The oldest modern bird (Ornithurinae) remains from the Early Oligocene of Hungary

by Eugen KESSLER

Abstract — The discovery of an almost complete wing skeleton, assigned to the petrel-like new fossil bird *Diomedeoides harmati* n. sp. The slab including the fossil specimen was collected by István HARMAT in 1923. It originates from Kiscell Clay Formation (Lower Oligocene, MP 24) of the Újhely Clay Open pit Mine in Szépvölgy, Budapest. This is the oldest modern bird species (Ornithurine) find from the present-day territory of Hungary. The presence of this aquatic bird, belonging to the order of Procellariiformes, is in accordance with deep-sea conditions in the Carpathian Basin during the Oligocene.

Keywords — Aves, Oligocene, Kiscell Clay Formation, Hungary, Diomedeoidae, new species.

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Introduction

A partial right wing skeleton including an almost complete humerus, the proximal fragment of the radius and the impression of the proximal part of the ulna embedded in Kiscell clay slab (Figure 1) was discovered in the vertebrate collection of the Department of Palaeontology and Geology of the Hungarian Natural History Museum.

According to the specimen label, the fossil material was collected by István HARMAT, the former director of the Újlak clay open pit mine in Szépvölgy (part of the former Óbuda, NW part of Budapest) in 1923.

The Kiscell Clay Formation is characterised by marine light greyish marl with fine grained sand intercalation at its lower part (Budakeszi Member) and with pebbly fluxoturbidites at its upper part (Noszvaj Member) as described by BÁLDI (1998) and CSÁSZÁR (1977).

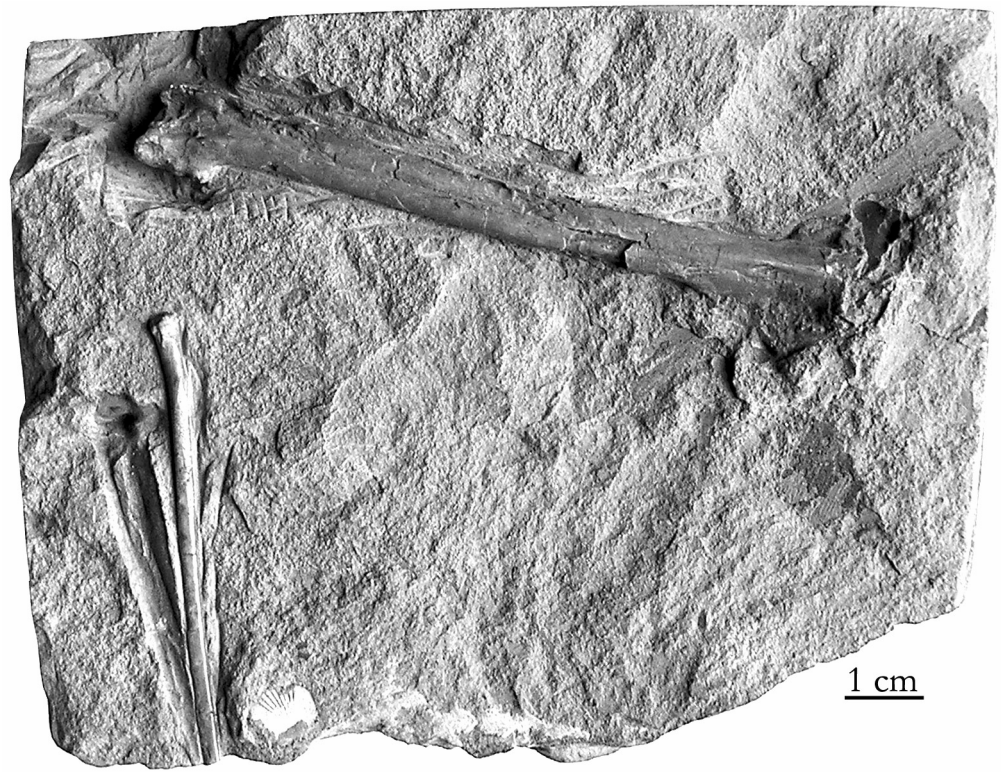


Figure 1 — Slab with the wing remains of *Diomedeoides harmati* n. sp. — (HNHM V.2007.112.1).

