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NEW SPECIES OF FOSSIL BEETLES FROM FLORISSANT, COLORADO.

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A recent sending of fossil Coleoptera from Florissant contains several species not hitherto described, and in pursuance of the plan of studying all available forms from these beds, I am submitting descriptions and figures herewith. With the exception of one specimen, *Brachyspathus curiosus*, belonging to the University of Colorado, all the types are the property of the United States National Museum. One of them, *Spondylis tertiarius*, represents a family not before recognized in the Florissant shales. Some of the others are of considerable interest and importance, as will be seen by a perusal of the list.

CARABIDAE.

Platynus insculptipennis, new species.
Cratacanthus florissantensis, new species.
Harpalus ulomaeformis, new species.
Harpalus redivivus, new species.

COCCINELLIDAE.

Anatis resurgens, new species.

BUPRESTIDAE.

Brachyspathus curiosus, new species.

LAMPYRIDAE.

Podabrus cupesoides, new species.

MALACHIIDAE.

Malachius immurus, new name.

PTINIDAE.

Vrilletta monstrosa, new species.

SPONDYLIDAE.

Spondylis tertiarius, new species.

CERAMBYCIDAE.

Callidium grandaevum, new species.

BRUCHIDAE.

Bruchus antaeus, new species.

OTIORHYNCHIDAE.

Pandeleteinus nudus, new species.

CURCULIONIDAE.

Tychius ferox, new species.
Baris primalis, new species.

Genus PLATYNUS Bonelli.

PLATYNUS INSCULPTIPENNIS, new species.

Plate 37, fig. 1.

Form fairly stout for this genus. Head, as preserved, about as long as the prothorax, showing no sculpture other than a minute

roughening, which is brought out only under high magnifying power. Eyes small. Antennae slender, distal segments lost, second joint much shorter than the third. Prothorax approximately one-third broader than long, sides regularly arcuate or nearly so, angles not long nor prominent, surface practically smooth, like the head. Elytra about 3¾ times as as long as the prothoracic median line, apparently very finely and faintly striate, but of this I can not be sure. Legs of moderate size, showing no details of any importance. Length, from front of head to abdominal apex, 10.25 mm.

Type.—Cat. No. 63441, U.S.N.M.

The single specimen, with counterpart, looks like *Platynus*, but the almost complete lack of sculpture is suspicious. However, this may be due partly to the state of preservation, which is only fair. It is not at all like *P. tartareus* from these shales.

Genus CRATACANTHUS Dejean.

CRATACANTHUS FLORISSANTENSIS, new species.

Plate 37, fig. 2.

Form rather stout, as in the recent *C. dubius*. Head large, as in that species, with prominent jaws. Antennae not well preserved, but showing that they reached to, or somewhat beyond, the prothoracic hind angles. Prothorax narrowed behind, broader in front of the middle, sides arcuately narrowing again to the front angles which are a little prominent but hardly acute. Elytra displaying no sculpture aside from feeble traces of striae showing through. Legs rather short and stout. Length, from apex of mandibles to that of abdomen, 9 mm.; of elytron, 5 mm.

Type.—Cat. No. 63442, U.S.N.M.

Described from one specimen, showing the under side. The resemblance to our modern North American *C. dubius* is quite marked, but apparently the fossil has a somwhat shorter prothorax and longer antennae. It is not like any of Scudder's described fossil Carabidae, the large head being definitive.

Genus HARPALUS Latreille.

HARPALUS ULOMAEFORMIS, new species.

Plate 37, fig. 3.

Form quite elongate, parallel sided. Head of moderate size, mandibles not abnormally developed. Antennae not preserved, except a small part of the base of one which is too poor for description. Prothorax much narrower anteriorly, arcuate in regular curve from the base which is the widest part. Elytra showing faint signs of punctured striae which have set through so as to appear on the underside. Abdomen with practically straight sides to near the apex.

Legs in poor preservation, rather short. Length, from apex of mandibles to abdominal tip, 10.25 mm.; of elytron, 6 mm.

Type.—Cat. No. 63443, U.S.N.M.

