

ART. XXV.—*Descriptions of Tertiary Insects*; by T. D. A. COCKERELL.

PART II. [Continued from p. 52.]

(3) *A Belostomatid (Hemiptera) from Colorado.*

THE occurrence of Belostomatid bugs in the Tertiary rocks of Europe has been known ever since 1837, when Germar described *Belostoma goldfussi* from the vicinity of Bonn, in Rhenish Prussia. *Belostoma speciosum* Heer, from Eningen, is one of the largest and finest fossil insects from that famous locality. So far as the paleontological evidence went, one might have supposed that the Belostomatids, now so characteristic of America, were in Tertiary times confined to the Old

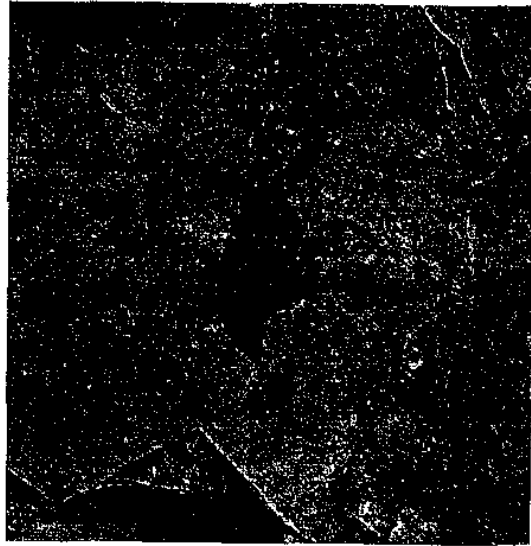


FIG. 1.—*Zaitha vulcanica*, $\times 2$.

World. That this was not really the case is shown by the discovery of a small species in the Florissant Miocene.

Zaitha vulcanica sp. nov.

Length of body 10^{mm} , not counting the thick caudal valves, which are about 2^{mm} long; breadth in middle a little over 5^{mm} ; shape normal; anterior femora 4^{mm} long, thick, but not swollen in the middle, the anterior edge practically straight (distinctly convex in the living *Z. fluminea*), the anterior side with a distinct groove; anterior tibia + tarsus about 3^{mm} long, curved as in *Z. fluminea*; hind femora distinctly incrassated in the middle; hind tibia + tarsus about 6^{mm} , thus shorter proportionally than in *Z. fluminea*. General appearance quite *Nepa*-

like, but the structure is that of *Zaita*. The apical angle of the corium appears to have been broader than in *Z. fluminea*, but the whole dorsal region is very indistinctly preserved. Florissant Station 14 (W. P. Cockerell, 1907).

(4) *A Tipulid Fly from the Green River Shales.*

The genus *Dicranomyia* Stephens is represented in the living fauna of North America by 35 described species. In the fossil state, numerous species occur in Prussian amber,

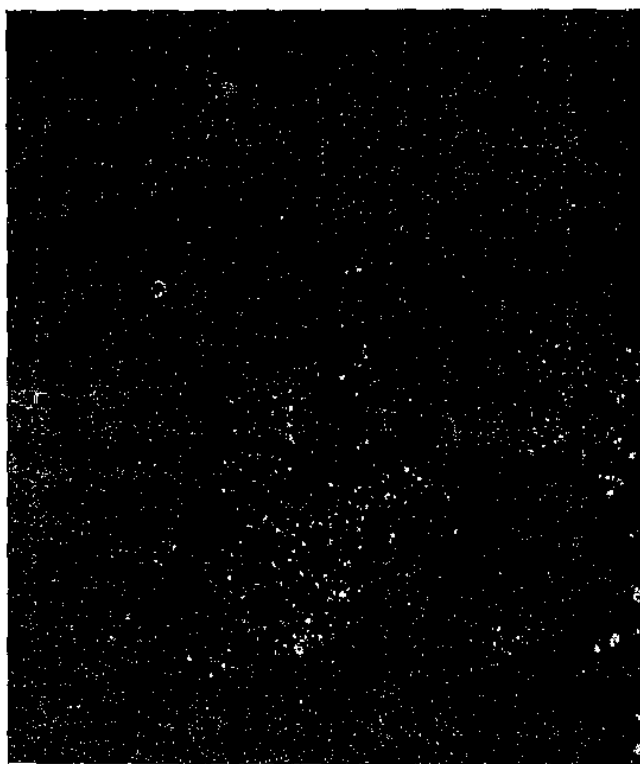


FIG. 2.—*Dicranomyia rhodolitha*, $\times 2$.

according to Loew. Scudder has described eight species from the Tertiary rocks of the Rocky Mountains; five being from Florissant and three from the Lower White River, at the boundary between Utah and Colorado. A new species is added from Wyoming.

Dicranomyia rhodolitha sp. nov.

Male. Length 7^{mm}; length of thorax 2^{mm}, its width 1 $\frac{1}{8}$ ^{mm}; genitalia essentially as in *D. stigmosa* Scudder. Eyes separated by an interval of about 135 μ .

