

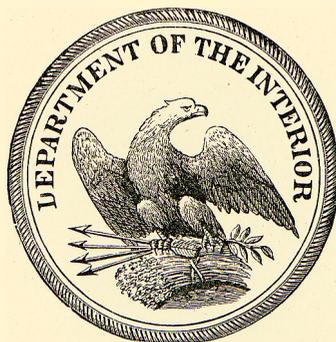
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CHARLES D. WALCOTT, DIRECTOR

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# ADEPHAGOUS AND CLAVICORN COLEOPTERA

FROM THE

## TERTIARY DEPOSITS AT FLORISSANT, COLORADO

WITH

DESCRIPTIONS OF A FEW OTHER FORMS

AND

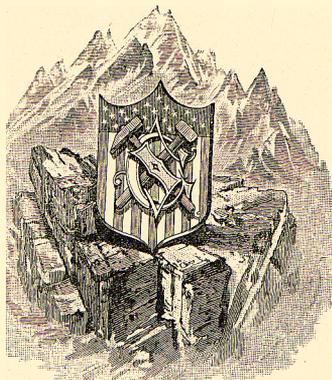
A SYSTEMATIC LIST

OF THE

NON-RHYNCHOPHOROC TERTIARY COLEOPTERA OF NORTH AMERICA

BY

**SAMUEL HUBBARD SCUDDER**



**WASHINGTON**  
GOVERNMENT PRINTING OFFICE  
1900

14/9/1901

British Society of London

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## LETTEKOFTKANSMITTAL.

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CAMBRIDGE, MASSACHUSETTS, *December 22, 1897.*

SIR : I send herewith for your acceptance a descriptive account of the Adepagous and Clavicorn Coleoptera of the Tertiary beds of Florissnnt, Colorado, together with a catalogue of the non-rhynchoporous fossil Coleoptera of North America, intended ax a complementary volume to my Monograph, already published by the Survey, on the Tertiary Rhynchoporous Coleoptera of the United States.

Very respectfully, **yours,**

SAMUEL H. SCUDDER.

Hon. C. D. WALCOTT,

*Director U. S. Geological Survey.*

# ADEPHAGOUS AND CLAVICORN COLEOPTERA OF FLORISSANT.

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By SAMUEL H. SCUDDER.

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## INTRODUCTION.

In Monograph XXI of the United States Geological Survey the rhynchoporous Coleoptera of North America are fully treated. It was considered as "a first installment toward a history of our fossil Coleoptera," which it was then intended should be followed by several other similar volumes treating in succession the other great divisions of the Coleoptera. The reasons for first undertaking the publication of the Rhynchophora were given in that volume. Work had, however, already progressed at the other end of the Coleopterous series, RR explained in my report of July 1, 1887,<sup>1</sup> and at that time nearly all the descriptions in the present volume had been drawn up. Change of circumstances has prevented me from being able to carry out the work as I had planned, and accordingly the present volume has been undertaken to complete temporarily the Coleopterous series. All the hitherto published non-rhynchoporous Coleoptera are catalogued, and in their proper place are given descriptions of all new forms and of those few species (five in number) and genera (two) which had been published in scattered papers by the United States Geological and Geographical Survey of the Territories. These new descriptions are almost exclusively confined to the Adephagous and Clavicorn families, and include all the species in these families known to me from the Florissant basin. Those from other Western deposits have not been studied or, indeed, assorted from the considerable mass of still unstudied material in my hands, most of which has come into my care within the last nine years, i. e., since these studies were undertaken.

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<sup>1</sup> Eighth Ann. Rept. U. S. Geol. Survey, pp. 188-189.

The volume is, therefore, mainly a treatise on the Adephagous and Clavicorn Coleoptera of Florissant, but is at the same time a catalogue of all hitherto known or here published non-rhynchophorous Coleoptera of North America (26 families, 125 genera, 210 species). As in the volume on the Rhynchophora, I have prefixed to each genus and family a summary of our knowledge of the extinct forms in the given group, brought up to the date of writing (August, 1896).

I still retain the hope of completing the history of our fossil Coleoptera, if not by extended memoirs embracing long series, at least by the publication of more limited papers upon separate families. The material therefor is vast, but other engagements prevent rapid execution of my desires.

## DESCRIPTIONS OF SPECIES.

### CARABIDÆ.

More than two hundred species of Carabidæ have been found fossil, referred to fifty-four genera, of which six are regarded as extinct. Thirty-two of these species, belonging to fourteen genera (of which only two are not otherwise recorded as fossil), are referred to existing species and occur only in the Pleistocene of Europe. Omitting these, there are one hundred and seventy-two fossil species, of which fifty-four (of twenty-four genera) belong to the Pleistocene, twenty-seven species of fourteen genera in the Old World, and the same number of species of ten genera in North America. From the older Tertiaries, one hundred and eighteen species are known of forty-four genera (six extinct), viz, eighty-five species of thirty-four genera (five extinct) in the Old World, and thirty-three species of twenty-six genera (one extinct) in the New World. No species have been found on both continents. Of the forty-four genera from the older Tertiaries, thirty-four are found in the Old World, nineteen in the New, and nine in both. Fourteen genera are represented both in the older and latest Tertiaries.

### CYCHRUS Fabricius.

The only fossil species of this genus known are the two here recorded and one other, *C. rostratus* Linn., a recent species, stated by Flach to occur in the Pleistocene of Hombach, Bavaria.

A fossil species from Wyoming, formerly described by me as *A. Cychrus*, has been found to belong to the Carabini.

The existing species of the genus, which are numerous, are mostly found in north temperate America and Europe.

CYCHRUS WHEATLEYI.

*Cychrus wheatleyi* Horn, Trans. Am. Ent. Soc., V, 242 (1876); Scudd., Tert. Ins. N. A., 536-537, pl. 1, fig. 1 (1890).

Bone caves of Pennsylvania.

CYCHRUS MINOR.

*Cychrus* (minor) Horn, Trans. Am. Ent. Soc., V, 243 (1876).

*Cychrus minor* Scudd., Tert. Ins. N. A., 537-538, pl. 1, fig. 2 (1890).

Bone caves of Pennsylvania.

NOMARETUS LeConte.

As existing to-day, this is a genus with few species, confined to the United States east of the Rocky Mountains. No other species than the one here described has been found fossil.

NOMARETUS SERUS sp. nov.

Pl. I, fig. 1.

About the size and of much the general appearance of *N. imperfectus* Horn. A single well-preserved specimen, showing nearly all the parts of the body. It has a remarkably broad and little elongate head for this group, but the whole form, the character of the appendages, and the deeply cleft labrum indicate this place for it. The head is fully three-quarters as broad as the thorax, tapering rapidly in front of the somewhat prominent eyes, so that the labrum is rather less than half as wide as the head, and before the labrum about as long as broad. The labrum is somewhat obscure, but it is apparently two-thirds as long as broad, very deeply and widely cleft. Mandibles moderately stout, finely pointed, and rather strongly hooked. Maxillary palpi moderately slender, about a third as long as the antennæ, the penultimate joint gradually enlarged at the apex, the last joint subtriangular, angulate in the middle, twice as long as broad

Antennæ nearly as long as the elytra, with the basal three joints larger and more rounded than the succeeding ; but the preservation does not permit of noting what joints were glabrous. Pronotum subquadrate, broadest in the middle, tapering gently in front', rapidly behind ; front margin broadly convex with no median excision, the lateral angles well rounded ; posterior border produced somewhat, roundly angulate, the disk strongly depressed in a longitudinal mesial band, broadening anteriorly ; lateral margin simple. Elytra very regularly ovate, nearly twice as broad as the pronotum, broadest a little behind the middle, the striæ, apparently to the number of about a dozen on each elytron, similar and slightly impressed, the outer border narrowly margined.

Length to tip of maxillæ, 7 mm.; breadth across elytra, 3 mm.; length of antennæ, 3.5 mm.

Florissant, Colorado, one specimen, No. 12086.

#### NEOTHANES Scudder.

An extinct genus, founded upon the present species, allied to *Carabus*. The species was formerly referred by me to *Cychnus*, but evidently belongs to the Carabini. The genus is described in my Tertiary Insects.

#### NEOTHANES TESTEUS.

Pl. I, fig. 5.

*Cychnus testeus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 758-759 (1878).

*Neothanes testeus* Scudd., Tert. Ins. N. A., 535-536, pl. VII, figs. 32, 39 (1890).

Green River, Wyoming.

#### CARABUS Linné.

A widespread genus, prolific in species, found in the north temperate regions and in a few south temperate districts. Three of the existing European species have been reported from the Pleistocene of Switzerland, England, and Poland, and as many more extinct species from the Pleistocene of Poland. Omboni also figures a species from the marls of Italy. But excepting that the genus has been recognized in amber, no species but that here described has been noted from the earlier Tertiaries.,

CARABUS JEFFERSONI **s p .** nov.Pl. I, **figs.** 6, 10.

Two entirely different specimens are referred here to a single species, one of them showing the head with the appendages, the other a nearly perfect elytron. Both are of about the size of an ordinary *Carabus*, and though neither agrees well with that genus in certain particulars, there seems to be no other with which they agree so well. The head is smooth, slightly tapering forward, just as broad behind the eyes as the length to the tip of the emarginate labrum; well pronounced, straight, slightly convergent, supraorbital ridges run backward from the outer base of the clypeus. Labrum deeply and roundly emarginate. Mandibles stout. Maxillary palpi extraordinarily stout for a *Carabus*, the joints being subequal, full and large, not more than twice as long as broad, together not nearly so long as the breadth of the head. Labial palpi entirely similar and correspondingly smaller. Antennæ 11-jointed, the second joint a little less than half as long as the third, the latter apparently cylindrical, the whole antenna rather short, being only about a little more than twice as long as the head, while it is usually three times as long as the head.

The elytron, which is of just the proper size to match the head, but which, being on a different stone, may of course belong to a distinct species, is placed here because it, too, differs in a similar way from *Carabus*. It is not perfect, the base being broken, but it is nearly complete, its original shape somewhat distorted by flattening, and shows the under surface. Ten punctate striæ are seen, of which the five on the sutural side are much less crowded than those next the outer margin. Near the middle of the elytron, on the fifth stria, can be very obscurely seen a pair of foveæ of large size, about as broad as the interspaces, and separated from each other by more than double that distance. The puncta, seen as slight elevations in the specimen, are much coarser on the crowded than on the more distant striæ.

Length of head, including mandibles, 5 mm.; of antennæ, 8.25 mm.; breadth of head behind eyes, 3.65 mm. ; length of maxillary palpi, 2.65 mm. ; breadth of basal joint at apex, 0.5 mm.; length of fragment of elytron, 11 mm.; breadth of elytron, 5 mm.

Florissant, Colorado; two specimens, Nos. 4264, **14139**.

Dedicated to the honored memory of President Thomas Jefferson, one of the earliest writers on American palæontology.

CALOSOMA Weber.

This genus is at present less numerous in species than the preceding, but, has much the same range. Over twenty-five species are recorded from North America. The fossil species are, however, more numerous in the early and middle Tertiaries than are those of *Carabus*, for no less than eleven species are described from Aix, Oeningen, Switzerland, and the Rhine, besides the one from Florissant here recorded.

CALOSOMA EMMONSII sp. nov.

Pl. I, fig. 7.

Represented by an excellently preserved elytron, with subparallel sides and eighteen striæ, of which fourteen are equidistant, equally and gently impressed, while the others are crowded together next the outer border, and only distinct on the apical half of the elytron. The interspaces are gently convex and broken by finely impressed lines into quadrate cells which are generally about two-thirds as long as broad, and are in all parts very obscure. The figure on the plate is not magnified enough to show these. No foveæ whatever can be seen. The species is nearest *C. willcoxi* of any of our native forms and agrees fairly well with it in size and shape; in that species the foveæ are very slight. It agrees still better with the fossil species *C. escheri* and *C. deplanatum* Heer from the Miocene of Oeningen, but both of these species are very much larger and punctato-striate, while in our species no sign of punctures appears.

Length of elytron, 13 mm.; breadth, 4.5 mm.

Florissant, Colorado; one specimen, Nos. 20 and 71.

The species is named for my honored instructor, the late Dr. Ebenezer Emmons.

ELAPHRUS Fabricius.

The present is the only known fossil species of this north temperate genus, excepting one which has been indicated from Oeningen.

## ELAPHRUS IRREGULARIS.

*Elaphrus irregularis* Scudd., Tert. Ins. N. A., 534, pl. 1, fig. 56 (1890); Contr. Canad. Palæont., II, 56 (1892).

Clay beds of Scarboro, Ontario.

## LORICERA Latreille.

This is a small group of beetles, mostly confined to boreal America and Siberia, of which the species here recorded are the only ones known as extinct.

## LORICERA GLACIALIS.

*Loricera glacialis* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., III, 763 (1877); Tert. Ins. N. A., 533, pl. 1, figs. 50, 57 (1890); Contr. Canad. Palæont., II, 55 (1892).

Clay beds of Scarboro, Ontario.

## LORICERA? LUTOSA.

*Loricera 3 lutosa* Scudd., Tert. Ins. N. A., 533-534, pl. 1, fig. 32 (1890); Contr. Canad. Palæont., II, 56 (1892).

Clay beds of Scarboro, Ontario.

## NEBRIA Latreille.

A north temperate genus rich in species, of which twenty or more are known from North America. Besides the fossil species here recorded, the genus has been recognized in amber, and two species have been described from Aix and Oeningen.

## NEBRIA PALEOMELAS.

*Nebria paleomelas* Scudd., Rept. Prog. Geol. Surv. Can., 1877-78, 179B (1879); Tert. Ins. N. A., 532, pl. 2, fig. 20 (1890); Contr. Canad. Palæont., II, 54-55 (1892).

Nicola River, British Columbia.

## NEBRIA OCCLUSA sp. nov.

Pl. I, fig. 3.

A single elytron, broadest in the middle, the humeral angle well rounded, of about the shape of that of *N. pallipes* Say, finely and sharply, but shallowly striate, the striæ scarcely punctured, the interspaces scarcely convex,

the surface slightly roughened, the color testaceous. It differs from any *Nebria* I have seen in that the sutural stria runs uninterruptedly to the base, while a short, oblique, faint, supplementary stria runs between the first and second striae into the former near the base.

Length of elytron, 7.25 mm.; breadth, 2.75 mm.

Florissant, Colorado; one specimen, No. 16382.

#### BEMBIDIUM Latreille.

Of this dominant genus, dominant especially in the north temperate zone, and of which more than one hundred and twenty species are known in America, a number have been found fossil. Most of these, including five existing species and ten in all, are confined to the Pleistocene of France, Bavaria, Galicia, Ohio, and Canada; the others, seven in number, come from the middle and lower Tertiaries of Radoboj, Aix, Amber, and Colorado, while the genus has been recognized also at Oeningen and in Alsatia. The following species are included in the above enumeration:

#### BEMBIDIUM EXOLETUM.

*Bembidium exoletum* Scudd., Bull. U. S. Geol. Geogr. Sum. Terr., II, 77-78 (1876); Tert. Ins. N. A., 530-531, pl. 5, figs. 121, 122 (1890).

White River. Colorado.

#### BEMBIDIUM GLACIATUM.

*Bembidium glaciatum* Scudd., Tert. Ins. N. A., 531, pl. 1, fig. 40 (1890); Contr. Canad. Palæont., II, 53-54 (1892).

Clay beds of Scarboro, Ontario.

#### BEMBIDIUM FRAGMENTUM.

*Bembidium fragmentum* Scudd., Tert. Ins. N. A., 531-532, pl. 1, fig. 45 (1890); Contr. Canad. Palæont., II, 54 (1892).

Clay beds near Cleveland, Ohio.

#### BEMBIDIUM OBDUCTUM sp. nov.

Pl. 1, fig. 9.

Allied to *B. simplex* LeC. The head is of the usual form, with large projecting eyes, and the antennae are long and slender, with long and

slender cylindrical joints; the thorax is unusually' quadrate, tapering but little posteriorly (though this may be only in appearance, through the partially lateral manner of its preservation), with well-rounded angles and truncate base and apex; there is a slight median impressed line and the surface is very delicately scabrous, with a slight tendency to a transverse arrangement of the roughnesses. Elytra uniformly striate throughout, the striæ apparently most delicately and faintly punctulate, though this is hard to determine, as the specimen is preserved in reverse and the striæ appear as ridges.

Length of body, 5 mm. ; width of elytra, 2 mm.

Florissant, Colorado; one specimen, No. 11790.

BEMBIDIUM TUMULORUM sp. nov.

Pl. I, fig. 2.

Of the same size as the last (*B. obductum*), but differing from it markedly in the form and structure of the thorax, which is considerably broader than the head, broadest in the middle of the anterior half, and rapidly tapering posteriorly to near the tip, when it tapers less rapidly, being thus subcordate. There is a median impressed line and the surface is longitudinally and very delicately corrugate in wavy lines. The rest of the body is very obscurely sculptured, but the elytra are apparently uniformly striate, at least at base, and distinctly punctate.

Length of body, 5 mm. ; width of elytra, 2 mm.

Florissant, Colorado; one specimen, No. 1.601, Princeton College collection.

PATROBUS Dejcan.

This genus has been found fossil only in the Pleistocene. The existing European species, *P. excavatus* Payk., has been recognized in France and Bavaria, and a couple of extinct species have occurred in Galicia and Canada. The present distribution of the genus is in the boreal portion of the north temperate zone.

PATROBUS GELATUS.

*Patrobus gelatus* Scudd., Tert. Ins. N. A., 530, pl. 1, fig. 48 (1890); Contr. Canad. Palæont., II, 53 (1892).

Clay beds of Scarboro, Ontario.

## MYAS Dejean.

Both the species of *Myas* here described agree closely together and differ from the species now belonging to the United States fauna in the shortness of the antennæ, the form of their joints, and the apical elongation of the hind trochanters, but they agree so closely in all other features, including the dilatation of the terminal joint of the labial palpi, and so certainly belong to the Pterostichini by all the available characters, including the three glabrous basal joints of the antennae, the structure of the mentum, the quadrisetose ligula, and the elytra without dorsal puncture, that there can be no doubt they belong either in the nearest neighborhood of *Myas* or strictly within that genus.

No other fossil species of the genus are known. It is a small group, with only a single European and two North American species.

## MYAS RIGEFECTUS sp. nov.

## Pl. I, fig. 4.

A single specimen shows an inferior surface through which the striation of the elytra can be seen, and is very perfectly preserved. The short and stout antenna+ the enlarged palpi, and the structure of the hind legs appear to agree better with *Myas* than with any other genus. The general form of the body, with the proportions of head, thorax, and abdomen and the exact shape of the thorax agree perfectly with *M. cyanesçens* Dej. The antennæ differ somewhat; they are 11-jointed, about half as long only as the elytra, the first joint a little larger than the others, the terminal oval, the remainder subequal, about half as long again as broad, not very strongly constricted at the base, and squarely truncate apically. Mandibles, labrum, and palpi, as well as the prominence of the prosternum, much as in *Myas*. Hind coxæ attingent at the tip of a broad triangular extension of the abdomen; hind trochanters very large, nearly two-thirds as long as the femora and separated from them by an unusually straight suture, the apex pointed. Faint signs of simple elytral striæ seen through the body (not shown in the figure) indicate a close resemblance to *M. cyanesçens*.

Length of body, 13 mm.; length of elytra, 7.5 mm ; breadth of elytra, 5.2 mm.; length of antennæ, 3.5 mm.

Florissant, Colorado; one specimen, No. 9173.

## CARABIDÆ.

### MYAS UMBRARUM SP. NOV.

#### Pl. I, fig. 11.

Several specimens are preserved, but only one is in a condition at all satisfactory. This is preserved both in obverse and reverse, one showing best the upper surface (but as a cast), the other the under surface. As the antennæ, legs, and mouth parts are almost, all excellently preserved, there is little left to be desired. The species is a little smaller and stouter than the living *M. cyanescens* Dej. or the fossil *M. rigefactus*, just described, and has comparatively shorter elytra. The antennæ are about three-quarters the length of the elytra, with joints far less moniliform than in the recent species, the first joint much stouter than the rest, the second quadrate, the terminal oval, the remainder subequal, nearly twice as long as broad, and shaped as in the preceding species, but more rounded apically. Laterally the prothorax is regularly and gently convex and delicately margined, with a distinct median furrow and very slightly impressed basal impressions. The elytral striæ are not punctured, the first stria is slightly angulate at the base, and outside, from the extreme base of the second stria, running obliquely into it and subparallel to its basal course, is a brief supplementary stria, faintly impressed. The hind tarsal joints are of more nearly uniform length than in *M. cyanescens* and with shorter terminal spines, and the hind tibiae are not apically dilated to such an extent as in the living species with which we have compared it. The structure of the hind trochanters is exactly as in *M. rigefactus*, from which species it differs in its greater stoutness, the more obconic forms of the antennal joints, and the more regularly convex sides of the pronotum.

Length of body, 11.65 mm.; of elytra, 6.75 mm.; breadth of elytra, **4.8** mm.; length of antennae, 4.2 mm.; of hind tibiae, 2.6 mm.

Florissant, Colorado; three specimens, Nos. 503, 8457 and 9208,14138.

### PTEROSTICHUS Bonelli.

This is another dominant genus of Carabidæ, north temperate in character, though with some Australasian forms, and of which considerably more than a hundred species are known in North America. It has been found in considerable numbers in Pleistocene deposits, half a dozen recent species having been recorded from England, Switzerland, and Galicia,

while eleven extinct forms are recognized in Germany, Galicia, Pennsylvania, Ohio, and Canada. Besides these, in the older Tertiaries two species are here described from Florissant, three have been described and two others indicated from Oeningen, and the genus has been recognized in amber.

PTEROSTICHUS ABROGATUS.

*Pterostichus abrogatus* Scudd., Tert. Ins. N. A., 525, pl. 1, fig. 39 (1890); Contr. Chad. Palæont., II, 50 (1892).

Clay beds of Scarboro, Ontario.

PTEROSTICHUS DORMITANS.

*Pterostichus dormitans* Scudd., Tert. Ins. N. A., 526, pl. 1, figs. 49, 55 (1890); Contr. Canad. Palæont., II, 50-51 (1892).

Clay beds in the vicinity of Cleveland, Ohio.

PTEROSTICHUS DESTITUTUS.

*Pterostichus destitutus* Scudd., Tert. Ins. N. A., 526, pl. 1, fig. 44 (1890); Contr. Canad. Palæont., II, 51 (1892).

Clay beds of Scarboro, Ontario.

PTEROSTICHUS FRACTUS.

*Pterostichus fractus* Scudd., Tert. Ins. N. A., 527, pl. 1, figs. 29, 30 (1890); Contr. Canad. Palæont., II, 51 (1892).

Clay beds of Scarboro, Ontario.

PTEROSTICHUS DESTRUCTUS.

*Pterostichus destructus* Scudd., Tert. Ins. N. A., 527, pl. 1, fig. 46 (1890); Contr. Canad. Palæont., II, 51-52 (1892).

Clay beds of Scarboro, Ontario.

PTEROSTICHUS GELIDUS.

*Loxandrus gelidus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., III, 763-764 (1877).

*Pterostichus gelidus* Scudd., Tert. Ins. N. A., 527-528, pl. 1, figs. 52, 59-61 (1890); Contr. Canad. Palæont., II, 52-53 (1892).

Clay beds of Scarboro, Ontario.

## CARABIDÆ.

### PTEROSTICHUS LÆVIGATUS.

*Pterostichus* sp. Horn, Trans. Am. Ent. Soc., V, 243(1876).

*Pterostichus lævigatus* Horn, ined.; Scudd., Tert. Ins. N. A., 528-529, pl. 1, figs. 3, 4 (1890).

Bone caves of Pennsylvania.

### PTEROSTICHUS? sp.

*Pterostichus?* sp. Horn, Trans. Am. Ent. Soc., V, 243 (1876); Scudd., Tert. Ins. N. A., 529, pl. 1, fig. 5 (1890).

Bone caves of Pennsylvania.

### PTEROSTICHUS PUMPELLYI sp. nov.

Pl. III, fig. 3.

This species may be best compared to our existing *P. coracinus* Newm. It is a large species with a smooth head and thorax, the former with a distinctly impressed straight transverse line connecting the anterior bases of the antennæ, and the eyes large but not greatly prominent. The thorax is somewhat crushed and distorted, but it is apparently broader than long, with gently rounded sides, the front angles square but not projecting, and the posterior margin squarely truncate. The elytra have a slight, well-rounded humeral angle, the striæ are deep and simple, and the interstitial spaces strongly convex; the sutural stria, not shown in the drawing, is of moderate length and does not appear to unite with the first regular stria in the figured specimen, but does so plainly in the other. One specimen shows the whole upper surface of the body excepting the two front pairs of legs, part of one elytron, and the abdomen; the other a single elytron.

Length of body, 16.5 mm.; of elytra, 9.75 mm.; breadth of one of latter, 3.5 mm.

Florissant, Colorado; two specimens, Nos. 401, 517.

Named for Raphael Pumpelly, United States geologist.

### PTEROSTICHUS WALCOTTI sp. nov.

Pl. III, hg. 1.

This species is represented by several specimens showing either the larger part of the body with elytra (but usually with the abdomen missing),

or simple elytra. It is of about the same size as *P. pumpellyi*; the head is smooth with a similar, but sometimes inconspicuous, transverse impressed line between the antenna; the thorax is squarely truncate anteriorly, with slightly projecting front angles, sides broadly, rather regularly and somewhat strongly rounded, so that the thorax is as broad posteriorly as anteriorly and fully half as broad again as long. Some specimens show a tendency to subangulate sides, and the slight median impressed line is scarcely noticeable in any (not given in the figure); the surface is entirely smooth. The elytra are smooth and flat but for the regular and not deep striæ, which show no punctuation and leave the interstitial spaces without convexity; there is a moderately long sutural stria connecting with the first longitudinal stria.

Length of body, 16 mm.; of elytra, 9 to 9.5 mm.; width of one, 3 to 3.5 mm.

Florissant, Colorado; six specimens, Nos. 259, **521** and 4640, 1781, 3105, 5131, and No. **1.557** of the Princeton College collection.

I give this species the name of C. D. Walcott, Director of the United States Geological Survey.

#### EVARTHUS LeConte.

The following is the only known fossil species of this genus, a considerable north temperate group with about a dozen North American species.

#### EVARTHUS TENEBRICUS sp. nov.

#### Pl. I, fig. 8.

Of this only the head is preserved, but this is so different from anything else which has been found fossil that it merits mention. It is of about the size of *Evarthrus gravidus* Hald., and is placed in this genus on account of the brevity of the last joint of the labial palpus. The head is subquadrate, about as long as broad, slightly narrower in front than behind, with two transverse lines, one in front of and the other behind the antennæ, the former the transverse impressed line of the upper surface, the latter the base of the labium seen through the head; the eyes are rather large, but not at all prominent; the mandibles stout and strongly curved; the maxillary and labial palpi unusually stout, the joints of the former subequal, not more than twice as long as broad; of the latter, the ultimate very much

shorter than the penultimate, indeed scarcely more than half as long, squarely truncate. Only about half a dozen joints of the antenna= are preserved, of which the basal is not more than half as long as in *E. gravidus*, while the other joints are as there.

Breadth of head at the eyes, 3.25 mm.

Florissant, Colorado ; one specimen, No. 1899.

#### AMARA Bonelli.

This is a genus numerous in species, mostly confined to the north temperate zone, and of which over sixty are found in North America. Three existing species have been found in the Pleistocene of Germany and Bavaria, and two extinct species in that of Galicia. Besides these, two undescribed species are recognized by Förster in the older Tertiaries of Alsatia, and three are described by Heer from Oeningen; to these are to be added the five Florissant species.

The Florissant species referred here differ from existing forms in several particulars, but I can not find that they agree better with any other types. They are remarkable for the shortness of the thorax, the breadth of the head, and the small size and anterior position of the eyes, which are next the antennæ and removed as far as possible from the border of the thorax.

#### AMARA REVOCATA sp. nov.

Pl. II, fig. 6.

Agrees well in general appearance, in size, and in form with *A. angustata* Say of the Northern States. It is smooth throughout, the thorax nearly twice as broad as long, with well-rounded slightly produced front angles, gently convex lateral margins, and a slight median impressed line. Elytra smooth, with gently impressed simple striæ and flat interstitial spaces.

Length of body, 6.5 mm.; breadth of elytra, 2.4 mm.

Florissant, Colorado; one specimen, No. 10404.

#### AMARA STERILIS sp. nov.

Pl. II, figs. 1, 9.

Another species, most nearly resembling *A. aurata* Dej., but much smaller, occurs at Florissant. It is the smallest species found there and is remarkable for its short and broad thorax and the shortness of the antennæ

join&. The head is not so broad in proportion to its length as in the other Florissant species, but on the other hand the thorax is broader, being more than twice as broad as long and exceptionally broad in front, where the front angles are not produced forward; the front margin is scarcely concave, the outer margin gently convex, with the height of the curve rather in advance of the middle; there is the usual impressed median line. The elytra are no broader than the thorax, with scarcely rounded humeral angles and striæ as in the other species.

Length of body, 5 mm.; of antennæ, 1.5 mm. ; 'breadth of elytra., 2.25 mm.

Florissant, Colorado; four specimens, Nos. 6226, 6570, 7060, and of the Princeton collection, No. 1.511.

**AMARA VETERATA** sp. nov.

Pl. II, fig. 3.

A number of specimens, none of them very completely preserved, represent a species intermediate in size between *A. powellii* and *A. danae* on one side and *A. revocata* and *A. sterilis* on the other. It has a more regularly oval shape than *A. danae*, to which it is on the whole the most nearly allied, but the form of the head and thorax is almost exactly as there. The elytra have fuller sides than even in *A. powellii*, with the humeral angle as in *A. danae*. None of the specimens show the elytral striæ with sufficient distinctness for characterization, but they are evidently similar to those of the other species. Excepting in one specimen there is no distinct sign of a median impressed line on the pronotum, and in this case it is very slight.

Length of body, 7.75 mm.; width, 3.4 mm.

Florissant, Colorado; five specimens, Nos. 414, 10811, 11271, 12055, 14135.

**AMARA POWELLII** sp. nov.

Pl. II, figs. a, 5.

This species is represented by a number of tolerably good specimens resembling *A. impuncticollis* Say in size. The head is unusually broad for its length, the portion back of the base of the mandibles being fully half as broad again as long; the eyes are small, placed well forward, and globular, though not greatly protruding. The prothorax is about twice as

broad as long, with roundly excised anterior margin, truncate posterior margin, and gently convex lateral margins, the broadest part just in front of the middle, and the front angles hardly projecting more than required by the different curves of the front and lateral margins. Surface smooth, the prothorax with a distinct, impressed median line. Elytra with the humeral angle well rounded off, the *striæ* distinct, but delicate and simple, the interstitial spaces flat and smooth.

