with a narrow transverse yellow line acrost the middle, female with elongate punctured area extending into the side of the thorax; elytra black, margins yellow usually with a transverse subbasal band or row of dots, the tip and in some females the sides are irrorate with yellow; the under surface is yellow. Length 10 - 11 mm.

Habitat- A single specimen was taken in a temporary pond formed by irrigation water.

Distribution- This species is recorded form California, Iowa, Mexico and Guatemala.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Provo, Utah	6/7/36	4,500	1	H.P.C.
Spanish Fork, Utah		♀	1	D. E. Hardy

Remarks- Our Spanish fork specimen is badly damaged, the head and prothorax being missing. The Provo specimen is a female. It differs considerably form the four eastern specimens which I have seen. The transverse bands on the thorax and elytra are lacking, the sides of the elytra are not irrorate with yellow, ther is no punctures on the pronotum, and the size is larger than in our eastern specimens. Sharps states that there is considerable variation in the species.

Genus ACILIUS

This genus consists of about six species which are found in the northern part of North America and Europe. Three of these species occur in the United States.

They may be separated from the other Dytiscids by the following characters, outline continuous; form obovate; eyes not emarginate in front; scutellum visible; lateral margins of thorax not margined; elytra and ventral surface punctate, sometimes the head and thorax are also punctate; prosternal process broad and bluntly rounded; metasternum with lateral wings quite narrow, outer margin of the wings sinuate, enlarged near tip; metacoxal plates very large, closely approching the mesocoxae; first three joints of the male protarsi greatly inlarged into a plate like pad, the margin fringed with ciliae, under surface with one large basal and two smaller subbasal suction cups; distal portion with a thick brush of bristles with glandular adhesive plate at tip; mesotarsi narrow; metatarsal spur blunt or emarginate; distal margin of the first four metatarsi margined with flat yellow cilia, claws nearly straight, unequal in length.

Acilius semisulcatus Aube is the only species of the genus which is found in Utah.

Acilius semisulcatus Aube.

Length 14 - 16 mm. Obovate in shape; ground color of upper surface yellow, with black markings; vertex of head black, (W) like marking on the front; thorax and elytra punctured; two transverse bars of black on the pronotum, the anterior thin, reaching

almost to the lateral margins then turning posteriorly to near the posterior margin, the posterior bar is thicker and shorter with tips only slightly produced posteriorly, elytra irrorate with black, posterior third of elytra with two transverse black bands formed by the black dots becoming confluent, each of these bands is followed by a space from which the black dots are almost lacking, thus there is two black bars separated by a light bar with the tip of the elytra light; the female elytra are longitudinally sulcate, the channels with the punctation reduced and with a black pubescence; prosternum pale, the rest of the under surface black with a few pale spots at the sides of the ventral segments.

Habitat- This species is usually found in still woodland pools at elevations from 4,000 to 10,000 ft.

Distribution- This species is widely distributed in North America, it is recorded from California, Oregon, British Columbia, Alaska, Kansas, Michigan, New York and Haiti.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Mirror Lake, Uinta Mts., Ut.		10,000	1	V.M.T.
Tryol Lake, Uinta Mts., Uta	8/26/40	9,700	40	H.P.C.
" " " " "		"	1	V.M.T.
Salamander L., Ut. Co., Ut.	7/ /26	7,800	1	"
Payson Can., Ut.	8/10/37		1	H.P.C.
Spanish Fork, Ut		4,500	3	H.H. Hardy
Provo, Utah	4/18/36	"	1	H.P.C.
" "	5/1/37	"	2	"
" "	4/30/39	"	9	"
Far West, Utah			2	C. Brown
River Dale, Ut.	6/ /26		2	

Genus GRAPHODERUS Aube

This group consists of about twelve species, five of which are found in North America, They are confined to the northern part of the Nearctic and Palearctic regions.

Form slightly obovate; surface polished; dorsal surface with yellow ground color; anterior margin of the eyes not emarginate; pronotum not margined scutellum visible; elytra with black vermiculate or reticulate markings; prosternum broad, tip bluntly rounded; metasternum with narrow lateral wings, expanded near tip, outer margin arcuate; hind coxal plates large closely approching the mesocoxa; male protarsi widely dilated, margin with fringe of hairs, basal palettes larger, than the others; male mesotarsi with paletes in most species; first four segments of the metatarsi with fringe of yellow setae on the distal margin, claws straight, unequal.

KEY TO THE UTAH SPECIES OF GRAPHODERUS

Posterior and anterior transverse bands on the pronotum reaching the fore and hind margins, male meso tarsi with out palettes
occidentalis Horn

Neither transverse band touching the margins, male mesotarsi with two rows of palettes
perplexus Shp.

Graphoderus occidentalis Horn

Length 13 - 14 mm. Obovate in shape; head yellow with vertex black, inverted V shaped marking on front, other markings often present; pronotum yellow with transverse black band on

anterior and posterior margins, black band attaining for and hind margins but not the lateral margins; ground color of the elytra yellow with thick black reticulate markings covering all except the narrow pale margins, becoming somewhat vermiculate toward margins; under surface pale; male protarsi with 15 palettes; male mesotarsi without palettes.

Habitat- This species is usually found in still water.

Distribution- Hatch records this species from Washington Alverta, and California.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Provo, Utah	5/ /37	4,500	1	H.P.C.

Graphoderus perplexus Spp.

Form obovate; head thorax and elytra marked almost as in occidentalis except that the transverse bands do not reach the anterior and posterior margins of the pronotum; ventral surface pale; male protarsi with three large and about 28-30 smaller pallets; mesotarsi with 14-15 pallettes in two longitudinal rows.

Habitat- Wilmer Tanner collected our specimens form a high mountain lake on the Aquarius Plateau.

Distribution- This species no doubt occurs widely in northern North America byt I Have not seen any record of specific localities from which it has been reported.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Aquarius Plateau, Utah	6/ /38	9-10,000	4	H.P.C.

Genus CYBISTER

This genus includes about 50 species of which only five are found in the United States. They are found in the eastern hemisphere and North America but are lacking in the South American fana.

This genus may be separated from the other genera by the following characters, form obovate; eyes not emarginate on anterior margin; scutellum visiable; prosternum and it process on the same plane, convex without margin, protarsus of male with disk transversely elongate, distal half with three rows of pallettes, base with bristles, margin with fringe of hairs; hind tibia as broad as long, outer apical spur greatly enlarged; hind margins of the metatarsus without a fringe of cilia on the distal margin; hind tarsus of male with only one claw, female with one or two claws.

KEY TO UTAH SPECIES OF CYBISTER

Hind tarsus of female with two claws, elytra of female with longitudinal anastomosing scratches — fimbriolatus

Hind tarsus of female with only one claw, elytra of both sexes smooth — explanatus

Cybister fimbriolatus (Say)

Length 28-29 mm., Width 16 mm. Form strongly obovate; head with clypeal region yellow, front and vertex dark green, vertex of female with oblique short scratches above the eyes; pronotum of female with irregular mostly longitudinal scratches, coarser on lateral margins, lateral margins broadly yellow,

anterior and posterior margin with faint narrow yellow band; elytra green with broad longitudinal yellow band on the margins, female with longitudinal scratches on the elytra, almost lacking near the suture; under surface dark red; metatarsus with two claws in the female, the ventral one quite small.

