

AN UNUSUAL AVIAN CORACOID FROM THE PALEOGENE QUERCY FISSURE FILLINGS IN FRANCE

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Abstract - We report on an avian coracoid from the Quercy fissure fillings, in France, now recognized to belong to a Middle Eocene to Upper Oligocene sequence. It shares characteristic derived features with the corresponding bone of modern Psophiidae (Trumpeters), most notably a medial crest along the wide shaft and pneumatic openings on the extremitas sternalis. If assignment to trumpeters can be confirmed by future material, the specimen would be the first fossil record of trumpeters and a further example of a characteristic South American taxon, of which stem lineage representatives occurred in the Paleogene of Europe.

Résumé - Cette étude concerne un coracoïde d'oiseau provenant des remplissages karstiques des Phosphorites du Quercy, dont les âges sont en majorité compris entre l'Eocène moyen et l'Oligocène supérieur. Ce coracoïde partage des caractères dérivés avec celui des Psophiidae, ou Agamis, actuels, principalement une diaphyse large s'étendant par une crête du côté médial et des orifices pneumatiques à l'extrémité sternale. Si l'attribution aux Psophiidae pouvait être confirmée dans le futur par la découverte d'éléments nouveaux, ce spécimen serait le plus ancien reste de Psophiidae connu jusqu'à présent. Plusieurs familles actuellement uniquement sud-américaines sont représentées dans le Paléogène d'Europe par des formes appartenant à des "stem-groups" de ces familles. La présence d'un Psophiidae dans le Quercy serait un nouvel exemple montrant que certains éléments caractéristiques de l'avifaune sud-américaine sont des relictés de groupes qui étaient également présents au Paléogène dans l'Hémisphère Nord.

Key words - Fossil bird, Quercy, Eocene-Oligocene, Grues, Psophiidae ? Paleobiogeography.

Mots clefs - Oiseau fossile, Quercy, Eocène-Oligocène, Grues, Psophiidae ?, Paléobiogéographie.

INTRODUCTION

The Quercy fissure fillings in France are among of the most important localities for Paleogene avian fossils and have yielded a great number of mainly Middle Eocene to Upper Oligocene bird bones.

Although the fossil remains from these localities are well-studied (Mourer-Chauviré, 1995 a, and this volume), there is still a number of previously unrecognized taxa among the undescribed material (CMC, GM, pers. obs.).

Here we report on a coracoid from the old collections of the Paris Museum which exhibits characteristic derived features of the corresponding bone of modern Psophiidae (trumpeters). These primarily frugivorous birds include a single extant genus (*Psophia*) with three very similar species that occur in humid equatorial forests of the Amazon Basin (Sherman, 1996). Recent studies have shown trumpeters to be the sister group of Aramididae (limpkin) and Gruidae (cranes), and the clade formed by these three taxa in turn is the sister group of a clade including Heliornithidae (sungrebes) and Rallidae (rails) (Livezey, 1998; Mayr & Clarke, 2003; Mayr & Ericson, 2004; Fain & Houde, 2004; Cracraft *et al.*, 2004). So far no fossil taxa were assigned to the Psophiidae.

1. SYSTEMATIC PALEONTOLOGY

Aves Linnaeus, 1758
Grues (sensu Livezey, 1998)
Family, genus, and species indet.

Referred specimen: MNHN QU 16929 (left coracoid, Fig. 1A-C), deposited in the Muséum national d'Histoire naturelle, Paris.

Locality and horizon: Unknown locality and horizon of the Quercy fissure fillings in France.

Measurements (in mm): Length, 21.4, mediolateral width of cotyla scapularis, 2.1.



Figure 1. Coracoid of MNHN QU 16929 (A, B, C) and modern *Psophia crepitans* (Psophiidae) (D, E, F) in comparison. A, D, dorsal aspect; B, E, ventral aspect; C, F, detail of dorsal aspect of extremitas sternalis showing pneumatic openings. Scale bars equal 5 mm.