Length of body, 8 mm.; of antennæ, 2.5 mm.; width of elytra, 3.2 mm.

Florissant, Colorado; twelve specimens, Nos. 472, 512, 5486, 7300, 7312, 7784, 8496 and 9277, 9172, 13608, 13618, 14195, 14336.

Named for Maj. J. W. Powell, Director of the United States Geological Survey when this description was written.

AMARA DANÆ sp. nov.

Pl. II, figs. 8, 10, 11.

This largest and most abundant of the Florissant species of *Amara* seems most to resemble *A. californica* Dej., and differs from *A. powellii* mainly in its greater slenderness; its head is relatively smaller, and the greatest width of its thorax appears to be in the middle rather than in front of it; the elytra have more nearly parallel sides and the humeral angle is less rounded off. Like it the head is broad and the eyes placed well forward, and not protuberant; the elytral *striæ* are delicately impressed, the interstitial spaces flat and smooth, and the prothorax has a delicately impressed median line.

Length of body, 13 to 14 mm.; of antennæ, 2.5 mm.; width of elytra, 3.5 mm.

Florissant, Colorado; fifteen specimens, Nos. 419, 1644, 5119, 7099, 7371, 8089, 8492, 8517, 8607 and 8867, 11198, 11262 and 14166, 12019, 13020, and of the Princeton College collection Nos. 1.555, 1.614.

In memory of the distinguished geologist J. D. Dana.

CARABITES Heer.

This term was employed by Heer to cover fossil Carabidæ of uncertain position, and under it I have placed the first of the following species, from Utah, which is probably one of the Pterostichini. The second species was

described by Heer from Greenland. Ten species in all have been referred here, seven from the older Tertiaries, three from the Pleistocene.

CARABITES EXANIMUS.

Pl. II, fig. 7.

*Carabites exanimus* Scudd., Bull. U. S. Geol. Survey No. 93, 17-18, pl. 1, fig. 4 (1892).

White River, Utah.

CARABITES FEILDENIANTJR.

*Carabites feildenianus* Heer, Quart. Jour. Geol. Soc. London, XXXIV, 69 (1878); Flora foss. arctica (V), I, 38, pl. 9, figs. 11, 11b (INS).

Discovery Harbor, Grinnell Land.

DIPLOCHILA Brullé.

No fossil form of this genus, which is widely distributed in various parts of the globe, has been recorded except the following, placed here doubtfully.

DIPLOCHILA? HENSHAWI.

*Diplochila ? henshawi* Scudd., Tert. Ins. N. A., 523-524, pl. 28, fig. 9 (1890).

Florissant, Colorado.

DICÆLUS Bonelli.

Of this North American genus, having about a dozen and a half species in the eastern half of the continent, only the following two species are known in a fossil state, from the Pennsylvania Pleistocene.

DICÆLUS ALUTACEUS.

*Dicælus alutaceus* Horn, Trans. Am. Ent. Soc., V, 244 (1876); Scudd., Tert. Ins. N. A., 524, pl. 1, figs. 8-10 (1890).

Bone caves of Pennsylvania.

DICÆLUS sp.

*Dicælus sp.* Horn, Trans. Am. Ent. Soc., V, 244 (1876); Scudd., Tert. Ins. N. A., 525, pl. 1, fig. 15 (1890).

Bone caves of Pennsylvania.

## CARABIDÆ.

### PLATYNUS Bonelli.

This is a dominant cosmopolitan genus, of which nearly ninety species occur in North America. In Europe only two species have been found fossil, in Pleistocene deposits of France and Galicia, and both are regarded as recent species. In America, six species, all extinct, have been found in the Pleistocene of Canada, while three others occur in the older Tertiary deposits of Wyoming and Colorado.

#### PLATYNUS SENEC.

*Platynus senecæ* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 759 (1878); Tert. Ins. N. A., 519, pl. 7, fig. 38 (1890).

Green River, Wyoming.

#### PLATYNUS CASUS.

*Platynus casus* Scudd., Tert. Ins. N. A., X9-520, pl. 1, fig. 42 (1890); Contr. Canad. Pakeont., II, 46 (1892).

Clay beds of Scarboro, Ontario.

#### PLATYNUS HINDEI.

*Platynus hindei* Scudd., Tert. Ins. N. A., 520, pl. 1, fig. 54 (1890); Contr. Canad. Palæont., II, 47 (1892).

Clay beds of Scarboro, Ontario.

#### PLATYNUS HALLI.

*Platynus halli* Scudd., Tert. Ins. N. A., 520-521, pl. 1, fig. 41 (1890); Contr. Canad. Pakeont., II, 47-48 (1892).

Clay beds of Scarboro, Ontario.

#### PLATYNUS DISSIPATUS.

*Platynus dissipatus* Scudd., Tert. Ins. N. A., 521, pl. 1, fig. 37 (1890); Contr. Canad. Pakeont., II, 48 (1892).

Clay beds of Scarboro, Ontario.

#### PLATYNUS DESUETUS.

*Platynus desuetus* Scudd., Tert. Ins. N. A., 521-522, pl. 1, figs. 43, 51, 58 (1890); Contr. Canad. Pakeont., II, 48 (1892).

Clay beds of Scarboro, Ontario.

## PLATYNUS HARTTII.

*Platynus harttii* Scudd., Tert. Ins. N. A., 522, pl. 1, fig. 31 (1890); Contr. Canad. Palæont., II, 48-49 (1892).

Clay beds of Scarborough, Ontario.

## PLATYNUS CÆSUS.

*Platynus cæsus* Scudd., Tert. Ins. N. A., 522-523, pl. 7, fig. 34 (1890).

Green River, Wyoming.

## PLATYNUS DILAPIDATUS.

Pl. II, fig. 4.

*Platynus dilapidatus* Scudd., Contr. Canad. Palæont., II, 49, pl. 3, fig. 2 (1892).

Clay beds of Scarborough, Ontario.

## PLATYNUS TARTAREUS sp. nov.

Pl. III, figs. 7-9.

Somewhat nearly allied to *P. sinuatus* Dej. The antennæ are longer than the head and thorax together, the head as well as the thorax with a median impressed line. Prothorax nearly half as broad again as the head (not including the projecting eyes) which is a little narrower than the length of the prothorax; front and hind margins squarely truncate, the sides strongly arcuate, subangulate, broadest about the middle, none of the angles rounded. Elytra with the humeral angle well rounded, the surface flat and smooth with delicate striæ and with apparently no interstitial punctures.

Length of body, 11.4 mm.; breadth of elytra, 4.4 mm.

Florissant, Colorado; four specimens, Nos. 2244, 3405, 8760 and 9252, 11363.

## GALERITA Fabricius.

The following species is the only one known in a fossil state. The genus is rather poorly represented in the United States, but is cosmopolitan in nature.

**GALERITA MARSHII** sp. nov.

## Pl. III, fig. 5.

A pair of elytra in place are to be referred here. The texture was evidently not dense, the elytra with straight, scarcely convex sides, apically truncate, but a little rounded and obtusely angled. A very little only of the base is lost, showing the species to be a small one and the combined elytra about half as long again as broad. The striæ are delicate, very slightly impressed, but sharp and straight, minutely and not closely punctured; the interstitial spaces are also more coarsely and densely but faintly punctured, the general punctuation being more obvious than the striation.

Length of elytra, 7 mm.; breadth, 4.5 mm.

Green River, Wyoming; one specimen, No. 92 (Dr. A. S. Packard).

Named for my friend Prof. O. C. Marsh, of Yale University.

## PLOCHIONUS Dejean.

The form here described is the only fossil species known in this genus, which has but few species, occurring in most parts of the world, only four of which inhabit the United States.

**PLOCHIONUS LESQUEREUXI** sp. nov.

## Pl. III, fig. 2.

A single specimen and its reverse seem to fall in this group, and to be not distantly related to *P. timidus* Hald., though it is impossible to say that it is not a Pinacodera. The antennae are about two-thirds as long as the elytra, with rather uniform joints about twice as long as broad and nearly cylindrical, the base being only a little smaller than the apex. The prothorax is about half as broad again as long, or half as broad again as the head, apart from the rather prominent eyes; with rounded sides, broadest a little behind the middle, but not greatly enlarging behind the broad, squarely truncate apex with nearly rectangular lateral angles; the surface appears to be smooth, with an impressed median longitudinal line. Elytra posteriorly truncate, distinctly striate, as in the Lebiini, the interspaces flat, with no sign of punctuation here or in the striæ, but with a feeble sign of transverse wrinkling, as is seen, but more heavily, on the thorax of *P. timidus*.

## PLATYNUS HARTII.

*Platynus hartii* Scudd., Tert. Ins. N. A., 522, pl. 1, fig. 31 (1890); Contr. Canad. Palæont., II, 48-49 (1892).

Clay beds of Scarboro, Ontario.

## PLATYNUS CÆSUS.

*Platynus cæsus* Scudd., Tert. Ins. N. A., 522-523. pl. 7, fig. 34 (1890).

Green River, Wyoming.

## PLATYNUS DILAPIDATUS.

Pl. II, fig. 4.

*Platynus dilapidatus* Scudd., Contr. Canad. Palæont., II, 49, pl. 3, fig. 2 (1892).

Clay beds of Scarboro, Ontario.

## PLATYNUS TARTAREUS sp. nov.

Pl. III, figs. 7-9.

Somewhat nearly allied to *P. sinuatus* Dej. The antennæ are longer than the head and thorax together, the head as well as the thorax -with a median impressed line.. Prothorax nearly half as broad again as the head (not including the projecting eyes) which is a little narrower than the length of the prothorax; front and hind margins squarely truncate, the sides strongly arcuate, subangulate, broadest about the middle, none of the angles rounded. Elytra with the humeral angle well rounded, the surface flat and smooth with delicate striæ and with apparently no interstitial punctures.

Length of body, 11.4 mm.; breadth of elytra, 4.4 mm.

Florissant, Colorado; four specimens, Nos. 2244, 3405, 8760 and 9252, 11363.

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A pair of elytra in place are to be referred here. The texture was evidently not dense, the elytra with straight, scarcely convex sides, apically truncate, but a little rounded and obtusely angled. A very little only of the base is lost, showing the species to be a small one and the combined elytra about half as long again as broad. The striæ are delicate, very slightly impressed, but sharp and straight, minutely and not closely punctured; the interstitial spaces are also more coarsely and densely but faintly punctured, the general punctuation being more obvious than the striation.

Length of elytra, 7 mm. ; breadth, 4.5 mm.

Green River, Wyoming; one specimen, No. 92 (Dr. A. S. Packard).

Named for my friend Prof. O. C. Marsh, of Yale University.

## PLOCHIONUS Dejean.

The form here described is the only fossil species known in this genus, which has but few species, occurring in most parts of the world, only four of which inhabit the United States.

**PLOCHIONUS LESQUEREUXI** sp. nov.

## Pl. III, fig. 2.

A single specimen and its reverse seem to fall in this group, and to be not distantly related to *P. timidus* Hald., though it is impossible to say that it is not a Pinacodera. The antennæ are about two-thirds as long as the elytra, with rather uniform joints about twice as long as broad and nearly cylindrical, the base being only a little smaller than the apex. The prothorax is about half as broad again as long, or half as broad again as the head, apart from the rather prominent eyes ; with rounded sides, broadest a little behind the middle, but not greatly enlarging behind the broad, squarely truncate apex with nearly rectangular lateral angles ; the surface appears to be smooth, with an impressed median longitudinal line. Elytra posteriorly truncate, distinctly striate, as in the Lebiini, the interspaces flat, with no sign of punctuation here or in the striæ, but with a feeble sign of transverse wrinkling, as is seen, but more heavily, on the thorax of *P. timidus*.

Length of body, 7 mm.; of antennæ, 2.75 mm.; breadth of elytra, 3.1 mm.

Florissant, Colorado; one specimen, Nos. 8728 and 9177.

In memory of the late Leo Lesquereux, who first illustrated the Florissant flora.

#### CYMINDIS Latreille.

Two species of this genus occur in the Pleistocene of the New World—in Canada and Massachusetts—while in Europe two other species occur in the older Tertiaries of amber and of Oeningen. At the present time the genus is tolerably rich in species and is found mostly in north temperate regions, and North America has its fair share.

#### CYMINDIS AURORA.

*Cymindis aurora* Horn, **Trans. Am. Ent. Soc.**, V, **243 (1876)**; Scudd., **Tert. Ins. N. A.**, **518**, pl. **1**, **fig. 6 (1890)**.

Bone caves of Pennsylvania.

#### CYMINDIS EXTORPESCENS sp. nov.

#### PI. III, fig. 4.

This species is described by me in a chapter on the Pleistocene beetles of Fort River, forming part of Monograph XXIX of the United States Geological Survey, by Prof. B. K. Emerson.

Hadley, Massachusetts.

#### BRACHYNUS Weber.

A cosmopolitan genus, pretty rich in species, of which about twenty-five occur in America. Three fossil species are now known, one from Oeningen, the others from Colorado.

#### BRACHYNUS NEWBERRYI sp. nov.

#### Pl. III, fig. 10; Pl. IV, fig. 8.

This species comes in the vicinity of *B. alternans* Dej., but is somewhat smaller, with shorter legs. Excepting in one specimen, which shows the middle and hind legs in addition, only elytra are preserved. The legs are slender, the tibia: rather sparsely haired and armed at tip with rather short

**spurs.** The elytra have much the form of those of *B. alternans*, with sharp but delicate uninterrupted ridges, the interspaces flat and smooth without vestiture.

Length of elytra, 7 mm.; breadth of combined elytra, 5 mm.

Florissant, Colorado; four specimens, Nos. 958, 7766, 8789, 8981.

In memory of the late J. S. Newberry, the veteran geologist and paleontologist of New York City.

BRACHYNUS **REPRESSUS** sp. nov.

Pl. IV, **fig.** 6.

A species allied to *B. fumans* Fabr., with which it agrees in size, the clothing of the elytra and the character of the striæ. It is represented by a single elytron much broader than in *B. newberryi* and in which the humeral angle is more pronounced; the apical margin is decidedly truncate and the elytron is furnished with tolerably coarse ridges, interrupted so as to give them a bead-like appearance, or a chain of slightly elongated tubercles; the interspaces are flat and scantily clothed with tolerably long delicate hairs.

Length of elytron, 6 mm.; breadth, 3.2 mm.

Florissant, Colorado; one specimen, No. 8316.

CHLÆNIUS Bonelli.

In this now dominant cosmopolitan genus, of which nearly fifty species inhabit the United States, no species are known from the earlier Tertiaries, excepting one from amber. In the Pleistocene, two existing species have been found in Bavaria, besides two extinct forms in Bavaria and Pennsylvania.

CHLÆNIUS **PUNCTULATUS**.

*Chlænius punctulatus* Horn, Trans. Am. Ent. soc., V, **244 (1876)**; Scudd., Tert. **Ins. N. A., 517-518, pl. 1, fig. 7 (1890)**.

Bone caves of Pennsylvania.

NOTHOPUS LeConte.

Of this now monotypic North American genus, a single species has been found fossil in Colorado.

## TERTIARY COLEOPTERA OF NORTH AMERICA.

NOTHOPUS KINGII sp. nov

Pl. IV, fig. 2.

A single fractured specimen represents a species somewhat larger than the living American form, but which agrees with it in all essential points. Of the head only a fragment remains. The prothorax is broad and short, being fully twice as broad as long, with rounded sides, sharp angles, barely perceptible impressed median line and a smooth surface, with some slight corrugations next the posterior border. The elytral striæ are in all respects similar to those of *N. zabroides* LeC., without punctures, and the interspaces are very gently convex, almost flat, and, so far as can be seen, without punctures. The humeral stria, not shown in the plate, is closely approximated to the first stria, and is shorter than in *N. zabroides*. The scutellum is larger than in the living species and sparsely covered at base with short hairs. The specimen shows an obverse in which the striæ appear as ridges.

Length of specimen, **16** mm.; of elytra, **11** mm.; breadth of elytron, **4** mm.

Florissant, Colorado; one specimen, No. 5984.

Named for Clarence King, first Director of the United States Geological Survey.

HARPALUS Latreille.

Of this dominant cosmopolitan genus, of which nearly fifty species are now found in North America, fourteen species have been found in the earlier Tertiaries of Colorado in the New World and, in the Old, at Oeningen, Aix Radoboj, Rott, and Brunstatt in Alsatia, besides being recognized in amber: Two extinct species are also known from the Pleistocene of Switzerland and Galicia, besides one from the Pliocene of England; a single existing species is also recognized in the Swiss Pleistocene.

HARPALUS NUPERUS sp. nov.

Pl. III, fig. 6.

A species is indicated near *H. nitidulus* Chaud., but it is rather obscure. The head is a little longer only than broad, at base with very straight and parallel sides. The prothorax is a third as broad again as the head, and nearly twice as broad as long, with well-rounded sides and especially with

well rounded posterior angles and no sign of any median impressed line. The elytra are somewhat broader than the thorax, rather slender, with nearly parallel sides on the basal half, the humeral angle a little rounded, and on the apical half tapering rather rapidly. As the under surface is exposed, the striæ are not shown.

Length of body, 7 mm.; of elytra, 4 mm.; breadth of both elytra, 2.75 mm.

Florissant, Colorado; one specimen, No. 165.

**HARPALUS WHITFIELDII** sp. nov

**PL. IV, fig. 7.**

A rather stout species not far removed from *H. ellipsis* LeC., with the prothorax nearly twice as broad as long, half as broad again as the head, the sides well rounded, a distinct median impressed line, and the surface slightly rugose posteriorly. The elytra are considerably broader than the thorax, broadest in the middle and considerably narrowed anteriorly as well as posteriorly, the humeral angle being roundly excised, and the opposite sides nowhere parallel; the striæ are delicate without punctures, and the interspaces scarcely convex with faint signs of scattered shallow punctures.

Length of body, 7.5 mm.; breadth of thorax, 2.7 mm.; of elytra, 3.6 mm.

Florissant, Colorado; three specimens, No. 10 104, and from the museum of Princeton College Nos. 1.574, 1.829.

Named for the New York paleontologist, R. P. Whitfield.

**STENOLOPHUS** Dejean.

Of this widespread genus, tolerably rich in species, of which about a dozen are known in North America, but a single fossil species is known, from Colorado.

**STENOLOPHUS RELIGATUS** sp. nov.

**PL. IV, fig. 1.**

A rather obscure specimen which appears to be allied to *S. ochropezus* Say. The head is large, longer than broad, with straight sides tapering anteriorly. The antennæ are moderately stout, a little longer than the head and thorax, the joints about twice as long as broad. The prothorax is scarcely broader than the head, about twice as broad as long, with

scarcely rounded sides, smooth, and no sign of a median furrow. The elytra are slender and elongated, parallel sided, smooth, but with some signs of faint striæ; probably these are fainter than they would be were they not seen through the body, the under surface being exposed.

Length of body, 4.6 mm.; of antennæ, 2 mm.; of elytra, 2.75 mm.; breadth of thorax, 1.1 mm.; of elytra, 1.6 mm.

Florissant, Colorado; one specimen, No. 6622.

### DYTISCIDÆ.

The only fossils of this family in North America are two species in the Pleistocene of Massachusetts and two in the older Tertiaries of Colorado, each of the four belonging to a distinct genus. In the Old World, fifty-six species have been found, belonging to seventeen genera, only two of them represented among the American fossils, and these the older. Of these species, twenty-seven, representing eleven genera, belong to the older Tertiaries, and twenty-nine species of nine genera to the Pleistocene. Of the Pleistocene species ten are recognized as still living.

#### HYDROCANTHUS Say.

This widely spread though restricted genus has but a single living species in the United States, and no extinct forms are known except the one here recorded.

#### HYDROCANTHUS sp.

*Hydrocanthus* sp. Scudd., **Am. Jour. Sci.** (3) XLVIII, 183 (1894).

Peat of Nantucket, Massachusetts

#### LACCOPHILUS Leach.

Of this cosmopolitan genus, of which about a dozen North American species are known, only two fossil species are recognized, the one here recorded and one found by Heer in the Miocene of Spitzbergen.

#### LACCOPHILUS sp.

*Laccophilus* sp. Scudd., **Bull. U. S. Geol. Geogr. Surv. Terr.**, II, 78 (1876); III, 759 (1877); **Tert. Ins. N. A.**, 517, pl. 5, figs. 116, 117 (1890).

White River, Colorado.

## DYTISCIDÆ—HYDROPHILIDÆ.

### AGABUS Leach.

A richly endowed cosmopolitan genus, of which nearly fifty species are found in North America. In the older Tertiaries a single species has been found at Rott and another at Florissant, while it is reported from amber. Two existing species have been credited to the Pleistocene of England and five described from that of Galicis.

#### AGABUS RATHBUNI sp. nov.

#### Pl. IV, fig. 4.

The structure of the under surface of this beetle, as shown in the figure, leaves no doubt of its belonging to the dytiscid tribe Colymbetini, and the form of the lateral wing of the metasternum with the carinate pronotum refers it to *Agabus*. Naturally there is little on the under surface to distinguish species in a group so abundant in forms as *Agabus*, but it may be said that it has a broadly ovate form, approaching the shape of the *Gyrinidæ* in its posterior breadth and narrowing anterior portions; the hind legs are rather stout, though not large, and the hind coxæ and anterior half (at least) of the abdomen are very distantly, arcuately, and exceedingly finely striate.

Length, 7.5 mm.; breadth, 4.5 mm.

Florissant, Colorado ; one specimen, No. 1906.

Named for my zoological friend, Richard Rathbun, of Washington.

#### DYTISCIDÆ sp.

#### Pl. IV, figs. 3, 5.

The figures represent the metasternum of a species of this family, perhaps a *Matus*, which is described in a section on the Pleistocene beetles of Fort River in Monograph XXIX of the United States Geological Survey, by Prof. B. K. Emerson (pp. 740-746).

Hadley, Massachusetts.

## HYDROPHILIDÆ.

As nearly all Tertiary insects are found in fresh-water deposits, one would naturally look for members of this group therein and would expect their absence from amber. This expectation is realized. Se-venty-four

species of seventeen genera are now known, of which only six of four genera are referred to living forms; these last are all from Pleistocene deposits in Europe, which have also yielded seven extinct species of four genera, besides which two species of different genera have been found in America. To the older Tertiaries belong forty-five species of ten genera in Europe and fourteen species of eight genera in America, the same genera being represented on both continents in three cases if only the older fossils are considered, in five cases if all are taken into account. Three of the European genera from the older formations are regarded as extinct,

#### HELOPHORUS Fabricius.

A tolerably prolific genus, mainly north temperate in distribution, with about a dozen North American species. Five extinct species have been found in Pleistocene deposits in Galicia and Ohio, and two in the older Tertiaries of Baden.

##### HELOPHORUS RIGESCENS.

*Helophorus rigescens* Scudd., Tert. Ins. N. A., 516-517, pl. 1, fig. 53 (1890); Contr. Canad. Palæont., II, 45 (1892).

Clay beds near Cleveland, Ohio.

#### HYDROCHUS Leach.

A dozen species of this genus exist in North America, being nearly half the known species, the others occurring in the north temperate regions of the Old World. The only fossil species known are the two here recorded, one each from the Pleistocene of Ohio and the Oligocene of Wyoming.

##### HYDROCHUS AMICTUS.

*Hydrochus amictus* Scudd., Tert. Ins. N. A., 515-516, pl. 1, fig. 47 (1890); Contr. Canad. Palæont., II, 45 (1892).

Clay beds near Cleveland, Ohio.

##### HYDROCHUS RELICTUS.

*Hydrochus relictus* Scudd., Tert. Ins. N. A., 516, pl. 8, fig. 11 (1890).

Green River, Wyoming.

## HY DROPHILIDÆ.

### TROPISTERNUS Solier.

This is an American genus, of which nearly half the species (about a dozen) occur in the United States. Four fossil species are known from the early Tertiaries of Wyoming and Colorado.'

#### **TROPISTERNUS SCULPTILIS.**

*Tropisternus sculptilis* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 760 (1878);  
Tert. Ins. N. A., 514-515, pl. 7, fig. 33 (1890).

Green River, Wyoming.

#### **TROPISTERNUS SAXIALIS.**

*Tropisternus saxialis* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 759-760 (1878);  
Tert. Ins. N. A., 515, pl. 8, fig. 2 (1890).

Green River, Wyoming.

#### **TROPISTERNUS VANUS** sp. nov.

Pl. v, fig. 1.

The specimen referred here apparently belongs to this genus, although the scutellum is of a somewhat smaller size than is characteristic of this genus and the sculpturing of the elytra is unusual. The length of the abdomen is doubtless due to accident, the character of the elytral tips indicating that they embraced its extremity. The form of the body and, with the above accidental exception, its several regions correspond closely to *Tropisternus*, though by the flattening of the head, which brings the labrum (not separately indicated in the figure) upon the same plane, the head is made to have an abnormal length. The eyes are large but scarcely protrude beyond the general curve of the side of the head. The prothorax shows a delicate margination laterally and exceedingly delicate wavy striate markings, as if longitudinally combed, hardly observable under an ordinary lens, instead of the minute punctuation usually found in *Tropisternus*. There is also observable along the middle line on the posterior half of the pronotum and the anterior part of the abdomen a slight carination, which is probably the impression of the sternal carina characteristic of this group of *Hydrophilidæ*. The elytra are rather short; their outer edge very delicately

marginate, the surface with the same sculpturing as the prothorax, and besides very faintly and very narrowly striate with longitudinal punctures, or more properly striæ. These are about as distinct as in *T. striolatus* LeC., but are wholly different on account of their extreme slenderness and the longitudinal character of their components.

Length of body as preserved, 9.25 mm.; length to tip of elytra, **8.1** mm.; breadth, 4 mm.; length of elytra, 4.6 mm.

Florissant, Colorado; one specimen, No. 9210.

TROPISTERNUS LIMITATUS sp. nov.

Pl. V, **fig. 2.**

Although this species is placed in this genus, it is only temporarily, until better and more abundant material shall give the opportunity of properly characterizing the genus to which it really should be referred, which, so far as we know, is extinct. It belongs without doubt to the Hydrophilini, as its wide prothorax and compressed tarsi show, but as the genera of Hydrophilidæ are tolerably constant in size and this is very much smaller than any Hydrophilini known, it can hardly be doubted that it will prove a distinct generic type; moreover the structure of the hind tarsi is very different from what we find in the other genera; for though strongly compressed, they are subequal, somewhat ovate, and two or three times as long as broad. The whole insect is of a very regularly elongate oval shape, of a uniform carbonaceous color, showing no sculpture whatever beyond a pair of straight raised lines, converging posteriorly, which cross the prothorax and thus limit a wedge-shaped median piece, the front margin of which is rather more than one-third of the front border of the prothorax, while the hind margin is about one-third its anterior width. It is probable, however, that these raised lines are indications of some sculptural characteristics of the under surface, as they are not quite symmetrical and do not appear on both specimens referred to this species. The eyes are large, subglobose, extend slightly beyond\* the curve of the head, and, as viewed from above, are longer than broad. The sutural edge of the elytra is very delicately margined.

Length, 5 mm.; breadth, 2.6 mm.

Florissant, Colorado; two specimens, Nos. 2956, 3179.

## HYDROPHILITES Heer.

The generic name is given by Heer to the following fossil species, allied to *Hydrophilus*. No other species is known.

## HYDROPHILITES NAUJATENSIS.

*Hydrophilites naujatensis* Heer, Flora foss. Groenl., II, 144, pl. 86, fig. 12b; pl. 109, fig. 10 (1883).

Naujat, Greenland.

## HYDROCHARIS Latreille.

A widespread but rather limited genus, three species of which occur in the United States. The species from Colorado here described is the only one known in a fossil state.

## HYUROCHARIS EXTRICATUS sp. nov.

Pl. V, fig. 4.

The single specimen referred here is slenderer and smaller than any of our existing species, and further differs in the great size of the eyes, which are transverse and separated by less than double their own width, and the excessive length of the terminal spines of the hind tibiae, both of which are nearly half the length of the tibiae. Being preserved on a ventral aspect any punctuation of the elytra is invisible. The sternal carina appears to be very slender and to extend beyond the hind COXÆ to a length rather more approaching its character in *Hydrophilus*, though it certainly does not extend beyond the second abdominal segment, and the prosternum appears to be equally carinate with the hinder parts of the thorax.

Length, 13 mm.; breadth, 6 mm.

Florissant, Colorado; one specimen, No. 692.

## BEROSUS Leach.

A widespread and tolerably rich genus, well supplied with North American species. The only fossils known are those here recorded from Wyoming.

## TERTIARY COLEOPTERA OF NORTH AMERICA.

### BEROSUS SEXSTRIATUS.

*Berosus sexstriatus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 760-761 (1878);  
Tert. Ins. N. A., 513-514, pl. 7, fig. 40 (1890).

Green River, Wyoming.

### BEROSUS TENUIS.

*Berosus tenuis* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 760 (1878); Tert.  
Ins. N. A., 514, pi. 8, fig. 8 (1890).

Green River, Wyoming.

### LACCOBIUS Erichson.

A limited genus of about a dozen species, almost exclusively confined to the north temperate zone and of which only two species are known in the United States. A single fossil species is found in the Pleistocene of Galicia, three others in the older Tertiaries of France and the Rhine, and one in Wyoming.

### LACCOBIUS ELONGATUS.

*Laccobius elongatus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 761 (1878);  
Tert. Ins. N. A., 513, pl. 7, figs. 27, 28 (1890).

Green River, Wyoming.

### PHILHYDRUS Solier.

A nearly cosmopolitan genus, with numerous species, many found in North America. A fossil species occurs in the Pleistocene of Galicia and at least three others in the older Tertiaries of the Rhine and Wyoming.

### PHILHYDRUS PRIMÆVUS.

*Philhydrus primævus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 78 (1876);  
Tert. Ins. N. A., 512, pl. 8, fig. 5 (1890).

Green River, Wyoming.

### PHILHYDRUS spp.

*Philhydrus spp.*, Scudd., Tert. Ins. N. A., 512 (1890).

Green River, Wyoming.

## HYDROPHILIDB.

### HYDROBIUS Leach.

A cosmopolitan genus with numerous species, of which nearly half come from North America. A couple of existing species have been found in the Pleistocene of Bavaria and Galicia; and in the older Tertiaries ten extinct species occur at Oeningen, Radoboj, Aix, Spitzbergen, Florissant, and in Wyoming.

