

Avian remains from the lowermost Oligocene of Hoogbutsel (Belgium)

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Abstract

Avian remains from the lowermost Oligocene of Hoogbutsel (Belgium) are described. The material includes a new species of loon (Gaviiformes, Gaviidae), *Colymboides belgicus* n. sp., which is the largest Lower Tertiary representative of the Gaviidae known so far. A new taxon of the Palaelodidae (Phoenicopteriformes) is described as *Adelalopus hoogbutseliensis* n. gen. n. sp., and is unusual in that the caudal surface of the extremitas sternalis of the furcula bears a deep cavity. A distal tarsometatarsus of a small falconiform bird is tentatively assigned to the Accipitridae. Another distal end of a tarsometatarsus belongs to a strigiform bird and most closely resembles *Prosybris antiqua* MILNE-EDWARDS 1867-71. In addition, mousebirds (Coliiformes, Coliidae) are represented by a fragmentary distal tarsometatarsus. A new taxon of the Sylphornithidae (*Aves incertae sedis*) is described as *Oligosylphe mourerchauvireae* n. gen. n. sp.; it is the first Oligocene record of this family which before was only known from the Upper Eocene of France.

Key-words: Fossil birds, lowermost Oligocene, Belgium, *Adelalopus* n. gen., *Oligosylphe* n. gen.

Résumé

Des restes d'oiseaux sont décrits de l'Oligocène basal de Hoogbutsel (Belgique). Le matériel contient une nouvelle espèce de plongeon (Gaviiformes, Gaviidae), *Colymboides belgicus* n. sp., le plus grand représentant des Gaviidae du Tertiaire inférieur, actuellement connu. Un nouveau taxon des Palaelodidae (Phoenicopteriformes), *Adelalopus hoogbutseliensis* n. gen., n. sp., est décrit; il est caractérisé par la présence d'une profonde cavité à la surface caudale de l'extrémité sternale de la furcula. La partie distale du tarsométatarse d'un petit oiseau falconiforme est provisoirement attribuée aux Accipitridae. Une autre extrémité distale de tarsométatarse appartient à un oiseau strigiforme très ressemblant à *Prosybris antiqua* MILNE-EDWARDS 1867-71. Un fragment distal de tarsométatarse est rapporté à un coliou (Coliiformes, Coliidae). Un nouveau taxon des Sylphornithidae (*Aves incertae sedis*) est décrit sous le nom d'*Oligosylphe mourerchauvireae* n. gen. n. sp.; c'est le premier représentant oligocène de cette famille qui n'était précédemment connue que de l'Eocène supérieur de France.

Mots-clefs: Oiseaux fossiles, Oligocène basal, Belgique, *Adelalopus* n. gen., *Oligosylphe* n. gen.

Introduction

The locality Hoogbutsel, a hamlet of Boutersem, is situated about 30 km east of Brussels, Belgium (Fig. 1). Its fossiliferous deposits were discovered in 1951, and subsequent screen-washing of 64 tons of sediment yielded more than 5000 mammalian bones, 36.000 turtle fragments, and numerous remains of other vertebrates, including lizards, amphibians, and freshwater fishes (GLIBERT & DE HEINZELIN, 1952).

The deposits of Hoogbutsel are of earliest Oligocene age (MP 21) (AGUILAR J.-P. *et al.*, 1997), and MISONNE (1957) considered the palaeoenvironment of the site to be the shores of a lagoon.

During the excavations, avian remains were discovered but until now they remained unstudied. The present study gives a first survey on some selected taxa. Most of the remaining avian bones in the collection of the IRScNB do not present taxonomically meaningful characters and thus

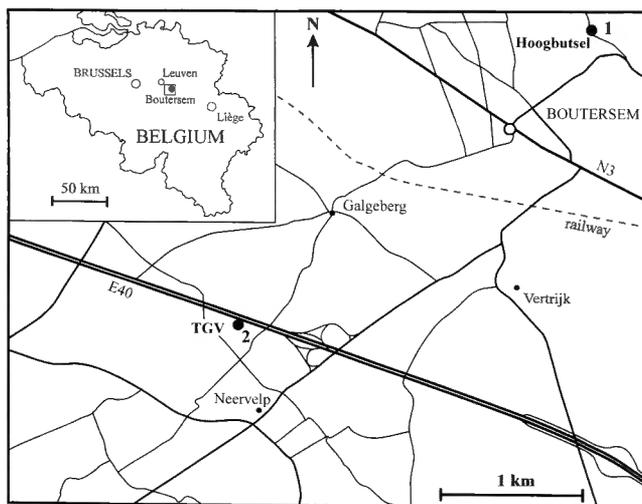


Fig. 1 — Location of both localities from Boutersem: 1, Hoogbutsel; 2, Boutersem TGV outcrop section.

cannot be identified with certainty (e.g. radii, pedal phalanges, or vertebrae).

The fossil specimens described herein are deposited in the Institut Royal des Sciences naturelles de Bruxelles, Belgique (IRScNB). The osteological terminology follows BAUMEL & WITMER (1993). All dimensions are in millimetres; comparisons with Recent bird skeletons are based on the specimens in the collection of the Forschungsinstitut Senckenberg, Frankfurt/M., Germany.

Taxonomy

Class Aves LINNAEUS, 1758

Order Gaviiformes WETMORE & MILLER, 1926

Family Gaviidae ALLEN, 1897

REMARKS

The two specimens described below exhibit the highly characteristic morphology of the Gaviidae (loons); shared derived characters for example are the greatly elongated *os metacarpale alulare* (*carpometa-carpus*), the cranio-caudal compression of the distal end of the ulna, and the very large *tuberculum carpale* (ulna).

Colymboides MILNE-EDWARDS, 1867-71

REMARKS

The new material from Hoogbutsel agrees with *Colymboides* (Upper Eocene - Lower Miocene) and differs from *Gavia* (Lower Miocene - Recent) in the relatively shorter *symphysis metacarpalis proximalis* of the *carpometa-carpus* and in the less strongly developed *tuberculum carpale* of the ulna. However, since these two features almost certainly are plesiomorphic within the Gaviidae, its assignment to *Colymboides* is only tentative and might be confirmed or refuted by the discovery of future specimens.

