

PAPERS IN  
AVIAN PALEONTOLOGY

---

HONORING PIERCE BRODKORB

---

EDITED BY  
KENNETH E. CAMPBELL, JR.

Incorporating the Proceedings of the II International Symposium  
of the Society of Avian Paleontology and Evolution  
Held at the Natural History Museum of Los Angeles County  
28-30 September 1988



NO. 36  
SCIENCE SERIES  
NATURAL HISTORY MUSEUM  
OF LOS ANGELES COUNTY

# THE PRESENT STATE OF KNOWLEDGE OF THE TERTIARY BIRDS OF CENTRAL EUROPE

Jiří Mlíkovský

**ABSTRACT.** Tertiary birds are recorded from 132 localities of Central Europe that range in age from the Late Paleocene to the latest Pliocene. The Early and Middle Miocene localities have furnished particularly significant numbers of fossil birds. Most of the birds collected have not yet been described, and many of those described are often in need of revision. At least 88 species and subspecies of Tertiary birds (excepting *nomina nuda*, but including two alleged bird species) are based on fossil material originating from Central Europe. Approximately 54 percent of these taxa were not listed in Brodkorb's (1963, 1964, 1967, 1971, 1978) *Catalogue of Fossil Birds*.

New taxonomic conclusions are as follows: (1) *Cygnus csakvarensis* belongs in the genus *Olor*; (2) *Anas isarensis* is an indeterminate member of the tribe Aythyini; (3) *Anas atava* belongs in the genus *Cygnus*; (4) *Anas eppelsheimensis* is Anseridae *incertae sedis*; (5) *Athene noctua veta* is synonymous with the modern *Aegolius funereus*; (6) *Ardea lignitum* is synonymous with the modern *Bubo bubo*; and (7) *Eleutherornis helveticus*, *Anas risgoviensis*, *Anas meyerii*, *Gallus longaeus*, *Totanus praecursor*, *Scolopax baranensis*, *Gallinago veterior*, and *Turdoides borealis* should be considered *Aves incertae sedis* until their types are restudied.

**ZUSAMMENFASSUNG.** Die tertiären Vögel wurden bisher in 122 Lokalitäten Mitteleuropas gefunden, die über den Zeitraum vom späten Paläozän bis zum jüngsten Pliozän verbreitet sind. Davon haben insbesondere früh- und mittelmiozäne Fundstellen bedeutende Mengen von Vögelknochen geliefert. Leider sind die meisten der gesammelten Vögel noch nicht beschrieben worden und diejenigen, deren Beschreibungen bereits publiziert worden sind, brauchen in vielen Fällen eine Revision. Wenigstens 88 Arten und Unterarten von tertiären Vögeln (ausschliesslich von *Nomina nuda*, aber einschliesslich von 2 Arten angeblicher Vögel) wurden auf dem aus Mitteleuropa stammenden Material begründet. Ungefähr 54 Prozentig davon wurde im Brodkorb's (1963, 1964, 1967, 1971, 1978) *Catalogue of Fossil Birds* nicht registriert.

Folgende taxonomische Schlussfolgerungen sind neu: (1) *Cygnus csakvarensis* gehört der Gattung *Olor* an; (2) *Anas isarensis* ist ein nicht näher unbestimmbares Vertreter des Tribus Aythyini; (3) *Anas atava* gehört der Gattung *Cygnus* an; (4) *Anas eppelsheimensis* ist ein Anseridae *incertae sedis*; (5) *Athene noctua veta* ist mit dem rezenten *Aegolius funereus* synonym; (6) *Ardea lignitum* ist mit dem rezenten *Bubo bubo* synonym; und (7) *Eleutherornis helveticus*, *Anas risgoviensis*, *Anas meyerii*, *Gallus longaeus*, *Totanus praecursor*, *Scolopax baranensis*, *Gallinago veterior*, und *Turdoides borealis* sind, solange ihre Typen nicht revidiert werden, als *Aves incertae sedis* zu betrachten.

Key words: Aves, Tertiary, Central Europe.

## INTRODUCTION

The fossil record of birds is often considered too incomplete to be useful in phylogenetic, stratigraphic, or faunal studies. A recent review by Olson (1985) showed that much information is contained in the avian fossil record, but highlighted the necessity to reevaluate the results of those workers who based their taxonomic determinations and/or descriptions of fossil birds on inadequate materials, or whose work was subject to other potential kinds of errors.

Reviews of previous studies of fossil birds may be pursued either by taxon or by region. Whereas the former approach allows more insight into the evolution of the taxon under study, the latter makes it possible to recover local publications on the topic and to be more up-to-date with local geographic and stratigraphic data. The present paper aims to contribute to the latter kind of work by summarizing our present knowledge of the Tertiary birds of Central Europe, which is defined for the purposes of this paper as an area including Germany, Poland, Czechoslovakia, Hungary, Austria, Liechtenstein, and Switzerland (Fig. 1). The area covers approximately 1,015,632 km<sup>2</sup>.

## HISTORY OF TERTIARY AVIAN RESEARCH IN CENTRAL EUROPE

Bird remains from Tertiary deposits of Central Europe were first mentioned by Swiss naturalist Johann Jacob Scheuchzer (1670–1733), who described an "ante-diluvian" (=Middle Miocene) feather from Öhningen, Germany (Scheuchzer, 1708). Regular research was started much later, around the middle of the nineteenth century, by German paleontologist Hermann von Meyer (1801–1869). Meyer (1844) also formally named the first Tertiary bird species of Central Europe, *Protornis glarniensis* from the Lower Oligocene of Matt, Switzerland. During the remainder of the nineteenth and early twentieth centuries, no workers were regularly studying Tertiary birds of Central Europe. Those that were, were only marginally interested in fossil birds, such as Oskar Fraas (1824–1897), Gustav Carl Laube (1839–1923), and Ludwig von Ammon (1850–1922), all of whom produced paleornithological works of generally low quality.

The classical period of Central European paleornithology culminated with the Hungarian paleornithologist Kálmán Lam-

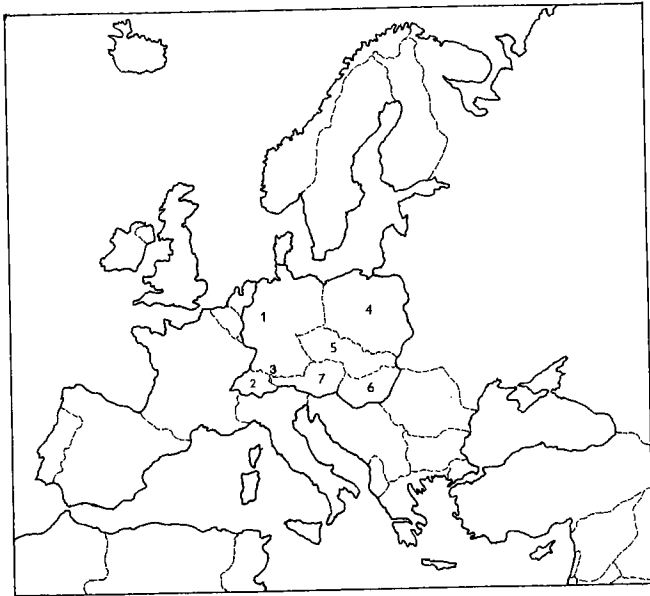


Figure 1. Map of Europe, indicating the area of Central Europe covered in the present paper. 1, Germany; 2, Switzerland; 3, Liechtenstein; 4, Poland; 5, Czechoslovakia; 6, Hungary; 7, Austria.

brecht (1889–1936), who described fossil birds from such Tertiary localities of Central Europe as Geisel Valley, Ipolytarnóc, and Aumeister or Eppelsheim (see later) and presented the first comprehensive review of these birds (Lambrecht, 1933). Following his death, a hiatus appeared in Central European paleornithology that lasted until the late 1960s. Thereafter, research revived slowly and is at present carried out by Peter Ballmann, Dieter Stefan Peters, Angelika Hesse, and Karl-heinz Fischer in Germany, Zygmunt Bocheński in Poland, and Dénes Jánossy in Hungary. Several other workers of Central Europe intensively study Quaternary birds but have yet to contribute significantly to the study of the Tertiary birds of the region.