#### HYDROBIUS DECINERATUS.

*Hydrobius decineratus* **Scudd.**, Bull. U. S. Geol. Geogr. Surv. Terr., **IV**, 761 (1878); **Tert. Ins. N. A.**, **511**, pl. 8, fig. 27 (1890).

Green River, Wyoming.

#### HYDROBIUS CONFIXUS.

*Hydrobius confixus* **Scudd.**, **Tert. Ins. N. A.**, 511-512, pl. 7, fig. 25 (1890).

Green River, Wyoming.

#### HYDROBIUS MACERATUS sp. nov.

Pl. V, fig. 3.

The specimen which is referred here seems to be more nearly related to the smaller forms of *Hydrobius* than to anything else, though it evidently belongs to a distinct genus on account of the extreme breadth of the prosternum, the front and middle coxæ being thereby closely crowded together. The slenderness and cylindrical character of the hinder tarsi show that it belongs in this neighborhood, but the imperfect preservation of the single specimen known leaves much to be desired. The legs are rather slender, though the femora are moderately stout, the tibiae are considerably longer than the femora, while the very slender tarsi are much shorter and the hinder pair are 5-jointed, the last two joints being equal and longer than the others. There is no sign of any transverse carina in front of the middle coxæ. The insect is of an elongated oval form, with a tolerably large head and an unusually large prothorax, which is much more than half as long as broad. The under surface, and noticeably the prosternum, is faintly, distantly, and rather coarsely punctulate.

Length, 3.1 mm.; breadth, 1.3 mm.

Florissant, Colorado; one specimen, No. 780.

## CERCYON Leach.

A cosmopolitan genus, very rich in species, mostly occurring in the north temperate regions and abundant in the United States. Only a couple of fossil species are known, an undetermined species from the Pleistocene of Bavaria, and a species from the older Tertiaries of British Columbia.

## CERCYON ? TERRIGENA.

*Cercyon ? terrigena* Scudd., Rept. Prog. Geol. Surv. Can., 1877-78, 179B (1879); Tert. Ins. N. A., 510-511, pl. 2, fig. 21 (1890); Contr. Canad. Palæont., II, 45 (1892).

Nicola River, British Columbia.

## SILPHIDÆ.

Fossil Silphidæ are uncommon. Sixteen species in all are known, belonging to eight genera, Silpha alone being represented by more than one species. All of these species except four of Silpha are found in the older Tertiaries. Only two genera with a single species each have occurred in America, and of these one, Silpha, occurs also in the Old World Tertiaries. Of the Old World genera four are recognized in amber only, and of the three from the rocks one is regarded as extinct.

## SILPHA Linné.

We have in the United States about ten species of this genus, which is mainly north temperate and rich in species. Two recent species have been recognized in the Pleistocene of Bavaria and England, and two extinct species in Galicia. In the older Tertiaries five species occur, one each in the deposits of Spitzbergen, Radoboj, Oeningen, the Rhine, and Colorado.

## SILPHA COLORATA SP. NOV.

Pl. V, fig. 5.

The only specimen known is broken just behind the base of the elytra and all the portion in front of it lost. What remains, however, is so characteristic that there can be little doubt that it belongs in this family and probably to Silpha. It has the aspect, however, of a Necrophorus from the spots

and hairiness of the elytra, but their non-truncate character and the apical slenderness of the hind tibiae show that it can not be referred to that genus. The elytra are long and narrow, without longitudinal carinæ, with tapering pointed apices, sparsely covered with rather long hairs, visible only on the pale transverse bands which cross the base and middle of the apical half of the elytra; these have rounded outlines, apparently just fail to reach either margin, and are more than half as long as broad on each elytron; the abdomen is hairy and angulate at tip, the hind tibiæ slender and equal, with rather dense and coarse erect hairs and apparently without apical spurs. The hind tarsi are also hairy but less prominently, the first joint long, all the remainder short and equal, the last not seen in the specimen.

Length of fragment, 6 mm.; of elytron, 5 mm.; breadth of same, 1.5 mm.; probable full length of elytron, 6 mm.; probable length of beetle, 11 mm.; length of hind tibiæ, 2.5 mm.

Florissant, Colorado; one specimen, No. 4700.

#### AGYRTES Fröhlich.

The species here described is the only known extinct form of this genus, which has now a very limited number of species in the north temperate zone, and only one in the United States.

#### **AGYRTES PRIMOTICUS** sp. nov.

#### **Pl. V, fig. 6.**

The specimen referred here is considerably larger than our native species and by no means of so slender a form, but it would seem to fall here from the structure of the antennæ and elytra and can not be referred to any other of our genera of Silphidæ. The specimen is tolerably perfect on the right half of the body, but does not show any important part of the legs. The head is transversely oval, smooth, with tolerably large round eyes. The antenna: reach to the base of the elytra; the third joint, though twice as long as the second, is not longer than the succeeding, though much slenderer than they and equal, while the next five, though submoniliform, are larger apically than basally, increase very slightly in size, and the last three are scarcely larger, equal, and subquadrate, the last apically rounded. Thorax nearly twice as broad as long, much narrower in front than behind,

pointed tip of the abdomen. The abdomen is black with long black hairs, sparsely scattered, and most conspicuous as edging the hind borders of the segments. Terminal appendages rather short, blunt, and very hairy.

Length of body, 5.5 mm. ; width of same, 1.2 mm. ; length of prothorax, 0.65 mm. ; breadth of same, 0.85 mm. ; length of middle tibia, 0.5 mm.

Florissant, Colorado ; one specimen, No. 329 **1**.

#### HETEROTHOPS Stephens.

A small genus, most of whose species are found in the north temperate regions of the Old World, but four or five in North America. A single species has been found fossil in Colorado.

#### HETEROTHOPS CONTICENS sp. nov.

#### Pl. V, figs. 8, 9.

A single specimen is referred here with some doubt, as it is not very well preserved, but it seems to bear a closer resemblance to the species of this genus than to any other. It is the smallest of the Florissant Staphylinidæ unless the shorter but stouter *Platystethus archetypus* be looked upon as smaller. It is very compact, is broadest at the elytra, narrows rapidly in front and less rapidly behind, so as to be somewhat' fusiform, the extremity of the abdomen bluntly rounded. The head is short, subtriangular, and rounded, the antennæ (fig. 9) closely resemble those of *H. pusio* LeC., excepting that the last joint is only a little longer and considerably larger than the penultimate, instead of being twice as long and scarcely any broader.; they scarcely reach the posterior border of the pronotum. The latter is smooth, considerably broader than long, tapers anteriorly a good deal, but its surface is too broken to show what punctures are present. The elytra are hairy, as are the sides of the abdomen, and the whole body is of a nearly uniform very dark castaneous.

Length of body, 3.45 mm.; breadth, 1 mm.

Florissant, Colorado ; one specimen, No. **120**.

#### QUEUIUS Stephens.

A genus with numerous species, widespread in both worlds. The older Tertiaries possess five species, two each at Aix and Florissant, and one in amber.

The two species here recorded from Colorado differ considerably from each other in general appearance, but appear to be structurally similar. They differ from modern species, one more markedly than the other, in the great brevity of the antennæ and of their separate joints, as well as, so far as can be seen, in the shortness and stoutness of the legs.

**QUEDIUS CHAMBERLINI.**

Pl. V, figs. 10, 11.

*Quedius chamberlini* Scudd., Tert. Ins. N. A., 508, pl. 16, fig. 8 (1890).

Florissant, Colorado.

**QUEDIUS BREWERI.**

Pl. VI, figs. 1, 2.

*Quedius breweri* Scudd., Tert. Ins. N. A., 508-509, pl. 16, fig. 4 (1890).

Florissant, Colorado.

**LAASBIUM** gen. nov. ( $\lambda\tilde{\alpha}\alpha\varsigma, \beta\iota\acute{\omicron}\omega$ ).

This name is proposed for a couple of fossil insects bearing a very close resemblance to Lathrobium, both in general appearance and in many details of structure, but which can not be placed there or even in the tribe Pæderini, to which Lathrobium belongs, on account of the entire absence of any constricted neck, the head being altogether sessile upon and indeed partially embraced by the thorax. The body is long and slender. The head is more or less triangular, largest at base; the antennæ long, slender, filiform, all the joints twice or more than twice as long as broad, the first longer but not much larger, the last shorter and smaller than the rest. Thorax transverse, equal, with rounded angles. Elytra twice or more than twice as long as the thorax, and together broader than it. Legs rather short and slight, but with dilated femora, the fore tarsi apparently not expanded. Abdomen beyond the elytra as long as the rest of the body with parallel sides and a bluntly rounded tip.

**LAASBIUM AGASSIZII** sp. nov.

Pl. VI, fig. 4.

Head of about equal length and breadth, regularly tapering from the base, the outer angles rounded, the surface perfectly smooth. Antennæ

reaching back nearly to the middle of the elytra, most of the joints about two and a half times longer than broad, slightly larger at tip than at base, rounded. Thorax about a fourth broader than long, a little broader than the head, with gently convex sides and base, and all the angles similarly and slightly rounded, the surface smooth and apparently, like the head, without hairs. Legs not very long, the femora considerably dilated, the tibiae slender but slightly enlarged at the tip, the tarsi very slender. Elytra slightly longer than the head and thorax together, considerably broader than the thorax, smooth, with long and very distant delicate hairs. Abdomen scarcely broader than the thorax, beyond the tips of the elytra longer than the rest of the body together, smooth.

Length of body, 9.25 mm.; breadth of elytra, 1.6 mm.; length of antennæ, 2.75 mm.

Florissant, Colorado; two specimens, Nos. 11179, 12045.

Named in memory of my honored teacher, Prof. Louis Agassiz.

LAASBIUM SECTILE sp. nov.

Pl. VI, fig. 3.

This is a much stouter form than the last, and not so elongated, but in all its essential features it agrees so well that it should fall in the same genus; the short head and thorax, the long antennæ and tegmina, with the elongated joints of the former, mark it as allied. There is but a single specimen and that not very distinctly preserved. The head is shorter than broad, subtriangular, with rounded sides, and apparently smooth surface. The antennæ are imperfectly preserved, but are at least as long as the head and thorax together, and probably longer, very slender, with joints which beyond the basal joint and before the middle are about three times as long as broad and nearly twice as broad apically as basally. Thorax apparently almost twice as broad as long, broader certainly than the head, broadest apparently just behind the head, with rounded sides, and the surface smooth, with a few scattered hairs. Legs slender and apparently proportionally longer than in *L. agassizii*. Elytra longer than the head and thorax together, and broader than the thorax, smooth and at most with but a few scattered hairs. Abdomen broader than the thorax but narrower than the elytra, beyond which it is scarcely so long as the rest of the body, equal or

scarcely tapering, the last segment broadly rounded, the surface smooth or with the faintest possible shallow punctuation and unprovided with hairs.

Length, 9.5 mm.; breadth, 2.1 mm.

Florissant, Colorado; one specimen, No. 13678.

#### LEISTOTROPHUS Perty.

North America possesses two living species of this genus, most of whose other species, not numerous, occur in Europe. A single fossil species has been found in Utah.

#### LEISTOTROPHUS PATRIARCHICUS.

*Leistotrophus patriarchicus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 78-79 (1876); Tert. Ins. N. A., 507, pl. 5, fig. 112 (1890).

White River, Utah.

#### STAPHYLINUS Linné.

This genus has numerous species all over the world, of which about twenty occur in the United States. Fossil species are by no means unknown, nine having been described from Aix, Oeningen, and Florissant, while the genus has been recognized in such different deposits as Senigaglia in Italy, Sicilian amber, Baltic amber, Rott on the Rhine, and the Isle of Wight, leading us to presume several additional species, all in the early Tertiaries.

#### **STAPHYLINUS LESLEYI** sp. nov.

Pl. VI, figs. 6, 7.

This most abundant species of the genus and one of the commonest of the family at Florissant resembles most *S. cinnamopterus* Grav., but is scarcely so large and has shorter and stouter antennae, and slenderer less densely spinous tibiæ. The head is subtriangular, the basal third with parallel sides, in front of which it tapers considerably; the posterior margin is truncate, but with rounded angles, and the head is a little longer than broad, including the sharply pointed longitudinally channeled mandibles; the surface is very delicately granulate. The antennæ are about as long as the elytra and are well represented in fig. 7, though the extreme base of the first joint does not appear. The pronotum is slightly broader than the head and of the same length as it, fig. 6 showing it a little too short; it is nearly quadrate, of about equal length and breadth, with slightly convex sides and

rounded angles, especially posteriorly; the surface appears to be much as in the head and delicately and briefly villous. The elytra are together rather broader than long and somewhat broader than the pronotum, with which they agree in texture and clothing. The legs are not very long but very slender, the femora delicately incrassate, the tibiæ enlarging regularly so as to be half as large again at tip as at base, with recumbent not very heavy spinous hairs and delicate apical spurs. Abdomen and abdominal appendages much as in *S. cinnamopteris*.

Length of body, 10 to 12 mm. ; of antennæ, 2.5 mm.; breadth of elytra, 2.6 mm.

Florissant, Colorado; eight specimens, Nos. 8572, 8692 and 9240, 11662, 12420, 13024, 13607, 14451, and of the Princeton College collection, No. 1.578.

Named for the veteran Pennsylvania geologist, Peter Lesley.

STAPHYLINUS VETULUS sp. nov.

Pl. VI, figs. 11, 12.

A large and stout species, perhaps as nearly allied to our common *S. vulpinus* Nordm. as to any of our living forms. The head, however, is more nearly rotund, not truncate posteriorly, and the sides strongly convex; apparently the surface was somewhat similarly punctate and was covered with a similar pile; the only bristles which can be seen are a pair of slender straight ones, distant from each other, but not so distant as they are from the eyes, between which they are placed; they are about as far apart as those on the front margin of *S. vulpinus*, but as far back as those on the inner margin of the eyes; they are also shorter than any of those on the head of *S. vulpinus*; and besides them are indistinct signs of some corresponding nearly in position to those on the front margin and on the posterior outer angles of *S. vulpinus*. I have examined nearly all our species of *Staphylinus* without finding any trace of bristles in such a position. The antennae are only partially preserved, the apex of the first joint with the seven succeeding showing upon one side and scarcely differing from their structure in *S. vulpinus* unless the first joint, only the tip of which is seen, is, to judge from the position of the apex, a little shorter than usual.

The pronotum has the same surface structure as the head and is of much the same size and shape, being subrotund, no longer than broad, with

the front angles well rounded and the sides slightly and roundly angulate just in front of the middle; it is of the same width as the head, or perhaps slightly narrower, and shows the faintest sign possible of a longitudinal median angulation. The elytra are considerably broader than the thorax, narrowed and rounded in passing forward toward the humeral angle, have apparently the same surface structure as the thorax, and are about as long as broad. The abdomen is very regularly elongate obovate, the sides being nowhere quite parallel but slightly rounded and the narrowed tip with a regular ovate outline. The remains of the legs show them to have been similar in length and stoutness to those of the species mentioned.

Length of body, 19.5 mm.; width of thorax, 3.85 mm.; of elytra, 5.5 mm.

Florissant, Colorado; one specimen, No. 16410.

#### STAPHYLINUS sp.

Another species occurs at Florissant, apparently belonging here or to *Ocypus*, and of about the size of *O. ater* Grav. It has a somewhat similarly shaped head and thorax, which are smooth and glabrous, or nearly so, but the only specimen obtained (No. 11751) is so badly broken that it can not be further described.

#### PHILONTHUS Curtis.

A dominant cosmopolitan genus, of which eighty or ninety species are already known in the United States and Canada. Including those here given, seven fossil species have been described from the earlier Tertiary deposits of Colorado, France, and the Rhine, and the genus has also been recognized in amber. A single species has been found in the Pleistocene of Bavaria.

The species which we have here grouped under this generic name agree in certain characteristics by which they differ from modern species of this genus. This is particularly the case in the nearly equal width of the head and prothorax, the brevity and rather uniform breadth of the latter, and the shortness of the antennæ. It is probable that if we could become better acquainted with their entire structure we should be forced to separate them as a distinct generic type.

## TERTIARY COLEOPTERA OF NORTH AMERICA.

PHILONTHUS MARCIDULUS sp. nov.

### PL. VI, figs. 5, 8, 13, 14.

A large species, broadest at or beyond the tips of the elytra, the abdomen tapering considerably beyond the middle. It was apparently black, or the abdomen possibly mahogany-black. The head is large, subquadrate, apparently of about equal length and breadth, with slightly rounded posterior angles and a slight neck; it is largest at or behind the middle, the eyes similar to but a little larger than those of *P. cyanipennis* Fabr., which it seems most to resemble, and the surface is smooth and glistening, with a few scattered, long, fine bristles; the mandibles are long and finely pointed, but much stouter and somewhat shorter than in *P. cyanipennis*; the antennae reach back only to or slightly beyond the middle of the prothorax, being considerably shorter than in most modern Philonthi, the brevity resulting from the lesser length of the elongated basal joints, and especially from the shorter basal joint, which appears to be scarcely more than half its usual length in recent Philonthi; the apical joints do not differ. The prothorax is subquadrate but broader than long, broadest posteriorly, with rounded sides, well-rounded posterior angles and roundly angulated anterior angles, the surface smooth and with no clearly perceptible punctures, though these may have existed. The legs are precisely similar to those of *P. cyanipennis* in form and clothing, particularly the armature of the tibiae, but are somewhat shorter in proportion, the hind legs, for instance, being considerably less than half as long as the body, while in *P. cyanipennis* they are considerably more than half as long. The elytra are a third longer than the prothorax, rather minutely and obscurely punctate and villous, margined at the suture. The wings, one of which is pretty well exposed in one of the specimens (see fig: 5), reach to the last segment of the abdomen, are of a smoother outline than is figured for Philonthus by Burmeister,<sup>1</sup> and are of precisely similar general character, the space between the mediastinal and scapular veins being delicately corneous, but the thickened recurved vein connecting the upper branch of the externomedian with the scapular, beyond the joint, is more distinctly a vein in the fossil and completely unites these two veins, springing as it does distinctly from the externomedian. The two branches of the externomedian unite at the same point in each, but in the

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<sup>1</sup> Untersuchungen über die Flügeltypen der Coleopteren, Pl., fig. 17, 1855.

present (fossil) species at a much slighter angle, while the branches themselves are both firm, gently and regularly curving lines, without the sinuosity figured by Burmeister; the lower is accompanied throughout its course by an almost equally distinct vein-like thickening (apparently a fold of the membrane) given by Burmeister only near the margin of the wing; the subsequent nervules can not clearly be made out. The abdomen is comparatively slender, shaped much as in *P. cyanipennis*, thinly villous, the terminal lateral appendages nearly as long as the last segment, slender, tapering on the apical third but bluntly rounded at tip, clothed rather sparsely with long and slender bristles; the median appendage of the male by no means as in *P. cyanipennis*, but very large and subtriangular, nearly as broad at base as the apex of the last segment, with convex lateral margin and appearing like a segment (as it really is) rather than as an appendage, which it resembles in the same sex of *P. cyanipennis*, where it is lanceolate with concave sides.

Length (not including terminal appendages), 12.25 mm.; breadth, 2.8 mm.; length of antennæ, 2.5 mm.; of hind legs, 5.5 mm.; of lateral anal appendages, 1 mm.

Florissant, Colorado; eight specimens, Nos. 4342, 7082, 9239, 9840, 11265, 12486, 13145, 13630 and 13631.

PHILONTHUS INVELATUS sp. nov.

Pl. VI, figs. 9, 10.

Head subquadrate, broader than long, tapering rapidly behind the eyes to a somewhat, constricted neck, the surface apparently smooth; the eyes rather large, not prominent, the mandibles as in *P. marcidulus* or rather stouter; the antennæ not reaching beyond the middle of the thorax and not very stout, the three basal joints of nearly equal length and twice as long as broad, the fourth and fifth obpyriform, a little longer than broad, the apical ones broader than long. Prothorax apparently about equally broad and long, tumid and largest in the middle, smooth, with a few scattered long bristles. Legs as in *P. marcidulus*, but the tibiæ rather stouter and very heavily spined. Elytra about as long as the prothorax and villous. Abdomen rather slender, equal except the last two segments, with long, straight, slender, lateral, spinous hairs; last two segments tapering rapidly to a rather pointed tip; lateral anal appendages long and slender, gently tapering and blunt tipped. The body is generally black or nearly so, but

the thorax and legs are much lighter and apparently were of a testaceous color.

It appears to be somewhat nearly allied to the modern *P. æneus* Rossi, which it nearly approaches in size and with which it agrees tolerably well in the relation of the second and third antennal joints to the succeeding, but the posterior angles of the head are less prominent, and like the other species here described, it differs markedly in the brevity of the antennæ. It is perhaps more closely allied to *P. tachiniformis* Say, figured by Sharp in the *Biologia centrali-americana*, but differs in the same points. In the shape of the head it is more like *P. godmani* Sharp from Mexico, but it has not so long a prothorax.

Length, 9.5 mm.; breadth, **1.75** mm.; length of antenna+ 2.25 mm.

Florissant, Colorado; one specimen, No. **616**.

PHILONTHUS HORNI sp. nov.

PL. VII, figs. 1, 2.

Head subquadrate, slightly narrower than the prothorax, but broadest at base and tapering forward, a little broader than long, smooth. Antennæ scarcely reaching to the middle of the prothorax, moderately slender, increasing but very little and very gradually in size, the first joint obovate, largest just beyond the middle and about three times as long as broad, the second joint much slenderer and about half as long, the third slender and not greatly shorter than the first, the fourth quadrate, and the remainder increasingly broader than long, excepting the last, which is ovate. Prothorax broader than the head and nearly half as broad again as long, as broad anteriorly as posteriorly, with rather strongly and regularly convex sides, the surface smooth, with scattered short and very fine hairs. Elytra a little broader and considerably longer than (half as long again as) the prothorax, villous, with rather short hairs. Legs apparently much as in the other Florissant. species, but only imperfectly preserved. Abdomen subfusiform, largest at the third segment, tapering apically to a not very blunt point, the surface covered with hairs exactly like the elytra, with straight lateral diverging bristles on the last two segments. Lateral terminal appendages nearly as long as the last segment, straight, scarcely tapering, bluntly rounded at tip and covered with bristles; median anal appendage

lanceolate, half as broad at base as the tip of the last segment., bluntly pointed, reaching as far as the lateral appendages, and similarly hirsute.

I can find no modern species with which to compare this unless it be the much slenderer *P. tachiniformis* (Say), and even in this the prothorax is much longer.

Length, 9.5 mm.; breadth, 2.25 mm.; length of antennæ, 1.75 mm.; of prothorax, 1.2 mm.; breadth of same, 1.8 mm.

Florissant, Colorado; three specimens, Nos. 491 and 7533, 3128, 13661.

Named for the distinguished coleopterist, George H. Horn.

#### PHILONTHUS ABAVUS sp. nov.

Pl. VII, fig. 3.

This species is represented by several specimens, but none that are well preserved. It is smaller than the others described and differs from them in some few particulars, which can be determined. The head is rather small, narrower than the prothorax, subquadrate and smooth, not narrowed posteriorly; the joints of the apical half of the antennæ are entirely similar to those of *P. horni*. The prothorax is broad and short, as in *P. horni*, broadest, however, posteriorly and narrowing throughout, as ordinarily in modern species of this genus, smooth. The legs are as in *P. marcidulus*, but the tibiae are less heavily spined. The elytra are twice as long as the prothorax, thinly and very delicately villous, slightly marginate at the suture. The abdomen tapers gradually from the tip of the elytra to a bluntly rounded apex and is sparsely villous.

Length, 7.5 to 9 mm.; breadth, 2 mm.

Florissant, Colorado; three specimens, Nos. 4791, 7466, and of the Princeton College collection, 1.500.

#### XANTHOLINUS Serville.

A cosmopolitan genus with numerous species, of which above a dozen are North American. Fossil species have been found at Aix, in amber, and at Florissant, one in each.

## TERTIARY COLEOPTERA OF NORTH AMERICA.

XANTHOLINUS TENEBRARIUS sp. nov.

PL. VII, figs. 4-6.

The specimen referred here, if it does not belong strictly to *Xantholinus*, is certainly nearly allied to it, but it differs from the modern species we have seen, either in nature or in illustrations, in the brevity of the antennæ and their apical slenderness. It seems to be nearly allied to *X. emmesus* Grav., but is of the size of *X. rudis* Sharp of Guatemala. The head is quadrate, longer than broad, narrowing posteriorly to a short neck half as broad as the head; antennæ scarcely longer than the head and neck, the first joint long, about one-fourth the length of the whole antenna, enlarging apically to nearly double the width of the succeeding segments, the second and third of which are quadrate, the remainder transversely obovate, the terminal subglobular. Thorax as long as the head, apparently narrower than it, and as seen from a partially side view, it appears to taper forward; it is apparently smooth. The legs are similar to those of *X. emmesus*, but are proportionally a little shorter, and the tibiæ are of perhaps more uniform size. The elytra are considerably longer and somewhat broader than the prothorax and apparently smooth. The abdomen is narrower than the elytra, slender, elongated, with parallel sides, a little enlarged at the fifth joint, tapering beyond to a rounded extremity, the joints smooth, excepting the last, which bears some bristly hairs toward tip.

Length, **11.5** mm.; breadth, 1.75 mm.

Florissant, Colorado; one specimen, obtained by the Princeton museum, Nos. 1.563 and 1.607.

LEPTACINUS Erichson.

North America possesses about a dozen species of this genus, and about as many more are scattered all over the globe. The Only fossils known are the five here described from Colorado.

The species we have placed here belong without doubt to the *Xantholini*, but excepting the first and perhaps the second, do not agree with any of the genera of our existing fauna, being remarkable for the shortness of the head, antennæ, and thorax, and the relative brevity of the elytra; the sutural stria is slight and the thoracic punctures do not appear to be aligned; nevertheless, as in the brevity of the parts they share the common

characteristics of most of the Florissant Staphylinidæ, it has seemed best to refer them to *Leptacinus*, with which group they appear best to agree.

**LEPTACINUS RIGATUS** sp. nov.

Pl. VII, fig. 11.

Head elongate-oval, considerably longer than broad, the sides only slightly convex, the hind angles well rounded, the eyes anterior, small, and scarcely prominent, the surface smooth but very faintly and very sparsely pilose, with three tolerably distinct longitudinal carinæ, one median and two postantennal, disappearing before the hind margin; similar but very brief postantennal carinæ are seen in a species of *Leptacinus* marked doubtfully in Mr. Austin's collection as *L. batychrus* Gyll., with which, better than any other I have seen, this species agrees generally. Antenna: reaching to the middle of the thorax, moderately stout, scarcely increasing in size apically, the basal joint fully three times as long as broad, rather stout, the second less than half as long, and only half as long again as broad, the rest scarcely broader than long, with rounded sides. Thorax slightly longer than the head, oval, with well-rounded sides and ends, scarcely broader in front than behind, the surface sparsely punctate, the puncta giving rise each to a rather short hair. Elytra scarcely longer and much broader than the thorax, apically truncate, with the same punctuation and clothing as the thorax. Abdomen about a third as long again as the rest of the body and slender, being at base no broader than the thorax, with nearly parallel sides, but enlarging very slightly to the fifth segment, afterwards narrowing slightly, the tip rounded; the surface is more sparsely punctate than the thorax and elytra, with similar but seemingly shorter hairs, apparently without setæ or fringes to the joints.

Length of body, 4.5 mm. ; of antennæ, 0.8 mm. ; breadth of elytra, 0.9 mm.

Florissant, Colorado ; one specimen, No. 1794.

**LEPTACINUS FOSSUS** sp. nov.

Pl. VII, fig. 12.

Head subquadrate, less than half as long again as broad, the sides parallel, with rounded posterior angles, rapidly narrowing at extreme base to

a slight and narrow neck, the surface smooth, with a few short and delicate scattered hairs. Antennæ about as long as the head and neck, the joints beyond the first nearly quadrate, scarcely if at all enlarging apically. Thorax scarcely longer than and of the same breadth as the head, apparently larger apically than at base, smooth, with a few short and delicate scattered hairs. Legs rather short. Elytra a little longer and somewhat broader than the thorax, apically squarely truncate, with a slight sutural stria, more distinct basally, and very sparsely pilose. Abdomen rather slender, equal, with a bluntly rounded tip, smooth, with a few scattered hairs.

Length, 5.1 mm. The specimen is preserved on a side view, so that the breadth can not be accurately given, but assuming that of the abdomen to be the same as the height, the breadth behind the elytra is 0.85 mm.

Florissant, Colorado; one specimen, No. 265.

**LEPTACINUS MACLUREI** sp. nov.

Pl. VII, figs. 7, 15.

Head half as long again as broad, parallel sided posteriorly, tapering anteriorly, very rapidly narrowing behind to a slight and slender neck; surface smooth, with scattered hairs on minute tubercles. Antennae only a little longer than the head and neck, the first joint nearly a fourth of the total length, the second to the fifth joints longer than broad, the sixth quadrate, the remainder broader than long, the whole antenna enlarging very slightly and very gradually toward the tip, and the apical joint subglobose. Thorax slightly broader and a little shorter than the head, quadrangular, with equal sides, smooth, and clothed like the head. The legs agree very well with modern Leptacini and are not apparently any shorter. Elytra broader and longer than the thorax, thinly clad with short hairs. Abdomen very slender, but apparently enlarging a little toward the fifth segment and then tapering to a rounded point, the segments sparsely clothed with delicate hairs.

Length, 7 mm.; breadth of elytra, **1.15** mm.

Florissant, Colorado; nine specimens, Nos. 3169, 4268, 5379, 5630, 6423, 6548, 10898, 11256, 13640.

Named in memory of one of the earliest American geologists, William Maclure.

## STAPHYLINIDÆ.

LEPTACINUS LEIDYI sp. nov.

Pl. VII, fig. 14.

Head half as long again as broad, tumid, with convex sides, rapidly tapering behind to a distinct neck, a little more than half as wide as the head; surface coarsely and somewhat sparsely punctate. Antennæ reaching back scarcely beyond the front, edge of the prothorax, scarcely enlarging apically, the joints beyond the basal one subquadrate, the second to the sixth inclusive slightly longer than broad, those beyond slightly broader than long, the last subglobose. Thorax about as long as and a little broader than the head, the sides apparently parallel, the surface with mingled fine and coarse punctation and finely pilose. The legs proportionally much shorter than in modern Leptacini, but otherwise similarly constructed, and the front tarsi dilated as much as in *L. nigripennis* LeC. Elytra a little longer than the thorax, probably not much broader, squarely truncate at apex, but with both outer angles well rounded, the whole punctate and pilose like the thorax. The abdomen is seen laterally but appears to be much slenderer than the elytra, with tolerably parallel sides, expanding slightly to the fifth segment and then rapidly narrowing to a bluntly rounded apex, the whole surface punctate and delicately pilose like the other parts. The whole body and its appendages piceous throughout.

