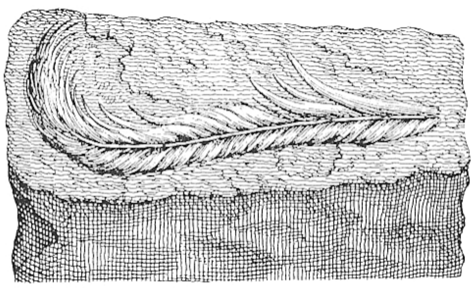
JIŘÍ MLÍKOVSKÝ

CENOZOIC BIRDS OF THE WORLD

PART 1: EUROPE



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Contents

Introduction

Birds of the past entered the realm of human knowledge at the dawn of the 17th century, when Swiss naturalist Johann Jacob von Scheuchzer (1708a,b) described from a quarry near Öhningen in Switzerland a feather imprint of an unidentified bird[1]. A century later, French naturalist Georges Cuvier (1822) founded the science of paleornithology. Today, fossil birds are known from almost 600 Tertiary and 1200 Pleistocene localities of Europe (Mlíkovský 1996a and the present paper, Tyrberg 1998, 2001), which represents roughly half of all avian localities known from the world.

First reviews of the fossil birds of Europe were presented already in the early 19th century by Hoff (1801), Cuvier (1822) and Krüger (1823). The rapidly growing knowledge was continuously mapped in a variety of subsequent reviews, the most important of which were those by Gervais (1844a), Milne-Edwards (1863, 1867-1868, 1869-1871), Lydekker (1891a), Lambrecht (1933), and Brodkorb (1963c, 1964, 1967, 1971b, 1978). Lists of the European fossil birds were presented also by Lambrecht (1921) and Bocheński (1997).

The aim of this paper is to present a comprehensive systematic review of the Cenozoic birds of Europe at the close of the 20th century. The review is based on my studies of the bones of fossil birds from 13 European countries, on the restudy of published figures and descriptions of type materials of most other taxa of fossil birds of Europe, and on the extensive scanning of literature.

Scope and arrangement of the catalogue

The catalogue lists all fossil and extinct bird species known from the European Cenozoic, and all modern species with fossil record older than the middle Pleistocene. It covers in full the period from the beginning of the Tertiary till the end of the early Pleistocene (i.e. ca. 65-0.6 Ma BP), while only records of fossil and extinct species are comprehensively listed for the last 0.6 Ma. The many other records from the latter time period can be found in Tyrberg (1998, 2001).

Europe is understood here in the geographical sense. It is bordered by the sea from the north, west and south. Its eastern border tracks the eastern foot of Ural mountains (i.e. approximately the 60° E) and Emba river, which enters in the Caspian Sea. Between the Caspian and Azov Seas, the border is formed by the Kuma-Manyč depression and the lower Don river, which opens into the Azov Sea. Islands northwest of the European continent are included here to Iceland and Jan Mayen, and most Mediterranean islands are included as well, excepting Cyprus and small islands laying near the continent of Africa. Macaronesian islands are not included. See also Mlíkovský (1996b). The area of Europe is ca. 10 527 000 km^2.

The catalogue is arranged systematically. Avian taxa of uncertain taxonomic position within families are listed at the end of each section, while taxa of uncertain position within the Aves, ichnotaxa, non-avian taxa formerly thought to represent birds, and nomina nuda are listed at the end of the catalogue. However, those nomina nuda, which could be unequivocally assigned to a valid taxon, are listed in the synonymy of the respective taxon, although they do not represent synonyms in the sense of the ICZN (1999).

The entries include the following data:

<u>Fossil species:</u>

- Reference to original description, incl. page number.
- Data on the type material, incl. its current place of deposition, and references to its figures. Note, that Brodkorb (1963c, 1964, 1967, 1971b, 1978) listed in his *Catalogue* figures of

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[1] The bird was believed to have perished in the Biblical Flood. The locality, now in Germany, is known to be middle Miocene in age. The bird continues to be unidentified. For more data on this specimen see Footnote 2.

both typical and referred material, but limited this information to figures in that paper, in which the species was described.

- Nomenclatural status of each name, if different from the standard, incl. indications of senior and junior homonyms, and nomina nuda.
- Full synonymy, incl. new combinations, correct and incorrect emendations (but not subsequent incorrect spellings), and changes in rank.
- Full list of localities, incl. extralimital ones (where known). The localities are listed chronologically, and within stratigraphical units geographically from the northwest to the southeast. Relevant authors are cited for each locality, but authors who just listed the species or the locality in a catalogue or in another paper are not.
- Remarks, particularly those on the taxonomic status of the species.

Modern species:

- General reference to its original description. These papers are not cited in the References section.
- List of fossil synonyms, for which full data are given as above.
- Full list of pre-middle Pleistocene localities, and a list of younger localities, where the remains were attributed to a fossil taxon. The respective name of the fossil taxon is listed in parentheses. For a list of the middle and late Pleistocene localities of modern species see Tyrberg (1998, 2001).
- Remarks, particularly those on the taxonomic status of the species.

Fossil genus:

- Reference to original description, incl. page number.
- Type species, incl. data on its fixation as a type.
- Nomenclatural status of each name, if different from the standard, incl. indications of senior and junior homonyms, and nomina nuda.
- Full synonymy, incl. correct and incorrect emendations (but not subsequent incorrect spellings), and changes in rank.
- General data on the distribution if more than a single species is included in the genus, incl. data on extralimital localities.
- Remarks, particularly those on the taxonomic status of the genera.

Modern genus:

- General reference to original description. These papers are not cited in the References section.
- List of fossil synonyms, for which full data are given as above.
- Remarks, particularly those on the taxonomic status of the genera.

Fossil family:

- Reference to its original description, incl. page number.
- Type genus.
- Nomenclatural status of each name, if different from the standard. See also Mlíkovský (2000f).
- Full synonymy, incl. correct and incorrect emendations (but not subsequent incorrect spellings), and changes in rank.
- General data on the distribution if more than a single species is included in the family, incl. those on extralimital localities.
- Remarks, particularly those on the taxonomic status of the families, and the groupings of genera.

Modern family:

- General reference to original description. These papers are not cited in the References section.
- List of fossil synonyms, for which full data are given as above.

- Remarks, particularly those on the taxonomic status of the families, and the groupings of genera.

Modern order:

- General reference to original description. These papers are not cited in the References section. Note, that no fossil orders are recognized in this paper.
- List of fossil synonyms, for which full data are given as above.

Stratigraphy

The stratigraphical arrangement of the Paleogene follows Schmidt-Kittler (1987) and Legendre & Lévêque (1997). The period is divided into 30 Paleogene micromammal zones (MP), but no definitions are available for the first five MP-zones, which encompass most of the Paleocene. See Fig. 1 for additional data.

The stratigraphical divisioning of the Neogene follows Mein (1976), respecting subsequent amendments of the system (Fahlbusch 1976, 1991, Mein 1990, Steininger et al. 1987, Bruijn et al. 1992, Steininger et al. 1996, Steininger 1999). The period has been divided in 17 Neogene micromammal zones (MN). Guérin (1982) separated the youngest part of the MN 17 zone as MN 18. The latter proposal is supported by ornithological data (Mlíkovský 2001) and is used in the present paper. Some of the MN-zones (particularly MN 3, 4, 16, and 17) are now subdivided into two subzones each, labeled with letters (*a* being older than *b*). The MN-zones 11-13 are clearly separable in westernmost Europe, but are difficult to discern in southeastern Europe. See Fig. 1 for additional data.

Three numerical systems for the divisioning of the Pleistocene were proposed by Horáček (1981, Horáček & Ložek 1988; Q zones), Guérin (1982; MNQ zones), and Fejfar & Heinrich (1990a,b, Fejfar et al. 1997, 1998; MQ zones), respectively. A derived system developed by Mlíkovský (2001) is used in the present paper. See Fig. 1 for a comparison of these systems. Note, that Guérin's (1982) MNQ zones simply correspond with the main European glacials and interglacials (in the sense of Penck & Brückner 1901-1909), the identity of which is dubious (see Kukla 1975, 1977, 1978).

It should be noted, that general stratigraphical terms used in literature, such as Pannonian or Biharian are used in different sense by different authors, and cannot be interpreted without the knowledge of how the author understood it. General understanding of the stratigraphical divisioning of the European Cenozoic in the early 20th century is correlated with the modern understanding in Fig. 1 (reconstructed from Lambrecht 1933).

Absolute ages are ca. 65-24 Ma for the Paleogene, 24-5.5 Ma for the Miocene, 5.5-1.65 Ma for the Pliocene, 1.65-0.01 Ma for the Pleistocene, and 0.01-0 Ma for the Holocene (Legendre & Lévêque 1997, Steininger et al. 1996).

Names

Transliteration from non-Roman alphabets

Names originally written in non-Roman alphabets are converted here to the Roman (= Latin) alphabet using transliteration. Note, that these names were formerly often transcribed or even translated, which resulted in variant spellings (see Mlíkovský 1996b).

Names originally written in the Cyrillic alphabet are converted here to the Roman alphabet using the "Berlin" system of transliteration, adopted in 1978, which superceded the older "London" system of transliteration. See Mlíkovský (1996b: 523) for the transliteration table. The use of the Cyrillic alphabet is currently limited to several eastern Slavonic languages (Russian, Ukrainian, Belorussian) and southern Slavonic languages (Bulgarian, Macedonian, Serbo-Croatian in Serbia). In addition, it was used in the 1940-1980s in Moldovan, a Romance language, when Moldova was part of the then Soviet Union.