## METHODS

I list all avian species and subspecies based on materials recovered from the Tertiary of Central Europe of which I am aware. The sequence of families follows, as far as possible, Wetmore (1960) for the sake of clarity, although considerable disagreement currently exists among avian systematists about this last standard offshoot of the classical Fürbringer–Gadow–Wetmore clade of avian classifications (Wolters, 1975–1982; Crafcraft, 1981; Mlíkovský, 1985; Olson, 1985). To facilitate the reader's orientation, I list all of the species in the systematic position that they occupied in the last catalogue of fossil birds (Brodkorb, 1963, 1964, 1967, 1971, 1978), if they were included in it, with only a few exceptions. I also follow this order because the taxonomic fate of many taxa is still unclear. For every species or subspecies, data on their original description, holotypes, and their location (if known) and on their age and locality from which they were described are given. Where appropriate, remarks are added. Figures in parentheses after each locality name refer to their numbers in the following section. [Localities with a letter added to their identifying number were added at press time; they are not included in the figures.—Ed.] Anatomical

nomenclature follows Baumel et al. (1979) throughout the present paper.

Four species frequently listed among the Tertiary birds of Central Europe are not included here: (1) *Plotus pannonicus* Lambrecht 1916 was described from Tataros, a locality that was formerly in Hungary, but now lies in Rumania and is thus outside the region of concern; (2, 3) *Pliogallus crassipes* Gaillard 1939 and *Pliogallus kormosi* Gaillard 1939, formerly thought to be Pliocene phasianids of Hungary, were found to be based upon remains of Recent domestic hen (Jánossy, 1976a, 1976b); and (4) *Odontopteryx longirostris* Spulski 1910 was based upon a skull of unknown origin. Although it could have come from the Tertiary of Hamburg, northern Germany, as sometimes believed, this remains unproven (Olson, 1985:198) and the state of preservation of bones of the Tertiary birds of northern Germany and Denmark (Hoch, 1973, 1975) makes this improbable.

In addition, *Ornitholithes ralli* Anonymous is an etiquette name given for what was thought to represent a bird from the Middle Miocene of Öhningen, Germany (Karg, 1805:26), but which turned out to be a forgery (Pffannenstiell, 1958:854, fig. 1).

For stratigraphic divisioning of the Central European Tertiary, I follow Russell et al. (1982) for the Paleogene and Steininger et al. (1987) for the Neogene. Mammal Neogene units (*sensu* Steininger et al., 1987) are abbreviated as MN. It is recognized that the age of some localities is known only approximately and that disagreement still prevails among European stratigraphers as to the limits of many stratigraphic units. Consequently, the allocation of individual localities to specific stratigraphic units may be subject to future change.

Abbreviations used throughout are as follows.

BMNH:	Natural History Museum, London, United Kingdom; formerly British Museum (Natural History)
BSP:	Bayerische Staatssammlung für Paläontologie und historische Geologie, München, Germany
CHI:	Conservation Hall, Ipolytarnóc, Hungary
DP FNSP:	Department of Paleontology, Faculty of Natural Sciences, Charles University, Praha, Czechoslovakia
GIB:	Geological Institute, Budapest, Hungary
GIH:	Geologisches Institut, Hamburg, Germany
GM:	Geiseltalmuseum, Halle (Saale), Germany
GPIW:	Geologisch-Paläontologisches Institut der Universität, Würzburg, Germany
IZK:	Institute of Systematic and Experimental Zoology, Polish Academy of Sciences, Kraków, Poland
KD:	Mrs. Kessler, private collection, Darmstadt, Germany
MB:	Museum für Naturkunde, Humboldt-Universität, Berlin, Germany
MR:	Naturkundemuseum Ostbayern, Regensburg, Germany
MZ:	Paläontologisches Museum der Universität, Zürich, Switzerland
NFS:	Naturmuseum und Forschungsinstitut Senckenberg, Frankfurt (Main), Germany
NHMB:	Naturhistorisches Museum, Basel, Switzerland
NMB:	National Museum, Budapest, Hungary
NMP:	National Museum, Praha, Czechoslovakia
NMW:	Naturhistorisches Museum, Wien, Austria
RMT:	Regional Museum, Teplice, Czechoslovakia
SMNS:	Staatliches Museum für Naturkunde, Stuttgart, Germany

UM: Dr. U. Maschwitz, private collection, München, Germany  
ZGIB: Zentrales Geologisches Institut, Berlin, Germany

#### SYSTEMATICS

Class Aves Linnaeus 1758

Subclass Ornithurae

Haeckel 1866

Infraclass Ratitae Merrem 1813

Order Struthioniformes

(Latham 1790)

Family Palaeotididae

Houde and Haubold 1987

*Palaeotis weigelti*

Lambrecht 1928

*Palaeotis weigelti* Lambrecht, 1928:20, text-fig. 6; pl. 1, figs. 1-4.

**HOLOTYPE.** Distal end of left tarsometatarsus with associated phalanx 1 digiti II; GM Ce I/4415 and Ce I/4418 (Haubold and Krumbiegel, 1984).

**HORIZON AND LOCALITY.** Middle Eocene of Geisel Valley (5).

**REMARKS.** When I studied the Geisel Valley bird fossils in 1983, I found that what was exhibited in the museum as the type of *Palaeotis weigelti* was, in fact, another specimen. The specimen on exhibit was a crushed partial skeleton, GM 4362, first mentioned in the literature probably by Weigelt (1942:30). The time of, and the reasons for, this substitution were unknown (H. Haubold, pers. comm., 1983).

*Palaeotis weigelti* was a flightless paleognathous bird (Houde and Haubold, 1987; Peters, 1988).

*Palaeogrus geiseltalensis*

Lambrecht 1935

*Palaeogrus geiseltalensis* Lambrecht, 1935:361, pl. 1, fig. 1.  
*Ornitocnemus geiseltalensis*: Brodkorb, 1967:148 (new combination).

**HOLOTYPE.** Associated right tibiotarsus, right tarsometatarsus, and two basal phalanges digitorum pedis; GM 5882. The phalanges were not described or figured by Lambrecht (1935).

**HORIZON AND LOCALITY.** Middle Eocene of Geisel Valley (5).

**REMARKS.** This species is synonymous with *Palaeotis weigelti* Lambrecht (1928) from the same horizon and locality (Houde and Haubold, 1987).

Family Struthionidae Vigors 1825

*Struthio pannonicus* Kretzoi 1954

*Struthio (Pachystruthio) pannonicus* Kretzoi, 1954:232, pls. 1, 2.

**HOLOTYPE.** Left pedal phalanx 1 digiti III; GIB, uncatalogued.

**HORIZON AND LOCALITY.** Upper Pliocene (MN 17) of Kisláng (114). \*

**REMARKS.** Kretzoi (1955) described additional material of this species. Mikhailov (1988) and Mikhailov and Kurochkin (1988) restudied associated eggshells and subsequently synonymized *Struthio pannonicus* with *Struthiolithus* (= *Struthio chersonensis* Brandt 1873).

Infraclass Carinatae Merrem 1813

Order Gaviiformes

Wetmore and Miller 1926

Family Gaviidae Allen 1897

*Gavia egeriana* Švec 1982

*Gavia egeriana* Švec, 1982:251, text-fig. 8a, pl. I, fig. 1a, b.

**HOLOTYPE.** Distal end of left humerus; DP FNSP 4816.

**HORIZON AND LOCALITY.** Lower Miocene (MN 4) of Dolnice 2 (67).

**REMARKS.** Additional finds from the same horizon and locality have been reported by Švec (1985).

Order Podicipediformes

Fürbringer 1888

Family Podicipedidae

Bonaparte 1831

*Miobaptus walteri* Švec 1982

*Miobaptus walteri* Švec, 1982:246, text-fig. 1a, b, pl. I, fig. 2.

**HOLOTYPE.** Proximal end of right humerus; DP FNSP 4810.

**HORIZON AND LOCALITY.** Lower Miocene (MN 4) of Dolnice 2 (67).

**REMARKS.** *Miobaptus walteri* is closely related to grebes of the modern genus *Tachybaptus* Reichenbach 1852 (Švec, 1982, 1984). As comparisons were made with only one species of the latter, *Tachybaptus ruficollis* (Pallas 1764), it is possible that the slight differences noted between *Tachybaptus* and *Miobaptus* are only a result of intrageneric variability.