Colymboides belgicus n. sp.

Pl. 1, Figs. 1-2, 4-5

HOLOTYPE

IRScNB Av 80 (proximal end of right carpometacarpus) (Pl. 1, Figs. 1-2).

DIAGNOSIS

Colymboides belgicus n. sp. is the largest Lower Tertiary representative of the Gaviidae known so far, slightly smaller than Recent *Gavia stellata* (Pl. 1, Fig. 3). Possibly autapomorphic for the new species is the very wide *incisura tendinosa* (ulna).

DIFFERENTIAL DIAGNOSIS

Colymboides belgicus n. sp. differs from:

- *Colymboides minutus* MILNE-EDWARDS, 1867-71 and *C. anglicus* LYDEKKER, 1891 in its larger size (*C. minutus* is only half as large as *C. belgicus*, *C. anglicus* about 2/3 its size).

- *Gaviella pusilla* (SHUFELDT, 1915) from the Lower Tertiary (?Oligocene) of North America in: decidedly larger size; more pronounced *processus pisiformis*; much lower *os metacarpale alulare*.
- *Gavia* spp. in: *symphysis metacarpalis proximalis* relatively shorter; *tuberculum carpale* of ulna distinctly smaller and *incisura tendinosa* wider. The Lower Miocene species *Gavia egeriana*, described by ŠVEC (1982) from the Lower Miocene of the Czech Republic, is only known from the distal humerus but is also smaller than *Colymboides belgicus* (it is less than 2/3 the size of Recent *G. stellata*). *Gavia schultzi* MLÍKOVSKÝ, 1998a, from the Middle Miocene of Austria is also distinctly smaller than *C. belgicus*.

DIMENSIONS OF THE HOLOTYPE

Length as preserved, 20.0; distance from most cranial margin of *os metacarpale alulare* to most caudal margin of *trochlea carpalis*, 11.5.

TYPE LOCALITY

Hoogbutsel near Boutersem, Brabant, Belgium.

STRATOTYPE

Lower Oligocene, MP 21.

REFERRED SPECIMEN

IRScNB Av 70 (distal end of right ulna; Pl. 1, Figs. 4-5).

DIMENSIONS OF THE REFERRED SPECIMEN

Length as preserved, 29.5; distal width (distance from *condylus dorsalis* to *tuberculum carpale*), 12.0.

REMARKS

The two bones might well belong to the same individual, since they are from the same side of the body, of comparable size, and directly adjacent in the skeleton.

ETYMOLOGY

From *belgicus* (Lat.): Belgian.

DESCRIPTION AND COMPARISONS

The proximal end of the *carpometa-carpus* shows the characteristic morphology of the corresponding bone of gaviiform birds. The *os metacarpale alulare* is greatly elongated and there is no cranially protruding *processus extensorius*. Since its tip is not preserved in the fossil specimen, the length of the *os metacarpale alulare* cannot be discerned; in Recent *Gavia* it measures about 1/3 of the length of the *carpometa-carpus*, in *Colymboides minutus* less than 1/4. The cranial margin of the *os metacarpale alulare* is not parallel to that of the *os metacarpale majus* as in Recent Gaviidae, but slightly declining towards the distal end of the *carpometa-carpus*. Its proximal margin runs more obliquely to the longitudinal axis of the *carpometa-carpus* than in Recent *Gavia*. The elevation caudal to the *processus pisiformis* is somewhat more elevated than in *Gavia* spp. As in other Gaviidae, the *fovea carpalis caudalis* is a marked pit. The *symphysis*

metacarpalis proximalis is completely preserved and, as in *Colymboides minutus*, much shorter in relative length than in *Gavia* (it measures about 1/3 the length of the symphysis of *Gavia stellata*).

As in other gaviiform birds, the distal end of the ulna is strongly compressed in cranio-caudal direction. The *tuberculum carpale* is large but, as in *Colymboides minutus*, less well developed than in *Gavia* spp.; the *incisura tendinosa* is much wider than in Recent Gaviidae.

DISCUSSION

The Gaviidae comprise four Recent species which only occur on the Northern Hemisphere. Loons are true aquatic birds and are always found on or near water. They winter on seacoasts in temperate areas but usually breed near the waters' edge at freshwater sites; all Recent species feed mostly on fish.

Although putative members of the Gaviiformes have already been recorded from Cretaceous deposits (OLSON, 1992), the earliest certain fossil record is *Colymboides anglicus* from the Upper Eocene of England (see FEDUCCIA, 1996; MLÍKOVSKÝ, 1998a). This species is only known from a coracoid, a referred humerus and a referred part of the skull (HARRISON & WALKER, 1976).

Well known, however, is the osteology of *Colymboides minutus*, a taxon known from the Lower Miocene of France and the Czech Republic (e.g., STORER, 1956; ŠVEC, 1980; CHENEVAL, 1984). Though undoubtedly a loon, *C. minutus* is clearly distinguished from Recent members of the Gaviidae in many osteological features. As revealed by the morphology of its hindlimbs, it was less specialized towards foot-propelled diving than its Recent relatives.

The remains from Hoogbutsel are too fragmentary to draw substantiated phylogenetic conclusions. However, they confirm an aquatic palaeoenvironment of Hoogbutsel in the lowermost Oligocene, and further indicate that loons of similar size to the extant species were already present in the Lower Tertiary of the Northern Palaearctic.

Order Phoenicopteriformes SHARPE, 1891
Family Palaelodidae (STEJNEGER, 1885)

REMARKS

The new genus described below is assigned to the Palaelodidae because of the following features: (1) *facies articularis clavicularis* of coracoid overhanging two distinct pits (these pits are also very distinct in *Megapaloelodus* but much shallower in *Palaelodus*); (2) coracoid with large *foramen nervi supracoracoidei*; (3) *extremities sternalis* of *furcula* with marked depression on its caudal surface; (4) *trochlea metatarsi II* reaching less far distally than in the Phoenicopteridae. Characters (1), (3), and (4) probably are derived within neognathous birds. The new taxon also most closely resembles the Palaelodidae in the overall morphology of the skeletal elements preserved.