Legs long and slender; anterior femur $4\frac{3}{5}$, tibia $5\frac{1}{2}$, tarsus $6\frac{1}{4}$ ^{mm}; middle femur $5\frac{1}{2}$, tibia 6 ^{mm}; hind femur 6, tibia $6\frac{2}{5}$ ^{mm}. Wings 7 ^{mm} long: a small dark spot on costa $2\frac{3}{5}$ ^{mm} from base; another 4 ^{mm} from base; stigmal spot large, as in *D. stigmosa*. Venation not well preserved, but the subcosta (mediastinal of Loew) and the four apical veins are all quite normal.

Allied to *D. stigmosa* Scudder, but distinguished by the details of the measurements, and especially by the two costal spots.

Red shale of Green River, Wyoming, in Yale University Museum. Collector unknown. One specimen, with reverse.

(5) *A Pompilid Wasp from Florissant.*

In all, four fossil Pompilidæ have been described, three from Florissant, and one from Eningen. One or two others, not named, are said to occur in Baltic amber. The Florissant species have been referred to *Hemipogonius* (2) and *Ceropalites* (1); an additional species, now described, belongs to *Agenia*.

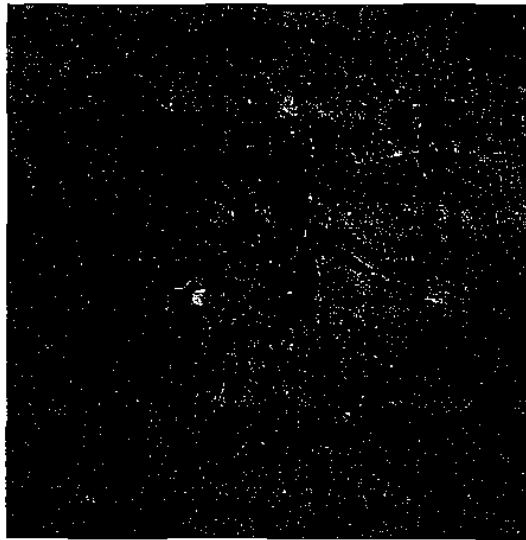


FIG. 3.—*Agenia saxigena*, $\times 2$.

Agenia saxigena sp. nov.

Length about $11\frac{1}{2}$ ^{mm}; rather stout, width of abdomen about $3\frac{1}{2}$ ^{mm}; anterior wing $9\frac{2}{8}$ ^{mm} long; body and femora black, tibiæ and tarsi ferruginous; wings faintly dusky, with a dark cloud in the marginal cell and below, and another in lower basal part of first discoidal and below; venation ferruginous; antennæ more or less curled apically; legs not at all spinose; stigma fairly large; marginal cell lanceolate, ending in a point

on costa; *first discoidal cell of the same length as first submarginal*, viz. 2890 μ ; cubitus of hind wings originating about 34 μ beyond transversomedial. The following measurements are in μ :

Greatest width of marginal cell	595
First submarginal on marginal	255
Second " " "	714
Third " " "	1020
Marginal from end of third transverso-cubital to apex	680
Basal nervure on first submarginal	340
" " " " discoidal	595
" " from transversomedial (basad of it)	680
Length of transversomedial	340
Lower side of first submarginal	2346
First transverso-cubital nervure	646
Second submarginal on first discoidal	255
" " " " third "	612
Third " " " " "	561
Lower side of third submarginal beyond third discoidal	1105

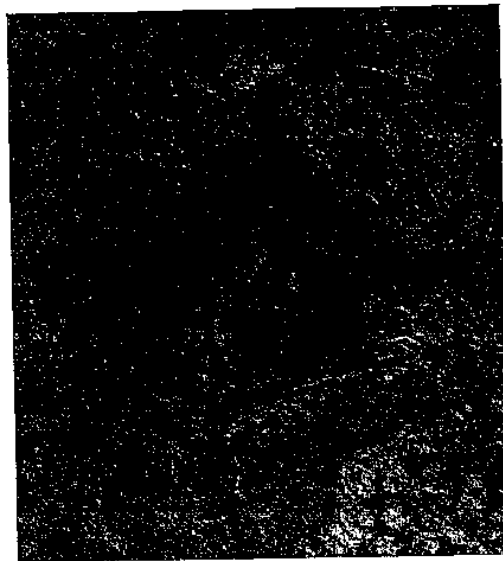


FIG. 4.—*Embia florissantensis*, $\times 2$.

According to Fox's* table the Pompilini (to which *Agenia* belongs) should have the first discoidal cell definitely longer than the first submarginal, but in some of the living forms the difference is trifling. *A. saxigena* is from Florissant, Station 14 (W. P. Cockerell, 1907).

*Proc. Phila. Acad., 1894, p. 295.

(6) *The Second Tertiary Embiid.*

Pictet in 1854 described *Embia antiqua* from Baltic amber, and this has remained the single fossil representative of the family; *E. westwoodi* Hagen, from copal, being properly of the recent period.