Description and comparison (osteological terminology follows Baumel & Witmer, 1993): The bone measures only about half of the size of the coracoid of modern *Psophia crepitans*. It is nearly complete, only the tip of the processus procoracoideus, as well as small parts of the margo medialis and the processus lateralis are broken.

In its proportions, specimen MNHN QU 16929 is intermediate between the coracoid of rails and that of trumpeters (Fig. 2). Especially the shape of the extremitas omalis is more similar to that of rails in that the facies articularis humeralis is shorter and situated closer to the cotyla scapularis. The fossil differs from both,

rails and trumpeters, in the presence of a distinct, pit-like depression in the sulcus supracoracoideus (Fig. 2), which is here considered to be an autapomorphy of MNHN QU 16929.

The processus acrocoracoideus is more protruding than in *Psophia*, the facies articularis clavicularis does not form a small hook. The cotyla scapularis is shallower than that of rails, similar to the condition seen in modern Psophiidae.

The foramen nervi supracoracoidei is proportionally larger than in *Psophia* and situated closer to the cotyla scapularis than in modern Psophiidae and Rallidae (Fig. 2).

As in modern Psophiidae, there is a marked crest along the medial margin of the shaft, from the processus procoracoideus to the extremitas sternalis. In modern Psophiidae this crest is even more pronounced than in the fossil. An incipient medial crest also occurs in some Rallidae in which it is, however, not as strongly developed than in the fossil specimen; the shaft of the coracoid is distinctly narrower in all rails. The medial margin of the shaft of MNHN QU 16929 further lacks the notch that is characteristic for Rallidae (Fig. 2).

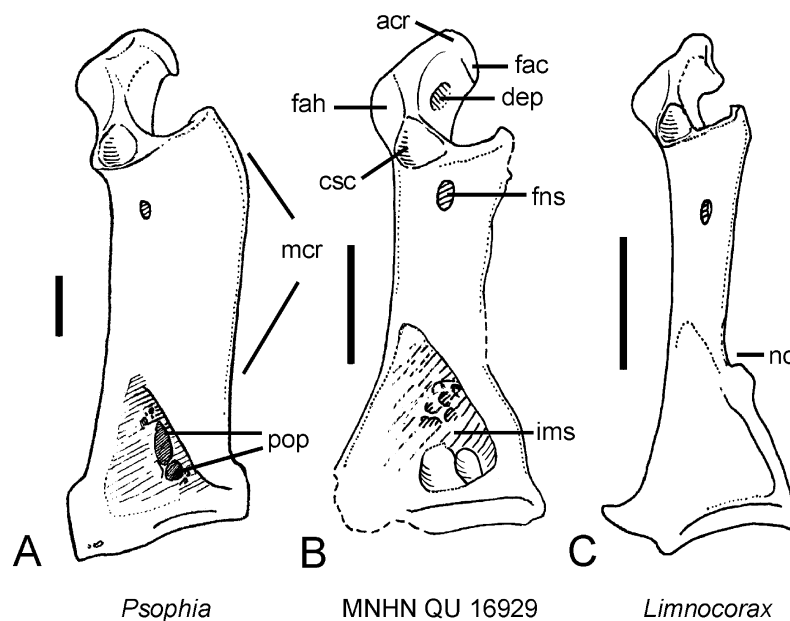


Figure 2. Dorsal view of the left coracoid in comparison. A, *Psophia crepitans* (Psophiidae); B, MNHN QU 16929; C, *Limnocorax flavirostris* (Rallidae). Abbreviations: acr - processus acrocoracoideus, csc - cotyla scapularis, dep - depression in sulcus supracoracoideus, fac - facies articularis clavicularis, fah - facies articularis humeralis, fns - foramen nervi supracoracoidei, ims - impressio musculi sternocoracoidei, mcr - crest along margo medialis, no - notch in margo medialis, pop - pneumatic openings. Scale bars equal 5 mm.