Adelalopus n. gen.

TYPE SPECIES

Adelalopus hoogbutseliensis n. sp.

DIAGNOSIS

Adelalopus n. gen. includes large birds that are characterized by the following, probably autapomorphic features: (1) depression on caudal surface of *extremities sternalis* of *furcula* with deep cavity in its centre; (2) *tarsometatarsus* with large *foramen vasculare distale*; (3) proximal half of *canalis interosseus distalis* replaced by a dorsally open groove.

DIFFERENTIAL DIAGNOSIS

Adelalopus n. gen. differs from

- *Palaelodus* MILNE-EDWARDS, 1863: decidedly larger size; *facies articularis clavicularis* of coracoid overhanging two distinct pits; *tarsometatarsus* not medio-laterally compressed; *foramen vasculare distale* much larger; proximal half of *canalis interosseus distalis* replaced by a groove.
- *Megapaloelodus* MILLER, 1944: *foramen vasculare distale* much larger; proximal half of *canalis interosseus distalis* replaced by a groove [comparisons were made with the figures of *Megapaloelodus goliath* in MILNE-EDWARDS (1876-71: pl. 87) and CHENEVAL (1983), in the figure accompanying the original description of *M. connectens* MILLER, 1944 the *foramen vasculare distale* is not visible].
- all anseriform birds in: plantar side of *trochlea metatarsi IV* without proximally extending wing-like flange; no furrow on plantar side of *tarsometatarsus*, distal to *foramen vasculare distale*.
- the Lower Oligocene ?anseriform genus *Cygnopterus* LAMBRECHT, 1931 in: 2/3 smaller size, *facies articularis clavicularis* (coracoid) overhanging two deep pits; *processus acrocoracoideus* medio-laterally wider; *tuberculum coracoideum* of scapula less distinct.
- the Upper Eocene to Lower Oligocene ?anseriform genus *Headonornis* HARRISON & WALKER, 1976 in: *processus acrocoracoideus* relatively longer and medio-laterally wider; sternal margin of *facies articularis clavicularis* sigmoidally curved (convex in *Headonornis*); *cotyla scapularis* less circular and relatively smaller (6.4 vs. 8.7 mm, whereas the *extremities oemales* of the coracoids themselves are of similar size).

The putatively phoenicopteriform genus *Elornis* MILNE-EDWARDS, 1867-71 was described from the lowermost Oligocene of Ronzon, France (MP 21, according to MOURER-CHAUVIRÉ, 1996). Unfortunately, the original specimens have been lost (OLSON & FEDUCCIA, 1980), and the illustrations in MILNE-EDWARDS (1867-71) do not allow meaningful comparisons with the material from Hoogbutsel.

ETYMOLOGY

Anagram of *Palaelodus*, the type genus of the Palaelodidae. Gender: masculine.

Adelalopus hoogbutseliensis n. sp.

Pl. 1, Figs. 7-16

HOLOTYPE

IRScNB Av 71 (incomplete furcula, *extremitas omalis* of right coracoid, right scapula, distal end of left ulna, shaft of radius, distal part of left *tarsometatarsus* lacking *trochleae metatarsorum III* and *II*; Pl. 1, Figs. 7-8, 11-16).

DIAGNOSIS

As for genus.

DIMENSIONS OF THE HOLOTYPE

Coracoid: distance from centre of *cotyla scapularis* to tip of *processus acrocoracoideus*, 27.1; *cotyla scapularis*, 5.8 3.6. Scapula: length as preserved, 81.3. Ulna: length as preserved, 50.8. *Tarsometatarsus*: medio-lateral width of shaft proximal to *fossa metatarsi I*, 8.3.

TYPE LOCALITY

Hoogbutsel near Boutersem, Brabant, Belgium.

STRATOTYPE

Lower Oligocene, MP 21.

REFERRED SPECIMEN

IRScNB Av 72 (*extremitas omalis* of left coracoid; Pl. 1, Figs. 9-10).

DIMENSIONS OF THE REFERRED SPECIMEN

Distance from centre of *cotyla scapularis* to tip of *processus acrocoracoideus*, 27.5; dorso-ventral length of *facies articularis clavicularis*, 16.8; *cotyla scapularis*, 6.0 6.8.

ETYMOLOGY

The specific name refers to the type locality.

REMARKS

The bones of the holotype have been found together and their size and similar preservation (all have a slightly weathered surface) makes it virtually certain that they are from a single individual. Although the referred coracoid IRScNB Av 72 is kept in a different collection box, it might also be from the same individual.

DESCRIPTION AND COMPARISONS

Adelalopus hoogbutseliensis n. sp. is slightly larger than *Megapaloelodus goliath* (MILNE-EDWARDS, 1867-71), and is 2/3 smaller than *Cygnopterus affinis* LAMBRECHT, 1931. The skeletal elements preserved are nearly identical in size to those of the Recent Coscoroba swan, *Coscoroba coscoroba*.

The furcula is widely U-shaped and highly specific in that there is a marked depression along the entire caudal surface of the *extremitas sternalis* which bears a deep, elongate cavity in its centre (Pl. 1, Fig. 13). In *Palaelodus*, the caudal surface also bears a marked depression (MILNE-EDWARDS, 1867-71: pl. 84, fig. 8), but there is no

large cavity as in *Adelalopus*. The furcula of *Megapaloelodus* has not been described so far. The *extremitas sternalis* itself is wide cranio-caudally in *Adelalopus* and *Palaelodus*. The *apophysis furculae* is well-developed and larger than in the Recent genus *Phoenicopterus*, but unfortunately, its tip is not completely preserved.

