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## Some Fossil Insects from Florissant, Colorado

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# SOME FOSSIL INSECTS FROM FLORISSANT, COLORADO.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO, BOULDER, COL.

The insects now described have a very modern aspect. The anal cell of *Venallites*, taken by itself, may be thought of as primitive, but the fly is otherwise a specialized type. Certainly there has been little advance in insect evolution since the Miocene, but many genera have become extinct.

## HOMOPTERA

### *Echinaphis* new genus (Aphididæ)

Stout, with long antennæ; the two basal joints short as usual; the first somewhat gibbous at apex on inner side; front broad; abdomen with six longitudinal rows (the outer was lateral) of about six very strong black spines; the apex of abdomen, which is broad, with a transverse (marginal) row of six still larger and stronger spines; cornicles not evident, probably small; hind wing of rather coriaceous texture, the venation essentially as in *Chaitophorus*. Anterior wings not preserved in type.

#### *Echinaphis rohweri*, n. sp.

Length, 3 mm.; width of abdomen, 1.75 mm.; length of hind wing a little over 2 mm.; dark colored, with the anterior legs clear

ferruginous; wings reddish; front and sides of thorax without hairs. The following measurements are in microns: Width of front between eyes 320; length of first antennal joint 128; of second 80; antenna, from base of third joint to apex, 1665; length of a dorsal spine about 160; of a caudal one about 270; distance between the



FIG. 9  
*Echinaphis rohweri*. Ckll.

wing-veins (Cu and M.) at base (separation from Rs) about 112. The veins are nearer together at base, and less parallel than in *Chaitophorus populicola*.

Miocene shales of Florissant, Station 13 (S. A. Rohwer).

This singular species is quite unlike any of the fossil Aphids previously described from Florissant. In the development of spines, it has a certain resemblance to the living *Chaitophorus spinosus* Oestl., found on oak in Minnesota. *Sipha glyceriæ* (Koch), which is also spiny, has much shorter antennæ. Close to

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the type of *Echinaphis rohweri* is an elongated, minutely reticulated object 690 microns long, shaped like the egg of *Aedes grossbecki*, but broader, with the reticulations considerably more minute and rather transverse than longitudinal, in the manner of *Aedes colopus*. It is, I think, a mosquito egg, and is the first fossil from Florissant I have been able to refer to the Culicidæ.

#### DIPTERA.

*Asilus peritulus* Cockerell.

Two wings from Station 14 (Geo. N. Rohwer).

*Verrallites*, new genus (Bombyliidæ).

A genus of slender-bodied Bombyliidæ, with clavate but not much elongated abdomen, characterized especially by the anal cell being very widely open, its width on margin in the typical species 720 microns, which is a slight fraction more than the width of the third position cell on the margin. Head and thorax apparently bare; abdomen sparsely minutely hairy; costa minutely bristly; auxiliary vein longitudinal, reaching costa near (apparently a little before) middle of wing (practically as in *Lordotus*); marginal cell long and narrow, its lower side gently concave, its apex broadly rounded, the second vein turned basad before reaching the costa (the cell practically as in *Lomatia lateralis*, except that the outer angle with costa is more acute in the fossil); two submarginal cells the second elongate, widened apically (about as in *Phthiria pulicaria* except that the upper nervure curves upwards apically, more as in *Geron*); four posterior cells, the first nearly parallel-sided throughout (in the manner of *Phthiria*), the others widely open, the third very broadly open (much as in *Ploas virescens*, only much longer); fourth posterior narrowed basally and extremely widely open apically (*Phthiria*-style, only more elongated); anterior cross-vein far beyond middle of discal cell, beyond the beginning of its last third.

*Verrallites cladurus*, n. sp.

Length, about 7 mm., with the abdomen gently curved; abdomen with a depth of 2 mm. near apex; wings 5.75 mm. long. Head and thorax probably black in life; abdomen apparently brown, the sutures broadly colourless; wings clear hyaline.

Miocene shales of Florissant, Colorado, Station 13 B (Univ. of Colorado Exped.)

This remarkable genus is dedicated to G. H. Verrall, whose writings are invaluable to students of fossil Diptera, although he studied only living forms. In Williston's table (N. Am. Diptera, 3rd. Edit.) it runs to 29, and the wings, except for the anal cell, show a rather close general resemblance to those of *Lepidophora*. In *Legnotomyia* the anal cell is as widely open on the wing margin as the third posterior, but these cells are not nearly as wide as in *Verrallites*; the discal cell in *Legnotomyia* is also much shorter than in the fossil, and there are other important differences. From all the genera of fossil Bombyliidæ from Florissant, *Verrallites* is easily known by the form of the anal cell.

We are still without a single Tachinid or Muscid s. str. from the Florissant shales. *Glossina* alone (two species) represents the whole series of Calyptate Muscoids. In Coleoptera, we are still without a Histerid or Cicindelid. A *Cypris* is, so far, the sole representative of the Crustacea. The total number of species described is now so great that these blanks become significant. In the Neuropteroid series we have plenty of Ephemerids and Termites; numerous Raphidiids, Chrysopids and Hemerobiids; a Nemopterid and an Embiid; but as yet not a single Perlid. The Panorpidæ are represented by three species. We have no less than five species of the Dipterous family Nemestrinidæ, now so rare in this country. The quite numerous Bombyliidæ, as well as the very numerous Aphididæ, all belong to extinct genera; but the Phoridæ, Syrphidæ, Therevidæ, Leptidæ, etc., are referable to genera still living.