Distribution- This species is recorded by Sharp from Pennsylvania, Georgia, Louisianna, Kansas, and Mexico. Other localities recorded in literature are New York, Virginia, Illinois, and Iowa.

New Record- This is a new record for Utah.

Locality	Date	Elev.	No	Collector
St. George, Utah		2,800	1	V.M.T.

Hybister explanatus Lec.

Length 26-27 mm., Width 14-15 mm.; Shape obavate, slightly narrower than fimbriolatus; color above deffering from fimbriolatus as follows, lateral yellow band on elytra narrower, the color a lighter more transparent yellow, the faint bands on the anterior and posterior margins of the pronotum are lacking; the elytra are smooth and polished, the under surface dark crufous; metacoxal plates with a coarse coxal file, this consist of five coarse ridges radiating from the coxal articulation, these are better developed in the male than in the female; female hind tarsi with only one claw.

Distribution- This species is recorded from California.

New Records- This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
East side of Utah Lake, Utah		4,500	1	V.M.T.
Salem Pond, Utah	9/22/40	"	1	H.P.C.

FAMILY GYRINIDAE

This family contains about nine genera of which only three occur in the United States and only one (Gyrinus) in Utah. Due to their habits of swimming or skating rapidly about on the surface of the water in schools they are often called Whirligig beetles. When captured they give off a disagreeable odor.

The family is easily recognized, it is probably one of the most highly if not the most highly modified family of the Coleoptera. The body is streamlined and more or less lens shaped, the color above usually dull or shining black. The eyes are completely divided s o that one pair is on the ventral suffface and one pair on the dorsal surface; the antennae are very short, the outer eggments ring like, two basal segments are enlarged and expanded; the front legs are very long, often longer than the body, however, they are usually tightly folded in oblique groves beneath the body; the middle and hind legs are short and expanded in to broad thin plates. Other characters which separate the family are, the submentum separated from the mentum by a distinct suture; metasternum without a transverse antecoxal sclerite; first ventral segment divided by the hind coxal cavities.

The eggs are laid in rows on the leaves of aquatic plants. The larva are entirely aquatic, breathing by means of tracheal gills on the abdomen. The mature larva leave the water and spin a paper-like cocoon.

Genus GYRINUS

This group includes about 36 species in the United States of which seven are found in Utah. They are small (5 to 8mm.), black,

oval beetles, the Utah species which, with the exception of minut us, are very similar in appearance. Fall begins his indispensable revisi as follow. "It would be difficult to find in collections of American Coleoptera, a group or genus in which the species are so consistently and completely muddled as they are in the genus here considered. It matters little whether the collection be large or small, whether it be that of a vetran or a novice, the difference is only one of degree of confusion, and with few exceptions, the name labels might quite as well have been drawn from a hat, so far as accuracy of assignment is concerned. Gyrini occur everywhere in our territory, and owing to their habit of congregating in schools, especially in mid and late summer, may be, and usually are at one time or another, gathered in numbers by every collector. But the difficulties of separation and identification of material are so great as to discourage much further effort, and he soon gives them up as a hard lot. They are a hard lot; there does not seem to be much to say about them taxonomi and what little there is in the books is of no very great assistance."

I might add that due to their simularity in appearance inadequat attention is usually given to their collection. A good method of collecting this genus is in alcohol (60%), then before mounting pull out the genitalis of several males with a pair of curved forceps with a very fine point.

The species of this genus are found near the banks of still or slow moving bodies of water. They may remain quietly on the surface of the water or swim rapidly about in schools. When disturbed they dive beneath the surface. Sweeping the water beneath overhanging grass covered banks often yields good results.

Key to the Utah species of Gyrinus

1. Scutellum with short longitudinal carina, size small(3.5-4. 5 mm. minutus

   Scutellum non-carinate, size larger 2.

2. Form broadly oval; strongly arched as viewed from the side, dorsal surface smooth and shining, margination of the elytra strong and angular, becoming more strongly so posteriorly, the groove formed by the margination of the elytra dividing near the posterior margin to form faint raised plica at the outer posterior margin of the elytra, color beneath variable. plicifer

   Form more elongate oval and not as strongly arched; surface smooth or dull, margination of the elytra less strong, the groove formed by the margination of the elytra becoming less evident posteriorly, not divided but following along the margin to the tip of the elytra 3.

3. Under surface predominently pale; hypomera and epipleura testaceous or rufous 4.

   Under surface with hypomera and epipleura testaceous, the body predominently dark or piceous, dorsal surface soulptured. 5.

   Under surface predominently piceous or metalic black, hypomera and eipleura piceous or with piceous tinge, sometimes testaceous, dorsal surface without soulpture. picipes

4. Dorsal surface finely alutaceous and minutely punctulate, more noticeably so in the female bifarius

   Dorsal surface highly polished and not alutaceous or punctulate color beneath darker medially than along the margins consobrinus

5. Surface in both sexes thickly covered with very fine oblique striolae affinis

   Surface in both sexes micro punctulate and faintly alutaceous pleuralis

Gyrinus minutus Linnaeus

Small, narrow, moderately convex; above black, sides bronzed, surface throughout strongly reticulato-alutaceous and dull; beneath testaceous or brownish testaceousm the ventral segments except the apical one commonly more or less infuscate; scutellum very finely longitudinally carinate basally; mesosternum distinctly rather deeply sulcate.

Male genitalia. Color brownish apically, paler basally; middle lobe about as wide apically as the lateral lobes, narrowly rounded and minutely notched at tip.

Length, 3.5 to 4.3; with, 1.8 to 2.3 mm. Average length close to 4 mm. (From Fall 22: 278)

Other characters which may be of use are as follows, head strongly alutaceous; clypeus on same plane as front evenly arched, sides of clypeus and front only very faintly margined; mesosternum channeled along median line with a deeper depression just behind middle, also with a deep triangular pit on each side just behind the impression into which the anterior femur fits. Sides of the elytra with very sparce fine short erect pubescence, visible only with high power.

Habitat-- Wilmer Tanner informs me that these insects were seen in a large school on the edge of one of the high mountain lakes on the Aquarius Plateau where he collected nine specimens by hand.

Distribution-- This species is recorded from Central and North Europe, Siberia, Maine, New Hampshire, Illinois, Kansas, South Dakota, Manitoba, Alberta, and Alaska.

New Records--This is a new record for Utah

Locality	Date	Elev.	No.	Collector
Aquarious Plateau, Ut.	8/ /36	9,000	9	W.W. Tanner
Fish Creek, Uinta Mts., Ut.	8/27/31		1	V.M. Tanner

Gyrinus bifarius Fall

Moderately elongate and of average convexity; black polished, sides widely bronzed, sometimes distinctly, sometimes rather obscurely so. With a strong lens the elytra are seen to be very finely alutaceous and numerously minutely punctulate over the

entire surface, a little more noticeable so in the female. The punctures of the outer elytral striae are but little larger than those toward the suture, the eleventh stria well above the margin, nearly as distant there from as in aeneolus and woodruffi. Body beneath nearly uniformly rufo-testaceous or ferruginous.

