

ART. XXXIII.—*Fossil Insects from the Eocene of Texas;*
by T. D. A. COCKERELL.

No fossil insects have been hitherto reported from the Tertiary of the Gulf States, notwithstanding the abundance of vegetable remains. I am greatly indebted to Professor Edward W. Berry for transmitting to me a couple of specimens, beautifully preserved in white rock (kaolinite) from the Upper Eocene (Jackson) of Texas. The specimens were collected by Professor O. M. Ball of the Agricultural and Mechanical College of Texas, who has performed such important service in making known the fossil plants of the Upper Eocene of Brazos County. The exact locality from which these insect wings were collected is Mossy Creek just below the International and Great Northern bridge and about 3 miles southwest of Wellborn, Brazos County, Texas. The kaolinite occurs as lenses in sandy beds formerly known as the Wellborn formation, but now called the Fayette sandstone.

The finest specimen is a dragon-fly, preserved without pressure, so that the convexities and concavities of the wing remain as in life. It is a single wing, presumably a lower wing on account of its breadth (depth), though in the somewhat related *Hetaerina* it is the upper wing which has the lower margin near the base evenly convex. The aspect of the wing is entirely that of some Anisopterous species, and I could hardly believe my eyes when I realized that it was Zygopteran. It forms a very distinct new genus, as follows:

Eodichroma new genus.

Wing remarkably broad, not petiolate, lower margin convex, antenodal cross-veins 13; postnodals about six in 3 mm.; basal space with very delicate cross-veins; arculus emitting divisions of the media about its middle; quadrangle very narrow basally, gradually broadening, but its apex not acutely produced; before its end is a curved oblique cross-vein, cutting off an apical triangle (the triangle of the Anisoptera), the upper corner of which is truncate; cells beyond the quadrangle subquadrate, the first two much higher than long; subquadrangle

with three irregularly placed cross-veins; below the subquadrangle is a series of large subquadrate cells, and three series between them and the margin, except more basally, where there are only two; subcosta ending below middle of nodus; subnodus oblique, ordinary; radial (zygopterid) sector leaving subnodus with a rather strong curve downward, then becoming straight, to curve in the opposite direction apicad; between this sector and the first media there are four single cells before the doubling begins; from about the ninth to the sixteenth cell or beyond the cells of the upper series are extremely high and narrow, while those below them are square; media 1a present, about 4 mm. long; third media arising far basad, about 4.3 mm. basad of the nodus, just before the oblique vein which is similarly present and characteristic of *Heterina*, *Lais* and *Vestalis*; third media diverging from Zygopterid sector apically, ultimately with two longitudinal veins between, and on the margin ten small cells; fourth media widely diverging from third apically, with two supplementary longitudinal veins between (the lower 7 mm. long); two supplementary longitudinal veins between fourth media and first cubitus, and two between first and second cubitus; below second cubitus are five variously developed longitudinal veins. The basal space is longer than the quadrangle, but not nearly twice as long. It is possible to hold that the quadrangle is not crossed, the apical part being considered the first of the series of cells beyond, but that part appears to agree with the triangle of the Anisoptera. The region of the pterostigma is unfortunately not preserved.

Type: *Eodichroma mirifica* new species.

Eodichroma mirifica new species.

Wing 20 mm. long, about 6.5 wide (a little of the lower margin missing); apex broadly rounded, lower margin strongly convex, the greatest width (depth) of the wing before the middle; the basal 11.5 mm. is dilute brown, the region beyond colorless, the limit of the dark color sharply defined, at right angles to costa; nervures pale brown. Nodus 11.6 mm. from apex of wing; arculus 6 mm. basad of level of nodus.

This very remarkable genus, by reason of the structure of the arculus and branches of media, should fall in

the subfamily Epallaginae of the family Agrionidae. Yet in some respects it resembles the Agrioninae; for example *Hetaerina*, the common modern species of which has sharply bicolored wings in the male. It is another example of the persistence of a color-pattern while structure has changed. There are however many characters which separate it equally from the Agrioninae and Epal-

FIG. 2.

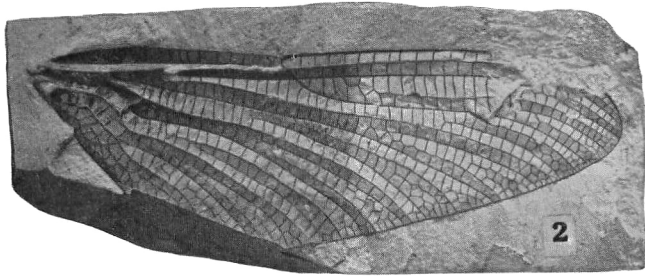


FIG. 2.—*Eodichroma mirifica* Ckll. $\times 4$.

laginae; the very broad wing, with extensive venation and fine reticulation in the anal region; the character of the quadrangle, with an apical cell simulating the triangle of an Anisoptera. Thus it may well form the type of a new subfamily, Eodichrominae (or Eodichromatinae).

The other specimen is the wing of an ant, to be described as follows:

Formica cooptera new species.

Anterior wing 11 mm. long and 4 wide; hyaline, faintly reddish, with pale but stout veins; stigma lanceolate, slender; costal cell very slender; basal nervure with upper section only slightly out of straight line with lower, the lower distinctly but not much the longer; nervulus about 1.6 mm. basad of basal nervure; discoidal cell large, subquadrate, but narrower above than below, and apically broader than basally, the upper basal corner obtuse; marginal cell long and broad, its inner corner acute; marginal and cubital nervures forming a cross as in *Camponotus*.