In converting the Greek alphabet to the Roman one, I applied the system adopted by the ICZN (1985). Greek alphabet is used only in the Greek language.

<table>
<tr><th colspan="2">Lambrecht[1]</th><th colspan="3">Modern[2]</th><th>MQ[3]</th><th>MQ[4]</th><th>Q[5]</th><th>MNQ[6]</th></tr>
<tr><td colspan="2">Holocene[7]</td><td colspan="2">Holocene</td><td rowspan="8">Toringian</td><td>2E</td><td rowspan="8">2</td><td rowspan="3">4</td><td rowspan="3">26</td></tr>
<tr><td rowspan="3">Pleistocene[8]</td><td rowspan="3"></td><td rowspan="11">Pleistocene</td><td>late</td><td>2D</td></tr>
<tr><td rowspan="6">middle</td><td rowspan="2">2C</td></tr>
<tr><td rowspan="4">3$3_{2-3}$</td><td>25</td></tr>
<tr><td rowspan="14">Pliocene</td><td rowspan="9">late</td><td rowspan="3">2B</td><td rowspan="2">24</td></tr>
<tr></tr>
<tr><td>23</td></tr>
<tr><td>2A</td><td>3_1</td><td>22</td></tr>
<tr><td rowspan="4">early</td><td rowspan="4">Biharian</td><td rowspan="2">1b</td><td rowspan="4">1</td><td rowspan="2">2</td><td>21</td></tr>
<tr><td rowspan="2">20</td></tr>
<tr><td rowspan="2">1a</td><td rowspan="2">1</td></tr>
<tr><td>19</td></tr>
<tr><td rowspan="5">Pliocene</td><td rowspan="3">late</td><td rowspan="3">Villanyian</td><td>18</td><td rowspan="2">17</td><td>17_3</td><td>18</td></tr>
<tr><td rowspan="3">early</td><td>17</td><td>$17_{1,2}$</td><td>17</td></tr>
<tr><td>16</td><td>16</td><td>16</td><td>16</td></tr>
<tr><td rowspan="2">early</td><td rowspan="2">Ruscinian</td><td>15</td><td>15</td><td>15</td><td>15</td></tr>
<tr><td rowspan="2"></td><td>14</td><td>14</td><td></td><td>14</td></tr>
<tr><td rowspan="3">Miocene</td><td rowspan="3">late</td><td rowspan="3">Turolian</td><td>13</td><td>13</td><td></td><td>13</td></tr>
<tr><td rowspan="2">Miecene</td><td rowspan="2">late</td><td>12</td><td>12</td><td></td><td>12</td></tr>
<tr><td>11</td><td>11</td><td></td><td>11</td></tr>
</table>

Oligocene												*Miocene*							
early		*middle*		*late*								*early*	—		*middle*	*late*			
Oligocene										Miocene									
early		middle		late						early				middle				late	
Stampian				Chattian						Agenian		Orleanian			Astaracian			Vallesian	
21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10
																		9	10
																		9	10

Paleocene		*Eocene*														
		early				*middle*			—			*late*				
Paleocene		Eocene														
early	late	early				middle			late							
		Ypresian				Lutetian			Bartonian			Priabonian				
1-5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Fig. 1. Biochronological chart of the Cenozoic of Europe. 1 - state in the early the 20th century (reconstructed after Lambrecht 1933); 2 - current understanding (used in this paper); 3 - current understanding (used in this paper) after Mlíkovský (2001; MN 18 to Recent), Mein (1976; MN 1-17: Miocene and Pliocene), and Schmidt-Kittler (1987; MP 1-30: Paleocene, Eocene and Oligocene). 4 - after Fejfar & Heinrich (1990a,b), 5 - after Horáček (1981), 6 - after Guérin (1982). See text for additional references, where the systems used were amended (the amendments being taken into account here). 7 - often called 'Alluvium', 8 - often called 'Diluvium'.

Personal names and toponyms

Personal names and toponyms are subject to variation, which results from several factors. In all cases, the original spelling of the name (transliterated from non-Roman alphabets) is given precedence. For details see below.

Use of different systems of conversion of names from a non-Roman alphabet to the Roman one. For example, Курочкин (original spelling in the Russian version of the Cyrillic alphabet) → Kuročkin (correct transliteration using the Berlin system), Kurochkin (transliteration using the London system of transliteration, or English transcription), and Kuroczkin (Polish transcription).

Transcriptions between languages within the Roman alphabet. Transcriptions adapt the spelling so that the pronunciation remains approximately the same in the other language. This system was often applied within the Roman alphabet until first decades of the 20^{th} century. For example, Novák (Czech) → Nowak (German), Rębielice (Polish) → Rembielice (e.g. English). Original spellings are used in all cases, but variant spellings are listed in the respective Indexes.

Transcriptions between languages within the Cyrillic alphabet. Names continue to be transcribed from language to language within this alphabet. This makes it difficult to recognize which is the original spelling of a personal name or a toponym without additional data, such as nationality of the author or ethnical origin of a village. Such data are obviously unavailable in many cases, so I have chosen the standard name with respect to the official language accepted as the original spelling that used in the country of the author's main activity.

Translation of names, sometimes used till the first half of the 20^{th} century, was applied mainly to first names. For example: Kálmán (Hungarian) → Koloman (German), Várhegy (Hungarian) → Castle Hill (English). Also Latinization, common till the early 18^{th} century, belongs to this category: e.g. Linné (Swedish) → Linnaeus (Latin). Original names were used throughout this paper, but Linnaeus was given preference over Linné, because of current standards in zoological nomenclature.

Omission of diacritical marks, which is still very common. For example, Švec (Czech) → Svec, Ciobanița (Romanian) → Ciobanita.

Carelessness of authors. For example Mlíkovský (Czech) can be found in scientific literature with at least three typographical errors (in addition to omitted diacritical marks) → M**i**liko**w**sk**i** (any combination of misprints possible).

Double or single surnames of Spanish/Catalan authors, e.g. Sánchez Marco ↔ Sánchez. Here I followed the prevailing use.

Changes of ladies' names, following marriage. To my best knowledge, this applies only to three researchers in European paleornithology: Brjuzgina → Umans'ka, Chauviré → Mourer-Chauviré, and Malez → Malez-Bačić. These authors are cited according to the name they used in the particular paper.

Use of explanatory names in composite toponyms: (variant spellings and alternative names being listed in the Index of localities). Many, particularly Quaternary localities have composite names, one or more of which are explanatory names, such as "hill" or "cave". The explanatory names are sometimes used in the original language, sometimes translated, and sometimes omitted. In the present paper, I omit the explanatory name if it is written separately, but I include it if is written together with the proper name. For example, the Hungarian locality <Somssichhegy> (i.e. Somssich hill), is listed here under the name <Somssichhegy>, while the French locality <La Grotte du Lazaret> (i.e. the Lazaret cave), is listed under the name <Lazaret>. When the proper name is an adjective (this being the case particularly in the Slavonic languages), and the explanatory name forms thus part of the locality name, the locality is listed under the composite name, but the explanatory name is translated to English. For example: the Russian locality <Medvež'ja peščera> (i.e. Bear Cave) is listed under the name <Medvež'ja Cave>. Exceptions are allowed only if the name could cause any doubts.

Use of articles. Definite articles, such as <La>, <L'> or <Les>, often precede the proper name of a locality or a person, particularly in the Romance languages. These articles are always omitted in toponyms, but included as alternative names in the respective Indexes.

Renaming of localities. Some localities were renamed, when changing state borders influenced their administrative position. For example Püspökfürdő → Betfia, Krottensee → Mokřina. These localities are listed under their new names, and the earlier names are listed in the Index of localities.

Note: Toponyms are cited in original languages up to the level of cities (Praha, not Prague), but names of the countries are translated to English (Germany, not Deutschland).

Order-group taxa

The names of the order-group taxa are not regulated by the International Code of Zoological Nomenclature (ICZN 1999). However, I follow here the ornithological standards, first adopted by Brodkorb (1963c, 1964, 1967, 1971b, 1978), and treat these names similarly as those of the family-group taxa, with the exception of endings, for which I follow Wetmore's (1930b) proposals.

Family-group taxa

The names of the family-group taxa are regulated by the International Code of Zoological Nomenclature from 1961 onwards (ICZN 1999, see also Bock 1994). The names adopted here are based on the lists by Brodkorb (1963c, 1964, 1967, 1971b, 1978), Bock (1994; but see Olson 1995b), and Mlíkovský (2000f). In synonymies, family-group names are cited in the original form. However, this may not be true for the few family-group names taken from Bock (1994), because he cited all names in the emended form, and with the ending *–idae*. I was not able to control the original spelling of these names before the deadline for the present paper.

Genus-group taxa

The rules of the International Code of Zoological Nomenclature (ICZN 1999) were applied. The only major change which resulted from the application of the Code regards the status of several genus names proposed by Lambrecht (1933). Type species were not fixed for some of them, which is mandatory after 1930 (ICZN 1999, Art. 13.3.), and are thus nomina nuda. Brodkorb (1952) fixed type species for these genera, becoming thus the author of all of them, although he attributed them to Lambrecht (1933).