Male genitalia. Rufo testaceous, middle lobe constricted in a peculiar manner at its apical third, so as to present the appearance of an elongate superiorly flattened appendix, which is about one-third as wide as the lateral lobes, broadly concave in a longitudinal sense, acuminate at base, and narrowly rounded at tip.

Length, 4.2 to 6.5 mm.; width, 2.35 to 3.6. The extremes are both very exceptional, the great majority of specimens lying between 5 and 6 mm. in length. (From Fall 22; 286).

Type locality--Paris Maine.

Habitat--This species was collected along the shores of Utah lake in the sheltered waters.

Distribution--This species was recorded by Fall form Quebec, Maine, New York, Michigan, South Dakota, Colorado, Manitoba, Oregon, Nevada, and California.

New Records--This is a new record for Utah.

Locality	Date	Elev.	No.	Collector
Provo, Utah		4,500	4	D.D. Jorgensen
Provo, Utah	3/28/36	4,500	2	H.P.C.
Utah Lake, Provo, Utah	4/24/41	4,500	1	H.P.C.
Minersville, Utah			4	V.M. T.

Gyrinus plicifer LeConte

Form rather broad and thick, approaching in these respects and in general facies the still somewhat stouter pachysomus of the Atlantic region. Color above black, the sides broadly bronzed, the surface highly polished and without trace of alutaceous sculpture in either sex. Strial punctures of the elytra distinctly

larger laterally than near the suture, the eleventh stria rather close to the margin; outer apical angle of the elytra with a short elevated plica close to the margin. Body beneath brownish redd varying to dark castaneous, the epipleura commonly of a brighter rufous tint.

Male genitalis Of a rather dark brownish ferruginous tint, the middle lobe very narrowly linear in apical third, not more than about one-sixth as wide as the lateral lobes.

Length, 4.5 to 6.1 mm.; width, 2.5 to 3.5 mm." (From Fall 22; 288).

Type locality San Diego, California.

Our Utah specimens vary greatly from the more southern type discribed by Le Conte. Fall's key is useless in separating 90% of our Utah specimens. The specimens from Zion Park (Lower Sonoran zone) agree moderately well with Fall's key and his discription. The specimens from the Escalante River and other localities in the Upper Sonoran have the ventral surface varying from partly piceous to entirely black. Usually with epipleura and hypomera tinged with black, last ventral rufous mesosternum dark rufous or rufo piceous, labium dark rufous, the rest of the ventral surface is black or piceous. I have not been able to find any reliable structural differences between the Zion Park and the other specimens. The genitalia are similar. Also, as I have not seen specimens from the more southern states except a me rather dark Arizona specimens, it seem advisable to treat this difference as a color variation.

Habitat This species as very common along the Escalante River, Fair sized groups were seen along the banks or in protected eddies of the river proper, but the ost common place of occurence was in the small isolated pools in the side box canyons. The author estemated that one such large pool near calf creek contained about

ten thousand specimens, many times more than I have ever seen in one group before.

Distribution Fall records this species from California, Oregon, Arizona, Colorado, and Texas. Tanner(28:271) record this species for Utah.

New Records

Locality	Date	Elev.	No.	Collector
Zion National Park, Utah	5/17/24		1	V.M.T.
Zion National Park, Utah	7/25/25		2	V.M.T.
Zion National Park, Utah	8/29/25		4	V.M.T.
Moab, Utah			4	V.M.T.
Moab, Utah			4	I. Rasmussen
Moab, Utah			1	A. Call
Calf Cr., Escalante Ri., Ut.	8/1/39		8	H.P.C.
Calf Cr., Escalante Ri., Ut.	8/2/39		2	H.P.C.
Calf Cr., Escalante Ri., Ut.	8/4/39		20	H.P.C.
Calf Cr., Escalante Ri., Ut.	8/8/39		7	H.P.C.
Calf Cr., Escalante Ri., Ut.	8/10.39		2	H.P.C.
Calf Cr., Escalante Ri., Ut.	8/12/39		1	H.P.C.
Escalante, Ut.			11	W.W. Tanner

Gyrinus consobrinus Le Conte

Of moderate size and convexity, form rathernarrow, black above with slight bluish reflections, sides moderately bronsed, surface strongly polished in the male with very minute scattered punctures, nearly as shining in the female, with an extremely fine alutaceous sculpture detectable posteriorly, and with similar but rather more numerous minute punctures than in the male. Strial punctures only slightly larger in the lateral rows, eleventh stria almost strictly marginal. Body beneath reddish brown with the median areas, especially the abdomen darker.

Male genitalia Rufo-testaceous, often a little darker in tint basally; median lobe apically a little less than half as wide as the lateral lobes.

Length 4.9 to 5.7 mm.; width, 2.6 to 3.15 mm. (From Fall 22;289)

Type Locality San Francisco, California.

Additional characters--Length, male 5-5.2 mm., Female 5.7-6mm.

Habitat This species is common around Provo where it may be found in the quiet pools of the nearby stream or in the protected arms of Utah Lake.

Distribution Fall records this species from California and Provo and Salt Lake City, Utah. Tanner (34:217) records this species from Moab, Ut.

New Records

Locality	Date	Elev.	No.	Collector
Provo, Utah		4,500	1	H.H. Hardy
Provo, Utah		4,500	2	A. Sutherland
Provo, Utah		4,500	2	T. Swallow
Provo, Utah		4,500	1	A.D. Hasler
Provo, Utah		4,500	12	L. Jeppson
Provo, Utah	3/29/36	4,500	1	H.P.C.
Provo, Utah	3/6/37	4,500	1	H.P.C.
Provo, Utah	4/14/37	4,500	2	H.P.C.
Provo, Utah	9/29/40	4,500	25	H.P.C.
Utah Lake, Provo, Utah		4,500	2	V.M.T.
Utah Lake, Provo, Utah			1	C.L.Hayward
Utah Lake, Provo, Utah	4/25/41	4,500	24	H.P.C.
Spanish Fork, Utah		4,500	1	H.H.Hardy
Spanish Fork, Utah		4,500	1	D.E.Hardy

Gyrinus pleuralis Fall

Size large, form moderate, rather flatly arched in profile, black, sometimes slightly aeneous, highly polished, sides evidently but not very conspiciously green bronzed; entire surface of elytra rather thickly micro-punctulate and minutely alutaceous in both sexes, the sculpture better defined toward the apex, becoming barely visible at base; strial punctures fine, a little stronger in the outer rows. Trunk beneath metallic black, anal segments more or less rufescent apically as a rule; Hypomera and epipleura varying from clear rufous to rufo-piceous.

Male genitalia Brownish piceous; middle lobe gradually decreasing in width from base to the narrowly rounded tip, the upper surface

carinate in more then apical half. At a distance from the tip equal to the apical width of the lateral lobes, the middle lobe is one-half as wide as the latter.

Length 6.2 to 7mm.; width, 3.3 to 3.75 mm. (From Fall 22; 292).