Order Procellariiformes

Fürbringer 1888

Family Diomedeoidea

Fischer 1985

*Diomedeoides minimus*

Fischer 1985

*Diomedeoides minimus* Fischer, 1985:114, figs. 1-6, 12, 13, 15, 16.

**HOLOTYPE.** Right humerus; MB Av. 764.

**HORIZON AND LOCALITY.** Middle Oligocene of Espenhain (21).

Order Pelecaniformes Sharpe 1891

Family Pelecanidae Vigors 1825

*Pelecanus intermedius* Fraas 1870

*Pelecanus intermedius* Fraas, 1870:281, pl. 13, figs. 3, 4.

*Miopelecanus intermedius*: Cheneval, 1984:77 (new combination).

**HOLOTYPE.** Skull with associated partial mandible; SMNS, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 6) of Hahnenberg, Nördlinger Ries (82).

**REMARKS.** Cheneval (1984) transferred this species to the genus *Mioplecanus*, which he established for *Pelecanus gracilis* Milne-Edwards 1867 from the Lower Miocene (MN 2) of France. He indicated that the two species might be synonymous.

### *Pelecanus fraasi* Lydekker 1891

*Pelecanus fraasi* Lydekker, 1891:44, fig. 10a.

**HOLOTYPE.** Skull; BMNH 47862.

**HORIZON AND LOCALITY.** Middle Miocene (MN 6) of Lierheim, Nördlinger Ries (82).

**REMARKS.** This appears to be a valid species of *Pelecanus* Linnaeus 1758 (Cheneval, 1984).

### Family Phalacrocoracidae Bonaparte 1853

#### *Phalacrocorax praecarbo* Ammon 1918

*Phalacrocorax praecarbo* Ammon, 1918:28, fig. 3.

**HOLOTYPE.** Humeral end of left coracoid; MR, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7-8) of Dechbetten (90).

**REMARKS.** Brodkorb (1980) synonymized *Phalacrocorax praecarbo* with *Ardea* (= *Phalacrocorax*) *brunhuberi* Ammon 1918 from the same horizon and locality. See *Ardea brunhuberi* for further discussion.

### *Carbo risgoviensis* Fraas 1908

*Carbo risgoviensis* O. Fraas in Engel, 1908:567 (*nomen nudum*).

### Order Ardeiformes (Wagler 1830)

### Family Plataleidae Bonaparte 1838

#### *Rhynchaetes messelensis* Wittich 1899

*Rhynchaetes messelensis* Wittich, 1899:103, pl. 2, figs. 1-17.

**HOLOTYPE.** Partial skeleton in a slab; location unknown. Peters (1983:4, fig. 2) selected a nearly complete skeleton in a slab, NFS ME 1045, as a neotype of this species because the holotype appears to have been lost.

**HORIZON AND LOCALITY.** Middle Eocene of Messel (4).

**REMARKS.** Wittich (1899) thought that *Rhynchaetes messelensis* was intermediate in morphology and taxonomic position between waders and rails, remarking that a similar position is occupied by the modern genus *Rostratula* Vieillot 1816. This was sufficient for Lambrecht (1933) to include *Rhynchaetes* in the Rostratulidae. Peters (1983) showed that the species actually belongs in the Plataleidae, where *Rhynchaetes messelensis* apparently represents a valid species. The status of *Rhynchaetes* within the Plataleidae has not been evaluated.

### *Plumumida lutetialis* Hoch 1980

*Plumumida lutetialis* Hoch, 1980:40, figs. 2-6.

**HOLOTYPE.** Incomplete skeleton in a slab; GIH S.G.P.I. 2183.

**HORIZON AND LOCALITY.** Middle Eocene of Messel (4).

**REMARKS.** *Plumumida lutetialis* is a synonym of *Rhynchaetes messelensis* Wittich 1899, described from the same horizon and locality (Peters, 1983).

### Family Ardeidae Vigors 1825

#### *Ardeacites molassicus* Haushalter 1855

*Ardeacites molassicus* Haushalter, 1855:11, pl. 2, fig. 1.

**HOLOTYPE.** Right humerus; location unknown.

**HORIZON AND LOCALITY.** Lower Miocene (MN 3) of Harbatshofen (55).

**REMARKS.** Brodkorb (1980:91) relegated this species to *Aves incertae sedis*, stating that it is not a heron but that he was "... unable to get it in an order, much less a family."

#### *Botaurites avitus* Ammon 1918

*Botaurites avitus* Ammon, 1918:31, figs. 5, 6.

**HOLOTYPE.** Cervical vertebra; MR, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7-8) of Dechbetten (90).

**REMARKS.** Olson (1985:67) determined that the holotype of this species is "almost certainly from a cormorant" of the size of *Ardea* (= *Phalacrocorax*) *brunhuberi* Ammon 1918 from the same horizon and locality, and he suggested that *Botaurites avitus* is best synonymized with that species.

### *Ardea similis* Fraas 1870

*Ardea similis* Fraas, 1870:284, pl. 7, fig. 14a-c.

*Botaurites similis*: Lambrecht, 1933:315 (new combination).

**HOLOTYPE.** Distal end of right tibiotarsus; SMNS, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7) of Steinheim (87).

**REMARKS.** Lambrecht (1933:315) thought he saw similarities between the holotype of *Ardea similis* and the same element of the modern ardeid genus *Botaurus* Stephens 1819. He transferred *Ardea similis* to the extinct, supposedly also bittern-like genus *Botaurites* Ammon 1918. Brodkorb (1963:282) followed him, but Olson (1985:166), restudying the figure of the holotype, concluded that "this specimen is from a large phasianid, possibly *Miophasianus altus* [Milne-Edwards (1869)]" described from the Middle Miocene of France.

### *Ardea brunhuberi* Ammon 1918

*Ardea brunhuberi* Ammon, 1918:30, fig. 4.

**HOLOTYPE.** Proximal end of left carpometacarpus; MR, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7-8) of Dechbetten (90).

**REMARKS.** Brodkorb (1980) determined that this is actually

a species of cormorant that may be valid, or which may be synonymous with *Graculus* (= *Phalacrocorax*) *intermedius* Milne-Edwards 1867, described from the Middle Miocene (MN 6) of France. I prefer the latter because the slight difference in age between *Phalacrocorax intermedius* and *P. brunhuberi* does not itself substantiate specific separation of the two taxa and the slight difference in size between the two species (Brodtkorb, 1980) may easily be attributed to intraspecific variability.

### *Ardea lignitum* Giebel 1860

*Ardea lignitum* Giebel, 1860:152, pl. 1, fig. 2.

*Bubo lignitum*: Brodtkorb, 1980:90 (new combination).

**HOLOTYPE.** Distal end of left femur; location unknown.

**HORIZON AND LOCALITY.** Middle Pliocene (MN 15-16) of Rippersroda 1 (106).

**REMARKS.** Brodtkorb (1980) showed that this is actually an owl of the modern genus *Bubo* Duméril 1806, similar in size and morphology to the modern European Eagle-Owl, *Bubo bubo* (Linnaeus 1758). Because he thought that the specimen came from the Sarmatian (Middle Miocene), he considered *Bubo lignitum* a valid species. Because it is, in fact, much younger, I synonymize it here with the modern *B. bubo*.

### *Ardea effosa* Meyer 1883

*Ardea effosa* Meyer in Lepsius, 1883:146 (*nomen nudum*).

*Ardea effosa* Meyer in Lepsius, 1892:623 (*nomen nudum*).

### *Ardea latipes* Meyer 1883

*Ardea latipes* Meyer in Lepsius, 1883:146 (*nomen nudum*).

*Ardea latipes* Meyer in Lepsius, 1892:623 (*nomen nudum*).

### Family Palaelodidae Stejneger 1885

#### *Palaelodus steinheimensis* Fraas 1870

*Palaelodus steinheimensis* Fraas, 1870:285, pl. 7, fig. 13.

**HOLOTYPE.** Distal end of left tibiotarsus; SMNS, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7) of Steinheim (87).

**REMARKS.** This is a large anseriform, according to Olson and Feduccia's (1980) reexamination of its description and the figure in Fraas (1870).