Species-group names

The rules of the International Code of Zoological Nomenclature (ICZN 1999) were applied. The only relevant problem regards the identification of the name-bearing types of some of the species described by Milne-Edwards (1863, 1867-1868, 1869-1871) from the early Miocene of Saint-Gérand-le-Puy in France, because some were based on hundreds of specimens, and the type series were not unequivocally defined in the original papers. In the present paper, I listed in the type series all bones mentioned by Milne-Edwards, when he describing the species, and found in the early collections of MNHN. These lists probably differ from the proper types series, because: (1) Milne-Edwards sometimes indicated that he examined – and identified as such – also specimens from other, usually private collections, the present location of which is unknown; (2) some of the specimens from the original series deposited in MNHN are missing; and (3) considerable material was accumulated between the early 1860s and mid 1870s, and this material cannot be discerned at MNHN (this applies to the species described by Milne-Edwards in 1863). Hence, not all of the bones in MNHN formed the type series of these species, while also an unknown number of bones not deposited in MNHN (and probably lost in many cases) belonged to the respective type series.

In his revisions of Milne-Edwards's species, Cheneval (1983a,b,c, 1984a, 2000) presented lists of syntypes for each species, and selected relevant lectotypes, without observing the rules of zoological nomenclature. His lists of the alleged lectotypes include bones which Milne-Edwards attributed to other species (even those which are holotypes of other Milne-Edwards's species), while they do *not* include bones which Milne-Edwards evidently assigned to the given species, but which Cheneval re-identified as belonging to some other species. Hence, his lists of the alleged syntypes are incorrect in these cases. Also Cheneval's selection of lectotypes of these species is often unhappy. He overlooked that most (if not all) of the drawings in Milne-Edwards (1867-1868, 1869-1871) are side-reversed, and selected the lectotypes to match the figures, i.e. unfigured specimens from the other side of body than intended. It is thus not certain, whether the lectotypes selected by Cheneval were part of the original type series or not. In spite of this, I consider his respective actions valid, until the opposite is proven.

Milne-Edwards (1863, 1867-1868, 1869-1871, 1874, 1892) described also a number of species on the basis of a few bones. They are usually clearly identifiable, but the way how the material was described caused much confusion as regards the decision whether a species was based on a holotype or on a type series. In many cases, Milne-Edwards based the new species on a single bone, adding other bones (often with descriptions) as assigned material, usually with a comment "I also assign to this species ...." or that alike. In such cases I consider the first bone the holotype of the species, following the intentions of Art. 72.4.6 of the ICZN (1999).

English names of modern species were accepted from Beaman (1994).

Taxonomic background

Recognition of taxa is always dependent on the underlying taxonomic philosophy, although practical paleontologists usually do not explain it. In paleornithology, most researchers evidently recognized taxa using purely subjective assessment of similarities and dissimilarities of the material they evaluated, looking for “gaps” between supposed taxa of any rank. Assignment of taxa to the rank was also purely subjective. Below, I understand *species* as units organized at the population level, *genera* and *families* as evolutionary-ecomorphological units (of lower and higher level, respectively), and *orders* as units of adaptive radiation. All the *sub*- and *super*- taxa are understood here as purely subsidiary units, which make the classification more lucid.

Order

Orders are understood here as units of the adaptive radiation of families. Because families are defined here in ecomorphological terms (plus monophyly), the orders include birds, which are often very different in appearance, but which have a common ancestor.

Family

For the history of the family notion see d'Hondt (1987) and Bock (1994). In the present paper I understand families as units similar to the genera, but occupying adaptive zones at a higher rank (Mlíkovský 1982d, 1983a, 1987b). Each adaptive zone of the family rank is composed of one or more adaptive zones of the genus level.

One or more phases of the adaptive radiation of the genera can occur within a family (see Müller 1955, 1961). Taxonomically, I interpret these phases as within-family units. For example, the Strigidae are represented in Europe from the late Paleocene to the end of the Eocene by ancestral forms, barn owls (Tytoninae) are prevailing in the Oligocene and the early Miocene, while modern types of owls (Striginae) appeared during the early Miocene (in MN 3), and prevail from the middle Miocene to the present (Mlíkovský 1998c,f).

Genus

The genus notion underwent considerable evolution (see e.g. Inger 1958, Smirnov 1960, Tintant 1984, Dubois 1988). In the present paper, the genus is understood as a monophyletic part of an adaptive zone (Mlíkovský 1987b). The notion of adaptive zones was introduced to the evolutionary biology by Simpson (1944, 1953), who believed that adaptive zones are occupied by taxa. Mlíkovský (1982d, 1983a, 1987b) suggested that counterparts of adaptive zones are not taxa, but life forms, i.e. ecomorphological units. Each adaptive zone corresponds to a life form, which is defined in ecomorphological terms, and which does not reflect the evolutionary past of the organisms which belong to it. A taxon is then “a part of a phyletic line bordered by the limits of an adaptive zone, or, in other words, a taxon is a monophyletic part of a life form” (Mlíkovský 1983a: 311). Macroevolution is thus basically an ecological process (Wahlert 1965, 1973, Mlíkovský 1982d, 1983a,b, 1987b, Lemen & Freeman 1984), and this process is not reducible to speciation.

Life forms of birds are usually defined by body proportions and/or by bill shape (see e.g. Leisler 1980, 1985), and – if the material is sufficient – these data are available also for fossil forms. Accordingly, the recognition of ecomorphological units is possible in both modern and fossil birds. Bones bear sufficient characters to discern whether a group of organisms within an adaptive zone originated from a single invader, i.e. whether the group is monophyletic (see Mlíkovský 1982d, 1987b). Hence, taxa of the genus rank can be defined identically for both the modern and the fossil birds.

There are no theoretical limits for the stratigraphical and geographical distribution of the genera.

Species

The species notion goes back to the Ancient Greece (Uhlmann 1923, Balme 1962), and considerably changed since that time (e.g. Mayr 1963, 1982, Nowiński & Kużnicki 1965, Mlíkovský & Zemek 1983). In this paper I understand a species as an evolutionary unit organized at the population level, and existing in the evolutionary (historical) time. The evolution of species is realized in the particular (ecological) time through its particular forms, i.e. populations (see Mlíkovský & Zemek 1983). The relativity of time solves the aged problem of the relation between species and populations, and also between the horizontal ("biological") and vertical ("phylogenetic") understanding of species.

Species as sets: From the point of view of practical systematists, species (and other taxa) are usually understood as classical sets, i.e. sets to which elements either belong or not. (This does not compete with the opinion that species are functional units, i.e. individuals – see also Van Valen 1988) This approach is untenable from the evolutionary point of view, because it implies evolution by jumps, i.e. the discontinuous evolution, which is at variance with the available data. I understand species as fuzzy units in the sense of Zadeh (1965), which allow for the continuous evolution (Mlíkovský 1983a,b; see also Kitcher 1984, Stent 1986, Van Valen 1988). Hence, the famous "missing links" need not be unequivocally attributable to any species.

Phenons vs. species

Specimens are described using "characters" (auctorum), for which also the terms "phenes" (Johannsen 1909) and "biocharacters" (Osborn 1917) were applied. In a n-dimensional space (formed by both metrical and morphological variables) specimens form clusters with unimodal distribution, known as "phenons" (Camp & Gilly 1943). The relation between these phenons and species is ambiguous, because a single phenon can consist of more than one species, while a single species can include specimens from more than one phenon (Mlíkovský et al. 1985). Because of this, phenons cannot be simply interpreted as species. The situation is the more complicated, because different bones may show different results.

Example 1: Wing bones of *Lagopus lagopus* and *Lagopus mutus*, two grouse species frequently found in the late Pleistocene deposits of Europe, fall into a single phenon, while their hindlimb bones, particularly the tarsometatarsus, form two rather distinctive clusters (Kraft 1972). Hence these two modern (and good) species cannot be separated on the basis of their wing bones, but can be well separated on the basis of their tarsometatarsi.

Example 2: A similar picture, but at the intraspecific level, is shown by domestic chickens, where the wing bones of males and females of the European standard early Medieval race form a single phenon, while hindlimb bones of the two sexes fall into two distinct clusters (Benecke 1989, Prummel 1993, Mlíkovský 2001). In the latter case, two phenons belong to a single species.

Example 3: Tarsometatarsi of the two modern peacock species, *Pavo cristatus* and *Pavo muticus*, fall into three clusters, of which the smallest (= with shortest tarsometatarsi) is formed by female *cristatus*, the middle-sized includes male *cristatus* and female *muticus*, and the largest contains only male *muticus* (see Mourer-Chauviré 1989b for measurements). Here, three phenons are observed, which are formed from two species.

Phyletic lines vs. species

The separation of phyletic lines into species is basically the question of the tempo and mode of evolution, and of the longevity of species. The theories on the tempo and mode of evolution – which influenced avian paleontology – are as follows: (1) species do not evolve (prevailing pre-Darwinian opinion), (2) species do evolve at a constant rate (prevailing early Darwinian opinion), (3) species do evolve at a changing rate (Simpson 1953, 1961, and many others), (4) species (i.e. phyletic lines in this sense) alternate periods of stasis with periods of rapid change (Eldredge & Gould 1972, Gould & Eldredge 1977, and many others). In my opinion, the rate of evolution (i.e. the rate of morphological change in the restricted sense) ranges between zero (stasis) and high (rapid), and the periods of no change, slow change and rapid change can alternate (see also e.g. Hoffman 1982, Gingerich 1985, Fortey 1985, 1988, Haffer 1995).