Type Locality Laramie, Wyoming

Male genitalia in our Utah speciemens has the middle lobe narrower than that pictured by Fall (22;Pl. XVI) . In one example the sides are nearly parallel from the tip to the basal third, the tip of the outer lobes becoming more oblique (Figs.24a & b)

Distribution Fall records this species form Wyoming, Colorado, Alberta, Washington, and California.

New Records; This species is a new record for Utah

Locality	Date	Elev.	No.	Collector
Sheep Cr., Unita Mts., Ut.	6/ /26	8,000	18	V.M.T.
Mesa Verda Nat. Park, Colo.	6/ /27		1	I. Rasmussen
Summit, Laketown, Utah	6/ /26		1	V.M.T.

Gyrinus affinis Aube

Form broadly oval and only moderately convex, shining black with faint bluish reflection, sides rather narrowly bronzed; surface without evident alutaceous sculpture, but covered throughout with a system of short, very fine, more or less oblique scratches, not differing in the sexes. Outer strail punctures only slighly coarser, eleventh stria quite near the margin. Body beneath metallic black, pronotal hypomera, epipleura and anal ventral segment more or less distinctly rufous.

Male genitalia Dull rufo-testaceous, the median lobe brownish at

apex. Median lobe very slender (linear) in about apical third, thence gradually widened to base.

Length, 5.6 to 7mm.; width, 3; 15 to 4 mm.

Type locality- United States

Distribution- Fall records this species from Maine, New Hampshire, Massachusetts, Connecticut, New York, Quebec, Michigan, Alberta, British Columbia, Wahington, Oregon and California.

New Records This is a new record for Utah

Locality	Date	Elev.	No.	Collector
Vernal, Utah			2	R.Rigby
Riverdale, Utah	6/ /26		5	V.M.T.

Gyrinus picipes Aube

Of average size and moderate convexity; highly polished black with sides distinctly bronzed. Some specimens appear to be absolute smooth, others show an extremely fine alutaceous sculpture, barely or scarcely detectable except towards the apex; there is also presen or not an excessively minute punctulation which is of variable visibility. Strial punctures very fine near the suture, evidently larger at sides.

Body beneath metallic black, the epipleura frequently tinged with rufous; anal segments more or less rufous or rufescent.

Male genitalia Brown or piceous brown; middle lobe about one-third as wide as the lateral lobes apically, upper surface flattened befor the apex and with a very minute obtuse prominence at the extreme tip.

Length 4.7 to 6 mm.; width, 2.6 to 3.2 mm.

Type locality- Norfolk Sound.

Habitat- This species is taken at High elevations in still water.

It is usually found along the shore in protected arms of the lakes or ponds. They may frequently be taken by sweeping the water under overhanging banks.

Distribution — Fall Records this species from Alaska, British Columbia, Alberta, Manitoba, Montana, and California. Dr. Tanner lists this species while discussing the Kaiparowits region of Utah. However I have not seen specimens from anywhere south of the Uinta Mts.

New Records

Locality	Date	Elev.	No.	Collector
Tryol Lake, Uinta Mts., Ut.		9,600	33	V.M.T.
Dimond Lake Uinta Mts., Ut.	8/28/40	9,700	10	H.P.C.
Mirror Lake Uinta Mts., Ut.		10,000	6	V.M.T.
Mirror Lake Uinta Mts., Ut.	7/15/31	10,000	22	V.M.T.
Mirror Lake Uinta Mts., Ut.	8/29/40	10,000	32	H.P.C.

SUMMARY

The results of this study have been quite satisfactory. Eighty nine species of aquatic and semi-aquatic Coleoptera of the suborder Adephaga have been made known for the State of Utah. Of these three were described as new species, fifty five were recorded for the first time from the state and three were not determined to species. The number of species for each family are as follows, Omophronidae 5, Amphizoidae 1, Haliplidae 9, Dytiscidae 67, and Gyrinidae 7.

The known range of a number of species will be greatly extended by our Utah records. This is especially true of many of the high elevation and arctic forms.

All the species known to occur in Utah are listed below. Those marked with (+) were described as new while those marked with (-) are new records for the state.

List of Utah Species of Water Beetles

Omophronidae
Homophron illustre Csy.
+Homophron tanneri sp Nov.
†Homophron tanneri
Prosecon gilae pallidum Csy.
Prosecon obliteratum utense Csy.

Amphizoidae
Amphizoa lecontei Matth.

Haliplidae
Brychius hornii Cr.
Peltodytes callosus Lec.
Peltodytes dispersus Robt.
-Haliplus robertsi Zimm.
-Haliplus distinctus Wallis
-Haliplus immaculicollis Harris
-Haliplus concolor Lec.
-Haliplus subguttatus Robts.
-Haliplus leechi Wallis

Dytiscidae - 67
Laccophilus decipiens Lec.
-Laccophilus atristernalis Crotch
-Hydrovatus brevipes Sharp
-Bidessus affinis Say
-Bidessus subtilis Lec.
Bidessus sp.
-Coelambus punctatus Say.
Coelambus virgo Fall
-Coelambus medialis Lec.
-Coelambus patruelis Lec.
Coelambus tumidiventris Fall
-Coelambus masculinus Cr.
-Coelambus ungicularis Cr.
-Coelambus impressopunctatus Schall
-Hydroporus hardyi ? Sharp
-Hydroporus planiusculus Fall
-Hydroporus vilis Lec.
-Hydroporus axillaris Lec.
-Hydroporus sinuatipes Fall
-Hydroporus despectus Sharp.
-Hydroporus pervicinus Fall
-Hydroporus occidentalis Sharp
+ Hydroporus transpunctatus sp. Nov.
Hydroporus tristis Payk.
Hydroporus Deronectes striatellus Lec.
Hydroporus Deronectes aequinoctialis Clark
-Hydroporus Deronectes griseostriatus De Geer
-Hydroporus Deronectes coloradensis ? Fall.
Hydroporus Oreodytes crassulus Fall
Hydroporus Oreodytes congruus Lec.

Dytiscidae (Continued)
Agabinus sculpturellus Zimm.
Agabus cordatus Lec.
- Agabus semivittatus Lec.
- Agabus hypomelas Mann.
Agabus seriatus Say
Agabus lugens Lec.
- Agabus nigroaenus Er.
- Agabus tristis Aube.
- Agabus tristis erotchi Zait.
- Agabus disintegratus Cr.
- Agabus punctulatus Aube
- Agabus strigulosus Cr.
- Agabus kenaiensis Fall
- Agabus austini Shp.
Agabus griseipennis Lec.
- Agabus obliteratus Lec.
- Agabus approximatus Fall
Ilybius subaeneus Er.
- Ilybius fraterculus Lec.
Rantus anisonychus Cr.
- Rantus notatus Fab.
- Rantus divisus Aube
- Rantus longipes Shp.
- Rantus hoppingi Wallis
- Rantus hubbelli Hatch ?
- Rantus mexicanus Cast.
Colymbetes sp.
Colymbetes sp.
Dytiscus marginicollis Lec.
Dytiscus dauricus Gebl. Th
Thermonectes marmoratus Hope
- Thermonectes bisilaris Harr.
- Acilius semisulcatus Aube.
- Graphoderus occidentalis Horn
- Graphoderus perplexus Shp.
- Cybister fimbriolatus (Say)
- Cybister explanatus Lec.