It is a much stouter form than *L. maclurei*, and its punctate body separates it, distinctly from that.

Length, 5.5 mm.; breadth, 1 mm.; length of hind legs, 2.5 mm.

Florissant, Colorado; one specimen, No. 13615.

Named in memory of the distinguished zoologist and paleontologist, Joseph Leidy.

LEPTACINUS ? EXSUCIDUS sp. nov.

Pl. VII, fig. 13.

The species here considered can hardly be congeneric with the modern forms of this genus, nor with the other species from Florissant which are here described as Leptacini. There appears to be absolutely no neck, and the thorax is crowded closely both upon the head at one end and the elytra at the other—and the straight equal and parallel sides of the body appear to show that this is not a mere accident of preservation—so as to make it very slightly resemble one of the tribe of Xantholini, to which otherwise it would

appear to belong. I have therefore placed it in the genus to which most of the Florissant Xantholini are referred, until more material may give us better means for judgment. It should possibly be placed in *Qthius*.

The head is quadrate, of about equal length and breadth, with scarcely rounded posterior angles, the surface feebly and shallowly punctate, with scattered short hairs. Antennæ poorly preserved, but evidently geniculate, reaching back nearly to the middle of the thorax (which is not far, both head and thorax being so short), enlarging a little apically, the terminal joints scarcely broader than long and the last one subglobose. Thorax quadrate, scarcely so long as broad, with straight and almost, parallel sides, scarcely narrowing from base to apex, where it is scarcely broader than the head, shallowly punctate and with short scattered hairs. Legs rather short, the tibiæ very slender. Elytra apparently somewhat longer but scarcely broader than the thorax and apparently with the same structure. Abdomen scarcely narrower than the elytra, with straight and parallel sides, the apex bluntly rounded, the surface faintly and minutely punctate.

Length, 5.5 mm.; breadth, 0.9 mm.

Florissant, Colorado; one specimen, No. 12767.

### LATHROBIUM Gravenhorst.

A genus rich in species, almost exclusively found in north temperate regions, but with a few elsewhere, and abundantly supplied in North America. Only a few fossil species are known; one occurs in the Pleistocene of Canada; a different species is found at each of the older Tertiary localities of Aix, Oeningen, and Wyoming, and the genus has been recognized in amber.

#### LATHROBIUM ABCESSUM.

*Lathrobium abcessum* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 791 (1876); Tert. Ins. N. A., 505-506, pl. 8, figs. 15, 21 (1890).

Green River, Wyoming.

#### LATHROBIUM INTERGLACIALE.

*Lathrobium interglaciale* Scudd., Tert. Ins. N. A., 506, pl. 1, fig. 38 (1890); Contr. Canad. Palwont., II, 44 (1892).

Clay beds of Scarboro, Ontario.

## LITHOCHARIS Dejean.

A cosmopolitan genus, rather rich in species, of which only about half a dozen are known from North America. The only fossils known are two from the earlier Tertiaries at Aix and Florissant.

## LITHOCHARIS SCOTTII sp. nov.

Pl. VII, fig. 16.

Head of about equal length and breadth, largest just behind the middle, scarcely narrowing behind, with slightly rounded posterior angles, the base truncate, the surface with scarcely perceptible delicate transverse rugæ. Slight traces of the palpi show nothing different from *Lithocharis*. Antennæ reaching to the end of the tegmina, rather slender, scarcely enlarging apically, the joints long, ovate, but none of them greatly larger apically than basally, the second and third joints not stouter than the others (in which the species differs from *L. corticina* Grav., with which it otherwise best agrees), the fourth to the sixth longest and about two and a half times longer than broad, most of the others about twice as long as broad, the apical joint globose and not enlarged. Thorax slightly broader than the head, subquadrate, the sides slightly convex, all the angles equal and scarcely rounded, the surface apparently smooth, with a few very short, delicate hairs and a faint median carina. Legs closely resembling those of *L. corticina*, but shorter, and the tibiæ slenderer and scarcely enlarged apically. Elytra considerably broader than the prothorax, longer than the head and thorax together, with well-rounded humeral angles, similarly rounded outer apical angles, squarely truncate apex, a slight sutural stria, and a smooth surface with a slight covering of fine hairs. Abdomen beyond the elytra about as long as the thorax and elytra together, broader than the thorax, but narrower than the elytra, scarcely tapering apically to a roundly pointed apex, the sides margined, and the surface apparently smooth and slightly villous.

Length, 6 mm. ; breadth, 1.6 mm. ; length of hind legs, 3.1 mm.

Florissant, Colorado; one specimen, No. 1.556 of the Princeton museum.

Named for my paleontological friend, Prof. W. B. Scott, of Princeton.

## TACHINUS Gravenhorst.

A genus tolerably rich in species, almost exclusively found in north temperate regions, and of which a couple of dozen occur in North America. The genus has been recognized in amber, but no fossil species, except the following from Florissant, has been described.

## TACHINUS SOMMATUS sp. nov.

## PI. VII. figs. 8-10.

Head small, triangular, broader than long, narrowing behind the eyes, smooth, with excessively delicate transverse rugæ. The slight remains of the maxillary palpi show that they are not subulate. Antennæ reaching almost but not quite to the hind border of the thorax, only slightly enlarging apically, the first four smooth and naked joints differing from those of *T. fimbriatus* Grav., with which this species agrees well in general appearance and size, in that they are not so dilated apically and the fourth joint is scarcely shorter than the third; neither are the fifth to the tenth joints darker colored and pilose as in the modern species, but they are not so uniform, the fifth and sixth, and especially the fifth, being considerably longer than broad, the seventh and eighth equally long and broad as in *T. fimbriatus*, and the ninth and tenth broader than long; the last joint is pyriform but no larger than the tenth. Thorax shaped as in *T. fimbriatus*, smooth, or with faint signs of excessively delicate transverse rugæ. Legs, excepting the bases of the femora, not preserved in any of the specimens. Scutellum considerably larger than in *T. fimbriatus*. Elytra perhaps slightly broader than the thorax, as long as the head and thorax together, the humeral and outer apical angles more rounded than in the modern species mentioned, apically truncate, the surface with the same transverse microscopic rugæ which characterize the head and thorax, and without any punctuation such as is found in all the eight or ten modern species of *Tachinus* I have seen. Apparently, too, the elytra are of the same light (reddish?) color as the head and thorax, in contrast to the black abdomen, which tapers uniformly to a dull point, the whole body being fusiform, but more pointed behind than in front; the abdominal joints are margined and the surface indistinctly punctate, clothed sparsely with short hairs and with four rows of long spinous hairs attached to the hinder margins, one to a segment in each row,

one row at the sides, and one row laterodorsal. The fifth segment is only about half as long again as the preceding, differing markedly in this respect from the modern species; the last dorsal segment is quadridentate (in the female), resembling most in this respect the much smaller American species *T. tachyporoides* and *T. repandus* Horn, but the lateral teeth are broader and more conical than in either of these, a feature which is not found in any of the species figured by Horn. They are slightly distorted in the specimen, the outer one on the right side being evidently not fully displayed.

Length, 7.5 mm.; breadth, 2.5 mm.

Florissant, Colorado; five specimens, Nos. **548**, 3395, **3446**, **7581**, **12058**.

#### TACHYPORUS Gravenhorst.

This genus is moderately rich in species, almost exclusively found in north temperate regions, and of these more than half a dozen occur in the United States. In the older Tertiaries, single species occur at Florissant and Rott, and the genus has been recognized in amber.

#### TACHYPORUS NIGRIPENNIS sp. nov.

##### Pl. VIII, fig. 1.

Head rounded, short, triangular, smooth, and piceous. Antennae reaching to the end of the thorax, enlarging gradually and slightly, testaceous. Thorax luteous, smooth, and shining, just twice as broad as long, scarcely narrower than the elytra, the sides narrowing strongly toward the apex, rounded, especially at the angles, squarely truncate at base. Elytra together nearly half as wide again as long, longer than the head and thorax together, squarely truncate at apex, the humeral angles well rounded, the surface smooth, with occasional short bristles, and testaceous, deepening to piceous on the basal two-thirds and sometimes including the whole of the elytra. Abdomen narrower at base than the tip of the elytra, tapering regularly to a rounded point, piceous on apical, dark testaceous on basal half, the tips of the segments and to some extent the other parts at the sides furnished with black bristles, the edge of the basal segment with four rather large equidistant bristles just at the tip of the elytra, not preserved in the specimen figured. It seems to agree well, in size and general appearance with our *T. jocosus* Say, but differs from all our species in its

decidedly particolored markings, and in the bristles on the basal abdominal segment.

Length, 4 mm.; breadth, 1.25 mm.

Florissant, Colorado; five specimens, Nos. 266, 4939, 7319, 11783, 12422.

#### BOLETOBIUS Leach.

This is a north temperate genus, containing about half a hundred species, about half of which belong to North America. The only fossil species known are the four here described from Colorado.

The species placed here differ from the modern species of the genus I have seen in one common character, the proportional shortness of the thorax, more marked in some than in others, but in all but one (*B. funditus*) strikingly apparent. As, however, this is in accordance with other differences of a similar nature apparently affecting all the Florissant Staphylinidæ, there seems to be no ground for hesitation in placing them here.

#### BOLETOBIUS LYELLI sp. nov.

#### Pl. VIII, fig. 2.

Head oblong oval, perhaps half as long again as broad, smooth, fusco-testaceous, shining. Antennae imperfectly preserved. Thorax tapering a little from base to apex, no longer than the head, smooth, luteo-testaceous, shining. Legs short and slender. Elytra considerably broader than the thorax and as long as or a little longer than the head and thorax combined, a little wider than long, smooth and shining, fusco-testaceous and apparently with a sutural, a marginal, and a pair of discal sharp striæ, scarcely punctured. Abdomen as broad at base as the elytra, beyond regularly and gently tapering to a blunt point, the abdomen beyond the tips of the elytra being half as long again as the rest of the body; the surface smooth, of variable color, the hinder edges of the segments, especially the hinder ones, armed with numerous bristly hairs. The species is a large one, and belongs apparently in the vicinity of those for which the generic name *Megacronus* was proposed by Stephens.

Length, 6.5 mm.; breadth, 1.4 mm.

Florissant, Colorado; two specimens, Nos. 2995, 10807.

## BOLETOBIUS FUNDITUS sp. nov.

Pl. VIII, fig. 3.

Head long oval, tapering, apparently smooth, piceous. Antennæ not preserved. Thorax fully as long as the head, tapering strongly from base to apex, smooth, piceous. Elytra broadening posteriorly, only a little longer than the thorax, and much wider than long, smooth, piceous. Abdomen longer than the rest of the body, a little narrower at base than the elytra, beyond tapering very gently, the tip rounded; the surface is smooth, piceous, almost entirely free from hairs, excepting a short and inconspicuous fringe along the posterior margins.

This is an ordinary sized species, and appears to be of a uniformly black color and unusually smooth; it is of about the size and form of our *B. cinctus* Grav.

Length, 6 mm.

Florissant, Colorado; one specimen, No. 6055.

## BOLETOBIUS DURABILIS sp. nov.

Pl. VIII, figs. 4, 5.

Head small, elongate, half as long again as broad, with nearly parallel sides, smooth, shining, fusco-testaceous. Antennæ not long enough to reach the hinder edge of the thorax, the first three joints long, very slender, smooth and luteous, the first as long as the second and third, which are equal; the remainder dark testaceous, bristly, growing constantly wider, the fourth as long and nearly as slender as the third, and lighter in color than the others, the fifth, sixth, and seventh nearly quadrate, the remainder broader than long, the apical subglobose. Thorax much broader than the head even at tip, tapering but little, with rounded sides, scarcely so long as the head but nearly twice as broad as long, smooth and luteous. Legs too poorly preserved to admit of statement. Elytra as broad at base as the thorax, broadening considerably on the basal half, slightly longer than the head and thorax together and longer than broad, smooth, luteo-testaceous. Abdomen almost as long as the rest of the body, as broad at base as the elytra, with parallel sides on the basal half, narrowing beyond to a rounded tip, sparsely covered with bristly hairs, almost as frequent over the whole surface as on the apical edges of the segments.

This species, on account of the excessive brevity of the thorax as well as of the antennæ (which, notwithstanding the shortness of the thorax, do not reach its hinder edge) can hardly be compared with any of our modern forms.

<sup>1</sup> Length, 5 to 6 mm.; breadth, 1.25 to 1.5 mm.

Florissant, Colorado; three specimens, Nos. 3735, 6930, 9207.

BOLETOBIUS STYGIS sp. nov.

Pl. VIII, fig. 7.

Head less than half as long again as broad, with nearly straight and converging sides, smooth, piceous. Antennæ reaching back almost to the base of the thorax, very gradually enlarging from the fifth joint apically, these joints stout, subquadrate, dark luteous, hairy, the fifth and sixth joints slightly longer than broad, the seventh to tenth of nearly equal length and breadth, scarcely cuneiform, the last largest and ovate, one-third as long again as broad (the basal joints not preserved). Thorax longer than the head, but apparently broader at base than long, tapering regularly from base to tip, the latter being as broad as the head, the disk smooth, shining, luteous. Elytra apparently of same width as the base of the thorax, longer than head and thorax, piceous. Abdomen not so long as the rest of the body, as broad at base as the elytra, narrowing at first slightly, on the apical half more rapidly, to a somewhat pointed apex, the surface blackish testaceous, with some bristly hairs.

This is the smallest of the Florissant species and about as small as any of our living American species; it differs from all I have seen in the character of the antennæ, and like *B. durabilis*, to which of the Florissant species it is most nearly allied, has a very short thorax, though not of such excessive proportions as there.

Length, 3.25 mm.

Florissant, Colorado; one specimen, No. 5397.

MYCETOPORUS Mannerheim.

A north temperate genus, tolerably rich in species, of which more than half a dozen occur in the United States. The only fossil species described is the one here given from Colorado, but the genus has been recognized in amber.

## MYCETOPORUS DEMERHUS sp. nov.

Pl. VIII, fig. 6.

Of the form and size of *B. americanus* Er., which it closely resembles. Head rounded triangular, of equal length and breadth, fusco-testaceous, smooth and shining. Antennae reaching a little farther back than the hinder edge of the thorax, and therefore considerably shorter than in *B. americanus*, imperfectly preserved, but so far as can be seen of precisely the same general form as there, except in being somewhat slenderer, and with the same form of such individual joints as can be made out (notably the fifth or sixth and the last), except in their greater brevity, apparently uniformly luteous. Legs rather short. Thorax slightly longer than the head, about half as wide again as long, tapering, in front of the same width as the head, scarcely broader behind than the base of the elytra, smooth, shining, and luteous. Elytra slightly shorter than the head and thorax together, slightly broader than long, smooth, shining, fusco-testaceous, with sutural, lateral, and discal striæ, having faint signs here and there of delicate setæ in them. Abdomen as broad at base as the elytra, about as long as the rest of the body, tapering pretty uniformly to a dull point, luteous or luteo-testaceous, the surface smooth and shining, apparently with no pubescence, but the apices of the joints with a few fine setæ which become coarse and longer on the terminal joints, especially at the sides.

Length, 3.75 mm.; breadth! 1 mm.; length of antennae, 1.2 mm.

Florissant, Colorado; one specimen, No. 14737, obtained by Miss C. H. Blatchford.

## OXYPORUS Fabricius.

This genus, with a moderate number of species, is almost exclusively North American, but a couple of species occur in Europe. In the older Tertiaries of Europe four species occur at Oeningen, Rott, and in amber. In America a single fossil is known, from the Pleistocene of Canada.

## OXYPORUS STIRIACUS.

*Oxyporus stiriacus* Ycudd., Tert. Ins. N. A., 505, pl. 1, fig. 36 (1890); Contr. Canad. Palæont., II, 44 (1892).

Clay beds of Scarboro, Ontario.

## TERTIARY COLEOPTERA OF NORTH AMERICA.

### BLEDIUS Leach.

A cosmopolitan, but prevailing north temperate genus with numerous species, of which more than forty are North American. In the earlier Tertiaries of Europe a species has been described from Oeningen, another (as a *Stenus*) from Aix, and the genus has been recognized in amber. In North America half a dozen species are described from Colorado and Wyoming, and besides these, one from the Pleistocene of Canada.

Two of the species from Florissant placed in this genus are remarkable for the uniform, close, and coarse granulation covering alike head, thorax, elytra, and abdomen, a peculiarity which seems to bring them nearest the *armatus* group of our living American forms, though in none of these, so far as I have seen them, is the abdomen closely granulate. With them agrees very well the *Stenus prodromus* Heer from Aix, which I am strongly inclined to think should be regarded as a *Bledius*. A third Florissant specimen agrees still better with the same *armatus* group, the granulations of the abdomen being comparatively infrequent, but in the coarse and heavy antennae, with no slender joints near the base, it departs altogether from any *Bledius* I have seen. In the fourth Florissant species and the two from Green River the granulation is feeble and sparse everywhere or wanting, and seems in all to be almost altogether or wholly wanting on the abdomen, though one of the Green River specimens still seems to belong to the *armatus* group, while closely resembling the fourth Florissant species in the form of the prothorax. In all, so far as can be seen, the antennae are unusually short.

#### BLEDIUS GLACIATES.

*Bledius glaciatus* Scudd., Tert. Ins. N. A., 505, pl. 1, fig. 35 (1890); Contr. Canad. Palæont., II, 43 (1892).

Clay beds of Scarboro, Ontario.

#### BLEDIUS MORSEI sp. nov.

Pl. VIII, fig. 8.

Both specimens referred here are preserved on a side view, so that the species can not be so well characterized as if the upper surface were shown. The head is coarsely granulate excepting on the neck below, where it is marked with exceedingly delicate, transverse, broken striation or comb-

ings. The antennæ reach back to the middle of the thorax and are of the same general structure as those of *B. armatus* Er. (except for the slighter enlargement of the basal joint apically), with which this species agrees well both in size and general appearance. The thorax is shorter than the head, uniformly, heavily, and coarsely granulate, much more heavily than the head, the granulations being rather ovate than round. The legs are of much the same structure as in *B. armatus*, excepting that the hind tibiae are not quite so enlarged apically, but the legs are slightly shorter. The elytra are granulate like the thorax and much longer than it. The thoracic sterna are almost equally granulate, while the abdomen, which in the last two or three joints tapers to a blunt point, is less heavily and less densely granulate, and here the granulations seem to be the bases of short delicate hairs.

Length, 6.65 mm.; of antennæ, 1.2 mm.; breadth of abdomen behind the elytra, 1.5 mm.; length of abdomen, 3.65 mm.; of hind legs, 2.75 mm.

Florissant, Colorado; two specimens, **Nos. 2337, 11313.**

It is possible that the specimen numbered 1.520 in the Princeton museum may belong here, though a larger and somewhat stouter insect appears to be indicated, and it is too imperfectly preserved to be sure that it is generically the same.

Named for my versatile friend, Edward S. Morse, of Salem, in memory of student days together under Agassiz.

*BLEDIUS SOLI* sp. nov.

**Pl. VIII, figs. 10, 14.**

The head is elongated rather than transverse; its surface, excepting on the neck below, where it is marked exactly as in *B. morsei*, is granulate but not prominently. The antennæ reach to the middle of the thorax and agree entirely in form and structure with those of *B. morsei*. Thorax shorter than the head, nearly half as broad again as long, with gently convex sides, the surface very coarsely granulate. Legs agreeing exactly with those of *B. morsei*, but they are, if different, even shorter. Elytra as long as the thorax and half the head, rather broader than long, at base only a little broader than the thorax, coarsely granulate. Abdomen longer than the rest of the body, narrower at base than the elytra, gradually tapering to a bluntly rounded, narrow tip, coarsely granulate like thorax and elytra. The whole body is piceous.

The species closely resembles the preceding in general appearance, but is smaller and is at once distinguished by the equal density and coarseness of the abdominal granulations as compared with those of the thorax and elytra.

Length, 4.8 to **5.1** mm.; breadth, 1.3 mm.

Florissant, Colorado; two specimens, Nos. 1123, 2803.

This species comes close to the fossil *Stenus prodromus* Heer from Aix, which I should look upon as a *Bledius*.

*BLEDIUS OSBORNI* sp. nov.

Pl. VIII, figs. 11, 12.

This species, smaller than the last, but closely resembling it in general appearance, differs from it and from *B. morsei* in its more finely granulate body and stouter legs, and from all other species described, living and fossil, in the coarseness of the antennæ. The body is piceous throughout. The head is as broad as the thorax, subquadrate, of equal length and breadth, the surface exceedingly finely granulate, or in places with irregular transverse striation, which if broken by equally deep opposing striæ would form similar granulations. Antenna: reaching to the posterior edge of the thorax, stout, enlarging but slightly and with perfect uniformity from the second joint outward, the first joint not very long and not greatly enlarged apically, the second scarcely smaller at base than the apex of the first, and as large as it at apex, being like the succeeding joints cuneiform with slightly convex sides and rounded apical angles, the second to the fourth joints a little longer than broad, the fifth to the eighth about equally long and broad, the ninth and tenth a little broader than long and half as broad again as the second, the apical joint subrotund, slightly longer than broad. Thorax of the length of the head, equal, the surface very finely granulate, the granules so arranged as to give somewhat the appearance of longitudinal beaded combings. Legs short and rather stout, the tibiæ scarcely enlarging apically. Elytra a little longer than the thorax, broader than long, delicately and rather feebly granulate. Abdomen half as long again as the rest of the body, as broad at base as the thorax, with parallel sides, tapering only in the last three segments, the tip bluntly pointed, the surface delicately and especially above rather sparsely granulate, very finely and very sparsely pubescent both above and below.

Length of body, 4.25 mm. ; of antennæ., 1 mm. ; breadth of base of abdomen, 0.65 mm.

Florissant, Colorado; three specimens, Nos. **7713**, **12770**, and of the Princeton museum, **1.554** and 1.605.

Named for my friend, Prof. H. F. Osborn, now of Columbia, but when this description was drawn up, of Princeton University.

**BLEDIUS PRIMITIARUM** sp. nov.

Pl. **VIII**, fig. 13.

Head ovate, considerably longer than broad, with gently rounded sides, strongly rounded posterior margin, and globose, prominent eyes, situated laterally rather far back; surface smooth and shining, with irregular, excessively fine transverse combings. Antennæ reaching nearly to the middle of the thorax, rather stout, not increasing in size much beyond the middle, but with the usual contrasted slenderness at the base, the joints of the apical half only a little broader than long, the apical joints subtruncated. Thorax subquadrate, much shorter and scarcely broader than the head, with gently rounded sides, the angles nearly rectangular, blunt; surface like that of the head. Legs very short, the femora only moderately stout, the tibiæ stout, increasing considerably in size toward the apex, with a single, rather slender, interior, apical spine as long as the apical width of the tibia. Elytra scarcely longer than the head, somewhat broader than the thorax, of about equal length and breadth, the surface sparsely and very faintly punctate and with exceedingly brief and sparse pubescence. Abdomen very short, not so long as the thorax and tegmina together, at base as broad as the tegmina, the basal half equal, beyond tapering rapidly to a rather blunt point, the surface sparsely pubescent, but otherwise smooth except for a feeble, sparse, and coarse punctuation laterally. Whole body piceous.

This species appears to be most nearly related to the *annularis* group, but is very different in several points from any of the species belonging to it I have seen, and is larger than all and much larger than most of them.

Length of body, 6 mm.; of antennæ, 1.5 mm.; of hind legs, 2.5 mm.; breadth, 1.75 mm.

Florissant, Colorado; one specimen, No. 6891.

## TERTIAKP COLEOPTERA OF NORTH AMERICA.

BLEDIUS FÆCORUM sp. nov.

PL. VIII, fig. 9.

Head subquadrate, slightly longer than broad, with very gently rounded sides, slightly prominent eyes, and roundly truncate hind margin; surface with a fine, scarcely perceptible granulation. Antennæ fragmentary and detached, but appasently not reaching the middle of the thorax; the most that can be said is that the basal joints (beyond the first,) are slender, that beyond they increase slightly in size and are scarcely broader than long on the apical joint's, the last of about equal length and breadth and obpyri-form. Thorax about one-fifth broader than the head, transverse, being about half as broad again as long, with gently convex subangulate sides, acute anterior and slightly obtuse posterior angles, the front margin very gently concave and hind margin as gently convex, the surface sparsely and somewhat obscurely punctate. Elytra nearly as long as the head and thorax together and somewhat broader than the thorax, slightly broader than long, with rounded humeral angles, the apical margin truncate with a slight obliquity, the surface faintly and sparsely punctulate, with faint signs of a sparse pubescence ; that the lateral declivent portion of the elytrn was separated from the dorsal area by a sharp carina is evident from the sharp line which separates the here jointly flattened fields in the specimen from base to apex; nothing of this sort appears in the modern species of *Bledius* I have seen excepting next the humeral angle; but a nearer approach to it is found in the neighboring genus *Oxytelus*; since, however, there is no sign whatever in the present species of the broad thoracic furrows peculiar to *Oxytelus*, I have preferred to consider this as belonging to the present genus. Abdomen considerably longer than the rest of the body, nearly as broad at base as the elytra, equal for some distance, but in the three apical segments rapidly and conically narrowing to a blunt point, the surface scarcely granulate, with no evident signs of pubescence.

The species seems to belong to the *armatus* group and to be most nearly though still rather distantly allied to *B. flavipennis* LeC.-a somewhat smaller species. It would appear to have been of a fusco-ferruginous color.

Length, 5.6 mm. ; breadth, 1.3 mm.

Green River, Wyoming; one specimen, No. 186, Dr. A. S. Packard.

## BLEDIUS ADAMUS.

*Bledius adamus* Scudd., Bull. U. S. Geol. Geogr. Sum. Terr., IV, 762 (1878); Tert. Ins. N. A., 504, pl. 8, fig. 10 (1890).

This species, though poorly preserved, would appear to be allied to the last two species, but has head, thorax, elytra, and abdomen of equal breadth; the head appears to be faintly marked with a rather coarse transverse combing, while the thorax and elytra are indistinctly and minutely granulated, which may possibly be traced on the abdomen. It is perhaps nearer the *semiferrugineus* group than any other.

Green River, Wyoming.

## PLATYSTETHUS Mannerheim.

This genus has a moderate number of species, nearly all of which are found in the north temperate regions of the Old World. North America has but a single living species, but two occur in the Oligocene of Colorado.

The two species placed here are remarkable for their close resemblance to our American species in the surface structure of the upper side of the body, and they agree well also in the more important features. They both differ, however, in their shorter antennae, and each has certain peculiar features of its own; in general, however, their affinities with a living type is more marked than in any other group of Staphylinidæ.

## PLATYSTETAUS CARCAREUS sp. nov.

Pl. IX, fig. 1.

Body piceous throughout, excepting the prothorax, which is dark testaceous. Head rounded, transverse, slightly broader than long, the surface apparently with fine transverse rugæ. Antennæ shorter than in our common *P. americanus* Er. (which it closely resembles in size, form, and general proportions, as well as in minor characters), scarcely reaching beyond the middle of the prothorax, of exactly the same structure as in our species. Thorax fully as long as the head and somewhat broader than it, transversely quadrate; its exact form can not be determined, but it would appear to be broader posteriorly than in our modern species; it has a distinct median stria, deeper than in the living form, and, like it, is sparsely punctate, the puncta giving rise to delicate hairs, which are only half as long as in *P.*

*americanus*. Elytra similarly punctate, with similar short hairs, the elytra themselves as broad as the thorax or broader, and scarcely longer than it. Abdomen narrower than the elytra, much longer than the rest of the body, gradually tapering to a pointed tip, each joint fringed with long, distant hairs and at outer margin with a very long fine seta, the surface besides very sparsely pilose and apparently punctate like the thorax and elytra, in which particulars it again agrees well with the American species.

Length of body, 4.25 mm.; of antennæ, 0.8 mm.; breadth, 0.75 mm.

Florissant, Colorado; one specimen, No. 256.

PLATYSTETHUS ARCHETYPUS sp. nov.

Pl. IX, fig. 2.

This species, agreeing better in form and size with our living American species than the preceding, does not so well resemble it in structure. The whole body is black. The head is subtriangular, of about equal length and breadth, with rather prominent large eyes, which give a somewhat angular outline to the sides; the surface is very sparsely and rather obscurely punctulate, each punctuation giving rise to a short hair. The antennæ are so imperfectly preserved that not much can be said of them, but they apparently agree in every respect with the other fossil species; at least they are longer than the head, have a slender basal and a not greatly enlarged apical portion. Thorax rather longer and much broader than the head, much broader than long, truncate at base and apex and with subangulate sides; there is a fine median stria and a pair of distinct sinuate oblique carinæ on the disk, each running from one of the anterior angles to the middle of the base, but fading at either extremity; the surface is otherwise precisely similar to that of the other fossil species. Elytra considerably broader than the thorax, longer than the head and thorax together, scarcely longer than broad, with the same surface structure as the thorax, but apparently with longer hairs. Abdomen rather shorter than the rest of the body, a little narrower than the elytra, scarcely broadening posteriorly for the first four segments, behind that broadly rounded and scarcely produced, the surface with scarcely perceptible, very sparse punctuation, but with hairs like those of the thorax, and no perceptible fringe or lateral setæ to the joints.

Length, 3 mm.; breadth, 1 mm.

Florissant, Colorado; one specimen, No. 263.

## STAPHYLINIDÆ.

### OXYTELUS Gravenhorst.

A cosmopolitan genus, with numerous species, of which North America has its fair share. It has been recognized in the early Tertiaries of New South Wales, and in amber, and four species have been described from Alsatia, Oeningen, and Utah.

#### OXYTELUS PRISTINUS.

*Oxytelus pristinus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 79 (1876); Tert. Ins. N. A., 503-504, pl. 5, figs. 118-120 (1890).

White River, Utah.

### GEODROMICUS Redtenbacher.

A north temperate genus with a moderate number of species, of which North America possesses only four. It has been found fossil only in America, in the older Tertiaries of Colorado, and in the Pleistocene of Canada.

#### GEODROMICUS ABDITUS sp. nov.

Pl. IX, fig. 3.

