A new record of the Prophaethontidae (Aves: Pelecaniformes)
from the Middle Eocene of Belgium

by Gerald MAYR & Richard SMITH

Abstract

A new record of the pelecaniform family Prophaethontidae Harrison & Walker, 1976 is described from the Middle Eocene of Belgium. The specimen, an isolated left coracoid, presents previously unknown osteological details. It is smaller than the coracoid of Prophaethon shrubsolei Andrews, 1899 and might belong to a new, yet unnamed species.

Key words: Aves, Pelecaniformes, Prophaethontidae, Middle Eocene, Belgium.

Résumé


Fig. 1 — Location of the Imbrechts quarry in Nederokkerzeel.
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Introduction

The Lower Eocene pelecaniform bird Prophaethon shrubsolei was described by Andrews (1899) from the London Clay of the Isle of Sheppey, England (stratigraphic level MP 8-9, according to Milkovsky, 1996). The type specimen consists of associated elements of a single individual, including a largely complete skull, an incomplete coracoid and scapula, part of the sternum, a nearly complete pelvis, a femur, and the proximal end of a tibiotarsus.

As indicated by the genus name, Andrews (1899) assigned Prophaethon to the family Phaethontidae (tropicbirds). In the course of a re-description of the type specimen, Harrison & Walker (1976) classified the genus in its own order and family, and thought it to be a "link" between the avian orders Pelecaniformes, Charadriiformes, and Procellariiformes. Olson (1985a, 1985b), however, considered ordinal separation of Prophaethon not to be justified, and stated that the Prophaethontidae "should be placed in the Pelecaniformes in the suborder Phaethontes" (Olson 1985a: 194). Olson (1994) tentatively assigned a very small coracoid from the Palaeocene of Maryland to the genus Prophaethon, but unfortunately did not figure this specimen which belongs to a yet undescribed species.

We herein describe a new record of the Prophaethontidae from the Middle Eocene of Nederokkerzeel, Belgium, which was collected by R. Smith in 1987. The locality is situated 16 km northeast of Brussels and 200 m southwest of the hamlet of Laar, in a sand quarry operated by the family Imbrechts (Figs. 1, 2).

The fossil specimen is deposited in the Institut Royal des Sciences Naturelles de Bruxelles, Belgium (IRScNB). The osteological terminology used in this study follows Baumel & Witmer (1993), the dimensions are in millimeters.

Taxonomy

Pelecaniformes Sharpe, 1891
Prophaethontidae Harrison & Walker, 1976
Genus and species indeterminate

Fig. 3

Referred specimen
IRScNB Av 79 (almost complete left coracoid, lacking part of the processus acrocoracoideus and the processus lateralis).

Locality and horizon
Nederokkerzeel near Brussels, Belgium; Middle Eocene (Lutetian, Brussels Formation).

Dimensions
Maximum length along longitudinal axis, 38.0; length...
from angulus medialis to tip of processus acrocoracoi-
deus, 34.3; minimum medio-lateral width of shaft, 4.8; length and width of facies articularis humeralis, 7.5 4.6.

DESCRIPTION AND COMPARISON

The specimen is about 2/3 of the size of the coracoid of the White-tailed tropicbird, Phaethon lepturus, which is the smallest extant species of the Phaethontidae. It is distinguished from all Pelecaniformes except for the Pelecanidae, Prophaethontidae and Phaethontidae by the presence of a foramen nervi sitpracoracoidei. As in recent and fossil Phaethontidae, the facies articularis scapularis is still very shallow (in recent Pelecanidae and in the early Eocene frigatebird Limnofregata it is deeply excavated).

As far as comparable, owing to préservation, the Nederokkerzeel specimen closely resembles the coracoid of Prophaethon shrubsolei. A characteristic feature which is shared by the fossil from Nederokkerzeel and Prophaethon shrubsolei is the narrow processus lateralis, which distinguishes the genus Prophaethon from extant Phaethontidae and all other Pelecaniformes (this process is very long in P. shrubsolei - in the new specimen its tip is broken just behind the angulus lateralis).