Phyletic lines can be separated into species in one of the following ways: (1) arbitrarily (common approach; often subjectively using the criteria 2, 4, and 5, as listed below), (2) where a gap in the fossil record occurs (common approach; requires insufficient knowledge of the fossil record), (3) at each branching point (e.g. Hennig 1966, Cracraft 1983, Willmann 1985; requires the cladistic approach to evolution), (4) when the older and the next younger part of the phyletic line are sufficiently distinct morphologically (common approach; requires insufficient knowledge of the fossil record, and a subjective assumption or an expressive statement what does it mean "sufficiently distinct"), (5) according to stratigraphical units (common, cf. e.g. Gingerich 1979; requires forever defined stratigraphical units), (6) according to a given time period (generally identified with the criterion 5; requires constant rate of evolution), (7) when slow rate of evolution is interrupted with a period of rapid change (Simpson 1943, 1953, 1961), and (8) when the evolutionary stasis is interrupted with a period of rapid change (Eldredge & Gould 1972, Gould & Eldredge 1977, and many others; this is just the extreme case of the criterion 7). All of these criteria (with the possible exception of the criterion 3) have been applied to fossil birds, but only No. 7 and 8 delimitate natural species (No. 7 only if the difference between the slow and rapid change is marked), while species separated according to the criteria 1-6 are artificial (see also Simpson 1961, Zarenkov 1976, Wiley 1978, 1981).

I do not recognize artificial "species" created by arbitrary delimitations of phyletic lines, such as allochronous species (Mayr 1942), chronospecies (George 1956), or successional species (Imbrie 1957). Accordingly, I do not believe, that the existence of any species is a-priori time-limited.

For various on the speciation rate and/or species longevity in birds see also Brodkorb (1960a), Ballmann (1977) and Zink & Slowinski (1995).

Intraspecific variability

Both morphological and metrical variability are considered. The variability as such is usually small in strictly defined, homogenous samples, but sharply increases when the sample includes individuals from: (1) different age classes, (2) different sex classes, (3) geographically different localities, and (4) stratigraphically different localities.

Allometrical variability: Both morphological and metrical variability is strongly, though in a predictable way influenced by allometrical variability. This phenomenon is often neglected in paleornithological studies. Objects are allometrically similar, when their proportions change with their overall size in an given manner, which can be usually described using the following equation: $P = a.W^b$, where P = dimension of the part, W = dimension of the whole, and *a* and *b* are coefficients (Röhrs 1959, 1961, Gould 1966, Rayner 1985, La Barbera 1989 and many others). In avian bones, it is possible to predict, that larger bones (intraspecifically or intragenerically) will be: (1) more robust, (2) will have processes more pronounced, and (3) will have muscular attachments more deepened (e.g. Rensch 1940, Hoerschelmann 1966, Alexander 1983, Anderson et al. 1985, Campbell & Marcus 1992, Mlíkovský orig., see also McMahon 1973, 1975). Morphological differences between congeneric species are often described using exactly these characters (see e.g. the alleged morphological differences between the Miocene European *Palaelodus* species listed by Cheneval 1983c and Heizmann & Hesse 1995). When controlled for size, the alleged differences disappear, as is also the case with the European *Palaelodus* species (Mlíkovský, orig.). Jánossy (1972, 1974a,b, etc.) based many of his new species of birds on alleged allometrical differences. Unfortunately, he totally misinterpreted the meaning of allometry: what he called allometric *difference*, is in fact the allometric *similarity*.

Metrical variability: The degree of variability of metrical characters is generally expressed using the coefficient of variability (CV), calculated as CV = 100.SD/M, where SD = standard deviation, and M = arithmetical mean. Metrical characters are normally distributed as a rule (see e.g. Warheit 1992), but the value of CV sharply increases with lower homogeneity of samples (see above for possible factors), with the measurement error (Pankakoski et al. 1987), and when the accuracy of measurements is too close to the mean value (Soulé 1982, Rohlf et al. 1983, Pankakoski et al.1987). The threshold is reached when the accuracy of measurement is less than 1-2% of the mean (Mlíkovský orig.), i.e. if the bone is measured with an accuracy to 0.1 mm (as is usual in paleornithological studies), then the mean size of the measured object should not be smaller than approximately 15 mm (which is often violated when widths or depths of bones are measured).

Considering that CV is measured properly, it usually reaches value 3-5 in modern populations of birds, if they are geographically restricted, and when only adult individuals of one sex are considered (Mlíkovský, in prep.). Samples of fossil bones of birds are usually far less homogenous, so that the values of CV will be higher, usually reaching values around 10 (Mlíkovský, in prep.). The values of CV can be even higher when body size of birds from a given phyletic line is consistently growing or decreasing over time.

Only bones of adult birds are normally included in biometrical analyses of fossil birds. The age of birds is identified according to the state of ossification of the bones. Nevertheless, Bacher (1967) and Northcote (1981) showed that long bones of subadult Mute Swans *Cygnus olor*, which were inseparable from fully ossified bones, were markedly shorter in mean than the corresponding elements of adult birds. This is another factor contributing to the non-homogeneity of samples. In addition, this observation could explain the occurrence of isolated bones which are smaller than expected for a given species.

Morphometrical characters are usually normally distributed, which allows for an estimation of the range of measurements in any given case. Generally, roughly 70 % of measurements will be found within 0.01 CV.M around the mean, and 95 % of them within 0.02 CV.M around the mean. Hence, bones which fall into the limits ± 0.1 CV.M are considered here as belonging to the same species, while bones within the limits ± 0.2 CV.M are considered as probably belonging to the same species. However, this criterion is not used strictly.

Discerning congeneric species: morphological vs. metrical characters

Intrageneric variation in size is much higher than the variation in shape (Lemen & Freeman 1984). Accordingly, morphological differences between congeneric species are usually negligible. Bones of congeneric species use appear separable from each other if very few bones are at disposal (e.g. Bocheński & Tomek 1995), but the alleged differences disappear when large series of bones are compared (Mlíkovský orig., see also Warheit 1992). If an author described many morphological differences between two congeneric species, then it is probable, that he or she underestimated the intraspecific variability and/or that one of the species is misclassified as to the genus and/or that he or she did not consider the allometrical variability.

Generally, I believe that most congeneric species of birds cannot be properly discerned on the basis of postcranial bones. Hence, two or more congeneric and sympatric species, which are similar in body size, may remain undetected in fossil samples.

Fossil and modern species: a comparison

The fossil record offers much less characters useful for the recognition of species than modern specimens or even living birds. In particular, data on plumage color, song, breeding habits etc. are not available for fossil birds, and useful molecular data can be obtained only from late Quaternary specimens. Unlike in modern birds, it is thus highly probable that sympatric species, which fall into the same size class, will not be discerned in paleontological studies, especially when only a few bones or even bone fragments are available. Similarly, it is impossible to exactly discern allopatric species. These problems are the more important, that a large proportion of modern species (in the broad sense of the 1970s) belongs to superspecies (Vuilleumier 1976, see also Stepanjan 1983, Haffer 1989), and that a large proportion of speciation events occurs sympatrically (Chesser & Zink 1994). Hence, the fossil species resembles probably most closely the superspecies of Schilder (1952; see also Kiriakoff 1967) or the species group of Haffer (1986), which includes closely related species without respect whether their ranges overlap or not. Also, it approaches the very narrow genus concept of Wolters (1971). For further discussion of the species problem in paleontology see e.g. Simpson 1943, 1950, 1961, Sylvester-Bradley 1956, Imbrie 1957, Shaw 1969, Reif 1984, Mlíkovský et al. 1985, Remane 1985, and Haffer 1995.

Subspecific categories

A few paleornithologists described fossil subspecies. This is not substantiated, especially with respect to the unclear definition of fossil species (see above). Naming fossil subspecies thus only inflates the number of names. No subspecific taxa are recognized in this paper.

Extinction and extermination

While the origin of taxa is a frequently discussed issue, the end of their existence is not. In the present paper I recognize the notions of *extinction*, where the phyletic line (at the levels of families, genera, and species) ceased to exist, and *extermination*, where the phyletic line either changed into another taxon of the same rank during a speciation or a macroevolutionary event, or when it lumped with another phyletic line (see e.g. Rhymer & Simberloff 1996 for the latter possibility; valid only at the species level).

Psychological factors in taxonomic decisions

Psychological factors influence taxonomic decisions to a surprisingly large degree (Mlíkovský, in prep.). In particular:

- ❑ Larger bones tend to be more often separated at the species level, than small bones, i.e. the perception of differences is size-dependent.
- ❑ Aberrant bones, i.e. those laying near the border of a phenon, tend to be selected as holotypes if more similar bones are available, especially when no study of variability is done (see e.g. the position of holotypes of four alleged *Necrobyas* species in the figures in Mlíkovský 1998c).