### Family Phoenicopteridae Bonaparte 1831

#### *Juncitarsus merkei* Peters 1987

*Juncitarsus merkei* Peters, 1987b:141, figs. 1, 3-8.

**HOLOTYPE.** Skeleton on slab; KD, uncatalogued.

**HORIZON AND LOCALITY.** Middle Eocene of Messel (4).

### Order Anseriformes Linnaeus 1758

#### Family Anseridae Vigors 1825

#### *Cygnavus senckenbergi* Lambrecht 1931

*Cygnavus senckenbergi* Lambrecht, 1931:3, pl. 1, figs. 3, 4; pl. 2, figs. 9-12.

**SYNTYPES.** Left femur with abraded ends, distal end of left tibiotarsus and pedal phalanx; NFS, uncatalogued.

**HORIZON AND LOCALITY.** Lower Miocene (MN 2) of Wiesbaden (50).

**REMARKS.** This species is based on three rather undiagnostic elements, and it was probably their size alone that led Lambrecht (1931, 1933) and others (Brodtkorb, 1964; Howard, 1964) to consider it a swan. However, the syntype femur differs from the same element of Anserinae in having the border of condylus lateralis less extended cranially. Although the species appears to be correctly assigned to the Anseriformes, there is little information as to its taxonomic position within that order, and until restudied it should be relegated to Anseriformes *incertae sedis*.

#### *Cygnus csakvarensis* Lambrecht 1933

*Cygnus csakvarensis* Lambrecht, 1931:4 (*nomen nudum*).

*Cygnus csakvarensis* Lambrecht, 1933:283, fig. 128g, h.

*Cygnanser csakvarensis*: Kretzoi, 1957:240 (new combination).

*Cygnanser csakvarensis*: Brodtkorb, 1964:210 (spelling emended).

*Olor csakvarensis* Mlíkovský, this paper (new combination).

**LECTOTYPE.** Proximal end of left carpometacarpus; GIB, uncatalogued; selected by Kretzoi (1957:240).

**PARALECTOTYPES.** Distal end of right carpometacarpus, phalanx 1 digiti majoris; GIB, uncatalogued. All syntypes are figured in Kretzoi (1957:figs. 37-43).

**HORIZON AND LOCALITY.** Upper Miocene (MN 10) of Csákvár (96).

**REMARKS.** Based on a study of two referred elements, an anterior portion of a sternum and fragmentary dentale, from the same horizon and locality, Kretzoi (1957) concluded that *Cygnus csakvarensis* was intermediate in morphology between *Cygnus* Bechstein 1802 and *Anser* Brisson 1760 and created a new genus, *Cygnanser*, for it. This action seems unsubstantiated because the lectotype carpometacarpus agrees well with the same element of swans. Moreover, it differs from the same element of *Cygnus* (*sensu stricto*) and agrees with that of *Olor* Wagler 1832 in having the following: (1) fovea carpalis caudalis shallow, and (2) facies dorsalis ossis metacarpalis allularis less deepened. With no evidence to the contrary, I consider *Olor csakvarensis* (Lambrecht) new combination a valid species.

#### *Cygnus bilinicus* Laube 1909

*Cygnus bilinicus* Laube, 1909:161, pl. I.

**HOLOTYPE.** Proximal end of ulna, proximal end of radius and carpometacarpus, lacking processus extensorius, in a slab; all apparently from a single individual. The bones are too flattened to reveal from which side of the body they originated. RMT, uncatalogued.

**HORIZON AND LOCALITY.** Lower Miocene (?MN 3) of Břešňany (59).

**REMARKS.** Lambrecht (1933) and others (Howard, 1964; Brodkorb, 1978) thought that *Cygnus bilineatus* is actually a raptor, but a restudy of the holotype showed that it is an indeterminate stork, family Ciconiidae (Mlíkovský and Švec, 1989).

### *Anas cygniformis* Fraas 1870

*Anas cygniformis* Fraas, 1870:276, pl. 13, fig. 2a, b.  
*Anser cygniformis*: Lambrecht, 1933:369 (new combination).

**LECTOTYPE.** Left coracoid, figured in Fraas (1870:pl. 13, fig. 2a, b); selected here. SMNS, uncatalogued.

**PARALECTOTYPES.** Two tarsometarsi and 3 pedal phalanges; SMNS, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7) of Steinheim (87).

**REMARKS.** Lambrecht (1933) transferred *Anas cygniformis* to the modern genus *Anser* Brisson 1760 on the basis of more developed lineae intermusculares on the impressio musculi sternocoracoidei. This character is not valid according to my observations, but other aspects of the lectotype coracoid support Lambrecht's (1933) judgment. The angle between the axis of the corpus coracoidei and the sternal facet, a blunt angulus medialis, and the presence of foramina pneumatica under the facies articularis clavicularis coracoidei are sufficient to refer *Anas cygniformis* to the Anserinae. Within that subfamily, the lectotype coracoid differs from the same element of the Cygnini and agrees with that of the Anserini in having the following: (1) canalis triosseus between the processus procoracoideus and the lateral border of the processus acrocoracoideus deep, and (2) foramina pneumatica under the facies articularis clavicularis coracoidei larger and limited to the lateral side of the sulcus musculi supracoracoidei. The latter character, and the fact that facies articularis clavicularis coracoidei appears less clearly bordered by the canalis triosseus, is sufficient to allocate *Anas cygniformis* to the genus *Anser*.

The specific status of *Anser cygniformis* is much less certain because *Anas* (= *Anser*) *oeningensis* Meyer 1865 (see below), described from a similarly aged (MN 7), nearby deposit is about the same size. Direct comparison is presently impossible, so I hesitate to synonymize the former with the latter, but the possibility that *Anser cygniformis* is not a valid species should be kept in mind in future studies.

### *Anas oeningensis* Meyer 1865

*Anas oeningensis* Meyer, 1865:126, pl. 30, fig. 2.  
*Anser oeningensis*: Milne-Edwards, 1867:127 (new combination).

**HOLOTYPE.** Incomplete skeleton in a slab, including a sternum, partial scapulae, sternal end of coracoid, humeri, ulnae, radii, distal end of carpometacarpus, phalanx 1 digiti majoris, and rib fragments; BMNH 42804.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7) of Öhningen (86).

**REMARKS.** Milne-Edwards (1867:127–28) transferred this species to the modern genus *Anser*. The shape of the spina externa sterni and the position of the dorsal linea intermuscularis sterni, which are quite visible in Meyer's (1865) illustration of the holotype, clearly support this decision. *Anser oeningensis* appears to be a valid species of goose.

### *Anas basaltica* Bayer 1882

*Anas* (?) *basaltica* Bayer, 1882:20, fig. 8/1.  
*Anas* (?) *basaltica* Bayer, 1883:62, fig. 1 (here labeled "n. sp.").

**HOLOTYPE.** Imprints of right coracoid lacking facies articularis sternalis, proximal end of right humerus, cranial end of right scapula, and a rib fragment, probably all from a single individual; NMP ČM 1519. See Mlíkovský and Švec (1989) for additional information.

**HORIZON AND LOCALITY.** Middle Oligocene of Varnsdorf (22).

**REMARKS.** This is an indeterminate heron of the tribe Ardeini (Mlíkovský and Švec, 1989).

### *Anas skalicensis* Bayer 1882

*Anas* (?) *skalicensis* Bayer, 1882:21, fig. 8/2.  
*Anas* (?) *skalicensis* Bayer, 1883:64, fig. 2 (here labeled "n. sp.").

**HOLOTYPE.** Scraps of long bones; NMP ČM 1520.

**HORIZON AND LOCALITY.** Middle Oligocene of Skalice (23).

**REMARKS.** The holotype of this species is indeterminate, even at the ordinal level (Mlíkovský and Švec, 1989).

### *Anas isarensis* Lambrecht 1933

*Anas isarensis* Lambrecht, 1933:361, fig. 123a.