Described from one specimen. Evidently this insect is not identical with any of those described by Scudder and it differs in prothoracic outline from any of the Florissant fossil Carabidae with which it might be compared. At first sight, it looks like a Tenebrionid of the *Uloma* type, but the prothoracic hypomera are those of a Carabid. The aspect, in this family, is decidedly harpaloid, whence the generic reference which is to be given a broad interpretation.

HARPALUS REDIVIVUS, new species.

Plate 39, fig. 1.

Form stout, similar to that of the recent *H. oblitus*. Head short and broad, rugose laterally beneath, the jaws not prominent. Antennae obscure. Prothorax distorted but evidently rather short, punctured beneath at sides, prosternum nearly smooth. One elytron is extended from the body and twisted so as to expose the upper surface; this shows the striae to have been moderately deep with distinct transverse punctures closely placed, the interstitial spaces convex, almost smooth. The other, overlapped by the abdomen, exhibits only the general courses of the striae. Legs of moderate size. Length of elytron, 10.85 mm.; of head and prothorax, 5 mm.

Type.—Cat. No. 63444, U.S.N.M.

The single specimen indicates a species approached in the Florissant fossil fauna only by *Harpalus maceratus* which is larger and has a strongly projecting muzzle. It can not possibly be confused with any of Scudder's Carabidae.

Genus ANATIS Mulsant.

ANATIS RESURGENS, new species.

Plate 38, fig. 1.

Preserved in ventral view. Antennae wanting. Form suborbicular but with the edges, as preserved, interrupted at the junction of the prothorax and elytra. Head moderately large. Prothorax subcrescentic in outline, the side margins not in good condition, the base regularly arcuate, apex deeply emarginate, with a rounded lobe at middle. Elytra, taken conjointly, of nearly circular outline apparently with a wide side margin. On this margin are shown one or two indistinct marks which appear to represent the similar creases in corresponding position on the underside of the elytra in the recent North American *Anatis 15-punctata*. Length, 8 mm.; width, across elytra, 5.75 mm.

Type.—Cat. No. 63445, U.S.N.M.

Described from one specimen. Compared with other fossil Florissant Coccinellidae, this is the largest, but is closely approached in size by *Coccinella sodoma*. The prothorax is of different outline in the two and I think they are distinct. The reference to *Anatis* is, of course, provisional and is based more upon size than anything else.

BRACHYSPATHUS, new genus.

This name is proposed for a fossil Buprestid which does not seem to fall into any of the modern genera known to me. The body is elongate, more or less elateriform, not at all cuneate, antennae short, only slightly serrate. The most essential character is the form of the prosternal tip, which is expanded into a long, stalked lobe, shaped something like a spatula, and emarginate at apex.

The type is *Brachyspathus curiosus*, described below.

BRACHYSPATHUS CURIOSUS, new species.

Plate 38, figs. 2, 3.

Preserved in ventral view. Form elongate, subparallel. Head rather small, frontal region strongly punctured, the punctures as close together as possible without becoming confluent. The sculpture evidently shows through, since farther back, where the integument is thicker, none is distinguishable. Antennae not well preserved, but what remains of one of them indicates that the basal joint is large, the second and third much smaller, subequal, together about one-third longer than the fourth, which is nearly of the same size as the fifth, sixth, seventh, or eighth, none of them strongly serrate. Prothorax with rather feebly arcuate sides, base not much narrowed, surface strongly, moderately coarsely and very closely but not confluently punctured, less deeply on the flanks, each puncture rounded and with a little mark as of a scale or hair at the bottom. Prosternal sutures nearly straight, not deeply excavated, lobe of anterior margin short, subtruncate, posterior tip of prosternum spatulate, notched apically and margined all around, strongly punctured like the body of the sternum. Meso and metasternal areas punctured similarly to the prosternum but somewhat more finely, becoming much more so in front of the hind coxal plates, which are also strongly punctate, broad over the insertion of the thighs, narrowing quite suddenly externally, and obscurely toothed on the hind margin. Abdomen much more finely punctured than the prothorax, sparsely at middle, moderately closely externally, scantily hairy. Legs rather short. Coxae all punctate, femora less strongly, tibiae still more finely. The elytra are evidently quite deeply striate, the grooves showing through. Length, total, 13.50 mm.