The coracoid closely resembles the corresponding bone of *Megapaloelodus* sp. (see MILLER, 1952: fig. 1; MILNE-EDWARDS, 1867-71: pl. 87, figs. 13, 14). As in the latter, the *facies articularis clavicularis* overhangs two deep pits delimited from each other by an obliquely oriented bulge (IRScNB Av 72). These pits are only very weak in *Palaelodus* and absent in Recent Phoenicopteridae. There are several pneumatic foramina at the bottom of the more marked ventral pit (IRScNB Av 72). The sternal margin of the *facies articularis clavicularis* is sigmoidally curved. The medial and lateral margins of the *cotyla scapularis* are not sharply delimited. The *processus procoracoideus* is broken in both specimens. The coracoid of *Adelalopus* exhibits a well-developed, elliptical *foramen nervi supracoracoidei* which is present in all Phoenicopteriformes as well as, for example, in basal anseriform birds.

The scapula is short and has a slender shaft. In the proportions of its shaft, it resembles the scapula of *Palaelodus*. The *tuberculum coracoideum* is moderately protruding. The *acromion* is broken.

The distal end of the ulna is very incompletely preserved, what can be compared resembles the condition in *Palaelodus* and Recent phoenicopteriform birds.

Although the *tarsometatarsus* is also fragmentary, it allows the recognition of several diagnostic features. The preserved portion of the shaft has a roughly rectangular cross-section as in *Phoenicopterus*, and is not medio-laterally compressed as in *Palaelodus*. The *foramen vasculare distale* is larger and more elongated than in other Palaelodidae and Recent Phoenicopteriformes, similar to the condition found in the Eocene genus *Juncitarsus* OLSON & FEDUCCIA, 1980 (which these authors considered to be a basal representative of the Phoenicopteriformes). The proximal half of the *canalis interosseus distalis* is replaced by a dorsally open groove. The *fossa metatarsi I* is shallow and situated directly proximally to the *trochlea metatarsi II*. The *trochlea metatarsi II* itself is broken but the break shows that it did not reach as far distally as the other two *trochleae*, and that it was turned plantarly as in all other Phoenicopteriformes. As in *Palaelodus*, it appears to have been positioned farther proximally than the *trochlea metatarsi II* of Recent Phoenicopteridae. The basis of the *trochlea metatarsi IV* has a similar morphology as in other Phoenicopteriformes.

DISCUSSION

The Palaelodidae are known from the Oligocene to Pliocene of Europe, both Americas and Australia (OLSON & FEDUCCIA, 1980; CHENEVAL, 1983; ALVARENGA, 1990; BOLES, 1991). They are especially abundant in the Lower Miocene of Saint-Gérard-le-Puy, France, where thousands of bones have been found. RASMUSSEN *et al.*

(1987) recorded possible remains of the Palaelodidae from the Middle Oligocene of the Fayum (Egypt). The family is generally classified within the Phoenicopteriformes (flamingos), and exhibits a much less specialized bill morphology than its Recent relatives (CHENEVAL & ESCUILLIÉ, 1992). *Adelalopus hoogbutseliensis* is the earliest record of the Palaelodidae known so far and both, in size and morphology, the new taxon most closely resembles the genus *Megapalaelodus*.

Apart from the differences mentioned in the differential diagnosis of the new taxon from Hoogbutsel, the *extremitas omalis* of the coracoid of *Adelalopus hoogbutseliensis* is very similar to that of *Cygnopterus affinis*. This species was described by LAMBRECHT (1931) as a swan from the Lower Oligocene of Belgium (MP?23-24 according to CHENEVAL, 1996). However, MLÍKOVSKÝ & ŠVEC (1986: 266) considered the possibility that *C. affinis* and *C. lambrechtii* KUROCHKIN, 1968 are not anseriform but belong to the Phoenicopteriformes. Unfortunately, the *tarsometatarsus* of *C. affinis* is unknown, but CHENEVAL (1984) assigned a new species from the Lower Miocene of France to the genus *Cygnopterus* and referred a *tarsometatarsus* to this taxon. If *C. alphonsi* CHENEVAL, 1984 has been correctly classified into the genus *Cygnopterus*, and if the referral of the *tarsometatarsus* is correct, this bone was of typical anseriform morphology. CHENEVAL (1984) also assigned *C. alphonsi* to the Anserinae (swans and geese), but the presence of a well-developed *foramen nervi supracoracoidei* (coracoid), plesiomorphic within Anseriformes and absent in all Anatidae, (LIVEZEY, 1986) does not support this classification. Instead, this feature indicates that *Cygnopterus alphonsi* branched off before the divergence of Recent Anatidae.

The genus *Headonornis* HARRISON & WALKER, 1976 from the Upper Eocene (MP 17, according to MLÍKOVSKÝ, 1996) and Lower Oligocene (MP 21-23, according to MLÍKOVSKÝ, 1996) of England resembles *Cygnopterus* in the morphology of coracoid and humerus but was assigned to the Presbyornithidae by HARRISON & WALKER (1976, 1979a) and DYKE (2000).

To find out their true phylogenetic affinities, *Headonornis* and the species of *Cygnopterus* need to be restudied and compared with both the Palaelodidae and Lower Tertiary Anseriformes, such as the putative anseranatid *Anatalavis rex* OLSON, 1999.

The functional meaning of the deep cavity on the *extremitas sternalis* of the furcula of *Adelalopus* remains enigmatic. MILNE-EDWARDS (1867-71) considered the corresponding structure at the furcula of *Palaelodus* to be "cavités pneumatiques". In *Adelalopus* the cavity is too small to enclose a tracheal loop (as does the *apophysis furculae* of the Recent galliform genus *Guttera*) but appears to be too large to be simply a pneumatic foramen.

Order Falconiformes (VIEILLOT, 1816)
Family?Accipitridae VIGORS, 1824
genus and species indeterminate
Pl. 2, Figs. 1-2

REFERRED SPECIMEN

IRScNB Av 73 (distal end of right *tarsometatarsus*; Pl. 2, Figs. 1-2).

DIMENSIONS

Maximum length as preserved, 13.7; distal width, 5.6; width of *trochlea metatarsi III*, 1.7; medio-lateral width of shaft proximal of *fossa metatarsi I*, 2.7.

