

carbonarius, but it is certainly important to record its discovery in the Staffordshire Coalfield.

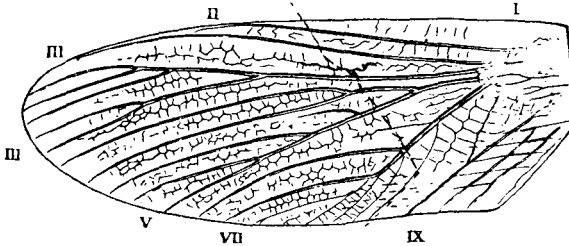


FIG. 5.—Wing of *Fouquea cambrensis*, n.sp., from the Coal-measures of South Wales. $\times 2$. Reproduced from Mr. H. A. Allen's paper (see GEOL. MAG., 1901, p. 66).

It is very distinct in general form from *Fouquea cambrensis*, figured and described by Mr. H. A. Allen, F.G.S., from the Coal-measures of South Wales, but it certainly belongs to the same group as *Lithomantis* and to the family PLATYPTERIDA.

V.—ON THE PERMIAN AND TRIASSIC FAUNAS OF SOUTH AFRICA.

By Professor R. BROOM, M.D., D.Sc., Victoria College, Stellenbosch.

UNTIL recently very little attempt has been made to classify the reptilian fossils of the Karroo Beds according to their geological horizons. Seeley recognised certain zones—(1) the zone of Mesosaurs, (2) the zone of Pareiasaurs, (3) the zone of Dicynodonts, (4) the zone of specialised Theriodonts, and (5) the zone of Zanclodonts. While the order of these zones is correctly given they do not cover the whole period, and the third zone is an unnatural one.

As the result of the work of the last few years, it is now possible to subdivide the Karroo Beds with some degree of accuracy into a number of fairly well-marked distinct faunas. At the recent meeting of the British Association a paper was read, which will appear elsewhere, giving the details of recent work. As, however, much interest is at present being taken in the Triassic faunas of both Europe and America, a summary of the conclusions come to may be of use to workers in the northern hemisphere.

The most recent rocks of the Karroo Series are the Upper Stormberg Beds. These contain remains of the Dinosaurs *Massospondylus*, *Euskelesaurus*, and *Hortulotarsus*, and of the small crocodile *Notochampsia*. As *Notochampsia* is a true crocodile, we may safely refer the beds to Lower Jurassic, more especially as the Lower Stormberg or Molteno Beds immediately below have been referred by Seward from the evidence of the plant remains to the Rhætic.

Below the Molteno Beds we come to the *Cynognathus* Beds, corresponding to the 'specialised Theriodont' zone of Seeley. In

these beds there is a very rich fauna, of which the most characteristic forms are the extremely mammal-like Cynodont reptiles, *Cynognathus*, *Gomphognathus*, etc. Other noteworthy forms are the large Phytosaur, *Erythrosuchus*; the Gnathodont, *Howesia*, a small form allied to *Hyperodapedon*; a species of *Cyclotosaurus*, and a species of *Ceratodus*. There seems little doubt that these beds are of Upper Triassic age.

Underneath these we come to a distinct but allied fauna characterised by the abundant remains of the primitive reptile *Procolophon*. Other forms are *Paliguana*, the oldest known true lizard, and *Proterosuchus*, a Rhynchocephalian which shows some affinity to the Phytosaurs. These beds are called the *Procolophon* Beds, and may be of Middle Triassic age.

Below these are extensive beds in which land forms are very rare, but in which are abundant remains of the aquatic Anomodont, *Lystrosaurus*, and the fish *Atherstonia*. These are called the *Lystrosaurus* Beds, and they are believed to be of Lower Triassic age.

Underneath these *Lystrosaurus* Beds we come to rocks in which land forms are again numerous. Three fairly well-marked zones are recognised: (1) *Kistecephalus* Beds, (2) *Endothiodon* Beds, (3) *Pareiasaurus* Beds. In all of these remains of *Dicynodon* are met with, but it is in the *Endothiodon* Beds that *Dicynodon* and *Oudenodon* are met with in greatest abundance. All the carnivorous reptiles of this period are either Therocephalians or Dinocephalians. All three zones are believed to be of Upper Permian age.

Below the *Pareiasaurus* Beds a few reptiles have been found in the *Ecca* Beds, but most of the remains are very imperfect. *Mesosaurus* is found in the Upper Dwyka, and may be assumed to be of Lower Permian age.

•While it is perhaps unwise to place too much weight on the evidence, the South African faunas seem to afford a little new light on the age of the Elgin sandstones. The *Stagonolepis* Beds, which contain *Stagonolepis*, *Ornithosuchus*, *Erpetosuchus*, *Stenomemetopon*, *Hyperodapedon*, and *Telerpeton*, seem to correspond to the *Cynognathus* Beds of South Africa, which contain *Erythrosuchus*, *Howesia*, and *Thelegnathus*, forms all allied to those of Elgin. If this be so, then the *Stagonolepis* Beds may be regarded as Upper Triassic.

The *Gordonia* Beds, containing *Gordonia*, *Geikia*, and *Elginia*, resemble most closely the *Pareiasaurus* Beds of South Africa with *Dicynodon*, *Oudenodon*, and *Pareiasaurus*. The resemblance, however, is much closer to the Russian forms of the Upper Permian of the Dwina, and it seems probable that the Elgin forms are descendants of the Russian, as the Russian probably are of the African. We may conclude that the *Gordonia* Beds are either Upper Permian or Lower Triassic, more probably the former.

(See also Abstract of paper by Prof. Broom on the Classification of the Karroo Beds of South Africa, p. 36.)