Type.—In the Museum of the University of Colorado, collected at Florissant, in 1906, by Prof. Cockerell's party and bearing his number 184. It came from Station 14, a most productive locality.

Described from one specimen. The most striking superficial character of the insect is its rough punctuation, which extends even to the antennal joints. The peculiar structural feature is the spatulate emarginate prosternal process, which has been hard to match on any Coleoptera known to me. An approach to it is seen in the Javanese *Belionota scutellaris*, where the process is very similarly broadened apically, but, instead of being simply emarginate, the tip in that species is divided into three teeth or lobes. In other respects the fossil is not at all close to the species cited, being far less specialized in antennal, coxal, and tarsal structure.

Genus PODABRUS Westwood.

PODABRUS CUPESOIDES, new species.

Plate 37, fig. 4.

Form narrow, elongate, parallel. Head distinctly narrowed behind. Antennae long and slender, reaching nearly to the elytral apices, the joints very little serrate. Prothorax about as long as the head but considerably broader, sides obscurely preserved but apparently rounding. Elytra, conjointly, a little less than two and one-half times as long as broad, their apices rounding. Abdomen, as preserved, extending well beyond the elytral tips but probably distended as indicated by the broad transverse bands which show location of the sutures. Length, to tip of abdomen, 8 mm.; to tip of elytra, 7 mm.; of elytron, 5.35 mm.; width, across broadest part of elytra, 2.30 mm.

Type.—Cat. No. 63446, U.S.N.M.

The type of this species bears a notable resemblance to a small *Cupes*, partly because of the way in which it is displayed upon the stone. The small size and long antennae will separate it from any other Florissant fossil *Podabrus*, into which genus it seems to go by the posterior constriction of the head and the truncate prothoracic apex. The sculpture is of the finely scabrous type common among the recent species. With the type, I have associated under the same name a considerable number of examples belonging to various other collections, especially those of the Museum of Comparative Zoology and the University of Colorado. It is possible that more than one species is concerned, but I can find no definite basis of separation. The texture of these beetles is so soft that they do not, as a rule, show up well as fossils and characters used in discrimination of recent forms, such as those founded upon structures of claws and maxillary palpi, are never visible upon the stones.

Genus MALACHIUS Fabricius.

MALACHIUS IMMURUS, new name.

Unfortunately the name *pristinus*, under which I described a fossil *Malachius* from Florissant,[1] had previously been used by Fall for a recent Californian species. Since he has kindly called my attention to the oversight, I wish to substitute for the fossil the name proposed above.

Genus VRILLETTA LeConte.

VRILLETTA MONSTROSA, new species.

Plate 37, fig. 5.

Form moderately elongate. Head deflexed, but not very strongly, surface extremely minutely and rather sparsely granulate on the front and vertex, but closely, finely and confusedly punctured on the sides near the thoracic front margin. Eye, as preserved, rather quadrate in outline, in life probably nearly circular. Antennae lost except a few disconnected joints which, in general, are scarcely serrate but the terminal ones appear to be larger. Prothorax about equal in height and breadth, back irregularly arched, surface granulate like the head but somewhat more coarsely and sparsely. Elytra approximately two and one-third times the prothoracic length, epipleural lobe distinct, set off from the remainder of the elytron by a fine ridge or crease, striae of small, rounded, moderately deep punctures separated in each series by about their own diameters or a little less, interstitial spaces broad, flat, minutely alutaceous. The tip is not well preserved, so that the lines are indistinct in that region. Under side nearly smooth. Legs short, not very stout, extremely minutely pubescent, tibiae carinate. Length, from front of pronotum to abdominal apex, 9.25 mm.

Type.—Cat. No. 63447, U.S.N.M.