DESCRIPTION AND COMPARISONS

The bone is about the size of the *tarsometatarsus* of a male European sparrow-hawk, *Accipiter nisus*, which it also resembles in its morphology (Pl. 2, Fig. 3). It mainly differs from *A. nisus* in the farther distally situated *foramen vasculare distale*, the wider *incisurae intertrochleares*, and the somewhat smaller and slightly less far distally reaching *trochlea metatarsi II*. The *foramen vasculare distale* is large. The shaft has a rectangular cross-section. As in all Recent Accipitridae, the *trochlea metatarsi II* is large and bears a medio-plantarly projecting wing-like projection. The *trochlea metatarsi III* is small; its dorsal surface strongly abraded. The *trochlea metatarsi IV* also is too poorly preserved to allow meaningful comparisons.

DISCUSSION

The specimen is tentatively assigned to the Accipitridae because it is very similar in overall morphology to the *tarsometatarsus* of *Accipiter nisus*. The *tarsometatarsus* of the Falconidae differs in the much smaller *foramen vasculare distale* and in that the process on the *trochlea metatarsi II* projects more medially. The specimen from Hoogbutsel differs from the unusual *tarsometatarsus* of the Upper Eocene Horusornithidae MOURER-CHAUVIRÉ, 1991 in the narrower *trochlea metatarsi IV*, the more medially projecting wing on the *trochlea metatarsi II*, and in that the distal end of the bone is less curved in distal view.

The Lower Tertiary record of falconiform birds in general is rather poor. PETERS (1994) assigned an isolated skull from the Middle Eocene of Messel to the Accipitridae. HARRISON & WALKER (1979b) described a fragmentary distal end of a *tarsometatarsus* and a few other referred bones from the Middle Eocene of England as a new taxon of the Accipitridae, *Milvoides kempi*. Though this species probably has been correctly referred to the Falconiformes, its classification within the Accipitridae also is based on overall morphology and thus is uncertain, too. Putatively accipitrid birds are also known from the Upper Eocene to Upper Oligocene deposits of the Quercy, France (GAILLARD, 1908).

Order Strigiformes (WAGLER, 1830)

Family?Tytonidae RIDGWAY, 1914

?*Prosybris* sp. cf. *Prosybris antiqua* MILNE-EDWARDS, 1867-71

Pl. 2, Figs. 4-5

REFERRED SPECIMEN

IRScNB Av 74 (distal end of right *tarsometatarsus*, lacking the *trochlea metatarsi IV*; Pl. 2, Figs. 4-5).

DIMENSIONS

Maximum length as preserved, 16.8; estimated distal width, ~7; width of *trochlea metatarsi III*, 2.5; medio-lateral width of shaft proximal of *fossa metatarsi I*, 3.6.

DESCRIPTION AND COMPARISONS

The bone has about the size of the *tarsometatarsus* of Recent little owl, *Athene noctua* (Pl. 2, Fig. 6). The plantar surface of the shaft is strongly concave. The *foramen vasculare distale* is small. The *incisura intertrochlearis medialis* appears very wide, but this impression is partially due to the fact that the lateral part of the *trochlea metatarsi II* is damaged. The *fossa metatarsi I* is situated on the medial side of the shaft.

The bone differs from the superficially similar *tarsometatarsus* of piciform birds in the following features: dorsal side of distal end not as flat, *foramen vasculare distale* smaller, and *incisura intertrochlearis lateralis* narrower.

DISCUSSION

There is already an extensive record of strigiform birds from Lower Tertiary deposits of Europe. Compared to the taxa already described, the specimen from Hoogbutsel compares best in size and morphology with *Prosybris antiqua* MILNE-EDWARDS, 1867-71 (= *Necrobyas minimus* MOURER-CHAUVIRÉ, 1987) known from the Lower Oligocene to Lower Miocene of France and Austria (MOURER-CHAUVIRÉ, 1987; MLÍKOVSKÝ, 1998b; MOURER-CHAUVIRÉ, 1999a). It is the first record of a Lower Tertiary owl from Belgium.

The genus *Necrobyas* is currently classified within the Tytonidae (MOURER-CHAUVIRÉ, 1987; MLÍKOVSKÝ, 1998b). This assignment is mainly based on the absence of an ossified *arcus extensorius* characteristic for most Strigidae. However, the absence of this feature certainly is plesiomorphic within Strigiformes, and a classification within the Tytonidae still needs to be confirmed with derived characters.

Order Coliiformes MURIE, 1872
Family Coliidae SWAINSON, 1837
genus and species indeterminate
Pl. 2, Figs. 7-8

REFERRED SPECIMEN

IRScNB Av 75 (distal end of left *tarsometatarsus*; Pl. 2, Figs. 7-8).

DIMENSIONS

Length as preserved, 6.2; distal width (estimated), 2.8; width of *trochlea metatarsi III*, 1.1.

DESCRIPTION AND COMPARISONS

The specimen is similar in size to the *tarsometatarsus* of Recent blue-naped mousebird, *Urocolius macrourus* (Pl. 2, Fig. 9). The *fossa metatarsi I*, situated on the medial side of the shaft in Recent Coliidae, is not visible. The *foramen vasculare distale* is small. The *trochlea metatarsi III* is

narrower and more asymmetric than in Recent mousebirds and in the Upper Eocene genus *Primocolius* MOURER-CHAUVIRÉ, 1988; it bears a well-developed furrow.

DISCUSSION

The six species of Recent Coliiformes only occur in Africa, South of the Sahara, but there is meanwhile an extensive record of mousebirds from Tertiary deposits of Europe (see MAYR, 2000 for a survey on the fossil history of the Coliiformes). Of similar age to the specimen from Hoogbutsel are the genera *Primocolius* from the Upper Eocene of the Quercy (MOURER-CHAUVIRÉ, 1988) and *Oligocolius* from the Lower Oligocene of Germany (MAYR, 2000). Given its very fragmentary preservation, however, an assignment of the new specimen from Belgium to either of these two genera is not possible.

