of the third, fourth, and fifth pairs of appendages movable and separated by a wide sternal area, which was membranous at the sides and furnished with a median longitudinal sternal plate, extending anteriorly between the coxæ of the appendages of the third pair (first pair of walking-legs).

ANTHRACOMARTI.

- b. Prosoma and opisthosoma not movably jointed together, and at least the anterior four somites of the opisthosoma fused. Lateral portions of terga and sterna of opisthosoma not produced into movably jointed laminae. Coxæ of the posterior appendages free or united to the prosoma, the sternal region of which is reduced to a narrow longitudinal sclerite by the encroachment of the appendages towards the middle line, or to a short transverse plate by the forward movement of the sternal elements of the anterior somites of the opisthosoma PHALANGIOMORPHÆ.

But whether the definition of the Opiliones be extended to include the Anthracomarti or whether the latter be regarded as an order apart, are questions of subordinate importance. The chief interest attached to these Carboniferous Arachnida lies in the fact that, setting aside the development of the specialized tergal laminae, the characters in which they differ from the Opiliones serve to link the latter to the Pedipalpi. The fusion of the prosoma with the opisthosoma, and of more or fewer of the tergal plates of the latter region with each other; the reduction in number of the segments of the opisthosoma to ten, including the anal valve, or eight; the immobility of the coxæ of the appendages and their admedian approximation on the lower side of the prosoma, accompanied by the reduction in size of the sternal sclerite, are a few of the many specialized features of the Opiliones. But since the Arachnida of this order are descended from forms in which the opisthosoma consisted of twelve separately jointed segments and was movably articulated to the prosoma, and in which the appendages of this region were freely movable and were separated by a broad sternal area furnished with a large sternal plate or plates, the existence of forms antecedent to the Opiliones and occupying an intermediate position between them and the primitive type is a necessity demanded by the theory of descent. The nearest known allies to these antecedent forms are, I believe, the extinct Arachnida belonging to the Carboniferous Anthracomarti.

III. — THE BASALT OF THE MOABITE STONE.

By Professor T. G. BONNEY, D.Sc., LL.D., F.R.S.

A BLOCK of basalt, bearing an ancient inscription in a Semitic language, was discovered in 1868 at Dhiban (the Dibon of Scripture) by the Rev. F. A. Klein, of the Jerusalem Mission Society. This block, which measured 3' 10" × 2' 0" × 1' 2-5", proved on examination to have been erected by Mesha, King of Moab about 890 B.C., and to refer to the war mentioned in 2 Kings iii. A series of blunders on the part of those anxious to obtain this interesting relic caused a quarrel about ownership between two Arab tribes, and one of them, to spite the other, broke it in pieces. These, however, were obtained by the French Consul in Palestine, and sent to Paris, where they were fitted together so far as possible, and the

repaired stone is now in the Louvre Museum.¹ The late Professor E. H. Palmer, on a visit to Dhiban in 1870, picked up a small fragment from those still lying on the spot, which he gave to me on his return to England. The constant pressure of other work has hitherto prevented me from examining the specimen, and I have only recently had a slice prepared. The largest face of the fragment measures about 3" × 2.5", but the thickest part hardly exceeds half an inch. The original smoothed surface of the stone, possibly including part of a letter, may be seen on one of the sloping sides.

The rock apparently is in good preservation; minutely granular, nearly black in colour, but proving on a closer examination to be speckled with more than one dark mineral, and with less definite greyish spots, all very small. Its specific gravity (by a Walker's balance) is 2.89. The slice, when examined under the microscope, exhibits a porphyritic structure, though on a small scale, no one of the minerals exceeding about .05" in diameter. They are:—(a) Augite, not abundant, brown in colour, the grains presenting a rather corroded aspect both externally and even internally, partially including, in one instance, a small grain of the next mineral. (b) Olivine, rather abundant, rounded or slightly irregular in outline, occasionally showing a fairly well-developed brachypinacoidal and an imperfect macropinacoidal cleavage. A brown staining has affected the exterior of most grains, and penetrated for a short distance into cracks. This, in addition to a very faint yellowish tinge in the grains, shows the olivine to be a rather ferriiferous variety. (c) Iron-oxide, hematite, or perhaps ilmenite, with a rusty-looking exterior; (d) felspar: this, like the last-named mineral, varies so much in size that it is difficult to draw the line between crystals occurring porphyritically and those in the base. In no case do the extinction angles give very decisive evidence, but they suggest that labradorite is at any rate the dominant species.