One specimen, with counterpart. There is no difficulty in distinguishing this beetle from other fossil Florissant Anobiinae, the great size, in itself, serving for identification. The reference to this subfamily is made on the basis of the form of the prothorax, its relation to the head, the cephalic, thoracic, and elytral sculpture, the antennae, as far as shown, and especially upon the tarsal structure which is like that of the recent *Vrilletta murrayi* from our Pacific coast. The sculptural characters are more like those of *V. plumbea* from the same general region. The generic assignment rests upon general similarity rather than upon truly definitive features.

[1] Bull. Lab. Nat. Hist. Univ. Iowa, vol. 7, No. 3, p. 8.

Genus SPONDYLIS Fabricius.

SPONDYLIS TERTIARIUS, new species

Plate 39, figs. 2, 3.

Form fairly elongate. Head finely and closely granulate, narrower than the prothorax, genae prominent, subspinose. Mandibles rough basally, smooth distally, as in the recent North American *S. upiformis*, quite strongly prominent. Antennae short, joints transverse, those of the base and apex wanting or obscured. Prothorax much broader than long, sides nearly straight but apparently not margined, surface sculpture coarser and shallower than that of the head. Elytra not very well preserved, the surface showing scarcely any definite sculpture except traces of certain costate markings similar to those of the modern species with which it has been compared. Legs short, tibiae longitudinally carinate. Length, as preserved, from point of mandibles to elytral tip, 18.25 mm.

Type.—Cat. No. 63448, U.S.N.M.

No doubt can be held as to the family affinities of this beetle. It is evidently a Spondylid and the first representative of this family from the Florissant shales. The shape of the prothorax and carination of the tibiae point to *Parandra*, but the apparent lack of prothoracic margin, the form of the genae, the sculpture of head and pronotum (as far as preserved) and the elytral costations have led me to refer it, in preference, to *Spondylis*. When the characters are better known, it may become necessary to erect a new genus for this insect.

Genus CALLIDIUM Fabricius.

CALLIDIUM GRANDAEVUM, new species.

Plate 38, figs. 4, 5.

Form elongate, subparallel. Head not well delimited, broad, minutely roughened beneath. Antennae much shorter than the body, not reaching far beyond the abdominal base, scarcely at all serrate, first joint large, thick, second small, length and breadth about equal, third, fourth, and fifth subequal to each other, each about two and one-half times as long as the second, sixth and seventh a little shorter, eighth to eleventh much narrower and still shorter than those preceding, the tenth not so long as its neighbors. Prothorax broad, sides, as preserved, nearly straight, under surface finely transversely rugose especially along the flanks. Abdomen somewhat distinctly banded with darker. Legs short, not well shown. Length, to abdominal apex, 13.50 mm.; of antenna, from base of second joint to tip, 7.20 mm.

Type.—Cat. No. 63449, U.S.N.M.

Described from one specimen. My first impression was that this beetle belonged to the Clytini, but the antennae are not of the right structure. They are more like those of some Callidioides, notably the recent North American *Callidium aereum*, and since no generic characters show which are available for separation, I have placed the fossil in that genus. The antennal structure will serve at once to differentiate this from all similar described Florissant fossils. The detail figure shows the sudden reduction in size of the distal four joints.

Genus BRUCHUS Linnaeus.

BRUCHUS ANTAEUS, new species.

Plate 38, figs. 6, 7.

Form fairly elongate. Head small. Eyes not large nor prominent. Antennae short, thick, joints beyond the third somewhat serrate but not strongly so. Prothorax transversely subelliptical, very nearly twice as broad as long, apex narrower, sides strongly and regularly arcuate, sculpture fine, obscure. Elytra about three and one-half times the prothoracic length, delicately striate, striae hardly visibly punctured, interspaces flat, broad, minutely roughened. Legs not preserved. Length, from front of head to abdominal apex, 9.20 mm.; of elytron, 5.10 mm.

Type.—Cat No. 63450 U.S.N.M.

This single specimen is by far the largest of any of the Florissant fossil Bruchids, being more than half as long again as *B. bowditchi*, from these shales, which it resembles quite strongly in form, antennal structure and elytral sculpture. The present insect has a much more transverse prothorax and is undoubtedly distinct.