Order *incertae sedis*

Family Sylphornithidae MOURER-CHAUVIRÉ, 1988

REMARKS

The Sylphornithidae are tiny birds which are well characterized by the morphology of their *tarsometatarsus*: the shaft is greatly elongated and slender; the *foramen vasculare distale* is large; the *fossa metatarsi I* protrudes beyond the medial margin of the shaft; the *trochleae metatarsorum II* and *IV* greatly protruding medially and laterally respectively.

Oligosylphe n. gen.

TYPE SPECIES

Oligosylphe mourerchauvireae n. sp.

DIAGNOSIS

Tiny birds characterized by the combination of the following features: *tarsometatarsus* very elongated with a slender shaft, cross-section of shaft trapezoid, *foramen vasculare distale* large and situated far proximally.

DIFFERENTIAL DIAGNOSIS

Oligosylphe n. gen. differs from

- the Eocene genus *Sylphornis* MOURER-CHAUVIRÉ, 1988 in: *foramen vasculare distale* situated much farther proximally (Fig. 2).
- the Eocene genus *Gracilitarsus* MAYR, 1998 in: *trochlea metatarsi III* with shallower furrow; *foramen vasculare distale* situated farther proximally; no marked sulcus on the dorsal side of the *tarsometatarsus* between the *trochleae metatarsorum III* and *IV* (see MAYR, 2001).
- the Paleocene genus *Eutreptodactylus* BAIRD & RICH, 1997 in: *foramen vasculare distale* larger and situated farther proximally.

Due to the very poor preservation of the holotype of *Palaegithalus cuvieri* GERVAIS, 1848-52, the new genus cannot be compared with this taxon (which might be closely related to the Sylphornithidae, see MAYR, 1998: 52).

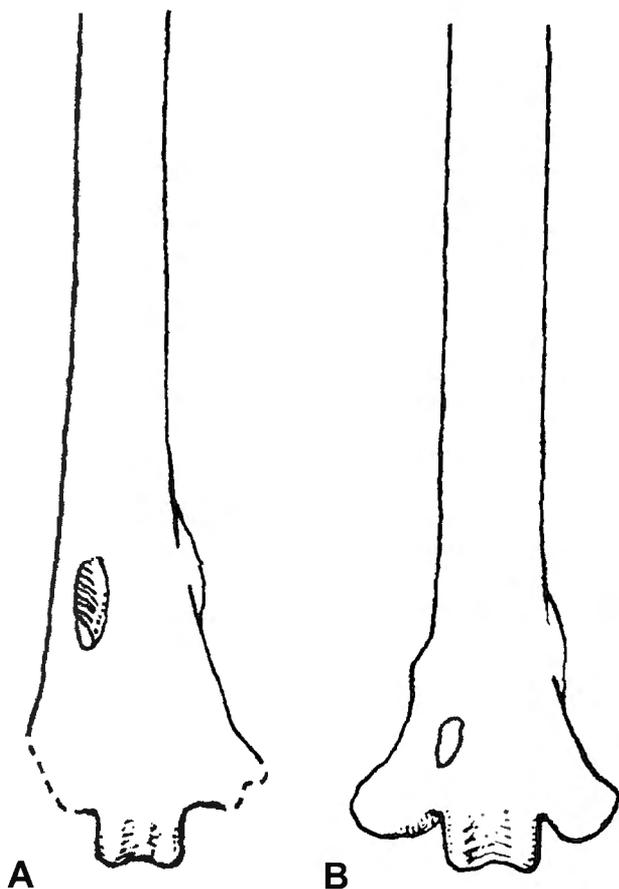


Fig. 2 — *Oligosylphe mourerchauvireae* n. gen. n. sp. (Sylphornithidae), distal end of right tarsometatarsus (A) in comparison with the corresponding bone of *Sylphornis bretouensis* MOURER-CHAUVIRÉ, 1988 (B). Scale bar equals 5 mm.

ETYMOLOGY

The generic name refers to the Oligocene age of the taxon and its close relationship to *Sylphornis*.

Oligosylphe mourerchauvireae n. sp.
Pl. 2, Figs. 10-13; Fig. 2

HOLOTYPE

IRScNB Av 76 (distal end of right tarsometatarsus; Pl. 2, Figs. 10-11).

DIAGNOSIS

As for genus.

DIMENSIONS OF THE HOLOTYPE

Length as preserved, 10.4; width of shaft, 0.8 [0.6-0.7]; distal width (estimated), ~2.8 [2.5]; width of *trochlea metatarsi III*, 0.6 (in brackets the dimensions of *Sylphornis bretouensis*, after MOURER-CHAUVIRÉ, 1988).

TYPE LOCALITY

Hoogbutsel near Boutersem, Brabant, Belgium.

STRATOTYPE

Lower Oligocene, MP 21.

TENTATIVELY REFERRED SPECIMEN

IRScNB Av 77 (distal end of left *tibiotarsus*; Pl. 2, Figs. 12-13).

DIMENSIONS OF THE REFERRED SPECIMEN

Length as preserved, 5.6; distal width, 1.8 [1.9] (in brackets the dimensions of *Sylphornis bretouensis*, after MOURER-CHAUVIRÉ, 1988).

ETYMOLOGY

The species is dedicated to Cécile MOURER-CHAUVIRÉ in recognition of her outstanding work on the fossil birds from the Quercy.

DESCRIPTION AND COMPARISONS

As in *Sylphornis bretouensis* MOURER-CHAUVIRÉ, 1988, the shaft is greatly elongated and very slender. It has a trapezoid cross-section. The *fossa metatarsi I* is very large and protrudes medially beyond the medial margin of the shaft. The *foramen vasculare distale* is large and situated farther proximally than in *Sylphornis bretouensis*. The *trochleae metatarsorum II* and *IV* are broken; what remains from the former indicates that it was protruding medially as in *S. bretouensis*. The *trochlea metatarsi III* is somewhat narrower and more elongated than in *S. bretouensis*.