Gyrinidae
- Gyrinus minutus Linn.
- Gyrinus bifarius Fall
Gyrinus plicifer Lec.
Gyrinus consobrinus Leconte
- Gyrinus pleuralis Fall
- Gyrinus affinis Aube
Gyrinus picipes Aube

Hydrophilidae
- Hydroscapha natans ? Lec.
- Helophorus linearis Lec.
- Helophorus (several species)
- Berosus punctatissimus Lec.
- Berosus infuscatus Lec.
- Berosus striatus
- Berosus rugolosus Horn
- Berosus styliferus Horn
- Hydrophilus triangularis (Say)
- Hydrochara obtusatus Say
- Hydrochara lineatus Lec.
- Tropisternus ellipticus (Lec.)
- Tropisternus sublaevis (Lec.)
- Tropisternus dorsalis Brulle
- Hydrobius fuscipes Lec.
- Hydrobius cabrosus Horn
- Helochares maculicollis Muss.
- Enochrus conjunctus (Fall)
- Enochrus fuscus (Mots.)
- Enochrus californicus (Horn)
- Enochrus hamiltoni (horn)
- Cymbiodayta dorsalis (Mots.)
- Cymbiodayta morata Horn
- Anacaena bipustulatus Marsh
- Paracymus subaupreus (Say)
- Sphaeridium scarabaeoides (L)
- Sphaeridium bipustulatum Fabr.
- Cercyon ocellatus (Say)
- Cercyon pygmaeus (Illig.)
- Cercyon tristis (Illig.)
- Cercyon navicularis ? Zimm.
- Cercyon lugubris Horn
- Cryptopleurum minutum (Fabr.)

Dryopoidae
- Heliohus striatus Lec.
- Helichus productus Lec.
- Helichus suturalis Lec.
- Simsonia vittata ? Lec.
- Heterlimnius koebelei ? Martin
- Heterlimnius sp. ?
- Microcylloepus similis ?? Horn
- Macronychus thermae Hatch.

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DRAWINGS

Figures 1 - 24

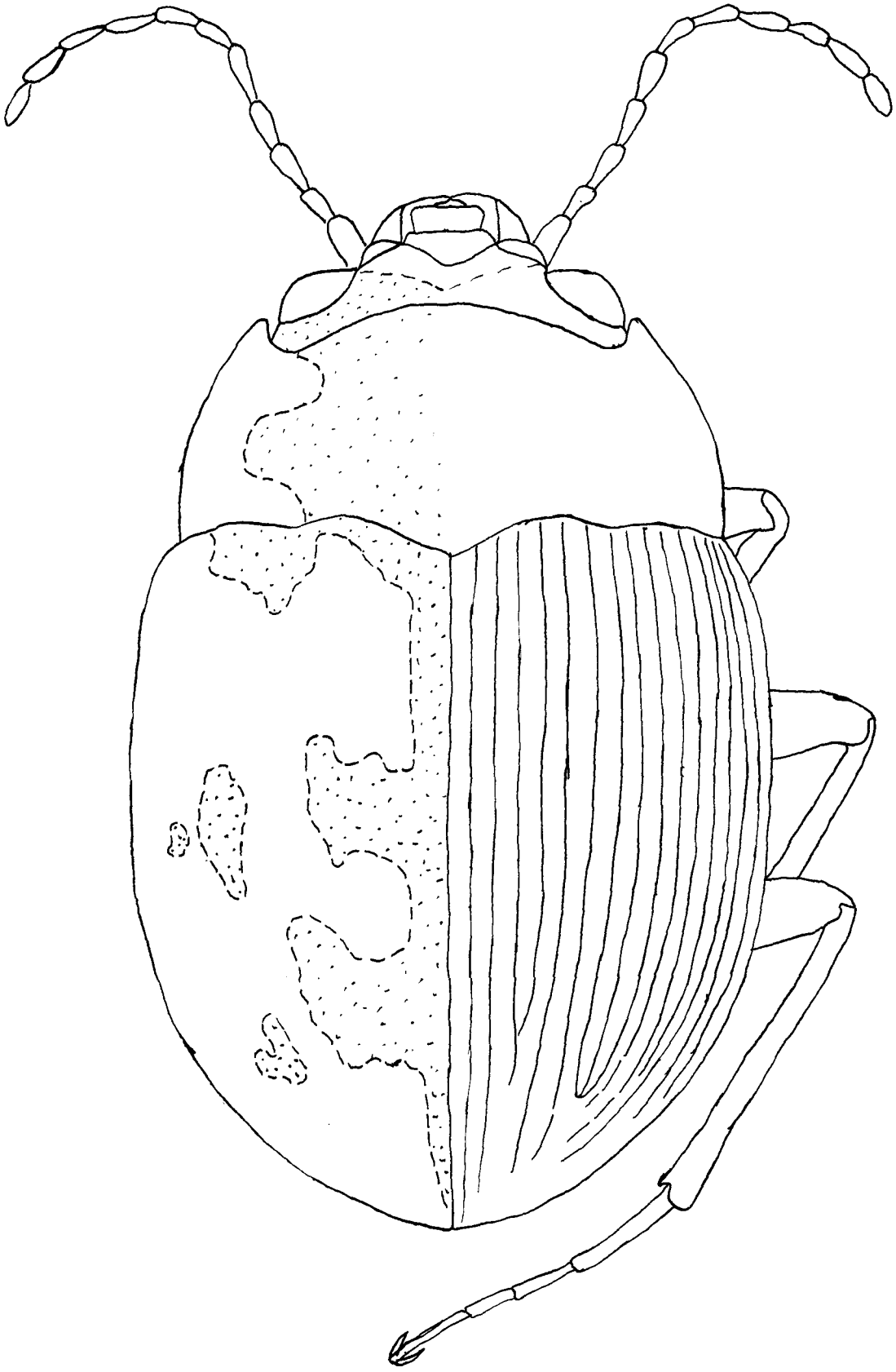


Fig. 1

Homophron tanneri proximum n. sub. sp.

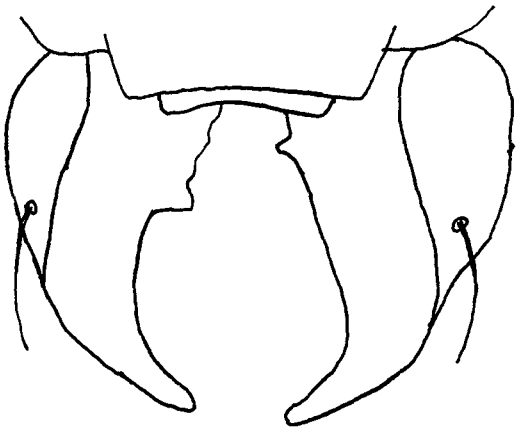


Fig. 2.
Mandibles of
Homophron tanneri n. sp.