Genus PANDELETEINUS Champion.

PANDELETEINUS NUDUS, new species.

Plate 39, fig. 4.

Form stout. Head finely but pretty deeply and very closely, in part confluently punctured, with a tendency to form transverse rugae, the portion normally covered by the prothoracic front margin extremely minutely, transversely strigulose. Eye small, subcircular, nearly central in position. Beak not fully defined but evidently short and broad. Antennae concealed or lost. Prothorax much higher than long, a trifle more closely and much more rugosely punctured than the head, the individuality of the punctures largely lost in a confluence which tends to form longitudinal rugae. Elytra moderately arched, deeply striate, strial punctures strong, large, deep, and rounded, separated in each series by less than their own diameters. Interstitial spaces rather broad, convex, not punctured

but very finely alutaceous. Legs moderate or rather short. Abdomen, as far as shown along the side, nearly smooth. Length, 4.35 mm.

Type.—Cat. No. 63451, U.S.N.M.

Represented by a beautiful specimen, preserved in reverse so that the punctures above described appear as granules. The form, size, and position of the eye, structure of abdominal segments and, to a less degree, the elytral punctuation are very similar to the corresponding features in the recent *P. submetallicus* from the southwestern United States. However, the fossil is without scales and is much more closely punctate on the head and prothorax; it may be generically distinct.

Genus TYCHIUS Schönherr.

TYCHIUS FEROX, new species.

Plate 39, fig. 5.

Form fairly elongate. Head with the forehead well arched and running into the rostrum without a break, surface vaguely but closely and rather coarsely punctured. Rostrum slightly curved, moderately thick and short, punctured like the head but not striate, scrobes about straight, directed beneath the eye which is elliptical and longitudinal. Antennal scape and funiculus about equal, club oval, gradually formed. Prothorax about twice as high as long, back scarcely arched, surface closely, more or less confluently and, relatively to the size of the insect, coarsely but only fairly deeply punctured, more strongly than the head. Elytron with the margin not very well preserved and the apex apparently a little distorted, about five times as long as the prothorax, surface moderately deeply striate, the striae with distant, not very well marked, elongate punctures, interspaces visibly convex and practically smooth. Beneath, the pectus is punctate similarly to the pronotum but less strongly, abdomen nearly smooth. Legs of moderate length, the middle and hind femora very strongly dentate, their tibiae slightly bent at base. Length, as preserved, from vertex of head to elytral apex, 3.90 mm.

Type.—Cat. No. 63452, U.S.N.M.

Described from one specimen. In form and general appearance, this beetle is like the Florissant fossil *T. evolatus* and I think the two are likely enough congeneric in spite of the difference in the thighs (which are unarmed in *T. evolatus*) since the modern species of *Tychius* may have the femora either dentate or mutic.

Genus BARIS Germar.

BARIS PRIMALIS, new species.

Plate 39, figs. 6, 7.

Form moderately stout. Head small, relatively coarsely, moderately deeply and closely punctate. Rostrum nearly straight, punctate, more strongly and coarsely than the head, and striate,

length, measured from the front of the eye, about equal to that of the remainder of the head or the median line of the prothorax. Eye elliptical, rather large. Antennae wanting. Prothorax short, noticeably narrowed and quite suddenly constricted in front, punctuation coarser and deeper than that of the head, crowded but hardly confluent, each puncture with a scale mark at bottom. Elytra moderately deeply striate, the striae with large, rounded or very slightly elliptical punctures, much wider than the grooves themselves, those in each series nearly or quite touching, interstitial spaces about one-third the width of the punctures, almost smooth or, in places, finely transversely striate. Each strial puncture is somewhat crateriform, with raised edge and a central depression which may have held a scale. Sternal side pieces and pygidium punctured. Legs showing only the femora, which are of moderate length and not toothed, almost smooth. Length, excluding rostrum, 3.50 mm.

Type.—Cat. No. 63453, U.S.N.M.

Described from one specimen, with counterpart. At first I was inclined to consider it an example of *B. matura*, but that insect is smaller and is described as having punctate femora, the elytral rows of punctures separated by "scarcely more than the width of the puncta." In the diagram given by Scudder, they are separated by about half that width, but in the present species they are still closer together.