The distal end of the *tibiotarsus* mainly has been assigned to this species because it corresponds to the *tarsometatarsus* in size (no other tiny birds are known from Hoogbutsel). The *condyli* have about the same size, the *incisura intercondylaris* is fairly wide. The *trochlea cartilaginosa tibialis* is high. The specimen corresponds well with the *tibiotarsus* MOURER-CHAUVIRÉ (1988: pl. 4, figs. 9-10) referred to *Sylphornis bretouensis*.

DISCUSSION

The Sylphornithidae are tiny, probably facultatively zygodactyl birds, which were first described from the Eocene of France (MOURER-CHAUVIRÉ, 1988). MOURER-CHAUVIRÉ (1999) also included *Eutreptodactylus itaboraiensis*, a species described by BAIRD & VICKERS-RICH (1997) from the Upper Paleocene of Brazil, into this family. *Palaegithalus cuvieri* GERVAIS, 1848-52 from the Upper Eocene of France might be another member of the Sylphornithidae (see MAYR, 1998: 52). The specimens from Hoogbutsel are the first Oligocene record of this family.

The higher systematic position of the Sylphornithidae still remains enigmatic, but they might be related to the Middle Eocene Gracilitarsidae MAYR, 2001 which also include very tiny birds with a strongly elongated *tarsometatarsus* (see MAYR, 1998; 2001).

Conclusions

The deposits of Hoogbutsel are contemporaneous to those of a nearby TGV outcrop section at Boutersem, recently

sampled by one of us (RS) (Fig. 1). During this recent excavation, numerous avian remains were discovered and their study has just been finished (MAYR & SMITH, in press). Despite their close geographic and temporal proximity the composition of the Lower Oligocene avifaunas from both sites is quite different. All avian orders identified in the present study are up to now unknown from the TGV section, except for the Phoenicopteriformes (to which a very fragmentary distal end of a *tarsometatarsus* from the TGV site was tentatively assigned). In contrast, charadriiform birds of an extinct taxon, probably belonging to the Glareolidae, are fairly abundant at the TGV site, whereas at Hoogbutsel we only identified a single distal end of a *tarsometatarsus* of this group (IRScNB Av 78). Rails (Rallidae, Gruiformes) are represented in the TGV material by at least two species, but were not identified in the Hoogbutsel material so far.

Comparison of the mammalian faunas leads to a similar situation. Although both sites have many mammalian taxa in common, some striking differences nevertheless exist. For example, large-sized taxa, mainly belonging to the Artiodactyla and Perissodactyla, as well as the tiny

erinaceid *Tetracus nanus* (AYMARD, 1846) and the castorid *Steneofiber butselensis* MISONNE, 1957 are present or even frequent at Hoogbutsel but missing at the TGV site.

It appears possible that the differences in the faunal composition of the two sites is due to palaeoecological reasons, but as the study of the Boutersem fauna is still in progress, it is too premature to draw definitive conclusions.

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Explanation of Plates

PLATE 1

- Fig. 1 — *Colymboides belgicus* n. sp. (Gaviiformes, Gaviidae), holotype (IRScNB Av 80), proximal end of right *carpometacarpus*, dorsal side.
 Fig. 2 — *Colymboides belgicus* n. sp., holotype (IRScNB Av 80), proximal end of right *carpometacarpus*, ventral side.
 Fig. 3 — *Gavia stellata* (Gaviiformes, Gaviidae), Recent, proximal end of right *carpometacarpus*, ventral side.
 Fig. 4 — *Colymboides belgicus* n. sp., referred specimen IRScNB Av 70, distal end of right ulna, ventral side.
 Fig. 5 — *Colymboides belgicus* n. sp., referred specimen IRScNB Av 70, distal end of right ulna, dorsal side.
 Fig. 6 — *Gavia stellata*, Recent, distal end of right ulna, dorsal side.
 Fig. 7 — *Adelalopus hoogbutseliensis* n. gen. n. sp. (Phoenicopteriformes, Palaelodidae), holotype (IRScNB Av 71), *extremitas omalis* of right coracoid, dorsal side.
 Fig. 8 — *Adelalopus hoogbutseliensis* n. gen. n. sp., holotype (IRScNB Av 71), *extremitas omalis* of right coracoid, lateral side.
 Fig. 9 — *Adelalopus hoogbutseliensis* n. gen. n. sp., referred specimen IRScNB Av 72, *extremitas omalis* of left coracoid, dorsal side.
 Fig. 10 — *Adelalopus hoogbutseliensis* n. gen. n. sp., referred specimen IRScNB Av 72, *extremitas omalis* of left coracoid, medial side.
 Fig. 11 — *Adelalopus hoogbutseliensis* n. gen. n. sp., holotype (IRScNB Av 71), right scapula, medial side.
 Fig. 12 — *Adelalopus hoogbutseliensis* n. gen. n. sp., holotype (IRScNB Av 71), right scapula, lateral side.
 Fig. 13 — *Adelalopus hoogbutseliensis* n. gen. n. sp., holotype (IRScNB Av 71), incomplete furcula, caudal view. The arrow points to the large cavity directly above the *apophysis furculae*.
 Fig. 14 — *Adelalopus hoogbutseliensis* n. gen. n. sp., holotype (IRScNB Av 71), distal end of left ulna, ventral side.
 Fig. 15 — *Adelalopus hoogbutseliensis* n. gen. n. sp., holotype (IRScNB Av 71), distal part of left *tarsometatarsus*, dorsal side.
 Fig. 16 — *Adelalopus hoogbutseliensis* n. gen. n. sp., holotype (IRScNB Av 71), distal part of left *tarsometatarsus*, plantar side.

All specimens are shown in the same magnification, the scale bar equals 20 mm.

