

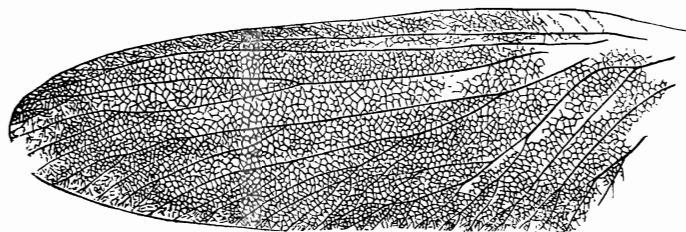
ART. IX.—*Brief Contributions to Zoölogy from the Museum of Yale College.* No. IX.—*Notice of a Fossil Insect from the Carboniferous formation of Indiana*; by SIDNEY I. SMITH.

Paolia vetusta, gen. et sp. nov.

THE fossil insect wing, represented in the accompanying figure, was sent for examination and description, from the Museum of Hanover College, Indiana, by Prof. E. Thompson Nelson. It occurred in the "grit" quarry near Paoli, Orange county, Indiana, and was discovered by the workmen while sawing the stone into small pieces for whetstones. The fossil is remarkably perfect, nearly the entire wing being beautifully preserved, and of peculiar interest for showing the complete wing-skeleton of an insect so ancient as the coal period. It is apparently the anterior wing of the left side, and measures 2.54 in. in length and about .85 in. in breadth, the posterior margin being slightly cut away by the saw.

Along the anterior border, the space between the second and third nervures is bent abruptly downward in the specimen, so as to be somewhat foreshortened as seen in the figure. This

is probably a natural fold such as is found in many Neuropterous insects.



The neururation is remarkable for the number of slender branchlets which the nervures throw off toward the posterior border and the tip of the wing. The first, or marginal, nervure* is continuous to the tip of the wing. The second is simple and straight nearly to the extremity, where it throws off several very minute branchlets and itself impinges upon the margin, about three-fourths of an inch from the tip of the wing, as a very delicate nervure. The third divides a short distance from its origin; the anterior branch runs parallel to the second nervure, is separated from it nearly as far as the second is from the first, and is simple to near its extremity, where it is twice forked, the minute branchlets reaching the margin a little way from the tip of the wing; the lower branch is broken and wanting just at its origin; it forks about the middle of its course, the anterior of these secondary branches again subdividing like the anterior primary branch, while the posterior secondary branch divides about the middle of its course, the anterior of these tertiary branches again dividing near its base, and the anterior of the branchlets reaching the margin at the apex of the wing. The fourth nervure divides a third of the way from the base to the tip of the wing; both these branches fork or branch several times, so that there are twelve branchlets extending from them to the margin, and one from the posterior, or inner, side which is lost in the space between the fourth and fifth nervures and does not reach the margin. The fifth divides near the base of the wing; the inner branch runs an almost straight course to near the margin where it divides: the outer primary branch divides about the middle of its course, both its branches again dividing or branching several times, and the first branchlet on the outer side not reaching the margin. The basal portion of

Figure 1, is once and a half natural size lineally, and was drawn on wood from a photograph.

* For convenience of comparison, I follow Heer's notation of the main nervures of the Neuropterous wing, as adopted by Mr. Scudder, regarding what are usually considered the primary branches of the median as distinct nervures, making six in all.

the sixth nervure is wanting in the specimen, but undoubtedly divides at its origin. The outer branch forks a short distance from the margin, and the outer of these branchlets, and probably the inner also, again fork very near the margin. The inner branch forks about the middle of its course, both these secondary branches forking once or twice.

All the interspaces are filled by a finely reticulated and very delicate net-work of minute nervures, but there are no straight cross-nervures. There is, however, a series of nervures running from the second nervure to the anterior margin, which are stronger than the general net-work, but still seem to be a part of it.

This wing differs so much in neururation from any family of recent insects, that it is difficult to point out any near affinity with living forms, although it shows some points of resemblance to several families of Neuroptera, and especially to the Ephemeroidea. To *Hemeristia* and *Miamia*, described and figured by Prof. Dana* and Mr. Scudder,† from the Carboniferous formation at Mazon creek in Illinois, it shows more resemblance, but still differs more from either of these genera, which are considered distinct families by Mr. Scudder, than they do from each other. From the forms described by Mr. Scudder in the third volume of the Geological Survey of Illinois, it is even more widely separated.

To the species described from the European Carboniferous, it seems to be still more closely allied. Prof. Hagen, to whom a tracing of the specimen was sent, is of the opinion that it will be found to belong to the same genus as the *Dictyoneura libelluloides* of Goldenberg.‡ Prof. Hagen, also, regards the remarkable *Eugereon Böckingi* Dohrn,§ which has attracted so much attention, as the same genus, and perhaps the same species, as *D. libelluloides*. In both *Dictyoneura* and *Eugereon*, as figured, the wings have considerable resemblance to the specimen from Indiana, but in neither of them are the nervures so numerous and branched toward the posterior border of the wing, and in *Eugereon* the spaces between the three first nervures next the anterior border are connected by straight cross-nervures. There are also important differences in the branching of the main nervures. Regarding these differences as at least of generic value, I propose to institute a new genus for the species from Paoli, and call it *Paolia vetusta*.

* This Journal, vol. xxxvii, pp. 34, 35, figs. 1, 2, 1864.

† This Journal, vol. xl, p. 268, 1865, and Memoirs Bost. Soc. Nat. Hist., vol. i, p. 173, pl. 6, 1866.

‡ Die fossilen Insecten der Kohlenformation von Saarbrücken (aus den Palæontographis von Dunker und Meyer, Band iv, 1854), pl. 1.

§ *Eugereon Böckingi*, eine neue Insectenform aus dem Todtliegenden (aus Palæontographica von Dunker, Band xiii, 1866, pl. 41).