EXPLANATION OF PLATES.

PLATE 37

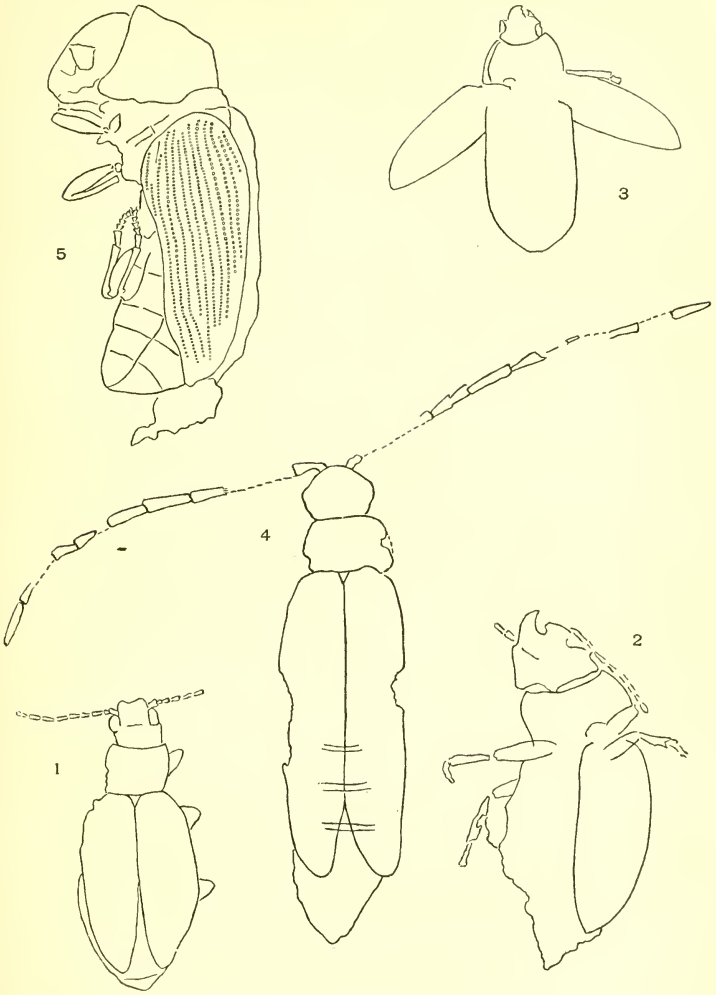
FIG. 1. *Platynus insculptipennis.*
2. *Cratacanthus florissantensis.*
3. *Harpalus ulomaeformis.*
4. *Podabrus cupesoides.*
5. *Vrilletta monstrosa.*

PLATE 38

FIG. 1. *Anatis resurgens.*
2. *Brachyspathus curiosus.*
3. *Brachyspathus curiosus*, antenna.
4. *Callidium grandaevum.*
5. *Callidium grandaevum*, antenna.
6. *Bruchus antaeus.*
7. *Bruchus antaeus*, antenna.