- For some authors it is so tempting to describe new taxa, that they tend to underestimate the intraspecific variability, and base their new taxa on indeterminate scraps of bones.
- Strong support is generally required for newly created taxa (i.e. the type I error is given preference), but equally strong support is required for synonymizing taxa (i.e. the type II error is given preference). Both types of errors should be considered in both cases.
- Researchers studying fossil birds from younger strata tend to describe new taxa on insufficient material, when they receive for study bird bones from older strata. This is especially marked, when students of Quaternary (especially late Quaternary) birds start to describe Tertiary bird remains.
- Modern birds from Plio-Pleistocene deposits are often identified on the "in-this-area-it-must-be-that-species" basis (see Tyrberg 1998: 518 for this apt term). This principle is often used also for older birds, where bones are assigned to previously described taxa on the "in-this-time period-it-must-be-that-species" basis. Although this approach is understandable to some degree, it obscures the distributional patterns of taxa both in time and space.

Although taxonomic decisions should be as exact as possible, the scarcity of material often requires, that the sixth sense is used. The psychological factors listed above limit the use of the sixth sense, and should be considered in evaluating the validity of taxonomic conclusions.

Classification of birds

The evolution of avian classifications has a long history (see Gadow 1893 and Sibley & Ahlquist 1990 for summaries). Early classifications were based on the general appearance of the animals, closely resembling the pre-scientific ethnobiological classifications (see Mlíkovský 1983a, Berlin 1992). Subsequent research modified these classifications using less apparent (anatomical, molecular, etc.) characters, in attempt to make the classification more “natural”. I understand here as natural such a classification, which reflects both the adaptive radiation and phylogenetic relationships of the taxa (see also Mlíkovský 1979, 1983a, 1987, and the above section of this paper).

The 20th century understanding of the avian classification evolved in the 19th century, when fossil birds were too insufficiently known to have any influence on the classification. Almost all the work was done in Europe, culminating with the papers by Fürbringer (1888, 1902), Gadow (1891, 1892, 1893), and Beddard (1898). In the early 20th century, the research in avian systematics moved from Europe to the USA, where Wetmore (1930b) transformed the results of the above mentioned comparative morphologists and systematists in a new, simple and lucid classification of birds. Subsequently, the Wetmorean classification of birds became the standard for the 20th century (Wetmore 1930b, 1934b, 1940b, 1951, 1960, see also Hachler 1944, Mayr & Amadon 1951, Stresemann 1959, Storer 1960, 1971, Bock 1992). The Wetmorean classification of birds was used also in the last two catalogues of fossil birds (Lambrecht 1933, Brodkorb 1963, 1964, 1967, 1971, 1978), though not in all details.

The advancements in avian systematics (with special respect to fossil birds) showed that the Wetmorean classification "amounts to little more than superstition and bears about as much relationship to a true phylogeny of the Class Aves as Greek mythology does to the theory of relativity" (Olson 1981b: 193). Starting in the 1960s, several alternative classifications of birds were published, based on different data sets and using different methodologies (Verheyen 1961, Wolters 1975-1982, Cracraft 1981, Mlíkovský 1982, 1985, Olson 1985, Sibley & Ahlquist 1988, 1990, Livezey & Zusi 2001). These classifications differ from each other as well as from the Wetmorean "standard" classification, but none was generally accepted. In view of this, Mayr & Bock (1994) suggested to use the Wetmorean classification until another classification of birds will be generally accepted. Nevertheless, the Wetmorean orders still resemble the ethnobiological classification, based on the overall similarity (see above), and some of the early Tertiary taxa of birds cannot be placed in this classification, because they represent evolutionary links between families formerly placed far away from each other, and in different orders.

Hence, the birds are arranged here according to a modified version of my classification of birds (Mlíkovský 1982, 1985). Only European taxa are considered here, although all taxa of birds were taken into account during the preparation of this classification (Mlíkovský, in prep.). In constructing the classification, all types of data were used, ranging from morphological over molecular to behavioral and ecological ones. The structure of the telencephalon is considered especially important, because it separates the Cenozoic birds into four distinct groups (Stingelin 1958a,b, 1960, Mlíkovský 1977, and unpublished data), which do not follow the ecomorphological classification in the Wetmorean orders, but seem to excellently indicate groups, within which adaptive radiation took place (Mlíkovský, in prep.). This arrangement is supported by an enormous amount of further data, which will be presented elsewhere (Mlíkovský, in prep.). In spite of this, the taxonomic position of some taxa remains uncertain. Below, I present an abbreviated version of the new classification of birds, limited to the taxa recorded from the Cenozoic of Europe:

Class Aves
Superorder Struthioni
- Order Tinamiformes: Tinamidae
- Order Struthioniformes: Palaeotididae, Struthionidae

Superorder Gavii
- Order Phaethontiformes: Gaviidae, Phaethontidae
- Order Ardeiformes: Sulidae, Ardeidae, Phalacrocoracidae, Anhingidae
- Order Bucerotiformes: Laurillardiidae, Bucerotidae, Upupidae, Phoeniculidae

Superorder Ciconii
- Order Procellariiformes: Procellariidae, Pelagornithidae
- Order Ciconiiformes: Podicipedidae, Pelecanidae, Messelornithidae, Gruidae, Threskiornithidae, Gastornithidae, Eogruidae, Otididae, Ciconiidae, Cathartidae,
- Order Anseriformes: Phoenicopteridae, Recurvirostridae, Anhimidae, Anatidae
- Order Charadriiformes: Jacanidae, Rostratulidae, Scolopacidae, Glareolidae, Thinocoridae, Pterocletidae, Charadriidae, Laridae, Alcidae
- Order Piciformes: Coliidae, Psittacidae, Ramphastidae, Picidae

Superorder Passeri
- Order Galliformes: Megapodiidae, Cracidae, Phasianidae
- Order Accipitriformes: Rallidae, Cariamidae (incl. Phorusrhacidae), Cuculidae (incl. Musophagidae), Accipitridae (incl. Sagittariidae)
- Order Columbiformes: Caprimulgidae (incl. Archaeotrogonidae, Nyctibiidae, Preficinae), Aegialornithidae, Apodidae, Podargidae, Sophiornithidae, Strigidae, Columbidae, Falconidae
- Order Coraciiformes: Sylphornithidae, Coraciidae, Trogonidae, Halcyornithidae, Alcedinidae, Todidae, Meropidae
- Order Passeriformes: several modern families.

The Struthioni is an ancient group of unknown systematic position. They probably represent remains of an early radiation of birds. All known forms are terrestrial and omnivorous. The adaptive radiation is very limited.

The Gavii is another ancient group of birds (see Olson 1992). The ancestral forms seem to have been aquatic, predatory birds, with limited attempts at colonizing dry ground (Ardeidae). A single offshoot adapted to the arboreal life habits (Bucerotiformes). The adaptive radiation is rather limited.

The Ciconii is a large group of birds, whose adaptive radiation probably took place mainly in the Paleogene. The ancestral forms seem to have been aquatic, predatory birds, but they were successful in adapting to terrestrial life habits, probably in several independent attempts (various Ciconiiformes). They also evolved filter-feeding (primary adaptation of the Anseriformes), and an offshoot adapted to the arboreal life habits (Piciformes). Most of the Ciconii radiated before the Oligocene. The Anseriformes originated in the Eocene, but most of their adaptive radiation probably took place in the Oligo-Miocene. The adaptive radiation is broad. The delimitation and arrangement of families depend on the still insufficiently known data on the Paleocene and Eocene forms.

The Passeri is a large group of primarily terrestrial/arboreal, predatory birds. Their adaptive radiation took place mainly in the Paleogene, prior to the Oligocene. The Passeriformes possibly also originated in the Eocene (see Boles 1997), but most of their adaptive radiation took place later, probably in the Oligo-Miocene. The Passeri radiated into a great variety of adaptive zones, but only very few entered the aquatic ones. The taxonomic position of the Sylphornithidae and Coraciidae is uncertain.

List of collections

BaM	Naturhistorisches Museum, Basel, Switzerland
BMNH	Department of Paleontology, Natural History Museum, London, England [formerly British Museum (Natural History)]
BSP	Bayerische Staatssammlung für Paläontologie und Historische Geologie, München, Germany
CHI	Conservation Hall, Ipolytarnóc, Hungary
CMP	Carnegie Museum, Pittsburg, Pennsylvania, USA
DPFNSP	Institute of Geology and Paleontology [formerly Department of Paleontology], Faculty of Natural Sciences, Charles University, Praha, Czechia
FSL	Centre des Sciences de la Terre, Université Claude-Bernard, Lyon, France
FSUM	Faculté des Sciences, Université de Marseille, France
GIB	Geological Institute, Budapest, Hungary
GIH	Geologisches Institut, Hamburg, Germany
GIK	Geological Institute, Ukrainian Academy of Sciences, Kyjiv, Ukraine
GIKM	State Museum of National History, Chişinău, Moldova
GMH	Geiseltalmuseum, Halle an der Saale, Germany
GMK	Museum of Geology, Institute of Geological Sciences, Ukrainian Academy of Sciences, Kyjiv, Ukraine
GPIW	Geologisch-Paläontologisches Institut, Universität Würzburg, Würzburg, Germany
GUN	Novorosijsk State University, Novorosijsk, Ukraine
HLMD	Hessisches Landesmuseum für Naturkunde, Darmstadt, Germany
HUJ	Hebrew University of Jerusalem, Jerusalem, Israel
IGF	Museum of Geology and Paleontology, University of Firenze, Firenze, Italy
IGS	Institute of Geological Sciences [formerly Geological Survey Museum], London, England
IGGB	Institute of Geology and Geophysics, Bucureşti, Romania
IGGL	Institute of Geology and Geochemistry of Fossil Fuels, Ukrainian Academy of Sciences, L'vyv, Ukraine
IM	Ipswich Museum, Ipswich, England
IPS	Institute of Paleontology, Sabadell, Spain
IRScNB	Institut Royal des Sciences Naturelles, Bruxelles, Belgium
ISEZ	Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Kraków, Poland
IQW	Indtitut für Quartärpaläontologie, Weimar, Germany
IZAN	Institute of Zoology, Ukrainian Academy of Sciences, Kyjiv, Ukraine
IZC	Institute of Zoology, Moldovan Academy of Sciences, Chişinău, Moldova
LMB	Landesmuseum Braunschweig, Germany
LPLN	Laboratoire de Préhistoire du Lazaret, Nice, France