Material and methods

The osteological and biometrical comparisons of the Hungarian specimen to recent taxa were made by using the comparative bone collections of the United States National Museum of Washington, Smithsonian Institution, Washington, D.C., and in the Museum Nationale d'Histoire Naturelle, Paris, France. The ana-

tomical terminology follows BAUMEL (1979).

Acronyms used — **BSP**: Bayerische Staatssammlung für Paläontologie und Historische Geologie, München, Germany; **MB**: Museum für Naturkunde, Berlin, Germany; **MNHN**: Museum Nationale d'Histoire Naturelle, Paris, France; **HNHM**: Department of Paleontology and Geology of the Hungarian Natural History Museum, Budapest, Hungary; **NHMM**: Natural History Museum Montbéliard, France; **SMNK**: Staatliches Museum für Naturkunde, Karlsruhe, Germany. **USNM**: Department of Birds of the United States National Museum of Washington, Smithsonian Institution, Washington, D.C., USA.

Comparative material available — the illustrations and biometric data of fossil species from the specialist literature as well as recent species from the bird bone collection of MNHN and USNM were used for osteologic and biometric comparisons.

Systematics

Class Aves LINNAEUS, 1758
Order Procellariformes FÜRBRINGER, 1888
Family Diomedeoididae FISCHER, 1985
Genus *Diomedeoides* FISCHER, 1985

Diomedeioides harmati n. sp.

(Figure 1–3)

Holotype — A slab containing the proximal part of the wing skeleton (HNHM V 2007.112.1). It includes the almost complete humerus, the proximal fragment of the radius and the impression of the proximal part of ulna.

Type locality — Újlak, open pit clay mine, Szépvölgy, Budapest, Hungary.

Type strata — Kiscell Clay Formation, Lower Oligocene (MP 24).

Name — The species name refers to the collector's name (István HARMAT), late director of the mine.

Diagnosis — A new species corresponding to the characteristics of Diomedeoididae family and *Diomedeioides* genus: the *crista deltopectoralis* has a triangular shape; the *processus supracondylaris dorsalis* is smaller than that of the of the Recent Procellariiformes. The new species is larger than the already known three fossil species (*Diomedeoides brodkorbi, D. babaheydariensi*, which has about the same length, and *D. lipsiensis*).

Dimensions (in mm) and their abbreviations — ***Humerus***: length (**A**): 97.00; lenght of *crista pectoralis* (**B**): 26.00; proximal width (across from *crista biccipitalis* to *crista pectoralis* (**C**): 21.66; corpus (*diaphysis*) width (**E**): 6.50; distal width (**F**): 11.31; length to *epicondylus dorsalis*, from the end of *condylus dorsalis* to *processus supracondylaris dorsalis* (**H**): 9.61;

Ulna: estimated corpus (*diaphysis*) width: 4.00; estimated distal width: 7.70;

Radius: proximal width: 3.47; corpus (*diaphysis*) width: 2.70.

Table 1 — Comparative measurements of the humerus (in mm).

Species	Inventory Number	A	B	C	E	F	H
Diomedeoides harmati n. sp.	HNHM V.2007.112.1	97.00	26.00	21.66	6.50	11.31	9.61
D. brodkorbi 1st fossil	SMNK.PAL 3182	67.00					
D. brodkorbi 2nd fossil	SMNK.PAL 3181	66.00					
D. brodkorbi 3rd fossil	NHMM uncatalogued	66.00				8.50	
D. lipsiensis 1st fossil	MB.Av 732					9.30	
D. lipsiensis 2nd fossil	BSP 1973 VII. 226	app. 85			5.50	11.20	
Fulmarus glacialis recent	MNHN 17.1	111.90	34.60	19.20	6.30	15.70	
Puffinus pacificus 1st recent	USNM 219180	101.21	24.24	15.10	5.11	10.80	9.94
P. pacificus 2nd recent	MNHN 11.11.1996	98.10	24.20	15.40	4.60	11.20	
P. lherminieri recent	MNHN 13.1	67.90		11.70	4.00	8.70	
P. griseus recent	MNHN 16.1	107.10		18.10	7.10	13.90	
Pterodroma barami recent	MNHN 01.1997	53.10		15.40	5.00	11.90	
Oceanodroma leucorrhoa 1st recent	USNM 428056	36.30	8.91		2.36	4.99	4.87
O. leucorrhoa 2nd recent	MNHN 11.8	36.80	9.00				
Pelecanoides urinatrix recent	USNM 18771	43.86	10.69		3.31	7.22	7.02
Calonectris diomedea recent	MNHN 013	117.50		18.30	5.60	13.00	

Description and comparison — The humerus is nearly complete, only its top in proximal end is missing. The shaft and the distal part are descreptially compressed. *Processus supracondylaris dorsalis* in the distal part seems to have been injured during the preparation. The radius is medio-ventrally embedded in the rock and therefore it

can be seen from interosseous view. Only its proximal epiphysis and the proximal part of the shaft were preserved. The impression of the proximal part of the ulna can be seen left to the radius.