An insect occurring at Florissant, having a strong general resemblance to a Termitid, proves upon careful examination to disagree in important particulars with all Termitidæ, and to agree well with the Embiidæ, to which it must be referred. It has even the peculiar streaked appearance of the wings, so characteristic of this family.

Embia florissantensis sp. nov.

Length $12\frac{1}{2}^{\text{mm}}$; head about 2^{mm} ; prothorax about $1\frac{2}{3}$; anterior wing 11^{mm} long and $3\frac{3}{4}$ broad; posterior wing just over 9^{mm} long, but as broad as the anterior; shape of wings normal, with the usual longitudinal bands of color, giving rather the appearance of a flower-petal with colored veins. The head is narrow-oblong, considerably narrower than in *E. (Oligotoma) michaeli*, McLachlan; prothorax unusually elongated, shorter, but not very much smaller than the head; the distinct venation consists of two parallel veins, barely separated, running along the upper part of the wing for about three-quarters its length, nearly parallel with the costa, but gradually nearing it apically, and apparently fusing at their ends; and of an oblique vein in the anal region. According to the interpretation of Melander* the parallel veins represent the subcosta; and the oblique vein the cubitus, with its lowermost branch. The color bands, regarded as representing veins, show the media + radius, giving off two large branches above, essentially as in *E. urichi* Saussure (this Trinidad species is presumably named after Mr. Urich, the well-known naturalist of that island; hence there is no reason for perpetuating the erroneous form "*uhrichi*"), except that the branches are given off much sooner, the first about $4\frac{2}{3}^{\text{mm}}$ from base of wing, the second a little more than 4^{mm} from apex. The two lower color-bands, representing the third media and first cubitus, are also well represented. These particulars are derived from the anterior wing, but the hind wing is similar.

Hab.—Florissant, Station 14 (*W. P. Cockerell*, 1907). Also two from Station 13 (*S. A. Rohwer*, 1907, *W. P. Cockerell*, 1906). Melander, in giving an account of the discovery of *E. texana*, remarks that *Sapindus* and *Eysenhardtia* grew profusely in the locality where it was found. It is of interest to

* Biol. Bull., 1908.

note that *Sapindus* was abundant at Florissant and *Eysenhardtia* also grew there.*

(7) *A Mayfly from Florissant.*

Seven Ephemeroidea have been described from Baltic amber, and one from Cöningen. In America, Seudder has described five nymphs and one adult from Florissant. I have examined the type of the latter (*E. exsucca*) in the Museum of Comparative Zoology. A much larger form is here described; like the other, it unfortunately does not show the characters necessary for precise generic reference.

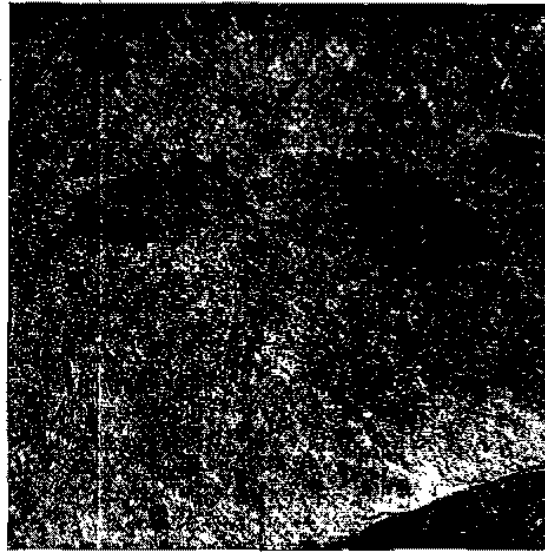


FIG. 5.—*Ephemera howarthi*, $\times 2$.

Ephemera (s. lat.) *howarthi* sp. nov.

Length of body, excluding caudal setæ, 15^{mm} ; thorax about 5^{mm} ; three slender caudal setæ; head transversely oval, about 2^{mm} broad, eyes about $\frac{1}{8}^{\text{mm}}$ distant on vertex; length of anterior wing 13^{mm} , costa very slightly arched, subcostal vein close to costa; outer margin about 9^{mm} long, distinctly convex.

Another specimen (from Sta. 13 B) is larger (anterior wing about 14^{mm}), but evidently the same species.

Florissant, Station 14 (*T. D. A. Cockerell*); also Sta. 13 B (*Geo. N. Rohwer*, 1907). I have named this species after Mr. Howarth, of Florissant, who is known even in Europe as a skillful creator of new genera and species of mayflies, of wondrous form and color, used by fishermen to lure the speckled trout.

* *Eysenhardtia* (or *Viborquia*) *nigrostipellata* Oehl. ined. was collected at Florissant by the Princeton expedition, and is now in the British Museum. The leaflets have the blade about $5\frac{1}{4}^{\text{mm}}$ long and $2\frac{3}{4}$ broad, and are almost exactly as in *E. orthocarpa* (Gray) Watson. The little black pointed stipels are like those of *E. spinosa* Engelm.