The minutely holocrystalline groundmass, except for one or two small patches, consists of lath-like plagioclases, up to about .004" in length; of stumpy, not very well-formed prisms of brown augite, about .002", and of granules of iron-oxide. The patches, small² and not numerous, are formed by a fairly clear mineral, which, however, includes some very minute films, giving bright polarization tints, its own being very low, not rising above a greyish or slightly pinkish white. Each patch generally consists of two or three grains, and is without a definite external form. The small felspars and augites are sometimes included by or project into these patches from the surrounding matrix, which has no regular boundary. The mineral resembles a lime carbonate (there is no distinct cleavage), and I observed, on applying some hydrochloric acid to the cut surface, a rather brisk effervescence at a number of points; hence, I conclude it must be calcite, probably not very pure. But though it occurs

¹ Palmer: "Desert of the Exodus," pt. 2, ch. x. For the inscription see Ginsburg, "Moabite Stone." A figure and succinct account are given in Chambers' *Encyclopædia*, s.v. Moabite Stone.

² The diameter of the largest is about .03".

sporadically it does not seem to fill a cavity, or to have replaced a less stable species of felspar, which indeed, as the rock is in good preservation, is hardly probable. So I think the mineral must have been present as a constituent when the rock was molten, and can only suppose that the latter, on its ascent to the surface, caught up some intervening limestone, and the pressure sufficed, as in a case of contact metamorphism, to prevent the dissociation of the carbonate, which here and there retained its identity in the viscid mass.¹ This occurrence in such a rock as basalt, is, I think, rather unusual.

IV.—THE CENOMANIAN OVERLAP.

By A. J. JUKES-BROWNE, B.A., F.G.S.

THAT the Upper Cretaceous deposits overlap those of the Lower Cretaceous series, and extend over much larger areas throughout the whole of western and central Europe, are facts which have long been familiar to all European geologists. There has, however, been a tendency, especially in France, to imagine that the subsidence to which the overlap is due took place at one particular epoch, namely, the Cenomanian, and that this subsidence was so rapid and profound that it caused the Upper Cretaceous Series to be sharply marked off from the subjacent strata by the so-called 'Cenomanian transgression.'

Moreover, some French geologists so magnified the importance of this transgression that they regarded it as a criterion for deciding whether a given stage or zone should be classified as Lower or Upper Cretaceous. Their views have doubtless had much influence upon Continental opinion, and are largely responsible for the classification which places the 'Albian' in the Lower Cretaceous Series, and for the uncertainty as to whether the zone of *Am. (Schlenbachia) rostratus* should be grouped with the Albian or the Cenomanian.

In England there has never been any such doubt; we have always included the Gault (Albian) in the Upper Cretaceous Series, and have regarded it as partaking in the transgression of that series beyond the limits of the Vectian or Lower Greensand.

The French view dates from the time of D'Orbigny, who wrote in 1840 as follows:—"From the time of the craie chloritée (which he afterwards called Cenomanien) we see that the whole aspect of the Cretaceous seas was changed. . . . At about this epoch the extension of the seas both in France and throughout Europe was at least double that which they had at the time of their first invasion of the region in the Neocomian period." This generalization may have been in accordance with the knowledge of D'Orbigny's time, but is not maintainable in the light of more recent investigations. It should be remembered that when D'Orbigny thus wrote, and for many years afterwards, he believed that there was a marked discordance between the Albian and the Cenomanian deposits, and that

¹ For cases of the imperfect digestion of a carbonate in an igneous mass, see J. Parkinson, Q.J.G.S., lvii (1901), p. 198, and A. K. Coomaraswamy, id., lviii (1902), p. 399.