Humerus (Figure 2, Table 1):

– *crista pectoralis* (**a** in Figure 2): the crista deltopectoralis has a triangular shape, characteristic to Procellariiformes birds;

– *crista bicipitalis* (**b** in Figure 2): the outline of the yet preserved part is similar to that of recent procellariforms (*Fulmarus*);

– *fossa pneumotricipitalis* (**c** in Figure 2) is double. The second (ventral) depth also resembles the genus *Fulmarus*

– *tuberculum ventrale* (**d** in Figure 2) is elongated and blunt-ended;

– *epicondylus ventralis* (**e** in Figure 2) is more rounded than in the type species (*D. brodkorbi*), and a wide depth presenting the angle of approximately 45° (**f** in Figure 2) is dividing it from *condylus ventralis*;

– *processus supracondylaris dorsalis* (**g** in Figure 2) is broken in our specimen but its base is small characteristically to the family.

Radius and ulna (Figure 3):

– underneath the *caput radii* (**a** in Figure 3) there is an emergence (**b** in Figure 3) on the *collum* that probably served for attachment of *ligamentum transversum radio-ulnar*. This projection is linear in the fossil specimen.

– the ulna is missing in the rock, and only the impression of its proximal end could be studied.

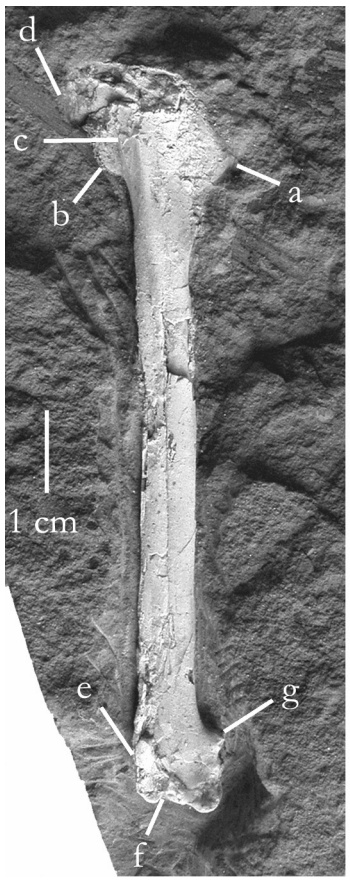
– the well developed *depressio musculi brachialis* (**c** in Figure 3) and the positive feature of *cotyla ventralis* can be recognized (**d** in Figure 3).

Referred materials (Table 1)

– fossil species: *Diomedeoides brodkorbi* (**3**–Froidefontaine, NHMM uncat.; **1–2**–Frauenweiler, SMNK.PAL 3182, 3181), illustrations and measurements (CHENEVAL 1995, MAYR et al. 2002), *D. lipsiensis* (**1**–Espenhaim, MB.Av 732; **2**–Steendorp, BSP 1973 VII. 226), illustrations and measurements (MAYR et al. 2002);

– Recent species: *Puffinus pacificus* (USNM 219180; NHMF 11.11.1996), *P. lherminieri* (MNHN 13.1), *P. griseus* (MNHN 16.1) *Oceanodroma leucorrhoa* (USNM 428056; MNHN 11.8), *Fulmarus glacialis* (MNHN 17.1), *Pelecanoides urinatrix* (USNM 18771), *Pterodroma barami* (MNHN 01.1997), *Calonectris diomedea* (MNHN 013).

Figure 2 — *Diomedeoides harmati* n. sp. — Right humerus, caudal surface (HNHM V.2007.112.1).