**HOLOTYPE.** Cranial end of right scapula; BSP 1926 v 12b.

**HORIZON AND LOCALITY.** Middle/Upper Miocene (MN 8–9) of Aumeister (91).

**REMARKS.** As seen in the original illustration, the holotype scapula differs from the same element of Anatini and agrees with that of Aythyini in having the following: (1) acromion more slender, (2) acromion more perpendicular to the axis of scapula, (3) whole extremitas cranialis more slender, and (4) longitudinal furrow on the facies costalis between tuberculum coracoideum and acromion deeper. Within Aythyini, however, the scapula is indeterminate (Woolfenden, 1961), so *Anas isarensis* will remain as Aythyini *incertae sedis*.

### *Anas risgoviensis* Ammon 1918

*Anas risgoviensis* Ammon, 1918:41, unfigured.

**SYNTYPES.** Left and right coracoids; BMNH 48165 and 48165a.

**HORIZON AND LOCALITY.** Middle Miocene (MN 6) of Lierheim, Nördlinger Ries (82).

**REMARKS.** This is nearly a *nomen nudum*. Until the syntypes of *Anas risgoviensis* are restudied, it should be considered *Aves incertae sedis* (see also Cheneval, 1987:147).

### *Anas eppelsheimensis* Lambrecht 1933

*Anas eppelsheimensis* Lambrecht, 1933:362, fig. 124.

**HOLOTYPE.** Right coracoid, lacking extremitas sternalis and processus acrocoracoideus; ZGIB, uncatalogued.

**HORIZON AND LOCALITY.** Upper Miocene (MN 9) of Eppelsheim (94).

**REMARKS.** Based on a study of the figure of the holotype in Lambrecht (1933), I consider this fossil indeterminate at even the tribal level within the Anseridae and thus relegate *Anas eppelsheimensis* to Anseridae *incertae sedis*.

*Anas meyerii* Milne-Edwards 1867

*Anas meyerii* Milne-Edwards, 1867:129, unfigured.  
*Aythya meyerii*: Brodkorb, 1964:228 (new combination).

**HOLOTYPE.** Crushed tarsometatarsus with associated phalanges in a slab; BMNH 42805.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7) of Öhningen (86).

**REMARKS.** Both Meyer (1865), who described and figured the specimen, and Milne-Edwards (1867), who named the species, mentioned the badly crushed state of the holotype. It is quite possible that the figure in Meyer (1865) is a reconstruction. Brodkorb (1964) transferred the species to the modern genus *Aythya* Boie 1822, probably inspired by Milne-Edwards' (1867) remark that the specimen exhibits some similarities to the same element of Fuligules (=Aythyini). This is a doubtful action and I recommend considering *Anas meyerii* as *Aves incertae sedis* until the holotype is restudied. There is a high probability that the species will be found to be based upon indeterminate remains.

*Anas albae* Jánossy 1979

*Anas albae* Jánossy, 1979:16, unfigured.

**HOLOTYPE.** Left carpometacarpus, NMB Vt.84.

**HORIZON AND LOCALITY.** Upper Miocene (MN 13) of Polgárdi (100).

**REMARKS.** The holotype of *Anas albae* was originally determined by V. Čapek (in Lambrecht, 1912a, 1912b) as "*Mergus* sp." Jánossy (1979) placed the species in the modern genus *Anas* Linnaeus 1758.

*Anas atava* Fraas 1870

*Anas atava* Fraas, 1870:275, pl. 13, fig. 1a-c.  
*Anser atavus*: Lambrecht, 1933:369 (new combination).  
*Cygnus atavus*: Mlíkovský, this paper (new combination).

**HOLOTYPE.** Proximal end of right femur; SMNS, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7) of Steinheim (87).

**REMARKS.** Lambrecht (1933) transferred *Anas atava* to the modern genus *Anser*, but, as judged from the illustrations in Fraas (1870), the holotype femur differs from the same element of Anserini and agrees with that of Cygnini in having the following: (1) processus trochantericus inclined in norma caudalis, and (2) collum femoris more reduced. The latter character, and the transverse ridge on the facies articularis antitrochanterica, is sufficient to distinguish the specimen from the same element of *Olor* and to refer it to *Cygnus* (*sensu stricto*). Here, *Cygnus atavus* (Fraas) new combination is probably a valid species.

*Anas submajor* Jánossy 1979

*Anas submajor* Jánossy, 1979:11, fig. 4/2.

**HOLOTYPE.** Left ulna; NMB Vt.83.

**HORIZON AND LOCALITY.** Upper Pliocene (MN 17) of Villány Mountains. Exact locality was not given by Jánossy (1979), but it was probably Villány 3 (115).

**REMARKS.** This species belongs to the modern genus *Tadorna* Oken 1817, where it is inseparable from, and synonymous with, the extant *Tadorna tadorna* (Linnaeus 1758) (Mlíkovský, 1982).

Order Falconiformes Sharpe 1874

Family Vulturidae Illiger 1811

*Eocathartes robustus*  
Lambrecht 1935

*Eocathartes robustus* Lambrecht, 1935:362, pl. 18, fig. 2.

**HOLOTYPE.** Partial skeleton in a slab, including pelvis, left and right femur, right tibiotarsus, right tarsometatarsus, and associated basal phalanges of toes II-IV; GM 6883.

**HORIZON AND LOCALITY.** Middle Eocene of Geisel Valley (5).

**REMARKS.** According to Houde (in Olson, 1985:191), this is almost certainly not a vulturid, but its true affinities are still unclear.

Order Galliformes Linnaeus 1758

Family Gallinuloididae  
Lucas 1900

*Taoperdix miocaena*  
Ballmann 1969

*Taoperdix miocaena* Ballmann, 1969:29, pl. II, fig. 14a, b.

**HOLOTYPE.** Proximal end of left carpometacarpus; BSP 18111.

**HORIZON AND LOCALITY.** Lower Miocene (MN 3) of Wintershof (West) (56).

Family Tetraonidae Vigors 1825

*Tetrao macropus* Jánossy 1976

*Tetrao macropus* Jánossy, 1976a:17, pl. I, fig. 6.

**HOLOTYPE.** Distal end of left tibiotarsus; GIB V.10348.

**HORIZON AND LOCALITY.** Lower Pliocene (MN 15) of Csarnóta 2 (105).

*Tetrao conjugens* Jánossy 1974

*Tetrao conjugens* Jánossy, 1974b:537, pl. 23, fig. 9.

**HOLOTYPE.** Proximal end of left carpometacarpus; IZK, uncatalogued.

**HORIZON AND LOCALITY.** Lower Pliocene (MN 15) of Węże 1 (101).

*Lagopus lagopus atavus*  
Jánossy 1974

*Lagopus lagopus atavus* Jánossy, 1974b:534, pl. 24, figs. 4-8.  
*Lagopus atavus*: Jánossy, 1976a:33 (new rank).

**SYNTYPES.** Thirty-three bone fragments, listed in Jánossy (1974b:534); IZK, uncatalogued.

**HORIZON AND LOCALITY.** Upper Pliocene (MN 16) of Rębielice Królewskie 1 (107).

**REMARKS.** Jánossy (1976a) elevated this subspecies to the species rank, but since the Willow Grouse, *Lagopus lagopus* (Linnaeus 1758), was rather variable in the late Cenozoic (Bocheński, 1974, 1985; Potapova, 1986), its taxonomic validity should be reevaluated.



Family Phasianidae Vigors 1825

*Palaeortyx intermedia*  
Ballmann 1969

*Palaeortyx (?)intermedia* Ballmann, 1969:33, pl. 1, figs. 1, 2.

**HOLOTYPE.** Left coracoid; BSP 18103.

**HORIZON AND LOCALITY.** Lower Miocene (MN 3) of Wintershof (West) (56).

*Phasianus augustus* Ammon 1918

*Phasianus augustus* Ammon, 1918:45, figs. 9, 10.

*Miophasianus augustus*: Lambrecht, 1933:440 (new combination).

**HOLOTYPE.** Left femur; MR, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7–8) of Dechbetten (90).

**REMARKS.** This species was transferred to *Miophasianus* by Lambrecht (1933). It was subsequently synonymized with *Phasianus* (= *Miophasianus*) *altus* Milne-Edwards 1871, described from the Middle Miocene (MN 6) of France (Švec, 1986; Bocheński, 1987).

*Gallus longaevus* Ammon 1918

*Gallus longaevus* Ammon, 1918:41, fig. 8.

*Miogallus longaevus*: Lambrecht, 1933:442 (new combination).