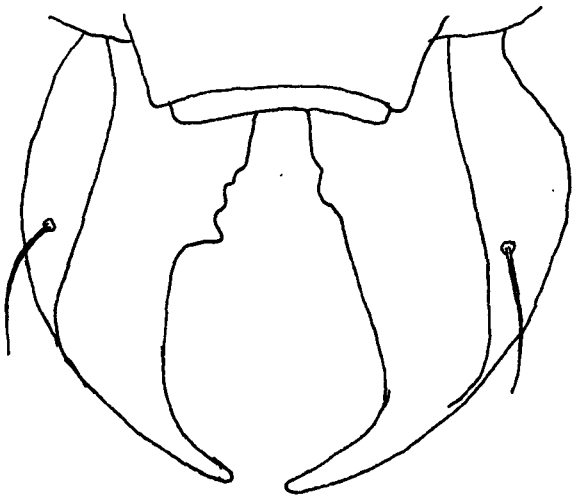
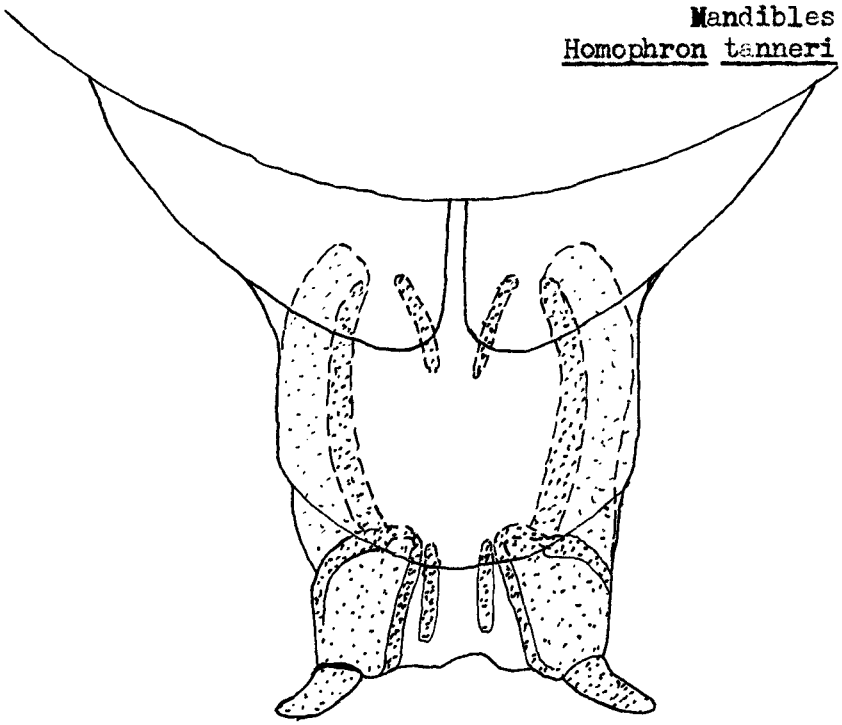


Fig. 3.
Mandibles of
Homophron tanneri proximum[illegible] n. sub. sp.



Fit. 4.
Female genitalia of
Homophron tanneri proximum[illegible] n. spb sp.

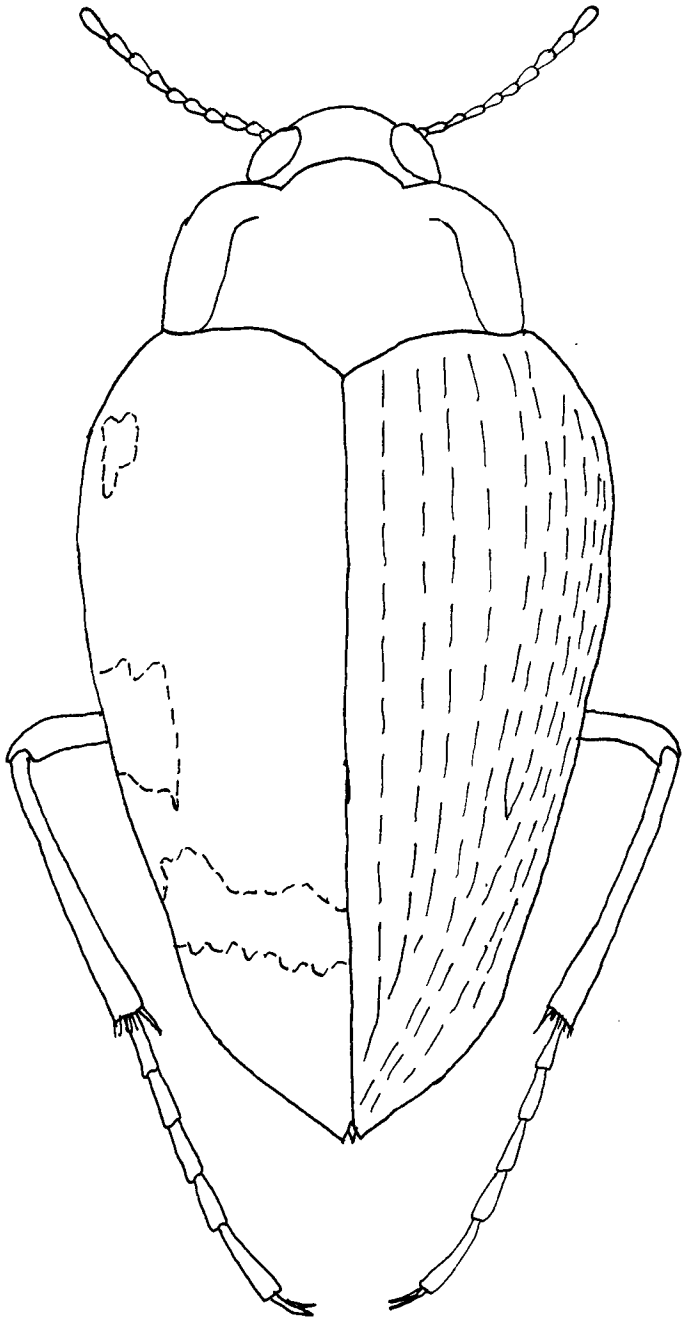


Fig. 5.

Brychius hornii Cr.

The right side shows the patern of the striae, the left side shows the elytral maculations, the striae are also lined with black.