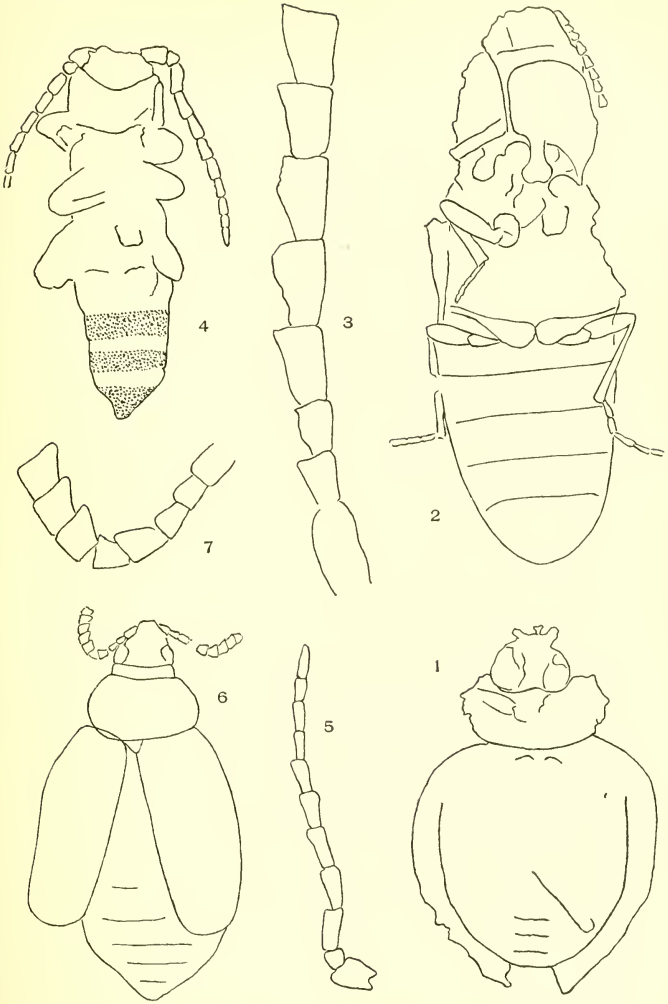
PLATE 39

FIG. 1. *Harpalus redivivus.*
2. *Spondylis tertiarius.*
3. *Spondylis tertiarius*, antenna.
4. *Pandeleteinus nudus.*
5. *Tychius ferox.*
6. *Baris primalis.*
7. *Baris primalis*, elytral punctuation.



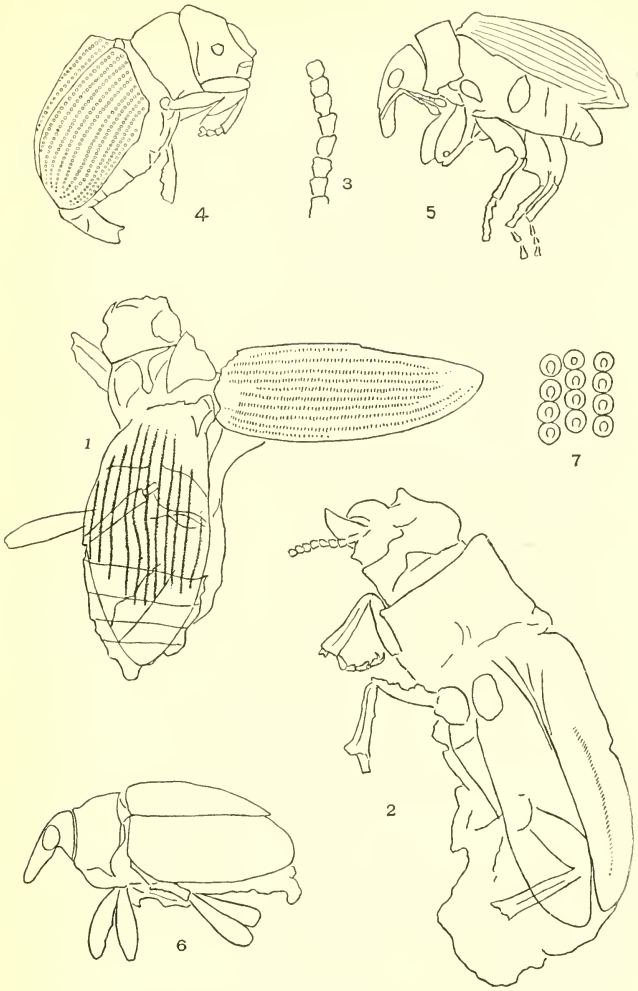
FOSSIL BEETLES FROM FLORISSANT, COLORADO.

FOR EXPLANATION OF PLATE SEE PAGE 472.



FOSSIL BEETLES FROM FLORISSANT, COLORADO.

FOR EXPLANATION OF PLATE SEE PAGE 472.



FOSSIL BEETLES FROM FLORISSANT, COLORADO.

FOR EXPLANATION OF PLATE SEE PAGE 472.