Unfortunately the single specimen on which this species is founded lacks the head, but as the form and surface structure of the other parts is somewhat peculiar, it is with little doubt that we place it here. The thorax is scarcely broader than long, the front and hind margin truncate, the sides strongly convex and slightly angulate just in advance of the middle, the hind margin therefore a little narrower than the front margin, the angles scarcely rounded; there is a slight median impressed line, and the whole surface is very delicately granulated, with scattered short delicate hairs. The elytra are half as broad again as the thorax, but narrow toward the base; they are nearly twice as long as the thorax, and they are together angularly emarginate at apex, and delicately margined laterally; the surface structure is the same as that of the thorax, only the granulations are a trifle coarser. The abdomen is scarcely so long as the thorax and elytra together, long ovoid, narrower at base than the elytra, beyond equal to it in breadth, roundly pointed at apex; the surface is vaguely granulated and very sparsely and briefly pilose. The whole body is piceous.

The species agrees best perhaps with *G. nigrinus* Müll., but is not very close to any, differing in the granulated structure of the body and the absence of any posterior collar-like constriction of the thorax.

Length of fragment, 5.1 mm. ; of thorax, 1 mm. ; of elytra, 1.75 mm. ; breadth of thorax, **1.1** mm.; of elytra, 1.85 mm.

Florissant, Colorado; one specimen, No. 2186.

#### GEODROMICUS STIBICIDI.

*Geodromicus stibicidii* Scudd., Contr. Canad. Palæont., II, 43, pl. 2, fig. 1 (1892).

Clay beds of Scarboro, Ontario.

#### ARPEDIUM Erichson.

A widespread genus, with a very limited number of species, of which nearly half a dozen occur in North America. The only fossil known is one from the Canadian Pleistocene, here recorded.

#### ARPEDIUM STILLICIDI.

*Arpedium stillicidii* Scudd., Contr. Canad. Palæont., II, **4243, pl. 2, fig. 2 (1892).**

Clay beds of Scarboro, Ontario.

#### TRIGA Fauvel.

A North American monotypic genus, which is represented in the earlier Tertiaries by a species from Colorado.

TRIGA CÆNI sp. nov.

Pl. IX, fig. 5.

Head orbicular, with barely prominent eyes, about half as broad again as the brief constricted neck, smooth, with distant, exceedingly brief hairs set in minute punctures. Antennæ with only the three or four basal joints preserved, and these imperfectly, but they indicate nothing at variance with those of *T. picipennis* LeC., unless they are stouter. Thorax slightly wider than the head, transversely suborbicular, slightly broader than long, truncate at apex, but well rounded at base and regularly convex on sides, with a faint median stria, the disk very sparsely and feebly punctate, the puncta giving rise to moderate hairs. Elytra a little wider, but scarcely longer

than the thorax, truncate at apex, with the outer margin strongly rounded, a distinct sutural stria, very sparsely and feebly punctate, and more densely and briefly pubescent. Abdomen hardly so broad as the thorax, with parallel sides, hardly so long as the rest of the body, bluntly rounded at apex, the surface rather feebly and sparsely punctate, the puncta giving rise to moderate hairs, the edges of the segments fringed with similar hairs.

Length, 6 mm.; breadth, 1.5 mm.

Florissant, Colorado; one specimen, No. 308; possibly also No. 5047 belongs here.

#### STAPHYLINITES Scudder.

A provisional genus, established for the species here mentioned, from the Oligocene of Wyoming, the generic affinities of which can be determined only after further material is obtained.

#### STAPHYLINITES OBSOLETUM.

*Staphylinites obsoletum* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IT, 78 (1876); Tert. Ins. N. A., 510, pl. 8, fig. 32 (1890).

Green River, Wyoming.

### COCCINELLIDÆ.

Twenty-seven species of seven genera of this family have been reported from Tertiary deposits, only one of them from the Pleistocene. Of these only three come from America, of as many genera, and these all represented also in Europe.

In the two species from Florissant here described we have forms tolerably near to existing species, but in both of them the punctuation of the upper surface of the body is coarser than in their living representatives.

#### COCCINELLA Linné.

About a dozen species of this genus are found living in North America north of Mexico; it occurs all over the world and has numerous species. About a dozen species have been found in the early Tertiaries of Europe, at Oeningen, Rott, and Aix, and it occurs also in amber, and is reported in the English Pleistocene. Chagnon reports a species from the Miocene (?) of Vancouver Island.

COCCINELLA **sp.**

*Coccinella* sp. Chagn., Nat. Canad., XXII, 109 (1895).

Vancouver Island, British Columbia.

## ADALIA Mulsant

A cosmopolitan genus, with a considerable number of species, of which only three belong to the United States. In the earlier Tertiaries a single species is found in Alsatia and another in Colorado.

ADALIA **SUBVERSA** sp. nov.

Pl. IX. fig. 6.

A single specimen of a beetle is preserved, showing, indeed, very few structural features, but in its form, size, and in its markings reminding us of the common "lady-bird" which crawls up our window panes in the spring. It is preserved on a dorsal view and shows head, thorax, and elytra in tolerably good preservation, together with one of the front tibiae. The form and proportions of the prothorax and elytra are exactly as in *Adalia bipunctata* (Linn.), but they are more coarsely punctate, though there is the same distinction between the thorax and elytra in the shallowness of the thoracic puncta. The insect appears to have been uniformly light colored, with only two submarginal lateral dark spots on the prothorax (in which it agrees better with *Adalia frigida* Schm. than with other "species of Adalia) and a rather large central spot on each elytron. In the generally uniform light color of the thorax it differs from any of the living species in the United States. It is also rather larger.

Length, 5.3 mm.; breadth, 3.65 mm.

Florissant, Colorado ; one specimen, No. 4704.

## CHI.LOCORUS Leach.

A cosmopolitan genus with a considerable number of species, of which a large part are tropical or subtropical, and only two occur in the United States and two others in Europe. Yet three species have been found in the early Tertiaries of these countries, two in Alsatia and one in Colorado.

CHILOCORUH ULKEI sp. nov.

Pl. IX, fig. 8.

Two specimens are here referred to this genus, although, possibly by the conditions of preservation, they differ from the members of this group in one of its most distinguishing characteristics, the deep and sudden anterior emargination of the prothorax. In the fossil it hardly appears to be much more emarginate than in other neighboring Coccinellidæ; but the expanded genæ of the head, the small size of the prothorax, the rotundity and unusually dark color of the elytra, which are here piceous, and the general form of the whole body make it tolerably certain that it belongs in this group, and the absence of any visible sign of a labrum indicates that it should be placed here rather than in Exochomus. It is of about the same size as our native species, or a trifle smaller. The shape of the elytra is the same, excepting that the humeral angle is scarcely so prominent; they are, however, uniformly black, and more coarsely, heavily, and distantly punctate than in *C. bivulnerus* Muls.; the shape of the prothorax is also the same except for the lesser emargination, which scarcely appears in the specimen selected for illustration and which is obscure at this point; the prothorax is less deeply punctate than the elytra, but differs from our modern species in the same way as do the elytra; its disk is dark like the elytra, and the head is infuscated, but the sides of the prothorax are of a light color and were probably red in life. One antenna is preserved on one specimen, showing a considerably stouter club than in *C. bivulnerus*.

Length, 4.5 mm.; breadth of thorax, 2 mm.; of elytra, 3.5 mm.

Florissant, Colorado; two specimens, Nos. 11227, **11929** and 12482.

Named for the coleopterist, Henry Ulke, of Washington.

## EROTYLIDÆ.

Only three fossil forms of this family are known, representing as many genera, two of them reported from amber, one in the early Tertiary of Wyoming.

MYCOTRETUS Lacordaire.

An American genus with numerous species, mostly found in the Tropics; a very few species occur in the United States. One species has been found fossil in Wyoming.

## MYCOTRETUS BINOTATUS.

*Mycotretus binotatus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 763-764 (1878); in Zittel, Handb. d. Palæont., (I), II, 800, fig. 1053 (1885); Tert. Ins. N. A., 502-503, pl. 7, fig. 30 (1890).

Green River, Wyoming.

## CUCUJIDÆ.

A half dozen species of this family have been found in the older Tertiaries of Europe and North America, equally divided between the two both as to species and genera, one genus of the five recognized having been found in both countries. One of the American genera is regarded as extinct.

## PEDIACUS Shuckard.

A north temperate genus, with a limited number of specific forms, of which three occur in North America. One fossil is known, coming from Colorado.

The single species found fossil in America is peculiar for the brevity of the antennæ, the similarity in size of the first joint to the succeeding, the lack of a distinct collar of equal width at the back of the head (notwithstanding the presence of the transverse ridge behind the eyes) and the absence of any sinuation or denticulations on the side of the prothorax.

## PEDIACUS PERICLITANS sp. nov.

Pl. IX, fig. 7.

The single specimen referred here agrees very closely with our native species of *Pediacus*, and especially with *P. depressus* Herbst, excepting in the absence of a collar-like neck to the posterior part of the head and in having shorter antennæ. The shape of the head is the same, with prominent, coarsely faceted eyes, a flattened quadrate snout, nearly as long as the head in front of the transverse ridge; behind the ridge the head continues to narrow. The first joint of the antennæ is scarcely larger than the second, and the second to the seventh are equal in size, and appear to have a median ridge or furrow above; the entire length of the antennæ is slightly less than the width of the prothorax. Prothorax subquadrate, broader than

long, not much longer than the elytra, the front margin straight, the hind margin scarcely convex, the sides well rounded and entire, with no angulations, the front and hind angles nearly equally rounded. Elytra entirely similar in form and sculpture to those of *P. fuscus* Er., the thorax being as there slightly more distinctly punctate. Scutellum transverse, small.

Length, 3.5 mm. ; of antennae, 1 mm. ; breadth of prothorax, 1.25 mm. ; of elytra, 1.3 mm.

Florissant, Colorado; one specimen, No. 112.

LITHOCORYNE (*λίθος, κορύνη*) gen. nov.

Closely allied to *Lathropus* Erichson, from which it differs principally in the narrower head and the structure of the antennae; of the last, which are as long as the head and half the thorax, the first joint is large and stout, but longer than broad and only half as broad again as the joints beyond; the second of entirely similar size to the following, or a very little shorter, and, with the third to the eighth, obconic, truncate, longer than broad; the ninth to eleventh enlarged into a distinct club; the ninth and tenth hemispherical, truncate at tip, nearly twice as broad as long; the terminal segment broad ovate, longer than broad, but scarcely narrower than the preceding. Prothorax narrowed posteriorly, without lateral denticulations, the hind angles rounded, the surface depressed, as in *Cucujus*.

The single species known is of about the size of the living species of *Nausibius* or of *Pediacus*, and much larger than those of the more nearly related *Lathropus*.

**LITHOCORYNE GRAVIS** sp. nov.

Pl. IX, fig. 4.

Head, including the mouth parts, shorter than broad, the rather large eyes scarcely disturbing the, full contour of the sides, distant from the prothorax, but little narrower behind and about three-fourths the width of the thorax; sculpture of the surface similar to but more subdued than that of the prothorax ; antennal stalk moderately slender, the whole reaching to the middle of the prothorax. Prothorax nearly twice as broad as long, broadest anteriorly, very gradually and regularly tapering to the base, which is about a seventh narrower than the front; in front the sides are suddenly turned inward, and the lateral angles, which are sharp, are produced forward,

but otherwise the front is truncate; base very gently convex, the outer angles gently rounded; the sides are narrowly margined or the margins thickened as in allied genera, but they are entire and nowhere denticulate; surface covered with minute not crowded nor prominent granulations. Elytra near base a third as wide again as the base of the thorax, the sides parallel, the shoulders abruptly rounded, with sculpturing similar to that of the thorax but less pronounced; their tips are broken in the only specimen known, but they are evidently at least half as long again as the head and thorax together and not much more than that.

Length of fragment, 5 mm.; probable complete length, 5.2 mm.; of antennae, 1.4 mm.; breadth of head, 1.2 mm.; of thorax, 1.7 mm.; of elytra, 2 mm.

Florissant, Colorado; one specimen, No. 1257.

#### PARANDRITA LeConte.

A monotypic genus, occurring in Arizona and California. The only fossil species is the one here recorded from the Oligocene deposits of Wyoming; but Dr. Förster of Mulhouse informs me by letter that he has recognized the genus in deposits of about the same age at Brunstatt, Alsacia.

#### PARANDRITA VEKTITA.

*Parandrita vestita* Scudd., Tert. Ins. N. A., 501-502, pl. 7, fig. 41 (1890).

Green River, Wyoming.

### DERMESTIDÆ.

Four species of this family, of three different genera, have been found in the European Tertiaries, in amber, and at Oeningen and Salzhausen. A species belonging to one of the genera recognized in Europe occurs in the Oligocene of Colorado.

#### ATTAGENUS Latreille.

A widespread genus, moderately rich in species, of which only four or five occur in North America. Two fossil species have been found in the early Tertiaries, one in Germany, the other in Colorado.

ATTAGENUS **SOPITUS** sp. nov.

Pl. IX, fig. IO.

A rather poorly preserved specimen, showing the prothorax and most of the elytra, seems to belong here. It is of about the size of *A. pellio* L. The prothorax, from which the head can not be separated, is triangular with rounded angles, the middle of the hind margin produced but rounded apically, the whole surface feebly punctate, but with larger puncta than in *A. megatoma* Fabr. Elytra shaped much as in *A. pellio*, with well-rounded humeral angles, but proportionally slightly longer than in the modern species and more coarsely punctate.

Length of body, 4.5 mm.; breadth, 2 mm.

Florissant, Colorado; one specimen, No. 2146.

## CRYPTOPHAGIDÆ.

Only three fossil beetles of this family, belonging to as many genera, have been found in the early Tertiaries, two in Europe and one in America.

ANTHEROPHAGUS Latreille.

A genus containing half a dozen species, equally divided between Europe and North America. A single fossil species is known from Wyoming.

### ANTHEROPHAGUS PRISCUS.

*Antherophagus priscus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 79-80 (1876); in Zittel, Handb. d. Palæont., (I), II, 799, fig. 1051 (1885); Tert. Ins. N. A., 501, pl. 7, figs. 24, 35 (1890).

Green River, Wyoming.

## NITIDULIDÆ.

Twenty-two species of this family have been found in the Tertiaries, none of them in the Pleistocene. Twelve genera are represented, eight in the Old World and five in the New, one only being common to both. Two of the genera are regarded as extinct, one on each continent.

## TERTIARY COLEOPTERA OF NORTH AMERICA.

### CARPOPHILUS Stephens.

A cosmopolitan genus with numerous species, many of which occur in North America. The only known fossil species is the one here described from Colorado.

CARPOPHILUS RESTRUCTUS sp. nov.

Pl. IX, fig. 9.

Form pretty regularly ovate. Head large, about half as large as the prothorax, full and rounded, subsemicircular, glabrous, the mandibles of the normal form. Thorax at base of the size of the there narrowed elytra, narrowing considerably, with rounded sides on the anterior half, the front margin being straight and scarcely broader than the base of the head; posterior margin straight, the outer angles scarcely rounded, the base scarcely narrowed, the surface glabrous. Scutellum very large, glabrous. Elytra almost as long as the head and thorax together, the sides nearly parallel but well rounded, and to that extent narrowed at base and apex, truncate, the apical margin faintly convex, the whole surface glabrous. Abdomen having the second and third segments together shorter than the fourth (showing that it falls in the subgenus *Carpophilus*, as characterized by Andrew Murray), the fourth and fifth equal and together nearly as long as the elytra, fully exposed and sparsely clothed with moderately long villous hairs.

Length, 3.2 mm.; breadth, 1.5 mm.

This species seems to belong in the subgenus *Carpophilus*, in the near neighborhood of the widely distributed species *C. hemipterus* (Linn.), but differs remarkably from it in the great size and fullness of the head and the glabrous surface of most of the body.

Florissant, Colorado; one specimen, No. 1400.

EPANURÆA (ἐπάνω, οὐρά) gen. nov.

Allied to *Epuræa*, with the same general form, but with a relatively larger head and peculiar antennæ. These are shorter than the width of the body and beyond the large basal joint consist of ten joints, of which five go to form the remarkably short, slender stem, in which the joints are hardly longer than broad, and together are shorter than the apical five which form the abrupt club; this is a little more than twice as broad as the stem, and

consists of two portions; the first of a single (the seventh) joint which is subcircular and sharply separated from the remainder (though not appearing so in the published figure), which are closely united and equal, excepting that the last is minute.

A single species is known, and comes from Florissant.

#### EPANURÆA INGENITA.

*Epanuræa ingenita* Scudd., Tert. rhynch. Col. U. S., pl. 1, fig. 2 (1892).

Head large, fully two-thirds as wide as the prothorax, and two-thirds as long as broad, the front well rounded, the surface feebly punctate; eyes large, lateral. Prothorax more than half as broad again as long, tapering slightly, with rounded sides, the front feebly and broadly emarginate, the surface more distinctly punctate than the head. Elytra a little broader at base than the thorax, with strongly pronounced impunctured striæ. Legs moderately short and not very slender, the tibiæ with long and delicate spurs.

Length, 4.6 mm.; breadth, 1.9 mm.

Florissant, Colorado; three specimens, Nos. 3517, 10267, 11661.

#### NITIDULA Fabricius.

A cosmopolitan genus with not a great many species, three only of which occur in the United States. Eight species of the genus have been found in the early Tertiaries of Oeningen and Radoboj; it has also been recognized in amber, and one species occurs in Colorado.

#### NITIDULA PRIOR sp. nov.

Pl. IX, fig. 11.

Body oblong ovate, broadest at the elytra. Head large, transverse, well rounded, broadest posteriorly, half as broad again as long, with no sign of emargination in front of the eyes, which do not disturb the even contour of the sides. Prothorax rather short, at its broadest twice as broad as long, broadest at base, with pretty regularly rounded sides, but tapering, especially in front, where it is only a little wider than the head, the sides scarcely if at all marginate; base apparently regularly truncate, the front rather deeply emarginate; surface both of head and thorax uncertain, but showing in certain places as delicately rugulose in a transverse sense.

Scutellum rather large, triangular, equiangular, the posterior angle well rounded. Elytra at base of the extreme width of the thorax and subparallel, together a third longer than broad, and half as long again as head and thorax together, truncate, with rounded apex, exposing two abdominal segments, with faint and rather numerous striæ, the interspaces exceedingly finely and delicately punctulate. Abdomen faintly punctate. No signs of any villosity in any part of the body, but this may be accidental, as the tibiæ appear to be as villous as in the modern species of *Nitidula*.

The species does not appear to be at all nearly related to any of our living native species, and the form of the head, the absence of any independent prominence of the clypeus, with the rapidly narrowing thorax and striate elytra, lead one to suspect that it will be found impossible to retain it in this genus. The general aspect is that of *Nitidula* rather than of any other genus of the family, and the legs have a similar structure. Unfortunately the antennæ are not preserved. It is nearest *N. rufipes* Linn.

Length, 6.5 mm.; breadth, 1.8 mm.

Florissant, Colorado; one specimen, No. 13565.

#### PROMETOPIA Erichson.

This is a genus of very wide range, but with exceedingly few species, of which one is found in North America; those of the Old World occur in the Tropics. One fossil species has been recorded from British Columbia.

##### PROMETOPIA DEPILIS.

*Prometopia depilis* Scudd., Rep. Prog. Geol. Surv. Can., 1875-76, 278-279 (French ed., 308-309) (1877); Tert. Ins. N. A., 500, pl. 2, fig. 29 (1890).

Quesnel, British Columbia.

#### PHENOLIA Erichson.

A monotypic genus, found in North America, where also a single fossil is found, in the Tertiary of Wyoming.

##### PHENOLIA INCAPAX.

*Phenolia incapax* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 80 (1876); Tert. Ins. N. A., 499, pl. 7, fig. 23 (1890).

Green River, Wyoming.

## TROGOSITIDÆ—BYRRHIDÆ.

### TROGOSITIDÆ.

Thirteen species of this family have been found in the earlier Tertiaries, referred to three genera. Only a single one of these belongs to our continent.

#### TROGOSITA Olivier.

A widespread genus with a considerable number of species, of which three occur in the United States. Ten fossil species have been found in the older Tertiaries of Europe and Greenland.

#### TROGOSITA INSIGNIS.

*Trogosita insignis* Heer, Flora foss. met., 129, pl. 50, figs. 12, 12 bc (1868); Flora foss. Groenl., II, 144 (1883).

Atanekerdluk, North Greenland.

### BYRRHIDÆ.

Sixteen species of this family have been found fossil, all but three in the older Tertiaries. Two of these three are species of *Byrrhus*, one each in Europe and America, the same genus occurring also in the older Tertiaries of both countries; the third is an existing species of *Cytilus* reported from the Bavarian Pleistocene. Of the thirteen species of six genera from the older Tertiaries, five of two genera occur in the Old World, eight of five genera in the New, the genus *Byrrhus* alone common to both. One American genus is regarded as extinct.

#### NOSODENDRON Latreille.

Two species of this genus are found in North America, another in Ceylon, while the fourth is cosmopolitan. A fossil species, the only one known, occurs in Wyoming.

#### NOSODENDRON TRITAVUM.

*Nosodendron tritavum* Scudd., Tert. Ins. N. A., 499, pl. 7, fig. 36 (1890).

Green River, Wyoming.

## NOSOTETOCUS Scudder.

This genus was established (Bull. U. S. Geol. Survey No. 93, p. 16, 1892) for fossil species from Colorado.

## NOSOTETOCUS DEBILIS sp. nov.

## Pl. x, figs. 1, 2.

Form very broadly oval, the length being about a third greater than the width, the head not disturbing the regularity of the contour. The head is rather small and transverse, with rather broadly rounded front; in one specimen it is unnaturally raised so that the actual form can easily be seen. The antennæ are somewhat more than half as long as the breadth of the broad body, and the apical joint, considerably larger than any of the others, is twice as broad as the slenderer joints of the stem. The elytra show very feeble indications of punctures longitudinally disposed, but not shown in the plate. The under surface of the body appears to be smooth, excepting the episterna, which are coarsely granulose.

Length, 4.5 mm. ; breadth, 3.25 mm. ; breadth of head, 1.4 mm. ; length of antennæ, 1.75 mm.

Florissant, Colorado; two specimens, Nos. 9231, 11303.

## NOSOTETOCUS VESPERTINUS sp. nov.

## Pl. x, fig. 3.

Form regularly obovate, about half as long again as broad. The head is comparatively small, transverse, the antennæ about half as long as the greatest width of the body, the third and fourth joints narrowest and about two-thirds the width of the apical joint, which is largest and well rounded apically. The under surface of the body is exposed in the only specimen discovered and is apparently smooth throughout, but where the tips of the parted elytra, show through the body they appear faintly and somewhat uncertainly as if feebly punctured in rows. The hind femora are considerably expanded, largest in the middle and about twice as broad as the straight and equal tibiæ.

Length of body, 6.4 mm.; breadth of same, 4.1 mm.; breadth of head, 1.65 mm.; length of antennæ, 2.2 mm.

Florissant, Colorado; one specimen, No. 11228.

## BYRRHIDÆ.

### NOSOTETOCUS MARCOVI.

Pl. x, figs. 4, 5.

*Nosotetocus marcovi* Scudd., Bull. U. S. Geol. Surv., No. 93, 17, pl. 2, figs 2, 3 (1892).

Florissant, Colorado.

### AMPHICYRTA Erichson.

A North American genus with only three species. A single fossil has been found in Colorado.

#### AMPHICYRTA INHÆSA sp. nov.

Pl. x, fig. 10.

A single fairly well preserved specimen of a byrrhid from Florissant seems referable to *Amphicyrta*. The form of the body is oval, broadest posteriorly, and the size and general appearance not unlike *A. dentipes* Er. of the Pacific coast. The head is rather narrow, and the labrum remarkably narrow for its length, being scarcely transverse, with strongly rounded front' margin. A few joints of one of the antennæ are seen crossing the thorax, but present nothing peculiar. The elytra are sparsely and shallowly punctate with circular puncta, removed from one another by at least double their own diameters, and thus very closely' resembling the sculpturing of the elytra of *A. dentipes* if the puncta of the latter were slightly smaller and more shallow.

Length, 6.25 mm.; breadth, 5 mm., as preserved with partially expanded elytra, but the probable actual breadth is 4.25 mm.

Florissant, Colorado; one specimen, No. 11274.

### CYTILUS Erichson.

A north temperate genus with very few species, of which two occur in North America. Two fossil species are found in Colorado, and a recent species is credited to the Bavarian Pleistocene.

#### CYTILUS TARTARINUS sp. nov.

Pl. X, fig. 6.

Here I refer a single specimen of a byrrhid in which the hind tarsi are plainly not retractile, but which does not agree well with the characters of

the American species, and is double their size. The general form is uniformly oval excepting for the slight prominence of the head, which may be entirely due to the state of preservation; the head is about half the width of the body. The elytra are furnished with rather deep and sharp striæ, as in existing species of *Cytilus*, but are distinctly though finely punctate, and the legs appear to be very different from *Cytilus*. The tibiæ have their opposite sides similarly and very slightly arcuate, and in the middle legs are as broad as the femora, though not more than two-thirds their width in the hind legs. The hind tarsi are as long as the hind tibiae, the last joint and claws quite as in the living *Cytili*. The specimen shows no antenna: and is somewhat mutilated behind.

Length, 8 mm.; breadth, 4.5 mm.

Florissant, Colorado; one specimen, No. 7740.

#### *CYTILUS DORMISCENS.*

*Cytilus dormiscens* Scudd., Tert. rhynch. Col. U. S., pl. 1, fig. 1 (1892).

Head very finely and profusely punctate, with some fine wrinkles above the rather large eye; antennæ hardly longer than the head, the terminal joints a third broader than the basal, of about equal length and breadth. Thorax apparently tapering but little, and so having an appearance very unlike a byrrhid, but this is apparently due to distortion in preservation; it is much broader than long, truncate at both extremities, finely, profusely, and uniformly punctate. Elytra similarly but not so heavily punctate, with faint signs of delicately impressed striæ. Femora rather stout, tibiæ moderately so, tapering at either end, with a few delicate spines. Under surface of thorax punctured like the elytra, of abdomen nearly or quite smooth.

Length, 5.5 mm. ; breadth, 3 mm.

The short antenna: hardly agree with *Cytilus*.

Florissant, Colorado; one specimen, Nos. 8068 and 8193.

#### BYRRHUS Linné.

A north temperate genus with tolerably numerous species, of which about half a dozen occur in North America. In the Old World the genus is recognized in the English Pleistocene, and three species have been found

in the older Tertiaries of Oeningen and the Rhine, and another in amber. In America two fossil species are known, one from the Canadian Pleistocene, the other from the Oligocene of Colorado.

The Florissant species here described agrees tolerably well in structure, as far as can be seen, with modern types, but has certainly a much more regularly oval contour to the body. The head is retractile; while in the species described from the European Tertiaries, or those best figured, it does not appear to be so, so that they are probably wrongly placed here, belonging rather to the Nosodendrinæ.

BYRRHUS OTTAWAENSIS.

*Byrrhus ottawaensis* Scudd., Contr. Canad. Palæont., II, 40-41, pl. 2, figs 6-8 (1892).

Greene's Creek, Ottawa River, Canada. Since the description was published, a second specimen of this species has been found at the same locality, by Dr. H. M. Ami.

BYRRHUS ROMINGERI sp. nov.

Pl. X, fig. 9.

A species of about the size of *B. geminatus* LeC. and agreeing fairly well with it in the sculpturing of the elytra and the granulation of the under surface of the abdomen, but differing from the Byrrhi in the more regular contour of the oval body, the lack of a humeral thrust at the base of the elytra, and the want of any prominence to the head. The antennæ are as long as half the width of the body, the joints increase more gradually in size than in *B. geminatus*, and the last joint has a greater proportionate size. The hind tibiæ are slender, but little expanded, and scarcely half-as wide as the femora; the hind tarsi are apparently quite as in the modern species. The elytral striation is indistinct and apparently of much the same character as in *B. geminatus*.

Length, 5.25 mm.; breadth, 3.75 mm.

Florissant, Colorado; three specimens, Nos. 7700, 8124, and of the Princeton collection, No. 1.540.

Named for the Michigan geologist, Carl Rominger.

## PARNIDÆ.

The species described below, from the Oligocene of Colorado, is the only extinct form of this family yet known; but a recent species of *Parnus* has been found in the Pleistocene of Galicia.

## PSEPHENUS Haldeman.

This is a North American genus with only two species. A single fossil species occurs in Colorado.

## PSEPHENUS LUTULENTUS sp. nov.

## Pl. x, fig. 8.

Ovate. Head with perfectly regular semicircular front with a curve that, apart from the eyes, would make the head longer than broad. **Eyes** protuberant, globular, much more than half as long as the head. Antennæ reaching fully to the base of the elytra, moderately slender, the somewhat moniliform joints increasing slightly in size to the tip, the apical joint subglobular, slightly elongate. The pronotum broadens far less rapidly than in the existing *P. lecontei* LeC., and is much shorter than there, being at the greatest not much longer than the anterior breadth, but has the same sinuate hind margin as in the modern species; the anterior lateral angles are joined by a semicircular impression, and behind it, parallel to and so concentric with it and lying midway between it and the hind margin, is a second similar line. The surface both of head and thorax appears to have had a similar sculpturing, which looks as if consist&g of crowded shallow depressions about as large as the facets of the eye. Scutellum slender, moderate. Elytra with the same sculpturing as the head and thorax, more than twice as long as they, broadest at end of basal third.

Length, 6 mm.; breadth, 3.6 mm.

Florissant, Colorado; one specimen, No. 9421.

## ELATERIDÆ.

In this family, beginning the *Serricornia*, and in the succeeding families, but very few of the American fossil species known to me are described or considered. It may nevertheless be well to continue in each case the brief

summary of our present Knowledge of the fossil forms, although most of the material must be taken from foreign sources. The American contingent, however, being so small, will not be contrasted with the European as heretofore, except so far 'as it may appear desirable.

About fifty-eight fossil species of this family have been described or indicated in a less degree than usual described or figured. They represent twenty-one genera, of which only one, an American, is regarded as extinct. Fourteen of these species, of five genera, come from the Pleistocene, the remainder, but including three of the Pleistocene genera, from the earlier Tertiaries. Two of the Pleistocene forms, one on each continent, are regarded as existing species.

FORNAX Laporte.

A cosmopolitan genus rich in species, of which about half a dozen occur in North America. A single fossil species is known, from the Pleistocene of Canada.

**FORNAX LEDENSIS.**

*Fornax ledensis* Scudd., Contr. Canad. Palæont., II, 39, pl. 3, figs. 3, 4 (1892).

Greene's Creek, Ottawa River, Canada.

EPIPHANIS Eschscholtz.

A monotypic North American genus, of which a single fossil species is known, from Utah.