PLATE 2

- Fig. 1 — ?Accipitridae gen. et. sp. indet, referred specimen IRScNB Av 73, distal end of right *tarsometatarsus*, dorsal side.
 Fig. 2 — ?Accipitridae gen. et. sp. indet, referred specimen IRScNB Av 73, distal end of right *tarsometatarsus*, plantar side.
 Fig. 3 — *Accipiter nisus* (Falconiformes, Accipitridae), Recent, distal end of right *tarsometatarsus*, plantar side.
 Fig. 4 — cf. *Prosybris antiqua* MILNE-EDWARDS, 1867-71 (Strigiformes, ?Tytonidae), referred specimen IRScNB Av 74, distal end of right *tarsometatarsus*, dorsal side.
 Fig. 5 — cf. *Prosybris antiqua* MILNE-EDWARDS, 1867-71, referred specimen IRScNB Av 74, distal end of right *tarsometatarsus*, plantar side.
 Fig. 6 — *Athene noctua* (Strigiformes, Strigidae), Recent, distal end of right *tarsometatarsus*, plantar side.
 Fig. 7 — Coliidae, gen. et. sp. indet, referred specimen IRScNB Av 75, distal end of left *tarsometatarsus*, dorsal side.
 Fig. 8 — Coliidae, gen. et. sp. indet, referred specimen IRScNB Av 75, distal end of left *tarsometatarsus*, plantar side.
 Fig. 9 — *Urocolius macrourus* (Coliiformes, Coliidae), Recent, distal end of left *tarsometatarsus*, plantar side.
 Fig. 10 — *Oligosylphe mourerchauvireae* n. gen. n. sp. (Sylphornithidae), tentatively referred specimen IRScNB Av 77, distal end of left *tibiotarsus*, cranial side.
 Fig. 11 — *Oligosylphe mourerchauvireae* n. gen. n. sp., tentatively referred specimen IRScNB Av 77, distal end of left *tibiotarsus*, caudal side.
 Fig. 12 — *Oligosylphe mourerchauvireae* n. gen. n. sp., holotype (IRScNB Av 76), distal end of right *tarsometatarsus*, dorsal side.
 Fig. 13 — *Oligosylphe mourerchauvireae* n. gen. n. sp., holotype (IRScNB Av 76), distal end of right *tarsometatarsus*, plantar side.

Specimens 1-6 and 7-13 are shown in the same magnification, the scale bars equal 5 mm.

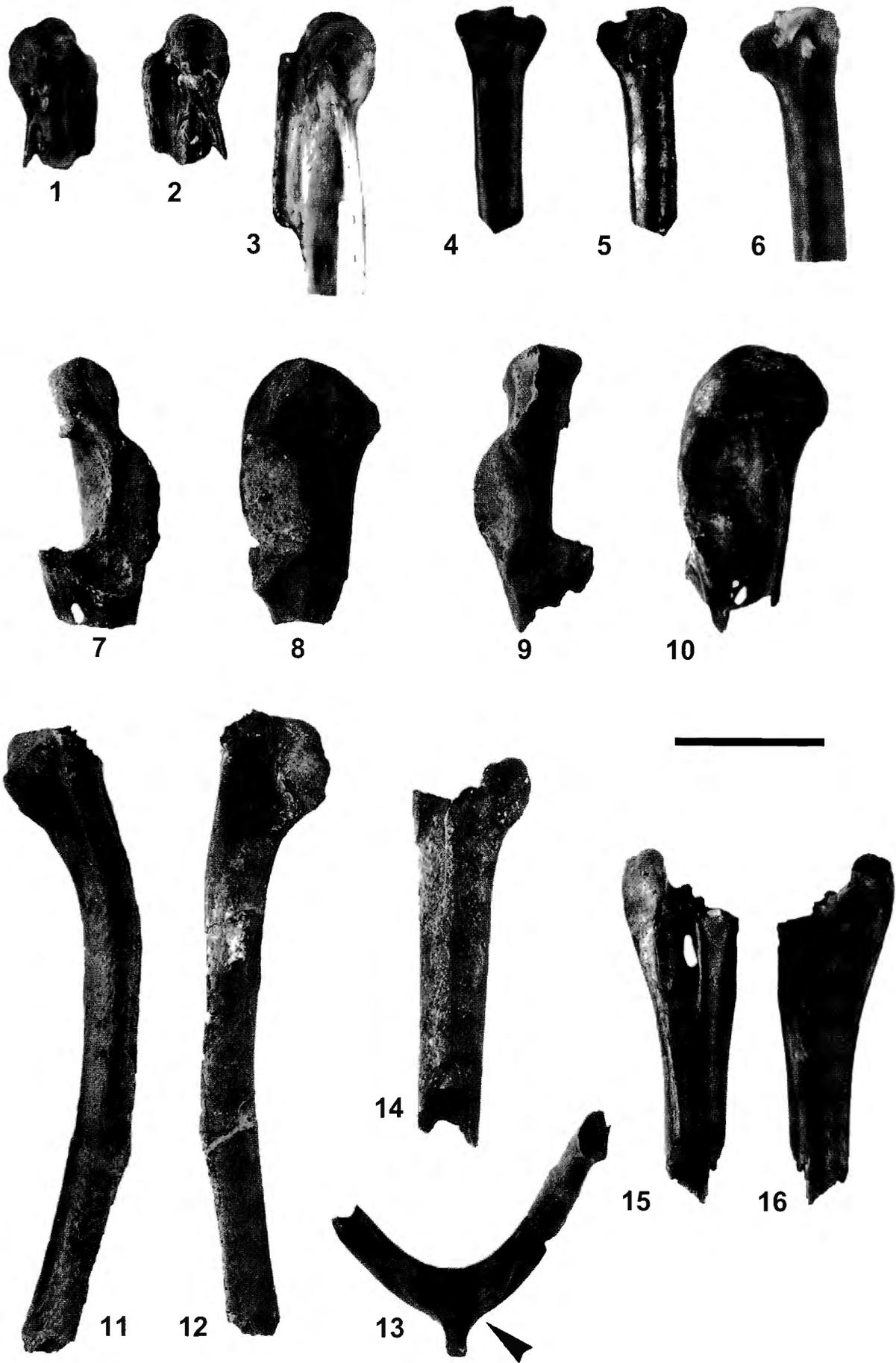


PLATE 1



PLATE 2