LPUB	Laboratory of Paleontology, University of Bucureşti, Bucureşti, Romania
LPUI	Laboratory of Paleontology, University of Iaşi, Iaşi, Romania
MB	Natural History Museum, Baku, Azerbaijan
MCI	Museum of Imola, Imola, Italy
MG	Landesmuseum Joanneum, Graz, Austria
MGPUB	Museum of Geology and Paleontology, University of Bologna, Bologna, Italy
MGPUT	Museum of Geology and Paleontology, University of Torino, Torino, Italy
MHNA	Musée d'Histoire Naturelle, Aix-en-Provence, France
MHNB	Muséum d'Histoire Naturelle, Bordeaux, France
MHNL	Muséum d'Histoire Naturelle, Lyon, France
ML	Musée Guimet d'Histoire Naturelle, Lyon, France
MMB	Anthropos Institute, Moravian Museum, Brno, Czechia
MNCN	National Museum of Natural Sciences, Madrid, Spain
MNHM	Muséum d'Histoire Naturelle, Montauban, France
MNHN	Laboratoire de Paléontologie, Muséum National d'Histoire Naturelle, Paris, France
MNHNS	National Museum of Natural History, Sofija, Bulgaria
MP	Museum of Petralona, Petralona, Greece
MPC	Musée de Paléontologie, Chilhac, France
MPUP	Museum of Paleontology, University of Padova, Padova, Italy
MS	Musée de Sartène, Corsica, France
MSNUP	Natural History Museum, University of Pisa, Pisa, Italy
NHMW	Geologisch-Paläontologische Abteilung, Naturhistorisches Museum, Wien, Austria
NKMB	Museum für Naturkunde, Humboldt-Universität, Berlin, Germany
NMB	National Museum, Budapest, Hungary
NMM	National Museum of Natural History, Valletta, Malta
NMP	Department of Paleontology, National Museum, Praha, Czechia
NMZ	Naturhistorisches Museum, Zürich, Switzerland
NRM	Department of Paleontology, Natural History Museum, Stockholm, Sweden
PIN	Paleontological Institute, Russian Academy of Sciences, Moskva, Russia
PINK	Paleontological Institute, Ukrainian Academy of Sciences, Kyjiv, Ukraine
RGM	State Museum of Geology and Paleontology, Leyden, Holland
RMO	Regional Museum, Oradea, Romania
RMT	Regional Museum, Teplice, Czechia
SMC	Sedgwick Museum [formerly Woodwardian Museum], Cambridge, England
SMF	Naturmuseum und Forschungsinstitut Senckenberg, Frankfurt am Main, Germany
SMNK	Staatliches Museum für Naturkunde, Karlsruhe, Germany
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany
TGPI	Tiraspol State Pedagogical Institute, Tiraspol, Moldova
ULg	Université de Liège, Liège, Belgium
UNL	New University, Lisboa, Portugal
USNM	United States National Museum, Washington, D.C., USA
USTL	Université des Sciences et Techniques de Languedoc, Montpellier, France
UUT	University of Utrecht, Utrecht, Holland
UWPI	Institut für Paläontologie, Universität Wien, Wien, Austria
WDC	Wyoming Dinosaur Center, Thermopolis, Wyoming, USA
ZGIB	Zentrales Geologisches Institut, Berlin, Germany
ZIN	Zoological Institute, Russian Academy of Sciences, Sankt Peterburg, Russia

Private collections:

coll. Aymard, France (present location unknown)
coll. Barbey (present location unknown)
coll. Bonifay (Lyon, France)
coll. Croizet (part in BMNH, present location of the rest unknown)
coll. Danninger, Allerding, Austria

coll. Delfortrie (present location unknown)
coll. Dvořák, Bílina, Czechia
coll. Fejfar, Praha, Czechia
coll. Keferstein (present location unknown)
coll. Kessler (Germany)
coll. Kormos, Budapest, Hungary (probably in NMB)
coll. Maschwitz, Germany
coll. Michel, France (to be deposited in Musée d'Histoire Naturelle in Montbéliard, France)
coll. Nouel, France (present location unknown)
coll. Paupe, France (to be deposited in Musée d'Histoire Naturelle in Montbéliard, France)
coll. Rummel, Weißenburg, Germany
coll. Villalta, Spain (present location unknown)

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History of the research

Avian paleontology evolved within the past 300 years and the research was done exclusively by European scientists in the first one-and-half century. In the 18th century, the research was limited to Switzerland, France and Germany, but it slowly spread over the Europe in the course of the 19th century, mainly in its second half. The history of research can be roughly separated into five periods, which are detailed below.

1700-1800: The understanding of fossils was weak, and they were usually explained as remnants of animals perished in the Biblical Deluge (see e.g. Zittel 1899, Rudwick 1972). The knowledge of avian morphology was negligible. Accordingly, most of the alleged records of fossil birds turned out to be based on non-avian material (see Cuvier 1822: 302-305, Krüger 1823: 709-715, and Bronn 1834 for reviews). Proper avian fossils were reported only from the Miocene of Öhningen, then in Switzerland (Scheuchzer 1708a,b[2], 1716, Razoumowsky 1789[3]), and from the Eocene of Montmartre in France (Lamanon 1782, 1783[4], Camper 1786).

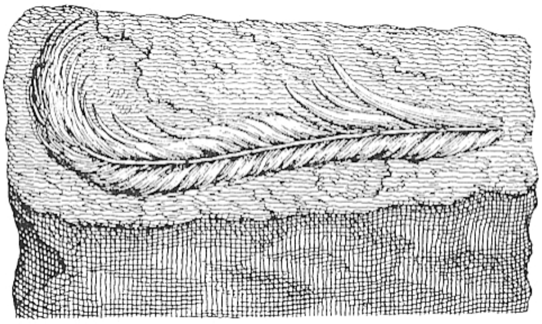

Fig. 2. An unidentified avian feather from the middle Miocene (MN 6) of Öhningen, Germany: the first record of a fossil bird from Europe (after Scheuchzer 1708a).

1800-1860: Accumulated evidence resulted in the abandonment of the single Deluge theory, in the formulation of the theory of multiple, more or less universal floods (e.g. Parkinson 1808-1811, Cuvier 1812), and finally in the formulation of the theory of evolution (Darwin 1859); see e.g. Zittel (1899), Glass (1959) and Laurent (1987). Avian paleontology started to develop, but remained to be limited to the western Europe (England, France, Germany, Switzerland, and marginally also Italy), although local paleontologists started to receive (in the 1820s) bones of fossil and subfossil birds also from "exotic" islands, particularly Sardinia (Wagner 1828, 1831, 1832, Marmora 1831), and later (in the 1830s and 1840s) New Zealand, Mauritius and Madagascar (see Lambrecht 1933). First comprehensive paper in avian paleontology is the description of the Eocene birds from Montmartre, France, by Georges Cuvier (1822). At the same time, English naturalist William Buckland (1822, 1823) published first account on the late Quaternary birds, describing their remains from the Kirkdale cave in England (see Harrison 1980c for their review). In 1825, German naturalist Carl Dietrich Eberhard König (1825) named first fossil bird: *Larus toliapicus*[5] from the Eocene of the Isle of

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[2] Scheuchzer's specimen (a feather imprint) was figured by Scheuchzer (1708a,b, pl. 2), Peyer (1957, fig. 5-6), and here (fig. 2). The original is deposited in NMZ (Peyer 1957).

[3] Razoumowsky's specimen (a hindlimb in slab) was figured by Karg (1805, pl. 2, fig. 1) and is deposited in BMNH under the catalogue number A-152 (Lydekker 1891a: 172).

[4] Lamanon's specimen is figured in Cuvier (1822, pl. 73, fig. 1).

[5] *Bucklandium diluvii*, another alleged bird named by König (1825), turned out to be a fish (see below).

Sheppey, England, but naming of avian fossils started to be more common only in the 1840s with the work of Richard Owen (1840, 1841, 1846) in England, Paul Gervais (1844a,b, 1852) in France, and Christoph Gottlieb Andreas Giebel (1847) in Germany. Simultaneously, the knowledge of the comparative osteology of birds developed (Nitzsch 1811, Merrem 1816, Blainville 1821)[6]. Significant contributions to the avian paleontology were published particularly by Georges Cuvier (1769-1832) and Paul Gervais (1816-1879) in France, by Hermann von Meyer (1801-1869) and Christoph Gottlieb Giebel (1820-1881) in Germany, and by Richard Owen (1804-1892) in England.