EPIPHANIS DELETUS.

*Epiphanis deletus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, SO-81 (1876); Tert. Ins. N. A., 498, pl. 5, figs. 113, 114 (1890).

White River, Utah.

CRYPTOHYPNUS Eschscholtz.

A cosmopolitan genus rich in species, of which about two dozen occur in North America. The genus has been recognized in amber, and a species from the earlier Tertiaries of British Columbia referred here doubtfully.

**CRYPTOHYPNUS? TERRESTRIS.**

*Cryptohypnus? terrestris* Scudd., Rep. Prog. Geol. Surv. Can., 1877-78, 181-182B (1879); Tert. Ins. N. A., 491, pl. 2, fig. 30 (1890); Contr. Canad. Palæont., II, 38-39 (1892).

Nicola River, British Columbia.

**LIMONIUS Eschscholtz.**

A north temperate genus rich in species, a good share of which are found in North America. Three fossil species have been found in the earlier Tertiaries of Oeningen, the Rhine British Columbia, and in amber.

**LIMONIUS IMPUNCTUS.**

*Limonius impunctus* Scudd., Contr. Canad. Palæont., II, 37-38, pl. 2, fig. 3 (1892).

Similkameen River, British Columbia.

**CORYMBITES Latreille.**

A dominant cosmopolitan genus, richly supplied with species in North America. Two fossil species have been found in the earlier Tertiaries of Wyoming and Baden, and a species, probably identical with one now living, in the Pleistocene of Massachusetts.

**CORYMBITES VELATUS.**

Pl. x, fig. 7.

*Corymbites velatus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 81 (1876); Tert. Ins. N. A., 496 (1890).

Green River, Wyoming.

**CORYMBITES ÆTHIOPS Herbst.**

Pl. x, fig. 11.

A prothorax, apparently belonging to this existing species, found by Prof. B. K. Emerson in the Pleistocene of Fort River, is described by me in a section forming part of Chapter XXI of Monograph XXIX of the United States Geological Survey, by Professor Emerson.

Hadley, Massachusetts.

ELATERIDÆ.

OXYGONUS LeConte.

A North American genus with only a couple of species. A single fossil has been found in Utah.

OXYGONUS **MORTUUS**.

*Oxygonus mortuus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 81 (1876); Tert. Ins. N. A., 496, pl. 5, figs. 110, 111 (1890).

White River, Utah.

ADOCETUS (*ἀδόκητος*) gen. nov.

Head very large indeed, together with the large eyes fully as broad as the front of the pronotum, the front broad, truncate or feebly rounded; antennæ obscurely preserved, but apparently much as in *Scaptolenus*, but with much less apical enlargement of the joints. Prothorax strongly transverse, nearly twice as broad as long, considerably and rapidly tapering, the front margin about three-fourths the length of the hind margin, gently and uniformly emarginate; hind margin scarcely angulate, sides scarcely arcuate, the outer anterior angles rectangular; both lateral and front borders equally, broadly, and regularly margined, the outer posterior angles rounded and in no way produced. Elytra at base of the breadth of the thorax, regularly tapering by the arcuation of the outer margin, the apex perhaps pointed. Hind coxæ very large, somewhat produced posteriorly next their inner side, the legs large and stout and apparently flattened. Abdomen with six segments, the first five of equal length and truncate, the sixth longer and conical.

The single species referred here has a close resemblance in general outline to a buprestid like *Psiloptera*, but the separation of the first and second ventral segments shows it to be an elaterid, the transverse labrum and the number of ventral segments a cibrionine.

ADOCETUS BUPRESTOIDES sp. nov.

Pl. x, fig. 12.

Surface of head more or less bluntly and rather finely rugulose. Thorax more heavily and more distinctly rugulose, and at the same time sparsely punctate, the puncta more distinct, because not confused by rugæ, on the front margined area; apparently also clothed with very

sparse, very short and fine hairs. Elytra each three and a half times longer than broad, with ten faintly punctate striæ, of which the sixth and seventh (or seventh and eighth) from the suture terminate before the others, at about the base of the apical fifth of the elytra, the others close to or at the tip ; the interspaces are sparsely and irregularly punctate, the equivalent of not more than two series of puncta in each interspace, each of the puncta giving rise to a very short fine hair. Abdomen feebly punctate, the last segment with fine, short, transverse, arcuate incisions.

Length, 22 mm.; breadth, 8 mm.

Fossil, Wyoming, in the bluffs by Twin Creek ; one specimen, Dr. J. S. Newberry. The specimen is in the, museum of Columbia College, New York.

#### ELATERITES Heer.

This generic name was employed by Heer for fossil species of the present family of uncertain position, and has since been used in the same sense.

#### ELATERITES sp.

*Elaterites* sp. Scudd., Contr. Canad. Palæont., II, 40, pl. 3, fig. 5 (1892).

Similkameen River, British Columbia.

#### ELATERIDÆ ? sp.

*Elateridæ* ? sp. Scudd., Rep. Prog. Geol. Surv. Can., 1877-78, 182B (1879); Tert. Ins. N. A., 498, pl. 2, fig. 28 (1890); Contr. Canad. Palæont., II, 40 (1892).

Nicola River, British Columbia.

### BUPRESTIDÆ.

About seventy-five Tertiary species of Buprestidæ have been described, figured, or indicated, which have been referred to sixteen genera, four of them regarded as extinct. With a single exception, none of these species come from the Pleistocene. Besides these, however, a considerable number of species have been referred to the family without even generic reference, from India, New South Wales, and various localities in England, including one in the Pleistocene.

## BUPRESTIS Linné.

A nearly world-wide genus, primarily north temperate, with numerous species, about a dozen and a half of which are North American. Half a dozen fossil species have been described from the Rhenish coal, three from British Columbia, and species have also been indicated at Aix and in amber, besides the Pleistocene of England.

## BUPRESTIS TERTIARIA.

*Buprestis tertiaria* Scudd., Rep. Prog. Geol. Surv. Can., 1877-78, 180-181B (1879); Tert. Ins. N. A., 493-494, pl. 2, fig. 23 (1890); Contr. Canad. Palæont., II, 35-36 (1892).

Nicola River, British Columbia.

## BUPRESTIS SAXIGENA.

*Buprestis saxigena* Scudd., Rep. Prog. Geol. Surv. Can., 1877-78, 181B (1879); Tert. Ins. N. A., 494-495, pl. 2, figs. 24, 25 (1890); Contr. Canad. Palæont., II, 36-37 (1892).

Nicola River, British Columbia.

## BUPRESTIS SEPULTA.

*Buprestis sepulta* Scudd., Rep. Prog. Geol. Surv. Can., 1877-78, 181B (1879); Tert. Ins. N. A., 495, pl. 2, fig. 26 (1890); Contr. Canad. Palæont., II, 37 (1892).

Nicola River, British Columbia.

## BUPRESTITES Heer.

Heer has given this name to fossil Buprestidæ of uncertain position, and it has been used also by Geibel in a similar way. Eleven species have been described from the earlier Tertiaries, all but one from Europe.

## BUPRESTITES HEERI nom. nov.

*Buprestites agriloides* Heer, Flora foss. Grœnl., II, 144, pl. 109, figs. 11, 11b (1883).

This is entirely distinct from the Oeningen species Heer described in 1882 (Verhandl. holl. maatsch. wetensch., XVI, 90, pl. 7, fig. 24) under

the name of *Buprestites agriloides*. He undoubtedly overlooked the fact that he had previously used the specific name. The present species may therefore bear his name.

Haseninsel, Greenland.

#### CHRYSOBOTHRIS Eschscholtz.

A prevailing cosmopolitan genus with numerous North American species. A fossil species has been described from Austria and another from Colorado.

#### CHRYSOBOTHRIS HAYDENI.

Pl. XI, fig. 1.

*Chrysobothris haydeni* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 80 (1876).

A single specimen, rather poorly preserved and obliquely crushed, was obtained by Dr. F. V. Hayden at what was then known as Castello's ranch. While it is unquestionably a buprestid, I place this species in *Chrysobothris* with some hesitancy. The shortness of the broad-tipped elytra, the rotundity of the eyes, and the comparatively slender fore femora separate it from the species of that genus which I have examined. The head is large, full, well rounded; the eyes moderately large, nearly circular. The prothorax is rather short, arched a little, minutely and shallowly punctulate. The elytra reach to the base of the penultimate abdominal segment, and, as exhibited on the stone, are as broad at tip as at base; the apex in any case is broad, broadly rounded, or almost truncate; there is no appearance of punctures, although there seem to be three or four faint equidistant longitudinal ridges. A fragment of one of the wings is seen extending at right angles to the elytra. The legs are slender and the fore femora resemble the others.

Length of insect, 15.75 mm.; of prothorax, 3.75 mm.; of elytra, 10 mm.; width of elytra at tip, 2.6 mm.; length of fore femora, 3.25 mm.; of hind femora, 3.25 mm.; breadth of fore femora, 0.56 mm.; of hind femora, 0.46 mm.

Florissant, Colorado.

## LAMPYRIDÆ.

Twenty-one fossil species of this family have been described or indicated, belonging to nine genera. Two of these genera, one in amber and one in the Tertiaries of New South Wales, are regarded as extinct.

## CHAULIOGNATHUS Hentz.

An American genus, with a moderate number of species. One species has been found fossil in Colorado.

## CHAULIOGNATHUS PRISTINUS.

Pl. XI, fig. 3.

*Chauliognathus pristinus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 81 (1876); in Zittel, Handb. Palæont. (I), II, 769, fig. 1032 (1885).

A single specimen, with its reverse, was obtained by Mr. T. L. Mead at what was then known as Castello's ranch. It is very fairly preserved and presents a dorsal view of the insect, with the left elytron and wing partially expanded. The antennæ are about as long as the elytra, and apparently consist of twelve joints, most or all of which are similar to one another, cylindrical, about three times as long as broad, and scarcely smaller at the proximal than at the distal extremity. The prothorax is small, scarcely larger than the head, the anterior border rounded. The elytra are slender, square at the shoulder, each independently rounded and slightly tapering at the apex, not reaching the tip of the abdomen. The abdomen, which tapers posteriorly, appears, however, to be unnaturally produced; more than four segments can be counted upon the unexpanded elytron. The wings are only as long as the elytra. The legs are slender, but the tarsi are indistinguishable.

But for the brevity of the elytra there would be little doubt that this insect should be referred to *Chauliognathus*. It has the general appearance, also, of a *Malthinus* or a *Malthodes*, but the wings are not exposed when the elytra are closed, and the insect is much larger than the living species of this genera. Heer has described, from Oeningen and Radoboj, several species of this family, but none so large as this, unless it be his *Telephorus germari*. Our species has much the general appearance of his

*Lytta æsculapii*, but the structure of the antennæ forbids its reference to that genus.

Length of body, as extended, 13 mm.; of head, 1.5 mm.; breadth of head, 1.8 mm.; length of antennæ, 6 mm.; of elytra, 6 mm.; breadth of elytra in middle, 1.2 mm.; of abdomen, 3.5 mm.; length of hind femora, 2.6 mm.; breadth of same, 0.5 mm.; length of hind tibiæ, 3 mm.; breadth of same, 0.23 mm.

Florissant, Colorado.

### PTINIDÆ.

Twenty fossil species of Ptinidæ have been found, belonging to ten genera, one of them regarded as extinct. On the other hand, Förster has found in the Oligocene of Alsatia what he regards as an existing species of *Dorcatoma*. No Pleistocene species are known.

### SITODREPA Thomson.

A north temperate genus, with a single North American species. A fossil species occurs in Wyoming.

#### SITODREPA DEFUNCTA.

*Sitodrepa defuncta* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 82 (1876); Tert. Ins. N. A., 493 (1890).

Green River, Wyoming.

### ANOBIUM Fabricius.

A widespread genus, mainly north temperate, of which a couple of species occur in North America. Half a dozen species are known or have been recognized, two in Europe at Oeningen and the Isle of Wight, the others in Wyoming and Colorado, two of those from Wyoming doubtfully.

#### ANOBIUM ? OVALE.

*Anobium ? ovale* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 762-763 (1878); Tert. Ins. N. A., 491-492, pl. 8, fig. 1 (1890).

Green River, Wyoming.

## ANOBIUM ? DECEPTUM.

*Anobium deceptum* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 763 (1878); Tert. Ins. N. A., 492, pl. 8, fig. 18 (1890).

Green River, Wyoming.

## ANOBIUM LIGNITUM.

*Anobium lignitum* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 763 (1878); Tert. Ins. N. A., 492-493, pl. 8, fig. 24 (1890).

Green River, Wyoming.

## ANOBIUM DURESCENS.

*Anobium durescens* Scudd., Tert. rhynch. Col. U. S., pl. 1, fig. 19 (1892).

Head, as usual in *Anobium*, bent downward, the front poorly preserved in the single specimen, the surface rather coarsely and rather distantly punctate, the eyes moderately large, circular, lying next the edge of the emarginate prothorax. Prothorax bullate and hood-like, the front border with strongly emarginate sides, the surface punctate exactly as that of the head. Elytra very regularly arched, elongate, with heavily and sharply impressed, deeply punctured striæ, the puncta longitudinal and usually separated by about half the length of one of them.

Length, 3.5 mm.; breadth, 1.25 mm.

Florissant, Colorado; one specimen, No. 13627.

## SCARABÆIDÆ.

Seventy-seven species of fossil Scarabæidæ have been discovered, of which sixteen are from the Pleistocene, and of the latter, half are regarded as identical with living forms. Thirty-two genera are represented, seven of them in the Pleistocene, though only two of them in the Pleistocene only. Three genera from the older Tertiaries are extinct types.

## CHÆRIDIIUM Lepelletier.

An American genus with only two species in the United States, but many in the Tropics. A single fossil species is known from the Pleistocene of Pennsylvania.

## CHÆRIDIDIUM ? EBENINUM.

*Chærididium ? ebeninum* Horn, Trans. Am. Ent. Soc., V, 244-245 (1876); Scudd., Tert. Ins. N. A., 490-491, pl. 1, figs. 18, 22 (1890).

Bone caves of Pennsylvania.

## PHANÆUS MacLeay.

An American genus tolerably rich in species, of which only about half a dozen occur in the United States. A single fossil has been found in the Pennsylvania Pleistocene.

## PHANÆUS ANTIQUUS.

*Phanæus antiquus* Horn, Trans. Am. Ent. Soc., V, 245 (1876); Scudd., Tert. Ins. N. A., 489-490, pl. 1, figs. 12-14 (1890).

Bone caves of Pennsylvania.

## ÆGIALIA Latreille.

A north temperate genus with rather few species, most of them found in North America. A single fossil species occurs in Wyoming.

## ÆGIALIA RUPTA.

*Ægialia rupta* Scudd., Tert. Ins. N. A., 489, pl. 8, fig. 19 (1890).

Green River, Wyoming.

## ATÆNIUS Harold.

An American genus with numerous species, of which about a dozen and a half are found in the United States. A single fossil occurs in Colorado.

## ATÆNIUS PATESCENS.

Pl. XI, figs. 5, 8, 10.

*Atænius patescens* Scudd., Tert. rhynch. Col. U. S., pl. 1, fig. 14 (1892).

Body slender, equal, slightly more than twice as long as broad. Head finely punctate and slightly plicate, slightly longer than in *A. abditus* Hald. Thorax of the same shape as in that species, distinctly and rather closely punctate, showing on the sides some tendency to a transverse arrangement.

Elytra with distinct and deep impunctured striæ. Outer hind angle of hind tibiæ spiniform.

Length, 4.2 mm.; breadth, 2 mm.

Florissant, Colorado; seven specimens, Nos. 167, 2312, 3046, 4702, 5024, 8147, 11258.

#### APHODIUS Illiger.

A dominant cosmopolitan type with numerous North American species. Many fossil species have been recorded: In the Pleistocene, one in Pennsylvania, and six in Galicia, of which two are regarded as identical with living forms; in the earlier Tertiaries, five species in Baden and Germany and on the Rhine; besides, according to an old reference of Robert, an existing species (probably an artifact) in amber.

#### APHODIUS PRECURSOR.

*Aphodius precursor* Horn, Trans. Am. Ent. Soc., V, 245 (1876); Scudd., Tert. Ins. N. A., 488-489, pl. 1, fig. 11 (1890).

Bone caves of Pennsylvania.

#### TROX Fabricius.

A cosmopolitan group, with abundant representation in North America. The following species from British Columbia is the only known fossil form.

#### TROX OUSTALETI.

*Trox oustaleti* Scudd., Rep. Prog. Geol. Surv. Can., 1877-78, 179-180B (1879); Tert. Ins. N. A., 487, pl. 2, fig. 22 (1890); Contr. Canad. Palæont., II, 35 (1892).

Nine-mile Creek, British Columbia.

### CERAMBYCIDÆ.

Forty-four species of this family have been found fossil, referred to thirty genera, of which six are extinct. Two only of the species are Pleistocene. The only described American species belongs to an extinct genus.

#### PAROLAMIA Scudder.

*Parolamia* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 529-530 (1878).

Closely allied to *Lamia*, but differing from it in the brevity of the head and the structure of the antennæ. Body heavy, moderately elon-

gated. The head is less than half as long as the prothorax, with less prominent and more nearly approximate antennal tubercles, as compared with *Lamia*. Antennæ moderately slender, half as long again as the body, composed of eleven joints, each cylindrical, scarcely enlarged at the distal extremity; the basal joint is short and stout, its length less than half the width of the head, twice as long as broad, tapering apically almost as much as at base; the second joint small, of equal diameter with the succeeding, and broader than long; the remaining joints almost imperceptibly decreasing in length, each equal in width until close to its tip, when it expands very slightly, the terminal joint a little shorter than the penultimate. Prothorax transverse, with a not very large spine on either side; scutellum larger than in *Lamia*. Elytra not connate, together more than half as broad again as the base of the pronotum, but with rounded humeral angles, not in the least produced, and with no basal tubercles; they are nearly parallel in their basal half, but beyond taper regularly though but slightly, the tip rounded, but not so declivent exteriorly as in *Lamia*. Last segment of the abdomen transverse, but longer than in *Lamia*, broadly and regularly rounded, with no excision of the apex.

This insect is interesting from its belonging to a group not now represented on this continent, the true *Lamioides*, which are found exclusively in Europe and Africa and have their home in the Mediterranean region. Our nearest living allies are the species of *Monohammus*. In its form and the surface sculpture it most recalls the genus *Lamia* proper, but differs from it as well as from the neighboring genera in important particulars, which will perhaps be increased in number when other specimens are found which will permit us to know the peculiarities of the structure of the legs and the sternal surface.

PAROLAMIA RUDIS.

Pl. XI, fig. 4.

*Parolamia rudis* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 530 (1878).

The elytra are parted and thrust forward upon the prothorax, concealing the outer posterior portions of the latter, but this permits the abdomen to be seen, and all other parts which could be seen on a dorsal view are present excepting the legs. The head is nearly smooth, or appears to be

slightly scabrous; the antennæ are nearly smooth, the basal joint mesially carinate above, the last joint bluntly pointed. Prothorax subquadrate, a little transverse, the extent of the lateral spines concealed, the surface rather coarsely and pretty uniformly scabrous. Elytra coarsely granulate at the base, the granulations becoming gradually fainter until they disappear, the apical quarter being free, although the surface is not uniform; outer and inner edges minutely marginate. A fragment of one of the wings remains, showing that the insect was not apterous.

Length of body, 22.5 mm.; of head, 2.5 mm.; of thorax, 4 mm.; of abdomen, 16 mm.; of antennæ, 26.5 mm.; its first joint, 2.5 mm.; third, 4.5 mm.; penultimate, 4 mm.; last, 3.25 mm.; breadth of first joint, 1.25 mm.; third, at base, 0.7 mm.; at tip, 0.9 mm.; of penultimate, at base, 0.5 mm.; at tip, 0.6 mm.; width of prothorax exclusive of spine, 6 mm.; width of elytron, at base, 4.5 mm.; in middle, 4.25 mm.; at one millimeter from tip, 2.5 mm.; length of elytron, 14 mm.

Florissant, Colorado; one specimen, No. 7807.

### CHRYSOMELIDÆ.

Fifty-one species of this family have been found fossil, twenty-nine in the older Tertiaries, twenty-two in the Pleistocene. The latter belong to four genera only, and fourteen of the species are regarded as identical with species now living. The older fossils represent nine genera, three of them common to both continents; one of the genera, found in America, is regarded as an extinct type.

#### DONACIA Fabricius.

A prevailing north temperate genus with numerous species in North America. Many fossil species have been recorded, especially from the Pleistocene, which in Europe has furnished three extinct species from Savoy, Italy, and Galicia, and thirteen existing species in numerous localities in Italy, France, Switzerland, Holland, Bavaria, and other parts of Germany; besides which there are three extinct species in America found in Canada and Massachusetts. Five species have been found in the older Tertiaries of Baden, Silesia, Alsatia, and Spitzbergen, and the genus has been recognized in amber.

## DONACIA STIRIA.

*Donacia stiria* Scudd., Tert. Ins. N. A., 486, pl. 1, fig. 28 (1890); Contr. Canad. Palæont., II, 34 (1892).

Clay beds of Scarboro, Ontario.

## DONACIA POMPATICA.

*Donacia pompatica* Scudd., Tert. Ins. N. A., 486-487, pl. 1, figs. 33, 34 (1890); Contr. Canad. Palæont., II, 34 (1892).

Clay beds of Scarboro, Ontario.

## DONACIA ELONGATULA sp. nov.

Pl. XI, fig. 2.

This species I describe in a section on the Pleistocene beetles of Fort River, forming part of Monograph XXIX of the United States Geological Survey, by Prof. B. K. Emerson.

Hadley, Massachusetts.

## SAXINIS Lacordaire.

An American genus with few species, of which three are found in the United States. A single species has been found in the Pleistocene of Massachusetts.

## SAXINIS REGULARIS sp. nov.

Pl. XI, figs. 7, 9.

This species is described in the section just referred to on the Pleistocene Coleoptera of Fort River in Monograph XXIX of the United States Geological Survey, by Prof. B. K. Emerson.

Hadley, Massachusetts.

## CRYPTOCEPHALUS Geoffroy.

A decidedly dominant cosmopolitan genus, with numerous species in North America. Single fossil species of this genus have been found in Wyoming, on the Rhine, and in amber.

## CRYPTOCEPHALUS VETUSTUS.

*Cryptocephalus vetustus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., IV, 764 (1878);  
Tert. Ins. N. A., 485-486, pl. 7, figs. 29, 37 (1890).

Green River, Wyoming.

## CRYPTOCEPHALITES Scudder.

This genus was founded by me for the fossil species here recorded, which is a peculiar form of the tribe Cryptocephalini.

## CRYPTOCEPHALITES PUNCTATUS.

*Cryptocephalites punctatus* Scudd., Contr. Canad. Palæont., II, 33, pl. 2, fig. 4 (1892).

Similkameen River, British Columbia.

## COLASPIS Fabricius.

This is an American and Polynesian genus, with many species, less than half a dozen of which inhabit the United States. A single fossil species is known from Colorado.

## COLASPIS LUTI.

*Colaspis luti* Scudd., Tert. rhynch. Col. U. S., pl. 1, fig. 4 (1892).

Head very finely rugose, with a large subcircular eye. Prothorax very delicately and rather densely punctate, tapering but little, and apparently much narrower at base than the elytra. Elytra with equidistant punctured striæ, the punctures rather large, rather closely crowded, rather deep and circular. Under surface of thorax feebly rugose, of abdomen smooth.

Length, 5 mm.; breadth, 2 mm.

Florissant, Colorado; one specimen, No. 7670.

## CHRYSOMELA Linné.

A very dominant cosmopolitan genus, with numerous North American species. A single fossil American species occurs in Colorado, but in the older Tertiaries of Europe there are at least nine species, found at Aix, at Oeningen, and in amber; besides which two species, one of them extinct, occur in the Pleistocene of Galicia.

## CHRYSOMELA VESPERALIS.

*Chrysomela vesperalis* Scudd., Tert. rhynch. Col. U. S., pl. 2, fig. 27 (1892).

A species is indicated of about the size of *C. elegans* Oliv., and is preserved so as to show a dorsal view. The head is moderately large, about two-thirds the width of the thorax, and is coarsely, distantly, and very feebly punctate; the antennæ are nearly a third longer than the head and thorax together. The thorax is twice as broad as long, with well-rounded sides, and the surface is punctate like the head, but a little more distinctly. The elytra are nearly twice as broad as the thorax, with well-rounded humeri and longitudinal series of shallow circular punctures, removed from each other in the same row by about their own diameters.

Length, 4.6 mm.; breadth of thorax, 1.4 mm.; of elytra, 2.6 mm.

Florissant, Colorado; one specimen, Nos. 7851 and 10416.

## CHRYSOMELITES Heer.

A name proposed by Heer for obscure fossil remains of uncertain position, closely allied to *Chrysomela*. Four species have been referred to it by him from the early Tertiaries in the polar regions.

## CHRYSOMELITES ALASKANUS.

*Chrysomelites alaskanus* Heer, Flora foss. Alask., 39, pl. 10, figs. 6, 6b (1869).

English Bay, Alaska.

## CHRYSOMELITES FABRICII.

*Chrysomelites fabricii* Heer, Flora foss. arct., 129, pl. 19, figs. 13, 14 (1868).

Atanekerdluk, North Greenland.

## CHRYSOMELITES LINDHAGENI.

*Chrysomelites lindhageni* Heer, Svensk. vetensk.-akad. handl., VIII, No. 7, 76, pl. 16, figs. 23a-d (1870); Flora foss. Grœn., II, 145-146, pl. 109, figs. 7, 7b (1883).

Ober-Atanekerdluk, North Greenland. This species is also recorded from Spitzbergen.

## GALERUCELLA Crotch.

A cosmopolitan genus with numerous species, of which about a dozen occur in the United States. A single fossil species is known from British Columbia and another from Alsatia.

## GALERUCELLA PICEA.

*Gallerucella picea* Scudd., Rep. Prog. Geol. Surv. Can., 1877-78, 182-183B (1879).  
*Galerucella picea* Scudd., Tert. Ins. N. A., 485, pl. 2, fig. 31 (1890); Contr. Canad. Palæont., II, 32-33 (1892).

Nine-mile Creek, British Columbia.

## ORYCTOSCIRTETES Scudder.

*Oryctoscirtetes* Scudd., Bull. U. S. Geol. Surv. Terr., II, 82, 83 (1876).

This genus belongs to the group of Chrysomelidæ, of which *Haltica* Illiger is the best known representative, the members of which are peculiar for their swollen hind thighs, enabling them to spring to great distances. It appears to belong to the group of *Ædionychites*, in which the last tarsal joint has a more or less prominent bulbous expansion on the hind legs; but it differs from any of the genera described by Chapuis in the nature of this expansion, as well as in other tarsal peculiarities. The basal joint of these hind tarsi is moderately long and cylindrical, scarcely larger at the distal than at the proximal extremity; the second and third joints are subequal, the latter slightly the larger, together as long as the basal joint, moderately lobate, the lobes pointed; while the apical joint is nearly as long as all the other joints combined, enlarges gradually from base to apex, so as to be fully two or three times as large at the distal as at the proximal extremity, and bears a pair of exceedingly long and slender, apparently simple, very slightly curved claws, nearly half as long as the apical joint itself. In other respects it closely resembles the genus *Ædionychis* Latr.

It is represented by a single species in the Oligocene of Colorado.

## ORYCTOSCIRTETES PROTOGÆUM.

Pl. XI, fig. 11.

*Oryctoscirtetes protogæum* Scudd., Bull. U. S. Geol. Surv. Terr., II, 83 (1876).

A single specimen, pretty well preserved, and showing the dorsal surface, was obtained by Dr. F. V. Hayden at what was formerly known as Castello's ranch. The head is pretty large, nearly as broad as the prothorax, the eyes moderately large, apparently circular, with large facets, their average diameter being nearly 0.02 mm. The prothorax is broad, with

well-rounded, somewhat convex sides and front lateral angles, the anterior margin considerably concave; the posterior lateral angles are rectangular and there is apparently a median furrow on the posterior half, although the appearance may be due to crushing. The surface of the prothorax, and also of the elytra, is very delicately granulate; the elytra are also furnished very indistinctly with several (five or six?) longitudinal ridges, straight and equidistant. The fore femora are swollen as well as the hind pair, but the middle femora are concealed. Both middle and hind tarsi have the characters mentioned in the description of the genus and are fully four-fifths as long as their tibiæ.

Length, 5 mm.; breadth, 2.25 mm.; breadth of head, 1.25 mm.; of prothorax, 1.8 mm.; length of prothorax, 0.92 mm.; of elytra, 3 mm.; of middle tibiæ, 1.34 mm.; of middle tarsi, 1.12 mm.; of middle claws, 0.18 mm.; of hind femora, 1.32 mm.; of hind tibiæ, 1.4 mm.; width of hind femora, 0.48 mm.; of hind tibiæ, 0.18 mm.; length of hind tarsi, 1.14 mm.; of first joint, 0.32 mm.; of fourth joint (excluding claws), 0.48 mm.; of claws, 0.22 mm.; breadth of fourth joint at tip, 0.1 mm.

Florissant, Colorado; one specimen, No. 14689.

#### MICRORHOPALA Baly.

A North American genus with about a dozen species. A single fossil species is indicated from British Columbia.

#### MICRORHOPALA sp.

*Microrhopala* sp. Chagn., Nat. Canad., XXII, 109 (1895).

Vancouver Island, British Columbia.

### BRUCHIDÆ.

Ten species of this family have been found in the early Tertiaries, belonging to four genera.

#### SPERMOPHAGUS Schönherr.

A cosmopolitan genus with a moderate number of species, of which a single one is found in the United States. One fossil species occurs in Colorado.

## SPERMOPHAGUS VIVIFICATUS.

Pl. XI, fig. 6.

*Spermophagus vivificatus* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 82 (1876);  
in Zittel, Handb. Palæont. (I), II, 792, fig. 1019 (1885).