**HOLOTYPE.** Humeral end of left coracoid; MR, uncatalogued.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7–8) of Dechbetten (90).

**REMARKS.** Ammon (1918) was unable to determine the affinities of this species within the Phasianidae and decided to place it “. . . in the best known genus *Gallus*, which in the present case is to be understood in its broadest sense, so to say as a group name” [my translation]. Lambrecht (1933), without seeing the holotype, established the genus *Miogallus* for *G. longaevus* because of its great age. *Gallus longaevus* is obviously *Aves incertae sedis* until its holotype is restudied.

*Gallus beremendensis*  
Jánossy 1976

*Gallus beremendensis* Jánossy, 1976b:34, fig. 8/5.

**HOLOTYPE.** Right humerus; GIB, uncatalogued.

**HORIZON AND LOCALITY.** Upper Pliocene (MN 17) of Beremend 5 (116).

*Gallus steinheimensis*  
Fraas 1908

*Gallus steinheimensis* E. Fraas in Engel, 1908:567 (*nomen nudum*).

**REMARKS.** Brodkorb (1978:222) attributed this species to Theodor Fraas (probably *lapsus calami*), but Engel (1908) wrote E. Fraas, which apparently means Eberhard Fraas, son of Oskar Fraas.

*Alectoris bavarica*  
Ballmann 1969

*Alectoris bavarica* Ballmann, 1969:36, pl. 1, fig. 4a, b.

**HOLOTYPE.** Left tarsometatarsus; BSP 18110.

**HORIZON AND LOCALITY.** Lower Miocene (MN 3) of Wintershof (West) (56).

*Francolinus subfrancolinus*  
Jánossy 1976b

*Francolinus subfrancolinus* Jánossy, 1976b:36, fig. 8/3.

**HOLOTYPE.** Left carpometacarpus, lacking os metacarpale minus; GIB, uncatalogued.

**HORIZON AND LOCALITY.** Upper Pliocene (MN 17) of Villány 3 (115).

*Francolinus capeki wenzensis*  
Jánossy 1974

*Francolinus capeki wenzensis* Jánossy, 1974b:540, pl. 23, figs. 7, 8.

*Francolinus wezensis* [sic]: Jánossy, 1981:380 (new rank).

**SYNTYPES.** Thirty-four bones and bone fragments, listed in Jánossy (1974b:540).

**HORIZON AND LOCALITY.** Lower Pliocene (MN 15) of Węże 1 (101).

**REMARKS.** *Francolinus capeki wenzensis* was described as a temporal and geographical subspecies of *F. capeki* Lambrecht 1933, from the lower Pleistocene (Biharian) of northwest Rumania. The taxonomic position of these birds should be reevaluated because they differ markedly from modern francolins in lacking a spur on the tarsometatarsus.

*Francolinus capeki villanyiensis*  
Jánossy 1974

*Francolinus capeki villanyiensis* Jánossy, 1974b:540, pl. 23, figs. 1–6.

*Francolinus capeki villanyiensis*: Mlíkovský, this paper (spelling emended).

**SYNTYPES.** 226 bones and bone fragments, listed in Jánossy (1974b:540).

**HORIZON AND LOCALITY.** Upper Pliocene (MN 16) of Rębielice Królewskie 1 (107).

**REMARKS.** The subspecific name was spelled with a long-sign above the *a* in the original description. As this is not allowed by Article 32 of the International Code of Zoological Nomenclature (ICZN, 1985), I here emend the spelling to *villanyiensis*.

*Francolinus capeki villanyiensis* was described as a temporal subspecies of *Francolinus capeki* Lambrecht 1933, younger than *Francolinus capeki wenzensis* Jánossy (1974b).

*Francolinus minor*  
Jánossy 1974

*Francolinus (Lambrechtia) minor* Jánossy, 1974b:547, unfigured.

**HOLOTYPE.** Left carpometacarpus, lacking os metacarpale minus; IZK, uncatalogued.

**HORIZON AND LOCALITY.** Upper Pliocene (MN 16) of Rębielice Królewskie 2 (108).

Order Gruiformes Bonaparte 1854

Family Messelornithidae  
Hesse 1988

*Messelornis cristata* Hesse 1988

*Messelornis cristata* Hesse, 1988:90, figs. 15–17.

**HOLOTYPE.** Complete skeleton in three plates; NFS ME 807a–c.

**HORIZON AND LOCALITY.** Middle Eocene of Messel (4).

Family Gruidae Vigors 1825

*Pliogrus germanicus*  
Lambrecht 1933

*Pliogrus germanicus* Lambrecht, 1933:522, fig. 156.

*Palaelodus germanicus*: Fischer and Stephan, 1971:576 (new combination).

**HOLOTYPE.** Distal end of left tibiotarsus; ZGIB, uncatalogued.

**HORIZON AND LOCALITY.** Upper Miocene (MN 9) of Eppelsheim (94).

**REMARKS.** Fischer and Stephan (1971) transferred this species to the flamingo genus *Palaelodus* Milne-Edwards 1863 and hypothesized that it might even be synonymous with *Palaelodus ambiguus* Milne-Edwards 1871 from the Lower Miocene (MN 2) of France. The species is in need of reexamination.

Family Rallidae Vigors 1825

*Pararallus hassenkampi*  
Martini 1967

*Pararallus hassenkampi* Martini, 1967a:8, unfigured (*nomen nudum*).

*Pararallus hassenkampi* Martini, 1967b:289, text-fig. 1, pl. 29, figs. 1, 2.

**HOLOTYPE.** Distal end of left tarsometatarsus with associated proximal phalanges digitorum I–IV (in a slab and counter-slab); GPIW F 1237 and F 1238.

**HORIZON AND LOCALITY.** Lower Oligocene of Sieblos (13).

**REMARKS.** This is apparently not a rail (Cracraft, 1973; Olson, 1977), but its affinities have not yet been clarified.

*Microrallus fejfari* Švec 1983

*Microrallus fejfari* Švec, 1983:37, fig. 1a.

**HOLOTYPE.** Distal end of left humerus; DP FNSP 4818.

**HORIZON AND LOCALITY.** Lower Miocene (MN 4) of Dolnice 2 (67).

*Porzana estramosi* Jánossy 1979

*Porzana estramosi* Jánossy, 1979:20, fig. 4/8.

**HOLOTYPE.** Fragmentary distal end of left tarsometatarsus; GIB V.78120.

**HORIZON AND LOCALITY.** Lower Pliocene (MN 15) of Osztramos 9 (104).

**REMARKS.** Jánossy (1979) placed this species in the modern rallid genus *Porzana* Vieillot 1816 solely on the basis of its small size. This is clearly insufficient. The diagnosis and the description

Table 1. Leg proportions [tibiotarsus length : tarsometatarsus length (tt:tmt)] in *Otis affinis* and modern genera of bustards.

	Number of species (individuals)	tt:tmt
<i>Otis affinis</i>	1 (1)	1.42 <sup>a</sup>
<i>Otis</i>	2 (4)	1.36–1.50
<i>Chlamydotis</i>	1 (2)	1.29–1.36
<i>Eupodotis</i>	6 (9)	1.21–1.38
<i>Ardeotis</i>	1 (1)	1.25
<i>Neotis</i>	2 (2)	1.22–1.25

<sup>a</sup> My estimation based on the figure of the holotype in Lambrecht (1933: 529). Other values were recalculated from Verheyen (1957) and Jánossy (1972).

of the species do not include any usable morphological details, and because the figure is indistinct, *Porzana estramosi* should be treated as *Aves incertae sedis* until the holotype is restudied.

Family Phorusrhacidae  
Ameghino 1899

*Aenigmavis sapea* Peters 1987

*Aenigmavis sapea* Peters, 1987a:73, figs. 1–12.

**HOLOTYPE.** Partial skeleton in a slab; UM, uncatalogued.  
**HORIZON AND LOCALITY.** Middle Eocene of Messel (4).

Family Otidae Gray 1840

*Otis affinis* Lydekker 1891

*Otis affinis* Lydekker, 1891:168, unfigured.

*Chlamydotis affinis*: Brodkorb, 1967:174 (new combination).