The processus procoracoideus is thin and blade-like, and directs more towards the facies articularis clavicu-
alis than in recent Phaethontidae. The processus acro-
coracoideus protrudes ventrally, the sternal margin of the facies articularis clavicularis is not as greatly ossified as in recent Phaethontidae (in the type specimen of Pro-
phaethon shrubsolei the extremitas omalis is largely bro-
ken). The sulcus musculi supracoracoideus bears a marked depression which is bordered by a bulge at its dorsal side; a pneumatic foramen is situated at the bottom of this depression. Among recent Pelecaniformes a similar depression occurs in the Sulidae (gannets and boobies), but it is present neither in the Miocene tropicbird Heliodorus nor in recent Phaethontidae. The shaft of the bone appears to be somewhat stouter than in P. shrubso-
lei, the angulus medialis of the sternal end is pointed and protrudes medially (this part of the coracoid is also broken in the type specimen of P. shrubsolei). The facies articularis sternalis runs from above the angulus medialis to the angulus lateralis; the dorsal surface of its medial part is not strongly pronounced as, for example, in recent Sulidae and Phalacrocoracidae. There is a marked ridge on the dorsal side of the extremitas sternalis, which runs along the margo supra-angularis. The facies articularis sternalis seems to be slightly less oblique in relation to the longitudinal axis of the shaft than in P. shrubsolei.

Discussion

The specimen described in this study is smaller than the coracoid of Prophaethon shrubsolei which, according to Harrison & Walker (1976), has an overall length of 43.2 mm. The Nederokkerzeel coracoid further differs in few osteological features (see description above) and thus
probably belongs to a new taxon of the Prophaethontidae. However, since we did not yet have the opportunity to compare it directly with the type specimen, we refrain from naming a new taxon.

We agree with Olson (1985a, 1985b) that Prophaethon is a member of the Pelecaniformes. A derived character shared by Prophaethon shrubsolei and the pelecaniform families Prophaethontidae, Phalacrocoracidae, and Sulidae is a distinct articulation facet for the furcula on the apex of the carina sterni (Harrison & Walker, 1976: Fig. 6; in recent Fregatidae and Pelecaniidae the furcula is completely fused with the apex carinae). The “interramal suture” of P. shrubsolei, which was described by Harrison & Walker (1976: Fig. 6), might be an intraramal hinge which is also found in extant Pelecaniformes, and which is derived in neognathous birds, too (see Zusi & Warheit, 1992).

Monophyly of Prophaethontidae and Phaethontidae, however, has not been established with derived characters so far, and Prophaethon shrubsolei distinctly differs from recent Phaethontidae in the much narrower pelvis and in the presence of enlarged cristae eneimiales on the proximal end of the tibiotarsus. If tropicbirds indeed are the sister taxon to all other extant Pelecaniformes as suggested by Cracraft (1985), osteological similarities between Prophaethontidae and Phaethontidae (e.g. skull morphology, presence of a foramen nervi supracoracocoidis) might be plesiomorphic within pelecaniform birds. Concerning the coracoid of the Eocene frigatebird Limnofregata for example, Olson (1977) also noted a great overall similarity to the Phaethontidae.

True members of the Phaethontidae are known from the Miocene of North America (Olson, 1985b), Austria (Milkovsky, 1997), and Belgium (Olson & Walker, 1997), and were classified in the genus Heliadornis Olson, 1985. Although the coracoid of Prophaethon more closely resembles that of the Miocene genus Heliadornis than the corresponding bone of recent Phaethontidae, it differs in the somewhat larger foramen nervi supracoracocoidis which is situated more closely to the facies articularis scapularis, the more obliquely oriented facies articularis clavicularis, and in the presence of a marked depression in the sulcus musculi supracoracocoidis.

Acknowledgements

We thank S. Tränkner (Forschungsinstitut Senckenberg, Frankfurt a. M.) for taking the photographs, and Cécile Mourer-Chauviré (Université Claude Bernard, Lyon), and S. L. Olson (Smithsonian Institution, Washington/D.C.) for comments on the manuscript.

References


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Typescript submitted: 15 April 2001
Revised typescript received: 12 September 2001