Also as in modern Psophiidae, the deeply excavated impressio musculi sternocoracoidei on the extremitas sternalis exhibits an irregular surface and many pneumatic foramina along its medial margin (Fig. 2; note that some of the openings visible in Fig. 1C are due to erosion of the bone). Pneumatic foramina on the extremitas sternalis are also found in few other taxa (Mayr and Clarke, 2003: character 67). However, in Gruidae, the anseriform Anhimidae (screamers) and Anseranatidae (magpie goose), and in Opisthocomidae (hoazin) they are situated in a single large opening; in Diomedeidae (albatrosses) and Cathartidae (New World vultures) they are not situated in a deeply excavated impressio musculi sternocoracoidei. The only taxon of which the dorsal surface of the extremitas sternalis of the coracoid exhibits a similar morphology to *Psophia* and the Quercy fossil is the Nkulengu Rail *Himantornis haematopus* (Rallidae). In all other aspects,

the coracoid of *H. haematopus* is, however, very similar to that of other rails and differs from MNHN QU 16929 (Olson, 1973: Fig. 2).

2. DISCUSSION

The avian coracoid is among the more diagnostic skeletal elements and the specimen described in this study exhibits a distinctive, derived morphology which it only shares with modern Psophiidae. In particular, it resembles extant Psophiidae in the wide shaft which bears a marked crest along its medial margin, and by the deeply excavated impressio musculi sternocoracoidei on the extremitas sternalis which exhibits many pneumatic foramina.

MNHN QU 16929 is however only about half of the size of modern *Psophia* and also shows some overall resemblance to the coracoid of rails, although it lacks the notch on the medial margin of the shaft which appears to be an apomorphy of crown group Rallidae (Fig. 2). Underlying the hypothesis that Rallidae and Heliornithidae are the sister taxon of the clade (Psophiidae + (Aramidae + Gruidae)) (see introduction), the more rail-like extremitas omalis of MNHN QU 16929 may be plesiomorphic for Grues. The pneumatic openings on the sternal extremity of the coracoid of *Himantornis* most likely are an apomorphy of this taxon as these are absent in Heliornithidae, the sister taxon of Rallidae (Mayr, 2004a: Fig. 4).

The coracoid is known for most other avian taxa from Quercy that have been associated with the Gruiformes, such as the Idiornithidae (genera *Elaphrocnemus*, *Idiornis*, *Oblitavis*) (Mourer-Chauviré, 1983, 2003), the Ameghinornithidae (Mourer-Chauviré, 1981, 1983), and the Messelornithidae (Mourer-Chauviré, 1995 b), and it is clearly distinguished from MNHN QU 16929. However, three putative rails which were assigned to *Quercyrallus* Brodkorb, 1963, are based on incomplete humeri (*Qu. arenarius* Milne-Edwards, 1892, *Qu. quercy* Cracraft, 1973) and a femur (*Qu. dasypus* Milne-Edwards, 1892) (Cracraft, 1973), and direct comparison with MNHN QU 16929 is thus not possible. *Qu. arenarius*, the type species of the genus *Quercyrallus*, is much too small to be conspecific with the species described herein, and "*Qu. dasypus*" was synonymized with the galliform *Palaeortyx gallica* by Mourer-Chauviré (1992). *Qu. quercy* does not exhibit derived characteristics that would allow assignment to the Psophiidae, and the coracoid of other Paleogene Rallidae exhibits a morphology very similar to their modern relatives (Mayr & Smith, 2001; Mayr, 2006). We thus consider it unlikely that MNHN QU 16929 belongs to *Quercyrallus quercy*.

Discovery of stem lineage Psophiidae outside the New World would add to the mounting evidence that some characteristic elements of the South American avifauna are relicts of groups that also occurred in the Paleogene of the Northern Hemisphere (Olson, 1989; Mourer-Chauviré, 1999; Mayr, 2005, contra Cracraft, 2001). Other avian groups that were once considered to be of South American origin but of which stem lineages representatives have been reported from the Tertiary of Europe include Nyctibiidae (potoos, Mourer-Chauviré, 1989; Mayr, 2001), Trochilidae (hummingbirds, Mayr, 2004b), and Cariamidae (seriemas, Mourer-Chauviré, 1983).

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