#### HYMENOPTERA.

*Alysia ruskii*, n. sp.

♀—Robust, length almost 5 mm.; anterior wings broad, broadly rounded at apex, nearly 4 mm. long; expanse about 9 mm.; head and thorax black; base of abdomen (apparently two segments) clear ferruginous, the rest black or dark brown; antennæ nearly 3 mm. long, dark, thick, the joints just before the end about as broad as long, with a diameter of about 110 microns; legs ferruginous, the hind femora incrassate, suffused with dark brown, the base broadly and apex more narrowly pallid; hind tibial spur long and sharp; head and thorax apparently closely but shallowly punctured;

parapsidal grooves of mesothorax distinct, entire; width of abdomen nearly  $1\frac{1}{2}$  mm.; wings hyaline, slightly dusky because minutely hairy all over, the hairs dark; nervures ferruginous, very distinct; costa not bristly; stigma large, about 720 microns long and 320 deep; a linear, hardly noticeable, costal cell; basal nervure leaving costa very obliquely near base of stigma, its lower part very strongly arched, its lower end only about 320 microns in a straight line from subcosta; marginal cell subtriangular, sharply pointed, about 930 microns long, its lower side beyond the submarginal cells faintly concave (bulging inward); first s.m. diamond-shaped except for the large part cut off by the stigma, its basal end only a short distance down nasal nervure; first section of radial or marginal nervure having stigma beyond middle, nearly at right angles; second section nearly obsolete, but marked by the bend in the nervure; second t.c. wholly obsolete, but marked at each end by an angle in the nervure where it should arise; recurrent nervure exactly meeting first t.c.; lower end of b.n. basad of t.m. a distance equal to rather more than half of latter; t.m. very oblique; second discoidal complete.

\* Florissant, in the Miocene shales (*Willard Rusk*). Type U. of Colorado Museum, 4903. Easily known from the two species described by Brues from the Florissant shales by the obsolete second t.c. Except for this the venation is nearly as in *A. petrina* Brues, except that the first section of radius is about as long as second, the marginal cell is narrower apically, the b.n. is strongly bent (straight in *petrina*), and the second s.m. has its apical corner more produced. The linear costal cell is not different from that seen in other forms in which this cell is described as "absent," because it is not readily seen without a microscope. According to Ashmead's tables, the absence of the second t.c. would throw it in Dacnusiinae; but, as Marshall observes, in true Dacnusiinae the radius beyond the first section presents an unbroken curve, without any angle where the second t.c. should be inserted. In the meeting of the a.n. and first t.c., *A. ruskii* resembles *Alysia* (*Goniarcha*) *atra* Hal., but that species has the first s.m. with a broad side on b.n. In the shape of the first discoidal cell, the fossil is suggestive of *Dacnusa* (*Phænolexis*) *petiolata* Nees.

*Alysia ruskii* should perhaps form a new genus near *Alysia*, but it seems better to leave it in *Alysia* sens. latiss.

*Heriades saxosus*, n. sp.

♂—Length about  $7\frac{1}{4}$  mm., in a rather contracted state, the abdomen strongly convex dorsally in profile; head and thorax dark brown, probably black in life; abdomen lighter and redder; wings hyaline, very faintly dusky; anterior wings 4 mm. long; venation as in *H. sauteri* from Formosa, except that lower section of basal nervure is more arched, the marginal cell is considerably longer and more pointed, and the bend in the second t.c. is less distinct. As in *H. sauteri*, the second a.n. squarely meets the second t.c. The following measurements are in microns: Length of marginal cell 1152; depth of marginal cell 304; greatest (diagonal) length of first s.m. 768; second s.m. on marginal, 240; lower side of second s.m. 544; second s.m. on first discoidal 80; greatest (diagonal) length of first discoidal about 976. The basal nervure practically meets the transversomedial, which, as usual in Heriadines, is oblique, the lower end most basad.

Florissant, Colorado, in the Miocene shales; Station 14 (*W. P. Cockerell*.)

Among the fossil bees hitherto found at Florissant, this comes nearest to *Heriades laminarum* Ckll., but is smaller, with the second r.n. meeting second t.c., and the b.n. hardly falling short of the t.m. The apex of the marginal cell is pointed, if rather obtusely, not rounded. The first r.n. joins the second s.m. at a distance from its base equal to a little over a third of the length of the first t.c., the latter being about 224 microns long. The stigma is well developed.

#### CONCERNING THE REPUTED DISASTROUS OCCURRENCE OF *VANESSA CALIFORNICA* IN OREGON AND CALIFORNIA

BY J. MCDUNNOUGH, DECATUR, ILL.

In the April number of the CANADIAN ENTOMOLOGIST, Prof. F. M. Webster of the Bureau of Entomology, Washington, D. C., recounts several instances of devastation of crops and foliage which he attributes to the larvæ of *Vanessa californica*. A careful study of the various letters quoted convinces us that in all but the last

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