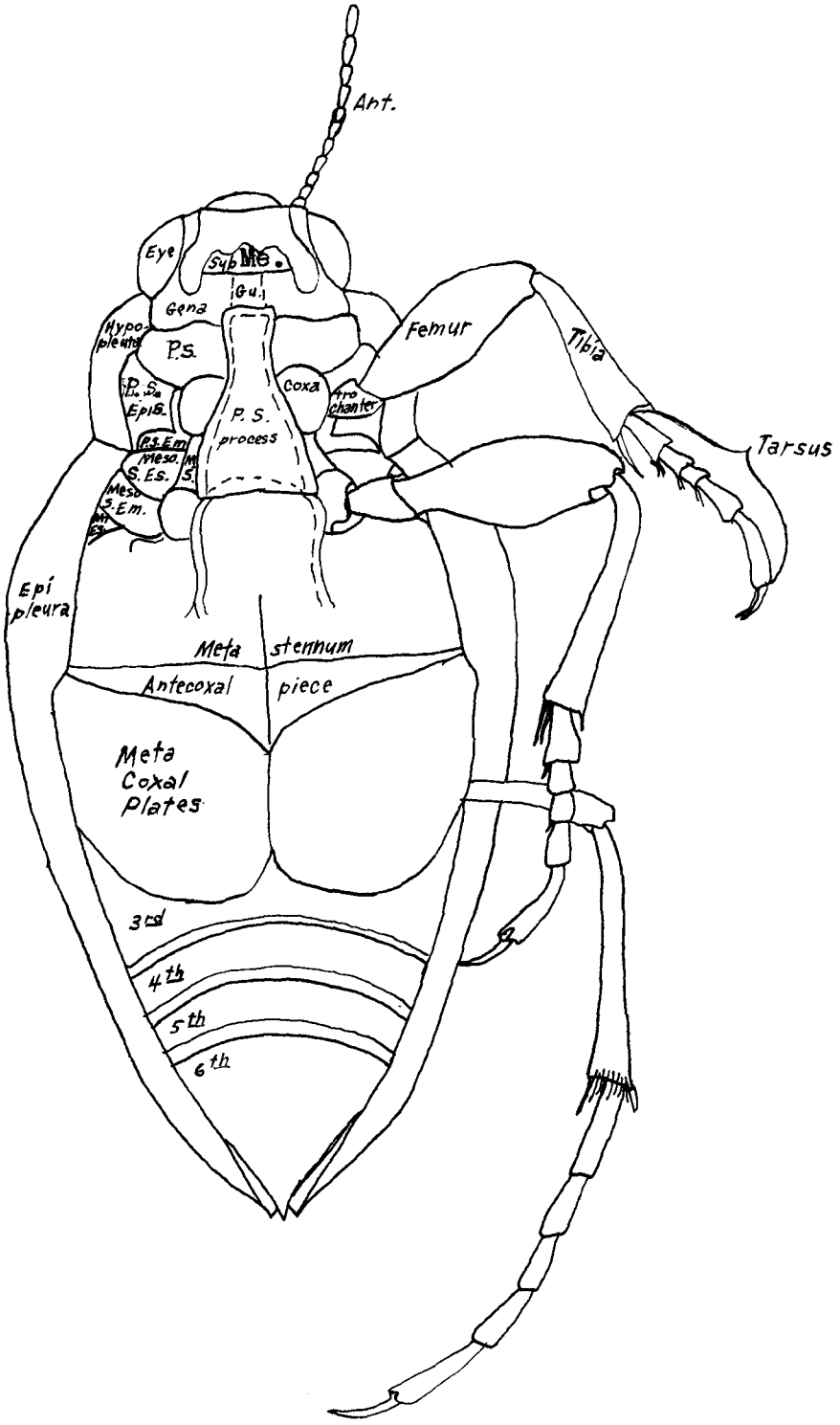


Fig. 6.
Brychius hornii Cr.

Fig. 7.
Brychius hornii Cr.

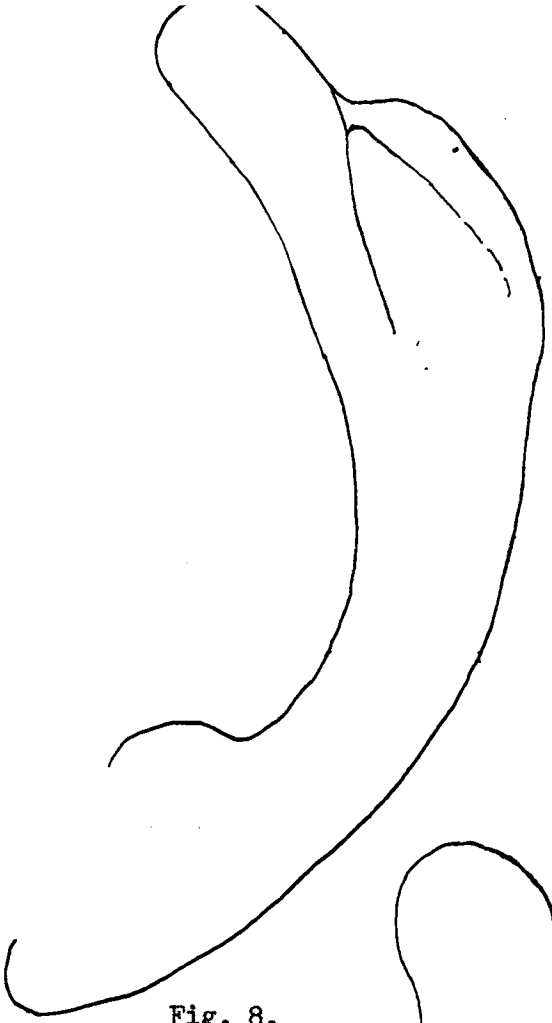


Fig. 8.
Haliplus distinctus
Wallis

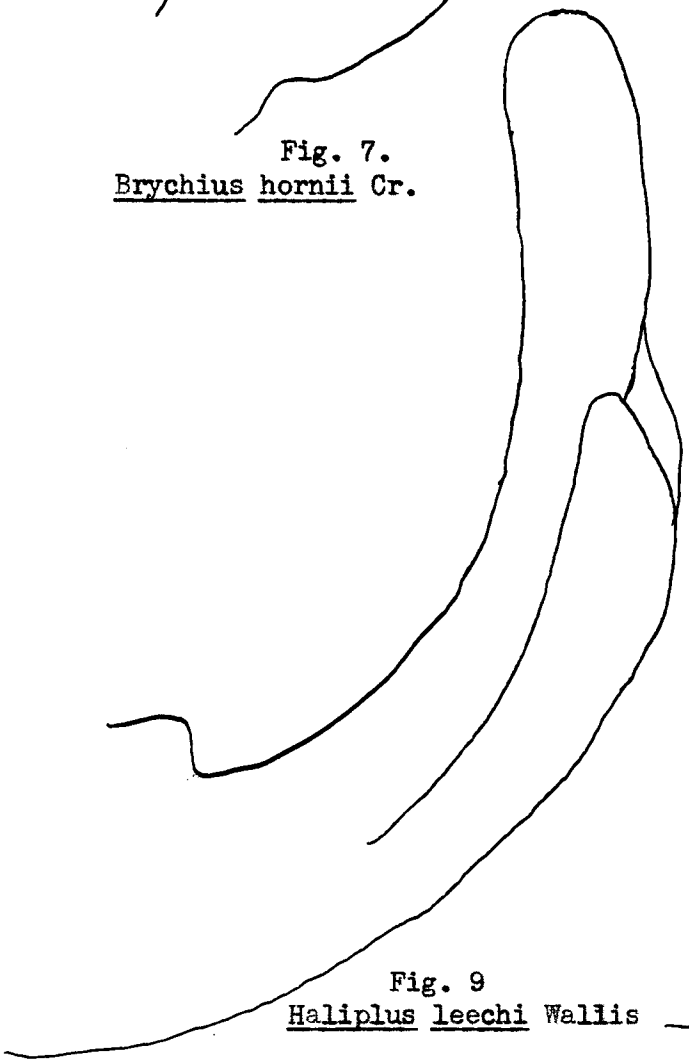


Fig. 9
Haliplus leechi Wallis

Fig. 10
Haliplus subguttatus
Robts.