Two specimens, reverses, but one showing more plainly the upper, the other the under surface, were found by Mr. T. L. Mead. They are in an unusually good state of preservation. But very little of the small head can be seen, either upon the upper or the under surface; the portion exposed is delicately punctured, the punctures being closely crowded, and rather less than 0.01 mm. in diameter. The antennæ show nine joints, which are together longer than the breadth of the prothorax; the first and second joints are ovate, the remainder more or less obconical; the first four are of nearly equal length, and of about equal length and breadth; beyond, the joints are subequal among themselves, but much longer than broad. The prothorax is crushed and although not displaced, it is difficult to determine its exact form, or whether or not it wholly concealed the head from above. It is more coarsely punctate than the head, the punctures being 0.025 mm. in diameter; the posterior border is broadly angulate, the angle rounded, the outer margin more or less rounded, and the whole prothorax broadest posteriorly. The elytra are very ample, equal, each independently very broadly and regularly rounded at the apex, which does not reach the tip of the abdomen; they are very distinctly but narrowly punctato-striate, in nine straight, equidistant, complete rows, besides an auxiliary row next the outer margin for a portion of the distance; near the tip of the elytron the outer and inner rows curve toward the middle of the apex and all fade out before reaching it; the entire border of the elytra is marginate. The femora, especially the hind pair, are stout; the hind tibiæ are considerably shorter than the femora and there are, apparently, on one side, faint indications of the two long tibial spurs, with which the apex of the hind tibiæ is armed in this genus. The abdomen is exceedingly short and broad, the apical segment protruding a little beyond the others and well rounded.

Length of body, 5.25 mm.; breadth of prothorax, 2 mm.; of body at middle of elytra, 3.25 mm.; length of antennæ, 2.2 mm.; of elytra, 3.75 mm.; breadth of same, 1.35 mm.; length of middle femora, 1.05 mm.; breadth of same, 0.28 mm.; length of hind femora, 1.56 mm.; breadth of

same, 0.48 mm.; length of hind tibiæ, 1.02 mm.; distance apart of elytral striæ, 0.265 mm.

Florissant, Colorado.

### BRUCHUS Geoffroy.

A dominant cosmopolitan genus, with abundant representation in North America. Seven fossil species have been recorded from the early Tertiaries of amber, Rott, Oeningen, Alsatia, and Utah. One of the two species found in the Oligocene of Alsatia is regarded by Förster as identical with a living form.

#### BRUCHUS ANILIS.

*Bruchus anilis* Scudd., Bull. U. S. Geol. Geogr. Surv. Terr., II, 82 (1876); Tert. Ins. N. A., 484, pl. 5, fig. 125 (1890).

White River, Utah.

## TENEBRIONIDÆ.

Twenty species of this family have been found fossil, referred to eleven genera, one of which is regarded as extinct. Only two of these species occur in the Pleistocene, one in America, the other in Europe, belonging to different genera; the European species is regarded as identical with a living form. Besides these, undetermined genera have been found in various localities.

#### TENEBRIO Linné.

A cosmopolitan genus with relatively few species, four of which occur in the United States. Two fossil species are found in the brown coal of the Rhine, one in the Tertiaries of British Columbia, and one in the Canadian Pleistocene.

#### TENEBRIO PRIMIGENTUS.

*Tenebrio primigenius* Scudd., Rep. Prog. Geol. Surv. Can., 1877-78, 183B (1879); Tert. Ins. N. A., 483-484, pl. 2, fig. 32 (1890); Contr. Canad. Palæont., II, 31 (1892).

Nine-mile Creek, British Columbia.

## TENEBRIO CALCULENSIS.

*Tenebrio calculensis* Scudd., Contr. Canad. Palæont., II, 31-32, pl. 3, figs. 1, 6 (1892).

Greene's Creek, Ottawa River, Canada.

## EPHALUS LeConte.

A cosmopolitan genus with few species, of which one occurs in the United States. A single fossil has been found in Colorado, probably belonging here.

## EPHALUS? ADUMBRATUS.

*Ephalus? adumbratus* Scudd., Tert. rhynch. Col. U. S., pl. 1, fig. 3 (1892).

Head large, apparently almost as broad as the prothorax, but all the specimens give a side view only, the surface uniformly granulose; eyes moderately large, nearly circular, but a little transverse; antennæ rather coarse, especially the apical half, where the joints are nearly twice as long as broad, the whole hardly reaching back to the elytra. Thorax granulose, exactly like the head, both anterior and posterior margins straight and truncate in most of their course, a distinct lateral plica or carina, the whole much broader than long. Elytra with well-rounded humeral angle and feebly punctured striæ. Legs, especially tibiæ, slender, the spurs small, the anterior pair broader, with prolonged outer angle.

Length, 4.6 mm.; breadth, 2 mm.

I have placed this species in *Ephalus* with some doubt, but it seems to belong in the *Opatrini*, and I find nothing nearer in point of structure.

Florissant, Colorado; three specimens, Nos. 6506, 7646, 14247.

## HELOPS Fabricius.

A widespread dominant genus, with numerous American species. Four fossil species have been found in the older European Tertiaries, and one of these is also recorded by Heer from Greenland.

## HELOPS WETTERAVICUS.

*Helops wetteravicus* Heyd.-Heyd., Palæontogr., XIV, 33, pl. 9, fig. 18 (1865); Heer, Flora foss. Grœnl., II, 145, pl. 109, figs. 8, 8bc (1883).

Umivik, Greenland. Originally described from Salzhausen, Germany.

## CISTELIDÆ.

Ten species of this family have been found fossil, belonging to five genera, of which one is regarded as extinct. Only one of these species has been found in the Pleistocene, and is regarded as identical with a living form.

## CISTELITES Heer.

A name proposed by Heer for fossil Cistelidæ of uncertain position, of which he described four, two from Greenland, the others from Baden and from Sachelin in eastern Asia. E. Geinitz has used the same generic term for species from the Lias of Dobbertin.

## CISTELITES MINOR.

*Cistelites minor* Heer, Flora foss. arct., III, 25, pl. 5, fig. 13 (1874); Flora foss. Grœnl., II, 145, pl. 109, fig. 6 (1883).

Puillasok, Aumarutigsat, Greenland.

## CISTELITES PUNCTULATUS.

*Cistelites punctulatus* Heer, Flora foss. arct., II, 484-485, pl. 56, figs. 14, 14bc (1870); Flora foss. arct., III, 25, pl. 5, fig. 12 (1874); Flora foss. Grœnl., II, 145 (1883).

Puillasok, Atanekerdruk, Greenland.

## MELOIDÆ.

Thirteen species of Meloidæ, of seven genera, have been indicated from the lower Tertiaries, but only about half of them have been described.

## GNATHIUM Kirby.

An American genus with half a dozen species, all but one found in the United States. A single species has been found fossil in Colorado.

## GNATHIUM ÆTATIS.

*Gnathium ætatis* Scudd., Tert. rhynch. Col. U. S., pl. 2, fig. 10 (1892).

Head smooth or with barely perceptible rugæ, prolonged, the eyes oval and nearly longitudinal. Prothorax remarkably short, apparently broader than long, longer above than below, with very faint transverse

rugæ. Body of the single specimen preserved on a side view so that it is impossible to say how much broader the elytra are at their base than the prothorax, but they have the appearance of being somewhat broader; there are faint signs on them of an exceedingly shallow, not very dense, and uniform punctuation, and, in places, of short hairs arising from the puncta. Legs very slender and constructed as in *G. minimum* Say.

Length, 6 mm.; breadth, 2 mm.

The form of the prothorax is very unlike *Gnathium*, but I find no other genus to which it is so nearly allied at all other points.

Florissant, Colorado; one specimen, No. 7493.

### RHIPIPHORIDÆ.

Only four fossil species of this family are known, belonging to three genera, all but one of them found in the Old World.

#### RHIPIPHORUS Fabricius.

A north temperate genus with relatively few species, most of them found in North America. A single fossil has been described from Colorado and the genus has been recognized in amber.

#### RHIPIPHORUS GEIKIEI.

*Rhipiphorus geikiei* Scudd., Tert. Ins. N. A., 482-483, pl. 27, fig. 1 (1890).

Florissant, Colorado.

# PLATES.

PLATE I.

## PLATE I.

All the drawings are by J. Henry Blake, excepting fig. 5, which is by S. H. Scudder. The specimens drawn come from Florissant, Colorado, unless otherwise specified. Numbers in parentheses are those affixed to the original specimens; fractions in parentheses indicate degree of enlargement of the figures shown in the plate.

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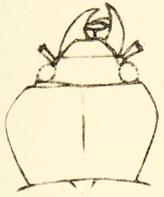
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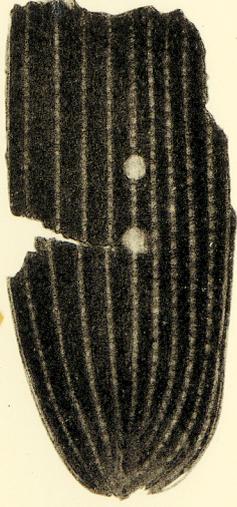
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CARABIDÆ

PLATE II

## PLATE II.

All the drawings are by J. Henry Blake. Unless otherwise specified the specimens drawn are from Florissant, Colorado.

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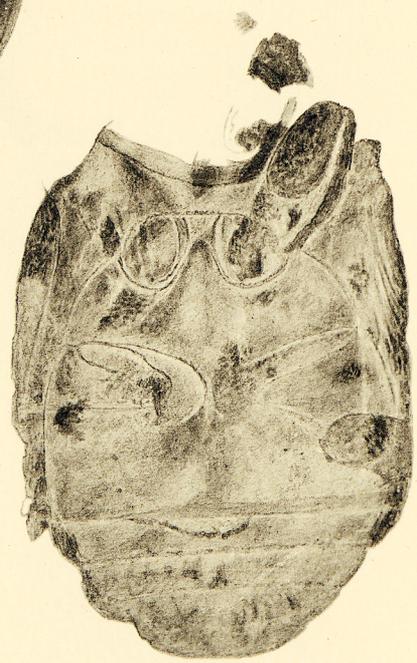
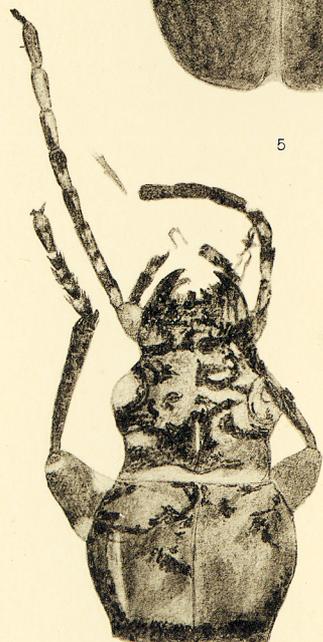
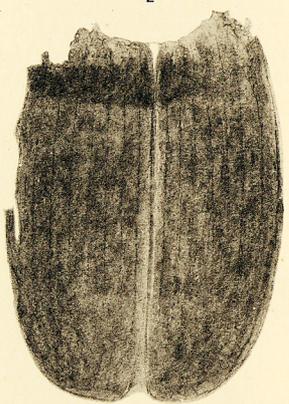
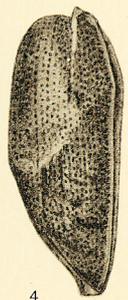
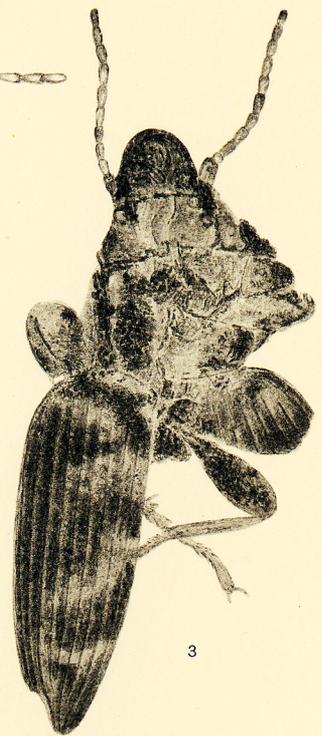
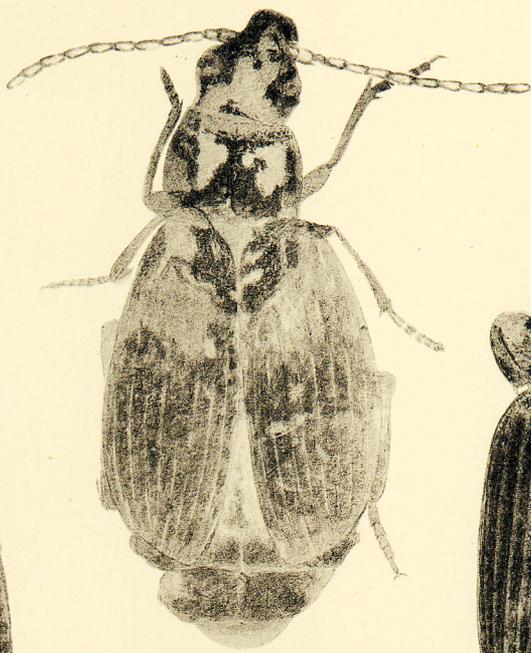
CARABIDÆ, ESPECIALLY SPECIES OF AMARA

PLATE III.

### PLATE III.

All the drawings are by J. Henry Blake. Unless otherwise specified all the specimens drawn come from Florissant, Colorado.

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CARABIDÆ

PLATE IV.

## P L A T E I V.

All the figures are by J. Henry Blake. Unless otherwise specified all the specimens drawn come from Florissant, Colorado.

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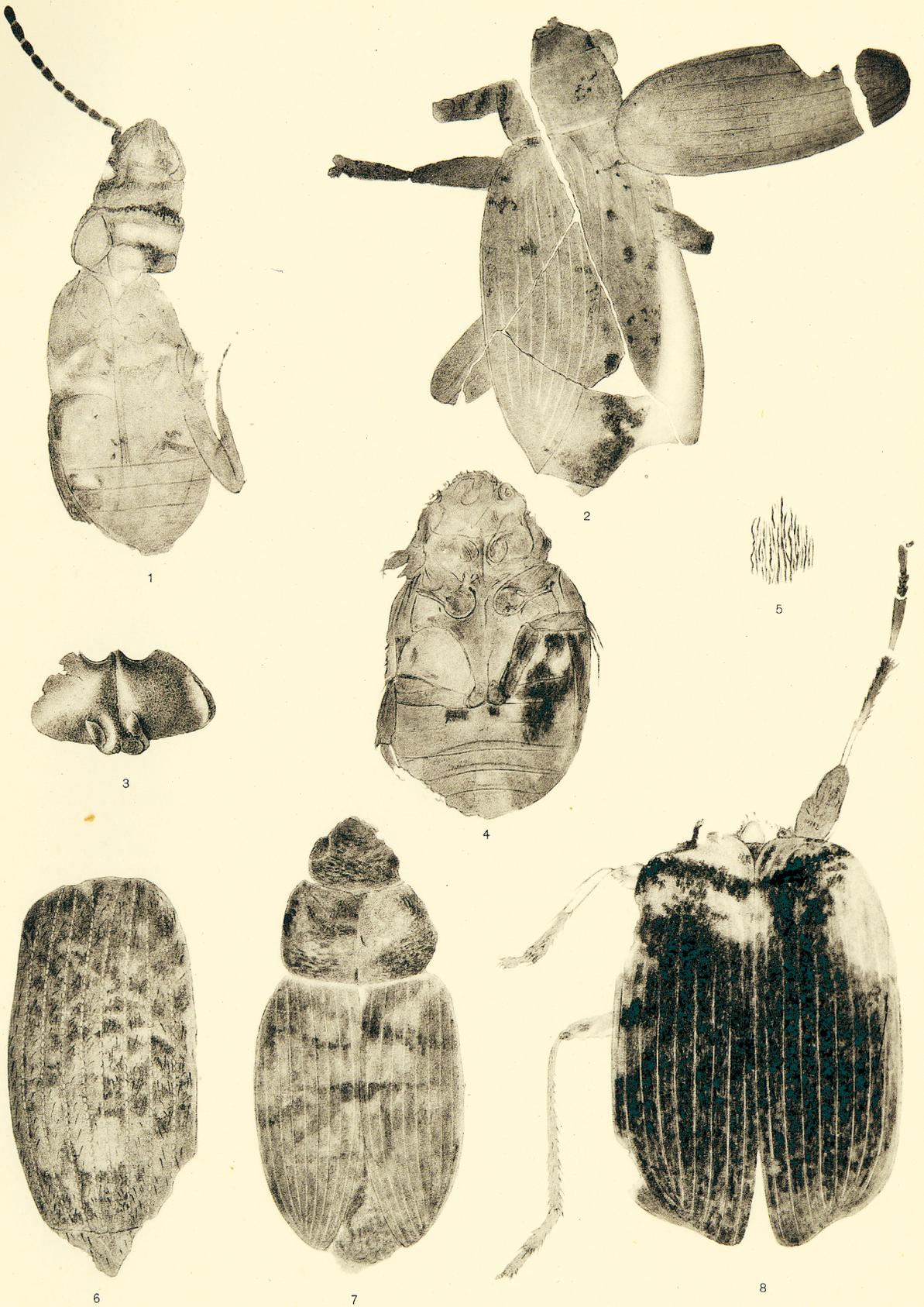


PLATE V.

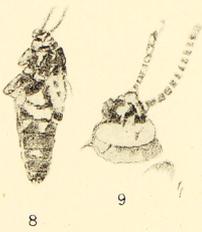
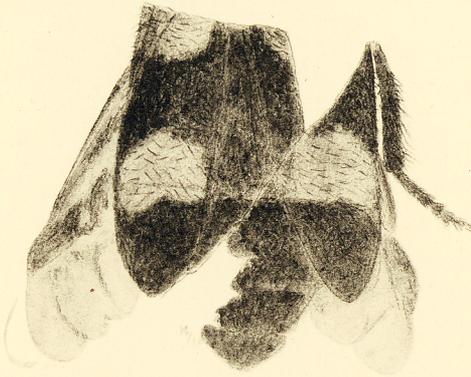
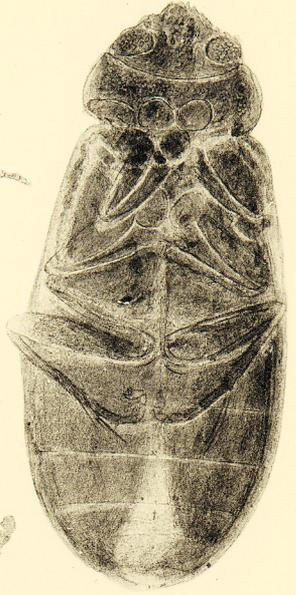
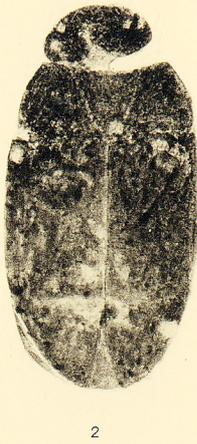
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## PLATE V.

All the drawings are by J. Henry Blake. The specimens drawn all come from Florissant, Colorado.

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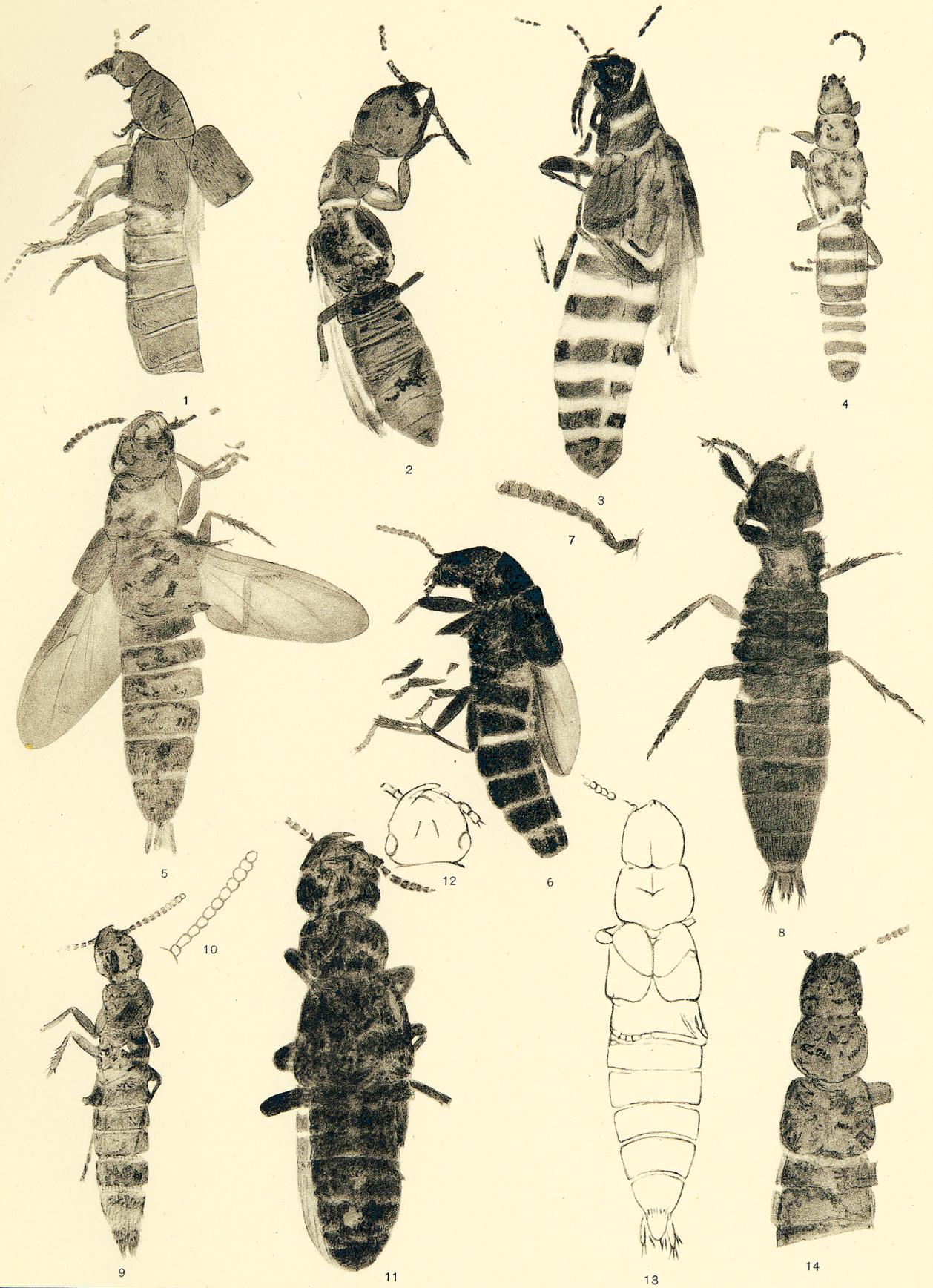
HYDROPHILIDÆ, SILPHIDÆ, STAPHYLINIDÆ

PLATE VI.

## PLATE VI.

All the drawings are by J. Henry Blake, and all the specimens drawn are from Florissant, Colorado.

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STAPHYLINIDÆ

PLATE VII.

## PLATE VII.

All the drawings are by J. Henry Blake, and all the specimens drawn come from Florissant, Colorado.

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STAPHYLINIDÆ

PLATE VIII.

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STAPHYLINIDÆ

PLATE IX.

## PLATE IX.

All the drawings are by J. Henry Blake, and all the specimens drawn come from Florissant, Colorado.

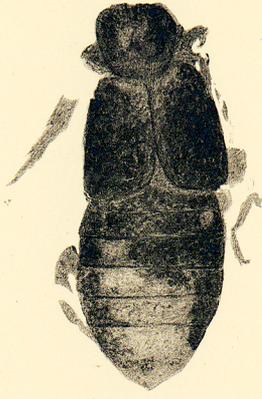
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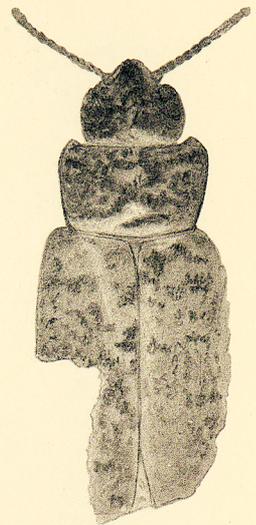
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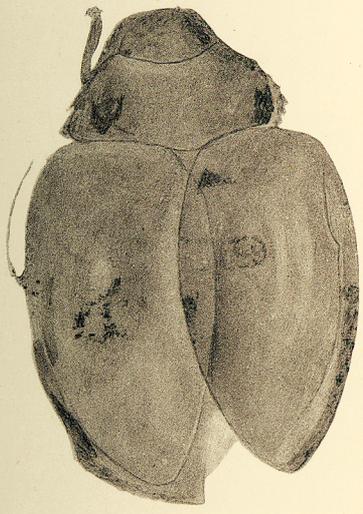
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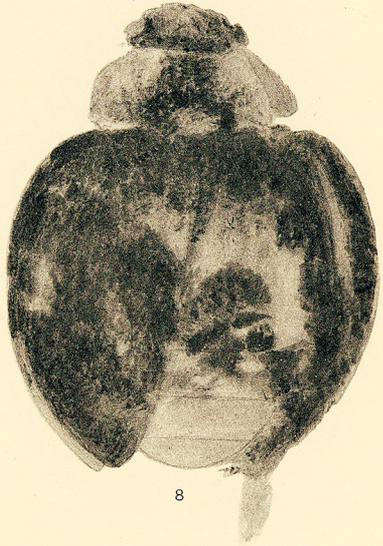
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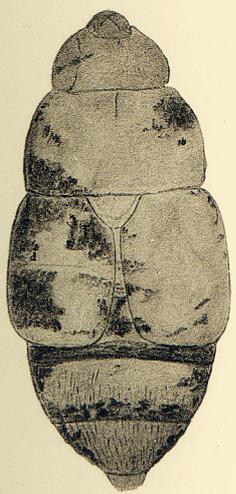
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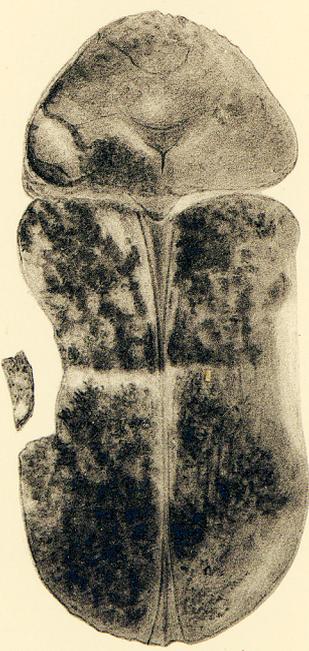
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STAPHYLINIDÆ, COCCINELLIDÆ, CUCUJIDÆ, DERMESTIDÆ, NITIDULIDÆ

PLATE X.

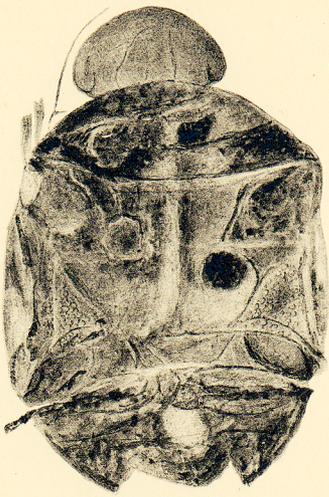
## PLATE X.

All the drawings are by J. Henry Blake. Unless otherwise specified all the specimens drawn come from Florissant, Colorado.

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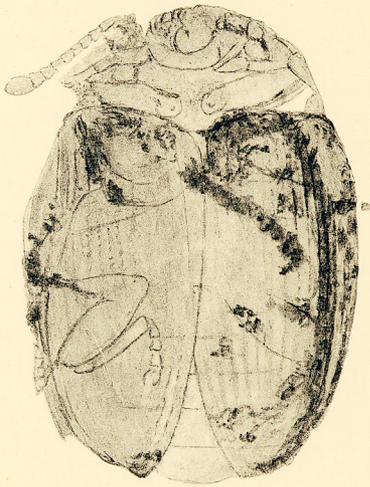
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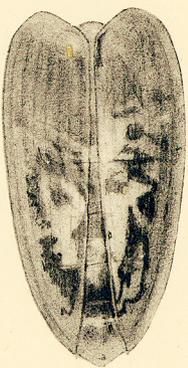
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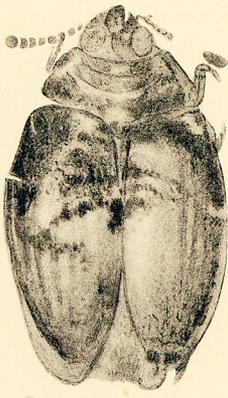
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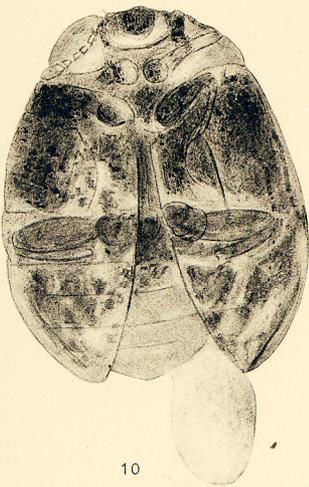
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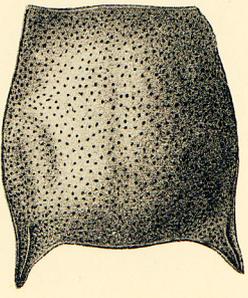
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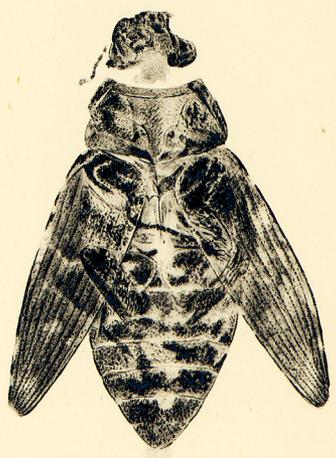
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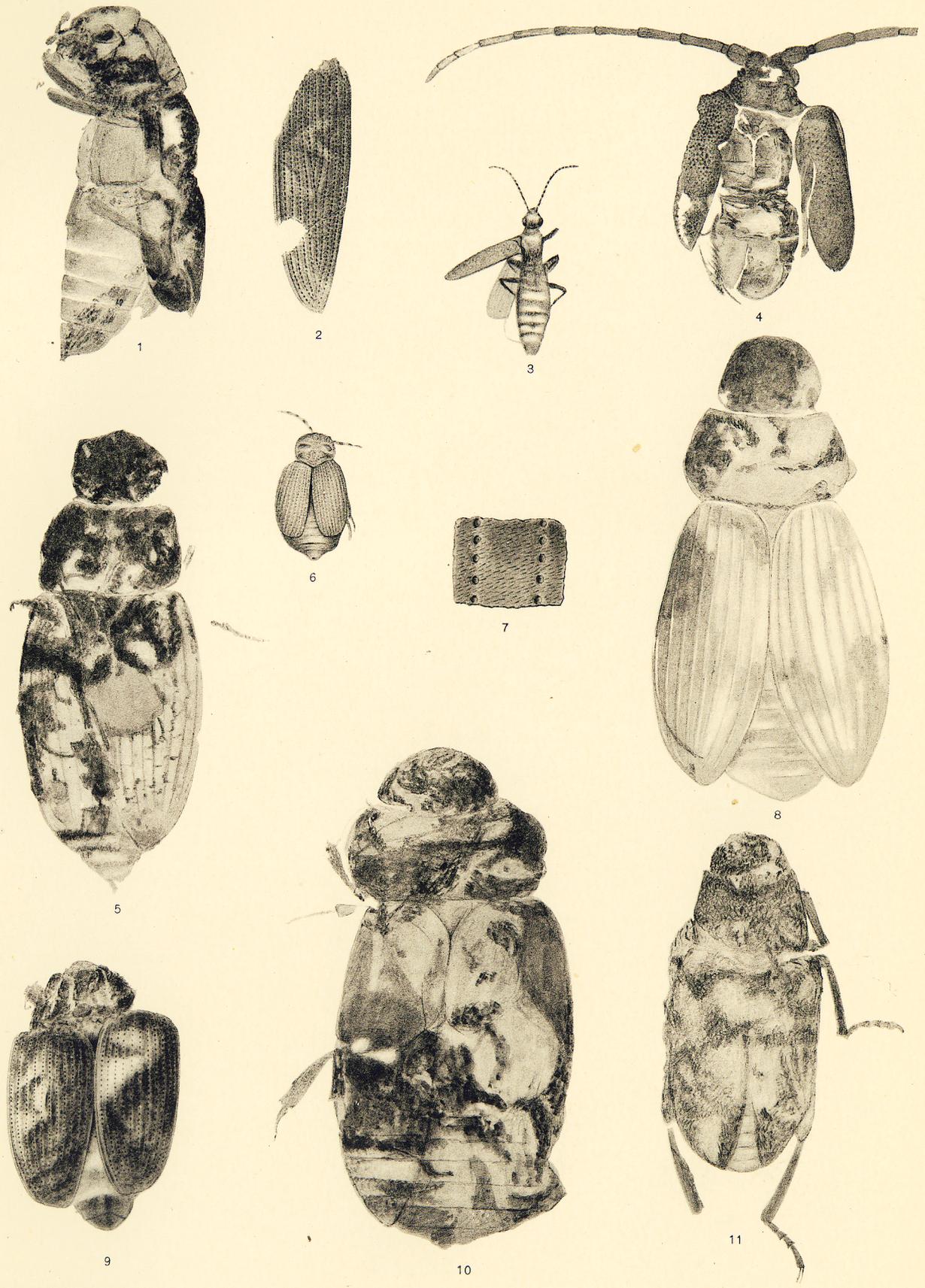
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PLATE XI.