**HOLOTYPE.** Crushed postcranial skeleton in a slab; BMNH 36745. See Lambrecht (1933:fig. 157b) for its illustration.

**HORIZON AND LOCALITY.** Middle Miocene (MN 7) of Steinheim (87), according to Ammon (1918) who considered Lydekker's (1891) note that the holotype originated from the Lower Miocene (MN 3) of nearby Schnaitheim incorrect.

**REMARKS.** Brodkorb (1967) placed this species in the modern genus *Chlamydotis* Lesson 1839, possibly on the basis of Lydekker's (1891) erroneous remarks that the fossil has the exact proportions of *Otis* (= *Chlamydotis*) *undulata* (Jacquin 1784). Actually, the leg proportions of *Otis affinis* differ markedly from those of *Chlamydotis undulata* and agree best with those of *Otis* Linnaeus 1758 (Table 1). Thus, until the holotype is restudied, the species is best treated as a member of the latter genus.

Order Diatrymiformes  
Matthew and Granger 1917

Family Diatrymidae  
Matthew and Granger 1917

*Diatryma geiselensis*  
Fischer 1978

*Diatryma geiselensis* Fischer, 1978:134, unfigured.

**HOLOTYPE.** Right scapulocoracoid; GM ?/Dia.2. See Fischer (1962:fig. 2) for an illustration of the holotype.

**HORIZON AND LOCALITY.** Middle Eocene of Geisel Valley (5).

**REMARKS.** This species deserves, as do all diatrymas, a modern revision (cf. Olson, 1985).

Order Charadriiformes

Huxley 1867

Family Scolopacidae Vigors 1825

*Totanus praecursor* Laube 1901

*Totanus praecursor* Laube, 1901:66, fig. 14.

**HOLOTYPE.** Pelvic impression; location unknown. The holotype is not in the Dresden Museum, where it should perhaps have been deposited (Lambrecht, 1933:538), but never was (S. Eck, in litt., 1987). Neither is it in the National Museum in Praha (J. Beneš, pers. comm., 1985), nor in the Regional Museum in Teplice (D. Ernygrová, pers. comm., 1986) where other bird remains from the same locality are deposited.

**HORIZON AND LOCALITY.** Lower Miocene (?MN 3) of Břešňany (59).

**REMARKS.** As the holotype appears to have been lost, and its figure in Laube (1901) is less than informative, I relegate *Totanus praecursor* to *Aves incertae sedis* until such time as the holotype is found and restudied.

*Scolopax baranensis*

Jánossy 1979

*Scolopax baranensis* Jánossy, 1979:23, unfigured.

**HOLOTYPE.** Proximal end of carpometacarpus (body side not given); NMB Vt.82.

**HORIZON AND LOCALITY.** Lower Pliocene (MN 15) of Csarnóta 2 (105).

**REMARKS.** Jánossy's (1979) superficial and irrelevant description of this species makes it almost a *nomen nudum*. In any case, *Scolopax baranensis* belongs in *Aves incertae sedis* until its holotype is restudied.

*Gallinago veterior* Jánossy 1979

*Gallinago veterior* Jánossy, 1979:24, fig. 4/9.

**HOLOTYPE.** Nearly complete right coracoid; NMB Vt.81. Jánossy (1979) stated that the holotype is from the left side of the body, but the figure shows a right coracoid.

**HORIZON AND LOCALITY.** Lower Pliocene (MN 15) of Csarnóta 2 (105).

**REMARKS.** *Gallinago veterior* is almost a *nomen nudum* because of the entirely useless diagnosis and nearly useless description given by Jánossy (1979). Until the holotype is restudied, the species is best referred to *Aves incertae sedis*.

Family Glareolidae Brehm 1831

*Mioglareola gregaria*

Ballmann 1979

*Mioglareola gregaria* Ballmann, 1979:68, text-fig. 3, pl. 1, figs. 3-5.

**HOLOTYPE.** Skull; BSP 1970 XVIII 851.

**HORIZON AND LOCALITY.** Middle Miocene (MN 6) of Steinberg, Nördlinger Ries (82).

*Glareola neogaena*

Ballmann 1979

*Glareola neogaena* Ballmann, 1979:81, pl. 1, fig. 9; pl. 2, fig. 1.

**HOLOTYPE.** Right humerus; BSP 1970 XVIII 852.

**HORIZON AND LOCALITY.** Middle Miocene (MN 6) of Steinberg, Nördlinger Ries (82).

Family Laridae Vigors 1825

*Gaviota lipsiensis*

Fischer 1983

*Gaviota lipsiensis* Fischer, 1983a:152, pl. XII, figs. 1, 2.

**HOLOTYPE.** Distal end of right humerus; MB Av.732.

**HORIZON AND LOCALITY.** Middle Oligocene of Espenhain (21).

*Larus dolnicensis* Švec 1980

*Larus dolnicensis* Švec, 1980:380, pl. 1, figs. 2, 3.

**HOLOTYPE.** Distal end of left humerus; DP FNSP 7344.

**HORIZON AND LOCALITY.** Lower Miocene (MN 4) of Dolnice 2 (67).

**REMARKS.** As already recognized by Olson (1985:182), this is not a gull, but a member of the family Glareolidae (Mlíkovský, pers. obs.). I have yet to ascertain its affinities within that family.

Family Alcidae Vigors 1825

*Petalca austriaca*

Mlíkovský 1987

*Petalca austriaca* Mlíkovský, 1987:136, text-figs. 4, 5, pls. 1, 2.

**HOLOTYPE.** Incomplete skeleton in a slab and counter-slab, including coracoids and all of the main wing bones; NMW 1980/25.

**HORIZON AND LOCALITY.** Upper Oligocene of Traunpucking (32).

Order Cuculiformes Wagler 1830

Family Cuculidae Vigors 1825

*Cuculus csarnotanus*

Jánossy 1979

*Cuculus csarnotanus* Jánossy, 1979:25, fig. 4/6.

**HOLOTYPE.** Distal end of left humerus; NMB Vt.80.

**HORIZON AND LOCALITY.** Lower Pliocene (MN 15) of Csarnóta 2 (105).

Order Strigiformes Wagler 1830

Family Protostrigidae

Wetmore 1933

*Oligostrix rupelensis*

Fischer 1982

*Oligostrix rupeliensis* Fischer, 1982:152, unfigured (*nomen nudum*).

*Oligostrix rupelensis* Fischer, 1983b:483, figs. 1, 3, 5, 7, 9.

**HOLOTYPE.** Distal end of left tibiotarsus; MB Av. 730.

**HORIZON AND LOCALITY.** Middle Oligocene of Espenhain (21).

### Family Strigidae Vigors 1825

#### *Eoglaucidium pallas*

Fisher 1987

*Eoglaucidium pallas* Fischer, 1987:138, figs. 1, 4.

**HOLOTYPE.** Right humerus; GM XXII/761.

**HORIZON AND LOCALITY.** Middle Eocene of Geisel Valley (5).

**REMARKS.** I am in the process of studying several more specimens (humeri, coracoids, scapulae) from the same horizon and locality that can clearly be referred to this species. This work is not complete, but it appears that the species may belong to the Coraciiformes and not the Strigiformes.

#### *Bubo florianae* Kretzoi 1957

*Bubo* (?)*florianae* Kretzoi, 1957:243, figs. 47–49.

**HOLOTYPE.** Phalanx 1 of pedal digit II; GIB, uncatalogued.

**HORIZON AND LOCALITY.** Upper Miocene (MN 10) of Csákvár (96).

#### *Surnia robusta* Jánossy 1977

*Surnia robusta* Jánossy, 1977:10, fig. 2a–d, 5/10.

**HOLOTYPE.** Left tarsometatarsus; NMB Vt.62.

**HORIZON AND LOCALITY.** Upper Pliocene (MN 17) of Villány 3 (115).

#### *Otus wintershofensis*

Ballmann 1969

*Otus wintershofensis* Ballmann, 1969:39, pl. 1, fig. 11a, b.

**HOLOTYPE.** Distal end of right tibiotarsus; BSP 18121.

**HORIZON AND LOCALITY.** Lower Miocene (MN 3) of Wintershof (West) (56).

#### *Athene noctua veta* Jánossy 1974

*Athene noctua veta* Jánossy, 1974b:555, pl. 24, fig. 1.