1860-1935: With the establishment of the theory of evolution (Darwin 1859), the meaning of fossils changed, although the theory itself had to be improved from the paleontological point of view (e.g. Owen 1860, Lyell 1863, Rolle 1863; see also Zittel 1899, Davitašvili 1948, Wilson 1970, Rudwick 1972, Bowler 1976). New standards in avian paleontology were set in the 1860s and 1870s especially by the continuing work of Richard Owen in England, and by Alphonse Milne-Edwards (1835-1900) in France with his treatise *Recherches anatomiques et paléontologiques pour servir à l'histoire des oiseaux fossiles de la France* (see also d'Archiac et al. 1866). The science of paleornithology slowly spread over all the Europe, and became established also in New Zealand and in the Americas (see Lambrecht 1933 for the authors).

Toward the end of the 19th century, the knowledge of the comparative morphology of birds, incl. osteology, markedly increased (see e.g. Fürbringer 1888, Selenka 1891, Gadow 1891, Beddard 1902), which in turn supported the development of paleornithology. Although many authors contributed to the research in this time period, the most significant ones appear to be Richard Lydekker (1849-1915) in England, Claude Gaillard (1861-1946) in France, and Kálmán Lambrecht (1889-1936) in Hungary. This period culminated with the *Handbuch der Palaeornithologie* by Lambrecht (1933).

1935-1970: This is the dark age of the European paleornithology, the onset of which coincides with the economical crisis which struck the developed countries of Europe in the late 1930s, and with the subsequent World War II (1939-1945). In these decades, Europe lost its position of the world leader in avian paleontology, leaving it for the USA. Consistent interest in the Cenozoic birds of Europe started to show in this period only Nikolaj Iosifovič Burčak-Abramovič (1939 ff.) in the then Soviet Union, and Miklós Kretzoi (1941 ff.) and Dénes Jánossy (1954 ff.) in Hungary, although all of them were primarily interested in fossil mammals.

1970-2000: Renaissance of the European paleornithology. This era brought several important novelties, generally imported from the USA, incl. (1) efforts at revising taxa described by earlier researchers, (2) world-wide reviews of selected taxa, (3) use of much improved comparative collections of modern avian skeletons, which allow for a comparison of fossil bones with the corresponding elements of previously unavailable taxa, (4) application of biometrical studies, and (5) departure from the geological understanding of the avian paleontology toward the zoological one.

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[6] A much earlier study by Coiter (1575) felt into oblivion (Allen 1951, Stresemann 1951: 47).

List of localities

The following list contains all Tertairy and early Pleistocene localities of Europe, which yielded remains of birds, and of which I became aware. Younger localities are listed only if they are mentioned in the text. Details on the localities can be found in Mlíkovský (1996a) and Tyrberg (1998, 2001). The list is arranged chronologically, and within periods alphabetically. All Tertiary localities are limited to a single mammal zone. If more zones are indicated for a given locality (e.g. MP 7-10), then its exact age is unknown, being somewhere within the limits. On the other hand, Quaternary localities use to be multi-layered, which is indicated below. Note, that the biochronological position of localities may be subject of change, caused by continuing research.

For each locality, its general geographic position is given, followed – in parentheses – with the reference to the catalogues by Mlíkovský (1996a) and Tyrberg (1998, 2001). In addition, references to relevant paleornithological papers are listed in each case (simple mentioning of birds from the locality being not considered). In brackets, the type of material recovered is indicated. The abbreviations are as follows: B – bones, E – eggshells, F – feather imprints, and T – tracks (footprints). An asterisk indicates that one or more avian species were created on the basis of the material.

MP 1-5

Gelinden, Belgium (Cheneval 1996a, # 1): Misonne 1958. [B]

Limhamn, Sweden (Tyrberg & Ericson 1996, # 1): Dames 1890, Lambrecht 1933, Olson & Feduccia 1980a, Tyrberg & Ericson 1996. [B*]

Selk, Germany (new): Lierl 1993. [B]

MP 5

Menat, France (Mourer-Chauviré 1996a, # 1): Launay 1908, 1923, Pitton 1940. [B]

Sundby, island of Mors, Denmark (new): Hoch 1997. [B]

MP 6

Cernay-les-Reims, France (Mourer-Chauviré 1996a, # 2): Gervais 1873, 1877, Lemoine 1878a, 1880, 1881a,b,c, 1884, 1885, 1893, Meunier 1882, Repelin 1924, Andors 1992, Martin 1992, Mourer-Chauviré 1994, 1995a. This is a complex locality, which includes the sites of Chalons-sur-Vesle, Berru and Rilly. [B*]

Maret, Belgium (Cheneval 1996a, # 2): Misonne 1958. [B]

Mesvin, Belgium (Cheneval 1996a, # 3): Dollo 1883, 1909, Martin 1992. [B]

Walbeck, Germany (Mlíkovský & Hesse 1996, # 1): Weigelt 1939, 1942. [B]

MP 7

Basse Provence, France (Mourer-Chauviré 1996a, # 7): Dughi & Sirugue 1959, 1962, 1968, Fabre-Taxy & Touraine 1960, Touraine 1960, 1961, 1969, Rey 1969, Cailleux 1969, Kerourio & Aujard 1987, Michajlov 1991, Dauphin 1991, 1992, 1994. This is a complex locality, which includes the sites of Baraque, Cengle, Mauquiers, Pontevès, Saint-Antonin, Saint-Julien-le-Montagnié, Saint-Maurin, and Sillans-la-Cascade. [E*]

Croydon, England (Mlíkovský 1996q, # 1): Newton 1885a,b, 1886a,b, 1889, Harrison & Walker 1977a, Martin 1992. [B*]

Dormaal, Belgium (Cheneval 1996a, # 5): Misonne 1958. Smith & Smith (1995) did not list birds from this locality. [B]

Fur, Denmark (Mlíkovský 1996f, # 1): Hoch 1975, Houde & Olson 1992, Kristoffersen 1998, 1999. [B]

Meudon, France (Mourer-Chauviré 1996a, # 3): Prévost 1855a,b, Hébert 1855a,b,c,d, Lartet 1855, Valenciennes 1855, Duméril 1855, Owen 1856a,b, Milne-Edwards 1867a,b, 1872, Meunier 1882, Woodward 1886, Lavocat 1899, Repelin 1924, Russell et al. 1990, Martin 1992. [B*]

Fig. 3. Type localities of Paleocene (MP 1-6) birds of Europe. 1 - Limhamn, 2 - Cernay-les-Reims. Scale bar = 100 km.

Passy, France (Mourer-Chauviré 1996a, # 4): Milne-Edwards 1867a,b, 1872. [B]
Silverinha, Portugal (Sánchez Marco 1996a, # 1): Harrison 1983a. [B*]

MP 7-10

Aude, France (Mourer-Chauviré 1996a, # 8a-c): Plaziat 1964, Villatte 1966, Dughi et al. 1969, Cailleux 1969, Kerourio & Aujard 1987. This is a complex locality, which includes the sites of Gallié, Auzières, and Serre de Trigodinna. [E]
Erquelines, Belgium (Cheneval 1996a, # 4): Misonne 1958. [B]
Grange Farm, England (Mlíkovský 1996q, # 9): George & Vincent 1978, Harrison 1980a, 1983b. [B*]
Havighorst, Germany (Mlíkovský & Hesse 1996, # 3): Illies 1941, 1942. [F]
High Ongar, England (Mlíkovský 1996q, # 7): Harrison & Walker 1977a, Harrison 1984b, Houde 1988. [B*]
Katharinenhof, Germany (Mlíkovský & Hesse 1996, # 2): Hoch 1975. [B, brain casts]
Orp-le-Grand, Belgium (Cheneval 1996a, # 6): Misonne 1958. [B]
Primrose Hill, England (Mlíkovský 1996q, # 5): Owen 1846, Lydekker 1891a, Harrison & Walker 1977a, 1978a, Harrison 1979a. [B*]
Vinalmont, Belgium (Cheneval 1996a, # 7): Misonne 1958.