## P L A T E X I .

All the drawings are by J. Henry Blake, excepting figs. 3 and 6, which are by Paul Roetter.  
Unless otherwise specified all the specimens drawn come from Florissant, Colorado.

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BUPRESTIDÆ, LAMPYRIDÆ, SCARABÆIDÆ, CERAMBYCIDÆ, CHRYSOMELIDÆ, BRUCHIDÆ

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# ADVERTISEMENT.

[Monograph XL.]

The statute approved March 3, 1879, establishing the United States Geological Survey, contains the following provisions:

"The publications of the Geological Survey shall consist of the annual report of operations, geological and economic maps illustrating the resources and classification of the lands, and reports upon general and economic geology and paleontology. The annual report of operations of the Geological Survey shall accompany the annual report of the Secretary of the Interior. All special memoirs and reports of said Survey shall be issued in uniform quarto series if deemed necessary by the Director, but otherwise in ordinary octavos. Three thousand copies of each shall be published for scientific exchanges and for sale at the price of publication; and all literary and cartographic materials received in exchange shall be the property of the United States and form a part of the library of the organization: And the money resulting from the sale of such publications shall be covered into the Treasury of the United States."

Except in those cases in which an extra number of any special memoir or report has been supplied to the Survey by special resolution of Congress or has been ordered by the Secretary of the Interior, this office has no copies for gratuitous distribution.

## ANNUAL REPORTS.

- I. First Annual Report of the United States Geological Survey, by Clarence King. 1880. 8°. 79 pp. 1 map.—A preliminary report describing plan of organization and publications.
- II. Second Annual Report of the United States Geological Survey, 1880-'81, by J. W. Powell. 1882. 8°. iv, 588 pp. 62 pl. 1 map.
- III. Third Annual Report of the United States Geological Survey, 1881-'82, by J. W. Powell. 1883. 8°. xviii, 564 pp. 67 pl. and maps.
- IV. Fourth Annual Report of the United States Geological Survey, 1882-'83, by J. W. Powell. 1884. 8°. xxxii, 473 pp. 85 pl. and maps.
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- XVI. Sixteenth Annual Report of the United States Geological Survey, 1894-'95, Charles D. Walcott, Director. 1895. (Part I, 1896.) 8°. 4 pt. xxii, 910 pp., 117 pl. and maps; xix, 598 pp., 43 pl. and maps; xv, 646 pp., 23 pl.; xix, 735 pp., 6 pl.
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135. Bibliography and Index of North American Geology, Paleontology, Petrology, and Mineralogy for the Year 1894, by F. B. Weeks. 1896. 8°. 141 pp. Price 15 cents.
136. Volcanic Rocks of South Mountain, Pennsylvania, by Florence Bascom. 1896. 8°. 124 pp. 28 pl. Price 15 cents.
137. The Geology of the Fort Riley Military Reservation and Vicinity, Kansas, by Robert Hay. 1896. 8°. 35 pp. 8 pl. Price 5 cents.
138. Artesian-Well Prospects in the Atlantic Coastal Plain Region, by N. H. Darton. 1896. 8°. 228 pp. 19 pl. Price 20 cents.
139. Geology of the Castle Mountain Mining District, Montana, by W. H. Weed and L. V. Pirs-son. 1896. 8°. 164 pp. 17 pl. Price 15 cents.
140. Report of Progress of the Division of Hydrography for the Calendar Year 1895, by Frederick Haynes Newell, Hydrographer in Charge. 1896. 8°. 356 pp. Price 25 cents.
141. The Eocene Deposits of the Middle Atlantic Slope in Delaware, Maryland, and Virginia, by William Bullock Clark. 1896. 8°. 167 pp. 40 pl. Price 15 cents.
142. A Brief Contribution to the Geology and Paleontology of Northwestern Louisiana, by T. Wayland Vaughan. 1896. 8°. 63 pp. 4 pl. Price 10 cents.
143. A Bibliography of Clays and the Ceramic Arts, by John C. Branner. 1896. 8°. 114 pp. Price 15 cents.
144. The Moraines of the Missouri Coteau and their Attendant Deposits, by James Edward Todd. 1896. 8°. 71 pp. 21 pl. Price 10 cents.
145. The Potomac Formation in Virginia, by W. M. Fontaine. 1896. 8°. 149 pp. 2 pl. Price 15 cents.
146. Bibliography and Index of North American Geology, Paleontology, Petrology, and Mineralogy for the Year 1895, by F. B. Weeks. 1896. 8°. 130 pp. Price 15 cents.
147. Earthquakes in California in 1895, by Charles D. Perrine, Assistant Astronomer in Charge of Earthquake Observations at the Lick Observatory. 1896. 8°. 23 pp. Price 5 cents.
148. Analyses of Rocks, with a Chapter on Analytical Methods, Laboratory of the United States Geological Survey, 1880 to 1896, by F. W. Clarke and W. F. Hillebrand. 1897. 8°. 306 pp. Price 20 cents.
149. Bibliography and Index of North American Geology, Paleontology, Petrology, and Mineralogy for the Year 1896, by Fred Boughton Weeks. 1897. 8°. 152 pp. Price 15 cents.
150. The Educational Series of Rock Specimens collected and distributed by the United States Geological Survey, by Joseph Silas Diller. 1898. 8°. 398 pp. 47 pl. Price 25 cents.
151. The Lower Cretaceous Gryphaas of the Texas Region, by R. T. Hill and T. Wayland Vaughan. 1898. 8°. 139 pp. 25 pl. Price 15 cents.
152. A Catalogue of the Cretaceous and Tertiary Plants of North America, by F. H. Knowlton. 1898. 8°. 247 pp. Price 20 cents.
153. A Bibliographic Index of North American Carboniferous Invertebrates, by Stuart Weller. 1898. 8°. 653 pp. Price 35 cents.
154. A Gazetteer of Kansas, by Henry Gannett. 1898. 8°. 246 pp. 6 pl. Price 20 cents.
155. Earthquakes in California in 1896 and 1897, by Charles D. Perrine, Assistant Astronomer in Charge of Earthquake Observations at the Lick Observatory. 1898. 8°. 47 pp. Price 5 cents.
156. Bibliography and Index of North American Geology, Paleontology, Petrology, and Mineralogy for the Year 1897, by Fred Boughton Weeks. 1898. 8°. 130 pp. Price 15 cents.
157. The Gneisses, Gabbro-Schists, and Associated Rocks of Southeastern Minnesota, by Christopher Webber Hall. 1899. 8°. 160 pp. 27 pl. Price 45 cents.
158. The Moraines of Southeastern South Dakota and their Attendant Deposits, by James Edward Todd. 1899. 8°. 171 pp. 27 pl. Price 25 cents.
159. The Geology of Eastern Berkshire County, Massachusetts, by B. K. Emerson. 1899. 8°. 139 pp. 9 pl. Price 20 cents.
160. A Dictionary of Altitudes in the United States (Third Edition), compiled by Henry Gannett. 1899. 8°. 775 pp. Price 40 cents.
161. Earthquakes in California in 1898, by Charles D. Perrine, Assistant Astronomer in Charge of Earthquake Observations at the Lick Observatory. 1899. 8°. 31 pp. 1 pl. Price 5 cents.
162. Bibliography and Index of North American Geology, Paleontology, Petrology and Mineralogy for the Year 1898, by Fred Boughton Weeks. 1899. 8°. 163 pp. Price 15 cents.
163. Flora of the Montana Formation, by Frank Hall Knowlton. 1900. 8°. 118 pp. Price 15 cents.
164. Reconnaissance in the Rio Grande Coal Fields of Texas, by Thomas Wayland Vaughan, including a report on Igneous Rocks from the San Carlos Coal Field, by E. C. E. Lord. 1900. 8°. 100 pp. 11 pl. and maps. Price 20 cents.
165. Contributions to the Geology of Maine, by Henry S. Williams and Herbert E. Gregory. 1900. 8°. 212 pp. 14 pl. Price 25 cents.
166. A Gazetteer of Utah, by Henry Gannett. 1900. 8°. 43 pp. 1 map. Price 15 cents.
167. Contributions to Chemistry and Mineralogy from the Laboratory of the United States Geological Survey, Frank W. Clarke, Chief Chemist. 1900. 8°. 166 pp. Price 15 cents.
168. Analyses of Rocks, Laboratory of the United States Geological Survey, 1880 to 1899, tabulated by F. W. Clarke, Chief Chemist. 1900. 8°. 308 pp. Price 20 cents.
169. Altitudes in Alaska, by Henry Gannett. 1900. 8°. 13 pp. Price 5 cents.
170. Survey of the Boundary Line between Idaho and Montana from the International Boundary to the Crest of the Bitterroot Mountains, by Richard Urquhart Goode. 1900. 8°. 67 pp., 14 pl. Price 15 cents.

171. Boundaries of the United States and of the Several States and Territories, with an Outline of the History of all Important Changes of Territory (second edition), by Henry Gannett. 1900. 8°. 142 pp., 53 pl. Price 30 cents.

172. Bibliography and Index of North American Geology, Paleontology, Petrology, and Mineralogy for the year 1899, by Fred Boughton Weeks. 1900. 8°. 141 pp. Price 15 cents.

173. Synopsis of American Fossil Bryozoa, Including Bibliography and Synonymy, by John M. Nickles and Ray S. Bassler. 1900. 8°, 663 pp. Price 40 cents.

174. Survey of the Northwestern Boundary of the United States, 1857-1861, by Marcus Baker. 1900. 8°, 174 pp. 1 pl. Price 15 cents.

*In press:*

175. Triangulation and Spirit Leveling in Indian Territory, by C. H. Fitch.

176. Some Principles and Methods of Rock Analysis, by W. F. Hillebrand.

*In preparation:*

— Bibliography and Catalogue of the Fossil Vertebrata of North America, by Oliver Perry Hay.

#### WATER-SUPPLY AND IRRIGATION PAPERS.

By act of Congress approved June 11, 1896, the following provision was made:

"Provided, That hereafter the reports of the Geological Survey in relation to the gauging of streams and to the methods of utilizing the water resources may be printed in octavo form, not to exceed one hundred pages in length and five thousand copies in number; one thousand copies of which shall be for the official use of the Geological Survey, one thousand five hundred copies shall be delivered to the Senate, and two thousand five hundred copies shall be delivered to the House of Representatives, for distribution."

Under this law the following papers have been issued:

1. Pumping Water for Irrigation, by Herbert M. Wilson. 1896. 8°. 57 pp. 9 pl.
2. Irrigation near Phoenix, Arizona, by Arthur P. Davis. 1897. 8°. 97 pp. 31 pl.
3. Sewage Irrigation, by George W. Rafter. 1897. 8°. 100 pp. 4 pl.
4. A Reconnaissance in Southeastern Washington, by Israel Cook Russell. 1897. 8°. 96 pp. 7 pl.
5. Irrigation Practice on the Great Plains, by Elias Branson Cowgill. 1897. 8°. 39 pp. 12 pl.
6. Underground Waters of Southwestern Kansas, by Erasmus Hawthorth. 1897. 8°. 65 pp. 12 pl.
7. Seepage Waters of Northern Utah, by Samuel Fortier. 1897. 8°. 50 pp. 3 pl.
8. Windmills for Irrigation, by Edward Charles Murphy. 1897. 8°. 49 pp. 8 pl.
9. Irrigation near Greeley, Colorado, by David Boyd. 1897. 8°. 90 pp. 21 pl.
10. Irrigation in Mesilla Valley, New Mexico, by F. C. Barker. 1898. 8°. 51 pp. 11 pl.
11. River Heights for 1896, by Arthur P. Davis. 1897. 8°. 100 pp.
12. Underground Waters of Southeastern Nebraska, by N. H. Darton. 1898. 8°. 55 pp. 21 pl.
13. Irrigation Systems in Texas, by William Ferguson Hutson. 1898. 8°. 67 pp. 10 pl.
14. New Tests of Pumps and Water-Lifts used in Irrigation, by O. P. Hood. 1898. 8°. 91 pp. 1 pl.
15. Operations at River Stations, 1897, Part I. 1898. 8°. 100 pp.
16. Operations at River Stations, 1897, Part II. 1898. 8°. 101-200 pp.
17. Irrigation near Bakersfield, California, by C. E. Grunsky. 1898. 8°. 96 pp. 16 pl.
18. Irrigation near Fresno, California, by C. E. Grunsky. 1898. 8°. 94 pp. 14 pl.
19. Irrigation near Merced, California, by C. E. Grunsky. 1899. 8°. 59 pp. 11 pl.
20. Experiments with Windmills, by T. O. Perry. 1899. 8°. 97 pp. 12 pl.
21. Wells of Northern Indiana, by Frank Leverett. 1899. 8°. 82 pp. 2 pl.
22. Sewage Irrigation, Part II, by George W. Rafter. 1899. 8°. 100 pp. 7 pl.
23. Water-Right Problems of Bighorn Mountains, by Elwood Mead. 1899. 8°. 62 pp. 7 pl.
24. Water Resources of the State of New York, Part I, by G. W. Rafter. 1899. 8°. 99 pp. 13 pl.
25. Water Resources of the State of New York, Part II, by G. W. Rafter. 1899. 8°. 101-200 pp. 12 pl.
26. Wells of Southern Indiana (Continuation of No. 21), by Frank Leverett. 1899. 8°. 64 pp.
27. Operations at River Stations, 1898, Part I. 1899. 8°. 100 pp.
28. Operations at River Stations, 1898, Part II. 1899. 8°. 101-200 pp.
29. Wells and Windmills in Nebraska, by Erwin H. Barbour. 1899. 8°. 85 pp. 27 pl.
30. Water Resources of the Lower Peninsula of Michigan, by Alfred C. Lane. 1899. 8°. 97 pp. 7 pl.
31. Lower Michigan Mineral Waters, by Alfred C. Lane. 1899. 8°. 97 pp. 4 pl.
32. Water Resources of Puerto Rico, by Herbert M. Wilson. 1899. 8°. 48 pp. 17 pl.
33. Storage of Water on Gila River, Arizona, by Joseph B. Lippincott. 1900. 8°. 93 pp. 33 pl.
34. Geology and Water Resources of SE. South Dakota, by J. E. Todd. 1900. 8°. 34 pp. 19 pls.
35. Operations at River Stations, 1899, Part I. 1900. 8°. 100 pp.
36. Operations at River Stations, 1899, Part II. 1900. 8°. 101-198 pp.
37. Operations at River Stations, 1899, Part III. 1900. 8°. 199-298 pp.
38. Operations at River Stations, 1899, Part IV. 1900. 8°. 299-396 pp.
39. Operations at River Stations, 1899, Part V. 1900. 8°. 397-471 pp.

## TOPOGRAPHIC MAP OF THE UNITED STATES.

When, in 1882, the Geological Survey was directed by law to make a geologic map of the United States there was in existence no suitable topographic map to serve as a base for the geologic map. The preparation of such a topographic map was therefore immediately begun. About one-fifth of the area of the country, excluding Alaska, has now been thus mapped. The map is published in atlas sheets, each sheet representing a small quadrangular district, as explained under the next heading. The separate sheets are sold at 5 cents each when fewer than 100 copies are purchased, but when they are ordered in lots of 100 or more copies, whether of the same sheet or of different sheets, the price is 2 cents each. The mapped areas are widely scattered, nearly every State being represented. About 900 sheets have been engraved and printed; they are tabulated by States in the Survey's "List of Publications," a pamphlet which may be had on application.

The map sheets represent a great variety of topographic features, and with the aid of descriptive text they can be used to illustrate topographic forms. This has led to the projection of an educational series of topographic folios, for use wherever geography is taught in high schools, academies, and colleges. Of this series the first folio has been issued, viz:

1. Physiographic types, by Henry Gannett, 1898, folio, consisting of the following sheets and 4 pages of descriptive text: Fargo (N. Dak.-Minn.), a region in youth; Charleston (W. Va.), a region in maturity; Caldwell (Kans.), a region in old age; Palmyra (Va.), a rejuvenated region; Mount Shasta, (Cal.), a young volcanic mountain; Eagle (Wis.), moraines; Sun Prairie (Wis.), drumlins; Donaldsonville (La.), river flood plains; Boothbay (Me.), a fiord coast; Atlantic City (N. J.), a barrier-beach coast.

2. Physiographic types, by Henry Gannett, 1900, folio, consisting of the following sheets and 11 pages of descriptive text: Norfolk (Va.-N. C.), a coast swamp; Marshall (Mo.), a graded river; Lexington (Nebr.), an overloaded stream; Harrisburg (Pa.), Appalachian ridges; Poteau Mountain (Ark.-Ind. T.), Ozark ridges; Marshall (Ark.), Ozark Plateau; West Denver (Colo.), hogbacks; Mount Taylor (N. Mex.), volcanic peaks, plateaus, and necks; Cucamonga (Cal.), alluvial cones; Crater Lake special (Oreg.), a crater.

## GEOLOGIC ATLAS OF THE UNITED STATES.

The Geologic Atlas of the United States is the final form of publication of the topographic and geologic maps. The atlas is issued in parts, progressively as the surveys are extended, and is designed ultimately to cover the entire country.

Under the plan adopted the entire area of the country is divided into small rectangular districts (designated *quadrangles*), bounded by certain meridians and parallels. The unit of survey is also the unit of publication, and the maps and descriptions of each rectangular district are issued as a folio of the Geologic Atlas.

Each folio contains topographic, geologic, economic, and structural maps, together with textual descriptions and explanations, and is designated by the name of a principal town or of a prominent natural feature within the district.

Two forms of issue have been adopted, a "library edition" and a "field edition." In both the sheets are bound between heavy paper covers, but the library copies are permanently bound, while the sheets and covers of the field copies are only temporarily wired together.

Under the law a copy of each folio is sent to certain public libraries and educational institutions. The remainder are sold at 25 cents each, except such as contain an unusual amount of matter, which are priced accordingly. Prepayment is obligatory. The folios ready for distribution are listed below.

No.	Name of sheet.	State.	Limiting meridians.	Limiting parallels.	Area, in square miles.	Price, in cents.
1	Livingston .....	Montana .....	110°-111°	45°-46°	3,354	25
2	Ringgold .....	(Georgia .....	85°-85° 30'	34° 30'-35°	980	25
		Tennessee .....				
3	Placerville .....	California .....	120° 30'-121°	38° 30'-39°	932	25
4	Kingston .....	Tennessee .....	84° 30'-85°	35° 30'-36°	969	25
5	Sacramento .....	California .....	121°-121° 30'	38° 30'-39°	932	25
6	Chatanooga .....	Tennessee .....	85°-85° 30'	35°-35° 30'	975	25
7	Pikes Peak (out of stock) .....	Colorado .....	105°-105° 30'	38° 30'-39°	932	25
8	Sewanee .....	Tennessee .....	85° 30'-86°	35°-35° 30'	975	25
9	Anthracite-Crested Butte .....	Colorado .....	106° 45'-107° 15'	38° 45'-39°	465	50
10	Harpers Ferry .....	(Virginia .....	77° 30'-78°	39°-39° 30'	925	25
		West Virginia ..				
		Maryland .....				
11	Jackson .....	California .....	120° 30'-121°	38°-38° 30'	938	25
12	Estillville .....	(Virginia .....	82° 30'-83°	36° 30'-37°	957	25
		Kentucky .....				
		Tennessee .....				
13	Fredericksburg .....	(Maryland .....	77°-77° 30'	38°-38° 30'	938	25
		Virginia .....				
		(Virginia .....				
14	Staunton .....	(West Virginia ..	79°-79° 30'	38°-38° 30'	938	25
		Virginia .....				
15	Lassen Peak .....	California .....	121°-122°	40°-41°	3,634	25
16	Knoxville .....	(Tennessee .....	83° 30'-84°	35° 30'-36°	925	25
		North Carolina ..				
17	Marysville .....	California .....	121° 30'-122°	39°-39° 30'	925	25

No.	Name of sheet.	State.	Limiting meridians.	Limiting parallels.	Area, in square miles.	Price, in cents.
18	Smartsville .....	California .....	121°-121° 30'	39°-39° 30'	925	25
19	Stevenson .....	Alabama .....	85° 30'-86°	34° 30'-35°	980	25
		Tennessee .....				
20	Cleveland .....	Tennessee .....	84° 30'-85°	35°-35° 30'	975	25
21	Pikeville .....	Tennessee .....	85°-85° 30'	35° 30'-36°	969	25
22	McMinnville .....	Tennessee .....	85° 30'-86°	35° 30'-36°	969	25
23	Nomini .....	Maryland .....	76° 30'-77°	38°-38° 30'	938	25
		Virginia .....				
24	Three Forks .....	Montana .....	111°-112°	45°-46°	3,354	50
25	Loudon .....	Tennessee .....	84°-81° 30'	35° 30'-36°	969	25
26	Pocahontas .....	Virginia .....	81°-81° 30'	37°-37° 30'	951	25
		West Virginia .....				
27	Morristown .....	Tennessee .....	83°-83° 30'	36°-36° 30'	963	25
28	Piedmont .....	Maryland .....	79°-79° 30'	39°-39° 30'	925	25
		West Virginia .....				
29	Nevada City .....	Nevada City .....	121° 00' 25"-121° 03' 45"	39° 13' 50"-39° 17' 16"	11.65	50
		Grass Valley .....				
		Banner Hill .....				
		Gallatin .....	121° 01' 35"-121° 05' 04"	39° 10' 22"-39° 13' 50"	12.09	
		Shoshone .....				
		Lake .....				
30	Yellowstone National Park .....	Wyoming .....	110°-111°	44°-45°	3,412	75
31	Pyramid Peak .....	California .....	120°-120° 30'	38° 30'-39°	932	25
32	Franklin .....	Virginia .....	79°-79° 30'	38° 30'-39°	932	25
		West Virginia .....				
33	Briceville .....	Tennessee .....	84°-84° 30'	36°-36° 30'	963	25
34	Buckhannon .....	West Virginia .....	80°-80° 30'	38° 30'-39°	932	25
35	Gadsden .....	Alabama .....	86°-86° 30'	34°-34° 30'	986	25
36	Pueblo .....	Colorado .....	104° 30'-105°	38°-38° 30'	938	50
37	Downieville .....	California .....	120° 30'-121°	39° 30'-40°	919	25
38	Butte Special .....	Montana .....	112° 29' 30"-112° 36' 42"	45° 59' 28"-46° 02' 54"	22.80	50
		California .....				
39	Truckee .....	California .....	120°-120° 30'	39°-39° 30'	925	25
40	Wartburg .....	Tennessee .....	84° 30'-85°	36°-36° 30'	963	25
41	Sonora .....	California .....	120°-120° 30'	37° 30'-38°	944	25
42	Nueces .....	Texas .....	100°-100° 30'	29° 30'-30°	1,035	25
43	Bidwell Bar .....	California .....	121°-121° 30'	39° 30'-40°	918	25
44	Tazewell .....	Virginia .....	81° 30'-82°	37°-37° 30'	950	25
		West Virginia .....				
45	Boise .....	Idaho .....	116°-116° 30'	43° 30'-44°	864	25
46	Richmond .....	Kentucky .....	84°-84° 30'	37° 30'-38°	944	25
47	London .....	Kentucky .....	84°-84° 30'	37°-37° 30'	950	25
48	Tennile District Special .....	Colorado .....	106° 8'-106° 16'	39° 22' 30"-39° 30' 30"	55	25
49	Roseburg .....	Oregon .....	123°-123° 30'	43°-43° 30'	871	25
50	Holyoke .....	Massachusetts .....	72° 30'-73°	42°-42° 30'	885	50
		Connecticut .....				
51	Big Trees .....	California .....	120°-120° 30'	38°-38° 30'	938	25
52	Absaroka .....	Wyoming .....	109° 30'-110°	44°-44° 30'	1,706	25
	Crandall .....					
	Ishawooa .....	Tennessee .....	85°-85° 30'	36°-36° 30'	963	25
53	Standingstone .....	Washington .....	122°-122° 30'	47°-47° 30'	812	25
54	Tacoma .....	Montana .....	110°-111°	47°-48°	3,273	25
55	Fort Benton .....	Montana .....	110°-111°	46°-47°	3,295	25
56	Little Belt Mountains .....	Montana .....	107° 45'-108°	37° 45'-38°	236	25
57	Telluride .....	Colorado .....	104°-104° 30'	37°-37° 30'	950	25
58	Elmore .....	Virginia .....	82°-82° 30'	36° 30'-37°	957	25
		Tennessee .....				
59	Bristol .....	Colorado .....	108°-108° 15'	37° 15'-37° 30'	237	25
60	La Plata .....	Virginia .....	79° 30'-80°	38°-38° 30'	938	25
		West Virginia .....				
61	Monterey .....	Michigan .....	87° 44'-88° 09'	45° 44'-45° 55'	254	25
62	Menominee Special .....					

## STATISTICAL PAPERS.

- Mineral Resources of the United States [1882], by Albert Williams, jr. 1883. 8°. xvii, 813 pp. Price 50 cents.
- Mineral Resources of the United States, 1883 and 1884, by Albert Williams, jr. 1885. 8°. xiv, 1016 pp. Price 60 cents.
- Mineral Resources of the United States, 1885. Division of Mining Statistics and Technology. 1886. 8°. vii, 576 pp. Price 40 cents.
- Mineral Resources of the United States, 1886, by David T. Day. 1887. 8°. viii, 813 pp. Price 60 cents.
- Mineral Resources of the United States, 1887, by David T. Day. 1888. 8°. vii, 832 pp. Price 50 cents.
- Mineral Resources of the United States, 1888, by David T. Day. 1890. 8°. vii, 652 pp. Price 50 cents.
- Mineral Resources of the United States, 1889 and 1890, by David T. Day. 1892. 8°. viii, 671 pp. Price 50 cents.

Mineral Resources of the United States, 1891, by David T. Day. 1893. 8°. vii, 630 pp. Price 50 cents.

Mineral Resources of the United States, 1892, by David T. Day. 1893. 8°. vii, 850 pp. Price 50 cents.

Mineral Resources of the United States, 1893, by David T. Day. 1894. 8°. viii, 810 pp. Price 50 cents.

On March 2, 1895, the following provision was included in an act of Congress:

"*Provided*, That hereafter the report of the mineral resources of the United States shall be issued as a part of the report of the Director of the Geological Survey."

In compliance with this legislation the following reports have been published:

Mineral Resources of the United States, 1894, David T. Day, Chief of Division. 1895. 8°. xv, 646 pp., 23 pl.; xix, 735 pp., 6 pl. Being Parts III and IV of the Sixteenth Annual Report.

Mineral Resources of the United States, 1895, David T. Day, Chief of Division. 1896. 8°. xxiii, 542 pp., 8 pl. and maps; iii, 543-1058 pp., 9-13 pl. Being Part III (in 2 vols.) of the Seventeenth Annual Report.

Mineral Resources of the United States, 1896, David T. Day, Chief of Division. 1897. 8°. xii, 642 pp., 1 pl.; 643-1400 pp. Being Part V (in 2 vols.) of the Nineteenth Annual Report.

Mineral Resources of the United States, 1897, David T. Day, Chief of Division. 1898. 8°. viii, 651 pp., 11 pl.; viii, 706 pp. Being Part VI (in 2 vols.) of the Nineteenth Annual Report.

Mineral Resources of the United States, 1898, David T. Day, Chief of Division. 1899. 8°. viii, 616 pp.; ix, 804 pp., 1 pl. Being Part VI (in 2 vols.) of the Twentieth Annual Report.

The money received from the sale of the Survey publications is deposited in the Treasury, and the Secretary of that Department declines to receive bank checks, drafts, or postage stamps; all remittances, therefore, must be by MONEY ORDER, made payable to the Director of the United States Geological Survey, or in CURRENCY—the exact amount. Correspondence relating to the publications of the Survey should be addressed to

THE DIRECTOR,  
UNITED STATES GEOLOGICAL SURVEY,  
WASHINGTON, D. C.

WASHINGTON, D. C., *August, 1900.*

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Washington | government printing office | 1900

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[UNITED STATES. *Department of the interior. (U. S. geological survey.)* Monograph XL.]

Subject.