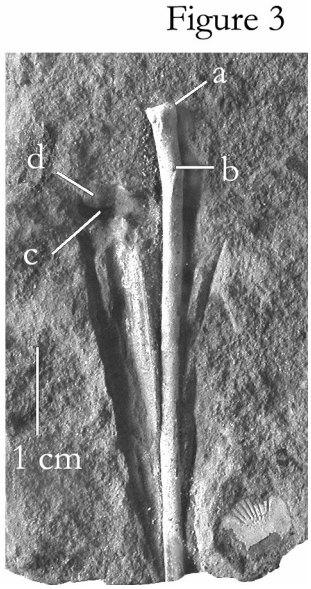


Figure 3 — *Diomedeoides harmati* n. sp. — Right radius, cranial aspect and right ulna, cranial aspect (HNHM V 2007.112.1).

Discussion and conclusions

The order of Procellariiformes includes typical deep-sea birds. In addition to the four recent families (Diomedeidae, Procelariidae, Hydrobatidae and Pelecanididae), a fossil family (Diomedeoidae) has been also described by FISCHER (1985). The fossil species *Diomedeoides minimus* FISCHER, 1985 was described based on a femur from a Lower Oligocene (Rupelian, MP 22) deposit in Germany (FISCHER 1985). A *humerus* found at the same German site Espenhain previously was described as *Gaviota lipsiensis* FISCHER, 1983 (FISCHER 1983). Later both species became the synonym of *Diomedeoides lipsiensis* (FISCHER 1997).

In 1995, a new fossil genera and species *Frigidafons brodkorbi* CHENEVAL, 1995 was described from two nearly complete skeletons and a *tarsometatarsus* from the Oligocene (Rupelian, MP 22) site of Froidefontaine in France and the Lower Miocene (MN 1) site of Weisenau in Germany, respectively (CHENEVAL, 1995; CHENEVAL & PHARISAT, 1995). Subsequently, both the genera and fossil species were renamed as *Diomedeoides brodkorbi* (CHENEVAL, 1995) by MAYR et al. (2002). Based on an almost complete skeleton the fossil species *Frigidafons babaheydariensis* PETERS & HAMEDANI, 2000 was described from the Lower Oligocene (Rupelian, MP 22) site of Baba-Heydar. This species was also renamed as *Diomedeoides babaheydariensis* (PETERS & HAMEDANI, 2000).

MAYR and his colleagues (2002) have ranked a humerus from the Oligocene (MP 23–24) site of Steendorp in Belgium and two (almost) complete skeleton from the Lower Oligocene (MP 22) site of Frauenweiler in Germany to *D. lipisiensis*. The *humerus* and

a *tibiotarsus* from Belgium have been previously described as *Rupelornis definitus* (VAN BENEDEN, 1871). MAYR and his colleagues also described *Diomedeoides* sp. based on the print of a skeleton from the Upper Oligocene (MP 30) site of Flörsheim in Germany (MAYR et al. 2002). This fossil was already noted by LAMBRECHT (1933), MLÍKOVSKÝ & HESSE (1996) and MLÍKOVSKÝ (2002).

Among the aforementioned fossils, only the humeri of *D. brodkorbi* from Froidefontaine (France) and Frauweiler (Germany), as well as the humeri of *D. lipsiensis* from Espenhaim (Germany) and Steendorp (Belgium) could be considered as comparative materials to the Hungarian fossil. Complete humeri were available only from *D. brodkorbi* from Froidefontaine, while the proximal epiphyses were missing in both *D. lipsiensis* fossils.

The first representative of the order Procellariiformes was found in New Jersey (USA) and dated to the border of Cretaceous–Palaeocene (OLSON & PARIS 1987). The next evidence in chronological order came from the Lower Eocene (London Clay), Middle Eocene (Uzbekistan) and Upper Eocene (Louisiana, USA) (HARRISON & WALKER 1977; PANTELEYEV & NESSOV 1987; FEDUCCIA & MCPHERSON 1993). BRODKORB mentioned the Lower Oligocene find described as a sea-gull by van Beneden as *Puffinus* sp. (BRODKORB 1962, 1963).

The presence of a fossil species from this order, however, corresponds to the Tertiary palaeogeographical conditions of the actual territory of Carpathian Basin. The fossil specimen was embedded in a deep see deposit (Kiscell Clay), pointing to ecological conditions that meet the requirements of Procellariiformes. This type of life style, correlated with the nesting habits on the rocky cliffs, explains the scarcity of fossil finds, similarly to other open sea species.

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