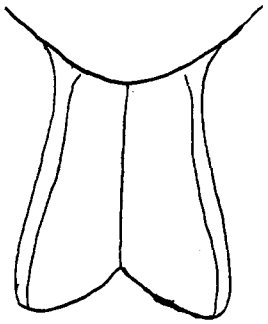
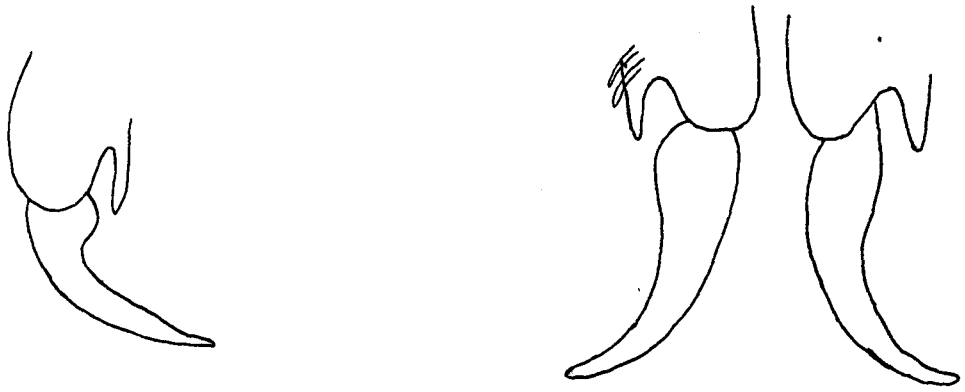
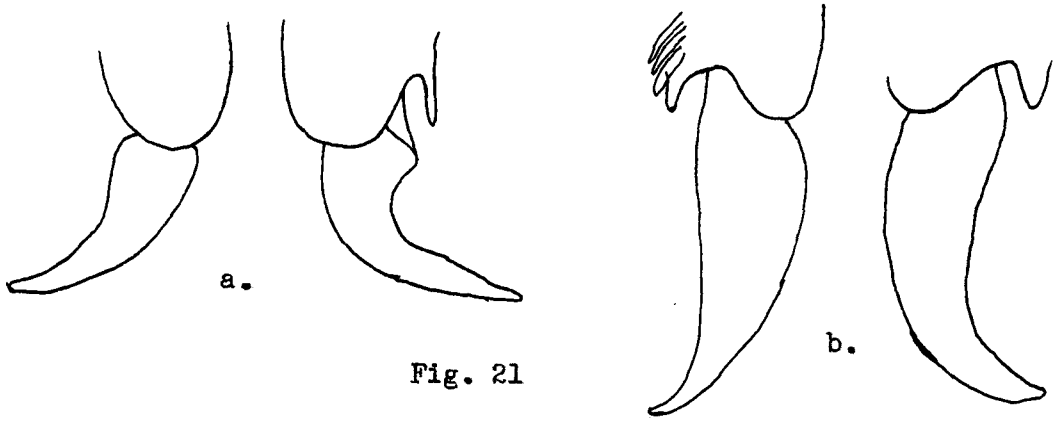


Fig. 19
Hind coxal processes of
Agabinus sculpturellus Zimm.



a. b.

Fig. 20
The protarsal (a.) and mesotarsal (b.) claws of Colymbetes
Group 2.



a. b.

Fig. 21

The protarsal (a.) and mesotarsal (b.) claws of Colymbetes
Group 1.

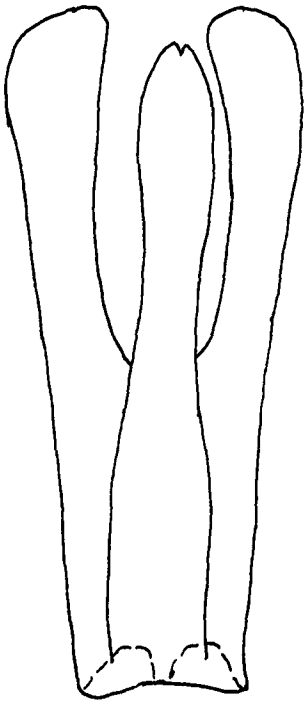


Fig. 22.

Gyrinus minutus Fab.

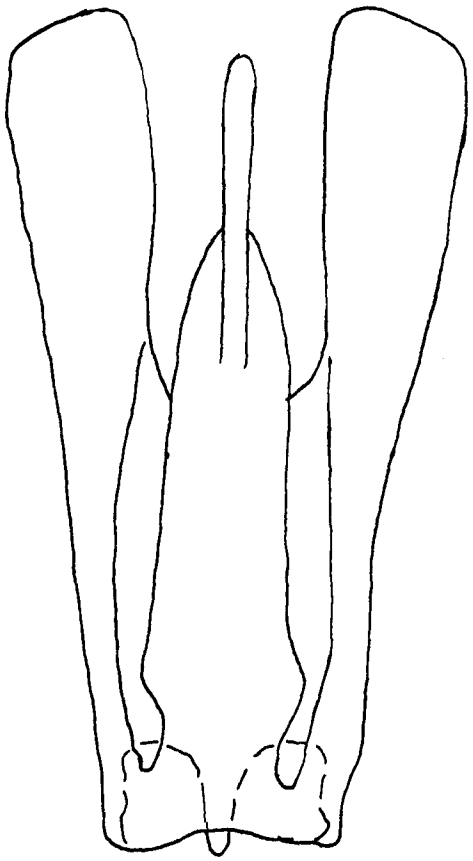


Fig. 23.
Gyrinus plicifer Lec.

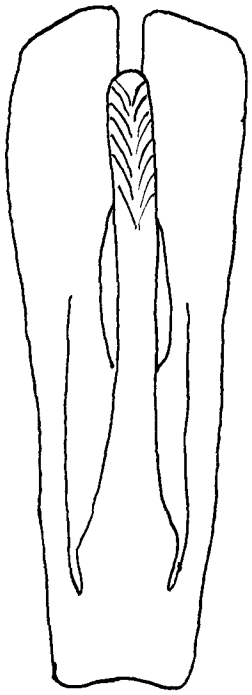
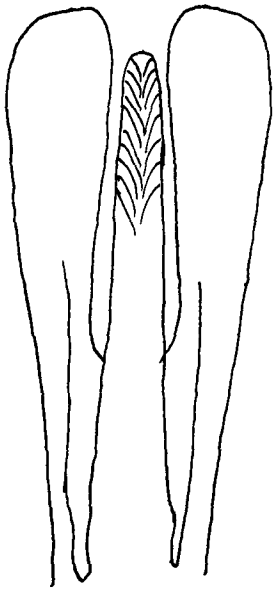


Fig. 24.

Gyrinus pleuralis Fall



Gyrinus pleuralis Fall