

XVI.—*On the Nature of "Hæmapophyses," in reply to some Criticisms of M. Dollo.* By G. A. BOULENGER.

IN two papers published in the 'Bulletin scientifique de France,' xxiv. 1892, of which extracts have been kindly sent me by the author, M. L. Dollo has endeavoured to show that his maxim, "*Chez tous les vertèbrés, les côtes sont homologues aux côtes et les hæmapophyses aux hæmapophyses,*" being true, the views I have expressed as to the nature of the Reptilian chevrons are necessarily incorrect. I fear my friend lets himself be carried astray by theories which, however fascinating they may appear when treated in the talented manner with which all readers of his works are familiar, are, in this special case, unsupported by facts. I maintain that there is not at present the slightest evidence that the chevrons are homologous throughout the Vertebrata, as my critic will have it. An examination of the vertebral column of *Amia* suffices to show how, in that type, the true ribs gradually converge ventrally towards the caudal region, and do duty for the "hæmapophyses." The embryological researches of C. Scheel (*Morphol. Jahrb.* xx. 1893, p. 1) also prove that in the Teleostei the hæmapophyses are formed by the parapophyses or parapophyses and ribs. It further appears to me that M. Dollo, when writing on the subject, had not present to his mind the multitudinous modifications of the vertebral column of Teleosteans, for I cannot see how his account of the relations of the ribs and hæmal arch can be reconciled with the structure of such a well-known type as the typical Scomberoids, Mackerel or Tunny.

I here quote Cuvier on the Mackerel :—"L'épine a trente et une vertèbres, Les apophyses transverses forment l'anneau [hæmapophysis] dès la dixième. Elles ont d'abord deux côtes de chaque côté, partant du même point; ensuite les côtes se séparent un peu. Les supérieures, plus courtes, durent jusqu'à la dix-huitième vertèbre; les autres, plus longues, cessent dès la treizième." Hence we have on one and the same vertebra (10th to 13th) the two ribs, assumed by M. Dollo to represent the true rib and the hæmapophysis, in addition to the hæmal arch.

A further argument against M. Dollo's theory of the homology of the hæmal arch throughout the Vertebrata is derived from the fact that in certain Cyprinoids the anterior thoracic vertebræ possess a ventral arch enclosing the aorta. This arch is pronounced by Scheel to be formed by mere fibrous processes of the centrum, and to be homologous with the chevrons of Urodele Batrachians.

I therefore conclude that the hæmal arch is not homologous throughout the Vertebrata, as it may be formed by the ribs alone (*Amia*), by the parapophyses or parapophyses and ribs (*Teleostei*), or by mere ventral processes of the centra or intercentra; that the "hæmapophysis," as an element, does not exist; and that the interpretation I have given to the chevrons of Reptiles is correct.

XVII.—*On the Tadpole of Pelobates syriacus, Boettger.*

By G. A. BOULENGER.

AMONG some Batrachians from Syria which their collector, Professor J. Barrois, has kindly sent me, were four large tadpoles, which I should have pronounced as of *Pelobates fuscus*, were it not for the locality whence they were procured—the immediate environs of Damascus. Now, the *Pelobates* of Syria which, in its perfect condition, stands much nearer to *P. cultripes* than to *P. fuscus*, has recently been described by Dr. Boettger under the name of *P. syriacus*; and I therefore feel justified in applying that name to these tadpoles, although I am unable to point out any character of importance by which they are to be distinguished from the common species, *P. fuscus*.

The nostrils are equally distant from the eyes and the end of the snout; the distance between them equals one half the interocular width, which equals once and a half to once and two thirds the width of the mouth. The tail is nearly thrice as long as deep, acutely pointed, once and two thirds to twice the length of the body. The beak and lips agree entirely with *P. fuscus*.

The largest specimen measures 120 millim. Length of body 42, width of body 25; length of tail 78, depth of tail 28.

I may add that I have received from Prof. R. Collett a young specimen of *P. syriacus*, stated to be from Smyrna.

XVIII.—*Notes on the Changes of Plumage in the Red Grouse (Lagopus scoticus).* By W. R. OGILVIE GRANT.

So many books have been written on British Birds that it seems curious any new facts regarding the sexual differences or changes of plumage in our common species should still remain unrecorded or only imperfectly described.

Some time ago, in two articles published in the columns of



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