*Athene veta*: Jánossy, 1979:19 (new rank).

**HOLOTYPE.** Humeral end of right [not left, as stated by Jánossy (1974b)] coracoid; IZK, uncatalogued. The specimen was not designated as holotype of *Athene noctua veta* by Jánossy (1974b); he generally does not select types for his new subspecies. I call it the holotype here because it is the only specimen upon which the taxon was based.

**HORIZON AND LOCALITY.** Upper Pliocene (MN 16) of Rębielice Królewskie 1 (107).

**REMARKS.** I have reexamined the holotype and find that it does not belong to the genus *Athene* Boie 1822, but to another modern strigiform genus, *Aegolius* Kaup 1829. The holotype coracoid differs from that of *Athene* and agrees with that of *Aegolius* in having the following: (1) head deflected more mediad

in ventral view, (2) head more robust in humeral view, (3) the border between impressio ligamenti acroracoracohumeralis and facies articularis humeralis indistinct (in *Athene* it is distinctly narrowed), and (4) foramen nervi supracoracoidei smaller. The latter character is the primary one in Jánossy's diagnosis of *Athene noctua veta*. Because there are no meaningful morphological or mensural character differences between the holotype coracoid fragment of *Athene noctua veta* (it is not measurable) and the same element of the extant *Aegolius funereus* (Linnaeus 1758), the only representative of the genus in the Palearctic, I here synonymize the *Athene noctua veta* Jánossy (1974) with the latter species.

#### *Strix brevis* Ballmann 1969

*Strix brevis* Ballmann, 1969:38, pl. 1, fig. 7a, b.

**HOLOTYPE.** Distal end of left humerus; BSP 18012.

**HORIZON AND LOCALITY.** Lower Miocene (MN 3) of Wintershof (West) (56).

### Order Apodiformes Peters 1940

#### Family Aegialornithidae

Lydekker 1891

#### *Aegialornis szarskii* Peters 1985

*Aegialornis szarskii* Peters, 1985:144, figs. 1, 4a, b.

*Primapus szarskii*: Mourer-Chauviré, 1988:372 (new combination).

**HOLOTYPE.** Nearly complete skeleton in a slab; NFS LNK-Me 301.

**HORIZON AND LOCALITY.** Middle Eocene of Messel (4).

### Family Apodidae Hartert 1897

#### *Chaetura baconica*

Jánossy 1977

*Chaetura baconica* Jánossy, 1977:22, fig. 5/13.

**HOLOTYPE.** Right ulna; NMB Vt.64.

**HORIZON AND LOCALITY.** Upper Miocene (MN 11–12) of Sümeg (98).

### Order Coraciiformes

Forbes 1884

### Family Bucerotidae Vigors 1825

#### *Geiseloceros robustus*

Lambrecht 1935

*Geiseloceros robustus* Lambrecht, 1935:365, pl. 2.

**HOLOTYPE.** Partial skeleton in a slab, including more or less complete left and right coracoids, right scapula, left and right humeri, right ulna, right radius, right carpometacarpus, phalanx 1 of right digitus major, and phalanx of right digitus minor; GM 5884.

**HORIZON AND LOCALITY.** Middle Eocene of Geisel Valley (5).

**REMARKS.** The wing proportions of *Geiseloceros robustus* (ulna shorter than humerus) make it highly improbable that this species is a hornbill (Olson, 1985), all of which possess ulnae

markedly longer than humeri (Verheyen, 1955). The true systematic position of this species remains uncertain, although Houde (in Olson, 1985) suggested that it may possibly be identical with *Eocathartes robustus* Lambrecht 1935, an alleged vulture described from the same horizon and locality.

Order Piciformes  
Meyer and Wolf 1810

Family *incertae sedis*

*Zygodactylus ignotus*  
Ballmann 1969

*Zygodactylus ignotus* Ballmann, 1969:52, pl. 2, fig. 13a, b.

**HOLOTYPE.** Distal end of right tarsometatarsus; BSP 18164.

**HORIZON AND LOCALITY.** Lower Miocene (MN 3) of Wintershof (West) (56).

**REMARKS.** Brodkorb (1971:257) created a new family, Zygodactylidae, for this species. Its affinities, however, still appear to be unclear (Olson, 1985:121–22).

Family Capitonidae  
Bonaparte 1840

*Capitonides europeus*  
Ballmann 1969

*Capitonides europeus* Ballmann, 1969:44, pl. 2, fig. 1a, b.

**HOLOTYPE.** Right carpometacarpus; BSP 18162.

**HORIZON AND LOCALITY.** Lower Miocene (MN 3) of Wintershof (West) (56).

**REMARKS.** In spite of a thorough original description, the genus *Capitonides* Ballmann 1969, which is based on *C. europeus*, was never properly diagnosed. To the contrary, Ballmann (1983) stressed its similarities to the modern genus *Trachyphonus* Vieillot 1816. The possibility that *Capitonides* is synonymous with *Trachyphonus* should be evaluated (but see Prum, 1988).

*Capitonides protractus*  
Ballmann 1983

*Capitonides protractus* Ballmann, 1983:46, figs. 2/5–6, 3a–d.

**HOLOTYPE.** Right tarsometatarsus; BSP 1970 XVIII.

**HORIZON AND LOCALITY.** Middle Miocene (MN 6) of Steinberg, Nördlinger Ries (82).

**REMARKS.** See *Capitonides europeus* for the generic status of this species.

Family Picidae Vigors 1825

*Dendrocopos praemedius*  
Jánossy 1974

*Dendrocopos praemedius* Jánossy, 1974a:237, unfigured.

**HOLOTYPE.** Right carpometacarpus; GIB, uncatalogued.

**HORIZON AND LOCALITY.** Upper Pliocene (MN 17) of Villány 3 (115).

Order Passeriformes  
Linnaeus 1758

Family *incertae sedis*

*Protornis glarniensis*  
Meyer 1844

*Osteornis scolopacinus* Gervais, 1844:39, unfigured (*nomen nudum*).

*Protornis glarniensis* Meyer, 1844:338, unfigured.

*Protornis glarisiensis* Anonymous, 1844:v, unfigured (*nomen nudum*).

*Protornis glaronensis* Meyer, 1856:92, pl. XV, fig. 12 (unjustified emendation of *Protornis glarniensis* and consequently its objective synonym).

**HOLOTYPE.** Incomplete skeleton in a slab and counter-slab; MZ, uncatalogued.

**HORIZON AND LOCALITY.** Lower Oligocene of Matt (12).

**REMARKS.** This species was originally described as a passerine bird (*sensu lato*) by Meyer (1839b, 1844, 1856). It was later transferred to the Alcedinidae (Peyer, 1957; Storer, 1960; Brodkorb, 1971) but has more recently been placed with the Momotidae (Olson, 1976).

*Protornis blumeri* Heer 1865

*Protornis blumeri* Heer, 1865:236, fig. 143 (reprinted in Peyer, 1957:fig. 25).

**HOLOTYPE.** Partial skeleton impression in a slab; location unknown.

**HORIZON AND LOCALITY.** Lower Oligocene of Matt (12).

**REMARKS.** After studying the figure and description of this fossil by Heer (1865), I can only agree with Olson (1976:117) that *Protornis blumeri* "... should be relegated to the category of *Aves incertae sedis* ..." until its holotype is located and restudied.

Family Timaliidae Gray 1841

*Turdoides borealis*  
Jánossy 1979

*Turdoides borealis* Jánossy, 1979:27, fig. 4/7.

**HOLOTYPE.** Proximal part of left humerus; GIB V.78119.

**HORIZON AND LOCALITY.** Lower Pliocene (MN 15) of Osztramos 1 (103).

**REMARKS.** This species is based upon a badly eroded, fragmentary humerus that is unsuitable for identification. Moreover, even if Jánossy (1979) correctly assigned the fossil to the turdoidine timalias, its generic affiliation is doubtful because he compared it with only 3 of the 38 extant genera of this subfamily (*sensu* Wolters, 1975–1982). I consider *Turdoides borealis* as *Aves incertae sedis* until its holotype is restudied.

*Aves incertae sedis*

*Eleutherornis helveticus*  
Schaub 1940

*Eleutherornis helveticus* Schaub, 1940a:283, figs. 1–4.