MP 8

Mariager Fjord, Denmark (Mlíkovský 1996f, # 2): Hoch 1975. [B, F]
Røsnaes, Denmark (Mlíkovský 1996e, # 3): Harrison 1984, Houde 1988. [B*]
Walton-on-the-Naze, England (Mlíkovský 1996q, # 11): Daniels 1979, 1987, 1988, 1989, 1990, 1991, 1993, 1994, 1997, 1999, Harrison 1982b,c, 1983b, 1984b,c, Houde 1988, Olson & Daniels 1994, Mayr 1998c, Mayr & Daniels 1998, Olson 1999a,b. [B*]

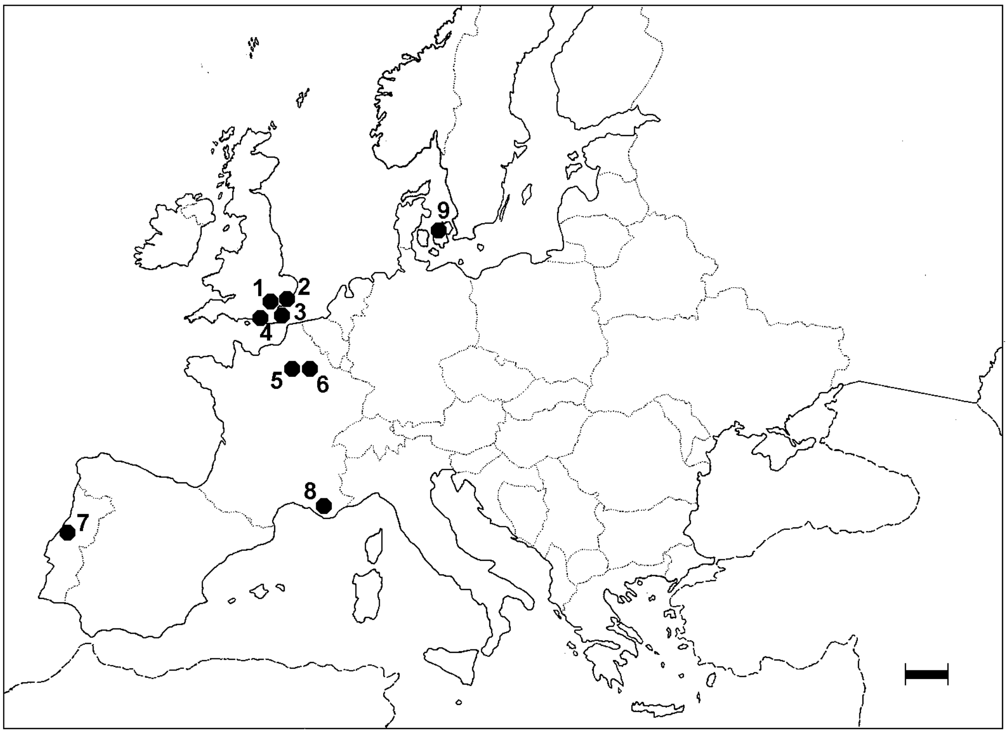

Fig. 4. Type localities of early Eocene (MP 7-10) birds of Europe. 1 - Croydon, Primrose Hill, 2 - Burnham-on-Crouch, Grange Farm, High Ongar, Walton-on-the-Naze, 3 - Abbey Wood, Herne Bay, Sheppey, 4 - Bognor Regis, 5 - Meudon, 6 - Monthelon, 7 - Silverinha, 8 - Basse Provence, 9 - Røsnaes. Scale bar = 100 km.

MP 8-9

Abbey Wood, England (Mlíkovský 1996q, # 2): Harrison & Walker 1977a. [B*]

Bognor Regis, England (Mlíkovský 1996q, # 4): Harrison & Walker 1975, 1977a, Olson & Feduccia 1979, Harrison 1982a, 1984a, Olson 1985, Baird & Vickers-Rich 1997. [B*]

Burnham-on-Crouch, England (Mlíkovský 1996q, # 6): Harrison & Walker 1977a, Olson & Feduccia 1979, Harrison 1982a, Martin & Mengel 1984, Baird & Vickers-Rich 1997, Olson 1999b: 127. [B*]

Herne Bay, England (Mlíkovský 1996q, # 10): Harrison & Walker 1977a, Harrison 1984b, 1985a. [B*]

Mutigny, France (Mourer-Chauviré 1996a, # 5): Martin 1992. [B]

Saint James Park, England (Mlíkovský 1996q, # 8): Harrison & Walker 1977a, Harrison 1984b. [B]

Sheppey, England (Mlíkovský 1996q, # 3): König 1825, Owen 1840, 1841, 1846, 1869, 1870, 1873, 1878, 1880, Bowerbank 1854, Seeley 1866, 1869, 1874, Martin 1874, Lydekker 1891a, 1896, Andrews 1899, Lambrecht 1933, Harrison & Walker 1971, 1972, 1975, 1976b,c, 1977a, Cracraft & Rich 1972, Harrison 1982a, 1984a,b,c, 1986, Houde 1988. [B*]

MP 10

Monthelon, France (Mourer-Chauviré 1996a, # 6): Schaub 1929a,b, Gaillard 1936, Andors 1992. [B*]

MP 11

Geiseltal XIII, Germany (Mlíkovský & Hesse 1996, # 5c): Fischer 1962, 1978. [B*]

Geiseltal XIV, Germany (Mlíkovský & Hesse 1996, # 5d): Fischer 1962, 1978. [B*]

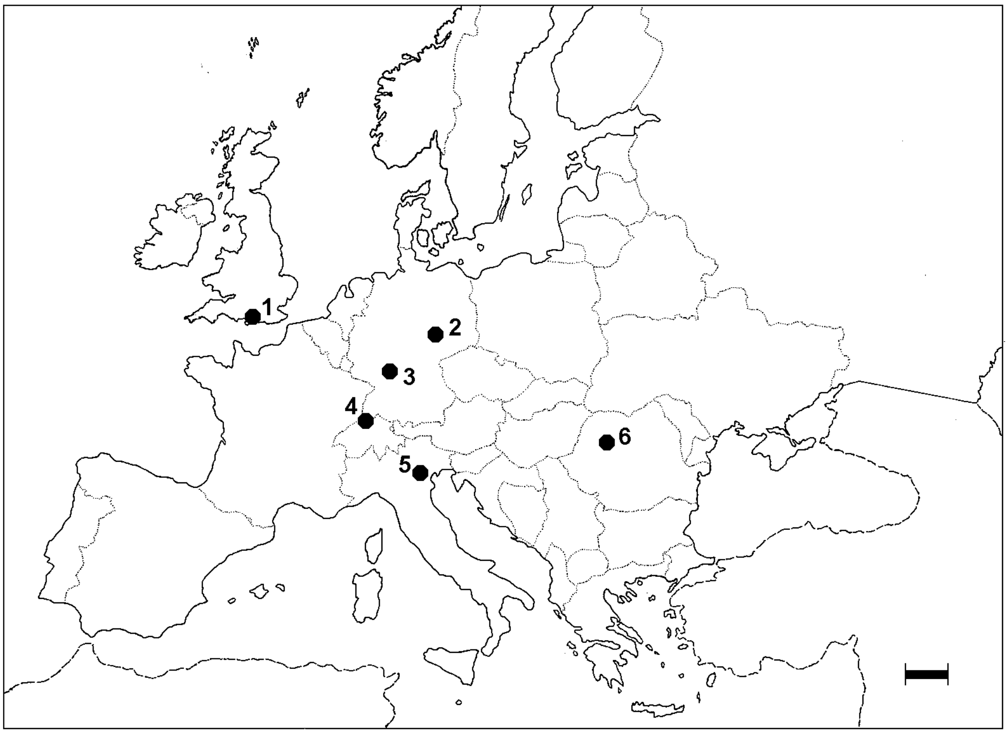

Fig. 5. Type localities of middle Eocene (MP 11-13) birds of Europe. 1 - Lee-on-Solent, Yateley, 2 - Geiseltal (incl. Cecilie), 3 - Messel, 4 - Egerkingen, 5 - Monte Zuello, 6 - Cluj-Manastur. Scale bar = 100 km.

Geiseltal IL, Germany (Mlíkovský & Hesse 1996, # 5j): Mlíkovský, orig. [B]

Messel, Germany (Mlíkovský & Hesse 1996, # 4): Wittich 1899, Berg 1965, Hoch 1980, 1988, Peters 1983, 1985, 1987a,b, 1988a,b, 1989, 1991, 1992, 1994, 1995, 1997a,b,c, Houde 1988, Hesse 1988a,b, 1989, 1990, Eikamp 1990, Hesse & Habersetzer 1993, Peters & Storch 1993, 1994, 1995, Mayr 1997, 1998a,b,c,d, 1999b,c, 2000b,c,d,f, Mayr & Daniels 1998, Mayr & Peters 1998, 1999. [B*, F]

MP 11-13

Chamblon, Switzerland (Mlíkovský 1996o, # 2): Thenius 1959. [B]

Egerkingen, Switzerland (Mlíkovský 1996o, # 1): Schaub 1929b, 1940a,b, Mlíkovský 1992b. [B*]

Etterbeek, Belgium (Cheneval 1996a, # 8): Dollo 1909, Lambrecht 1933, Misonne 1958. [B]

Fontcouverte, France (Mourer-Chauviré 1996a, # 8d): Dughi & Sirugue 1962. [E]

Geiseltal, Germany (Mlíkovský & Hesse 1996, # 5): Lambrecht 1928, 1933, 1935, Heller 1932, Bachofen-Echt 1936a, Krumbiegel 1959, Fischer 1962, 1967, 1978, 1987, Matthes 1970, Haubold & Krumbiegel 1984, Houde 1986, 1988, Houde & Haubold 1987, Peters 1989, 1998, Mlíkovský 1992b, Kohring & Hirsch 1996, Mayr 2000e. This is a complex locality, which includes many fossiliferous sites. Three early sites are called Cecilie and Leonhard, respectively, while the newer ones Geiseltal. Vertebrate sites are numbered with Roman numbers (Krumbiegel 1959, 1962, 1966, 1968, 1977, Krumbiegel et al. 1983). [B*, E, F]

Lee-on-Solent, England (Mlíkovský 1996q, # 12): Harrison & Walker 1979a, Harrison 1982c. [B*]

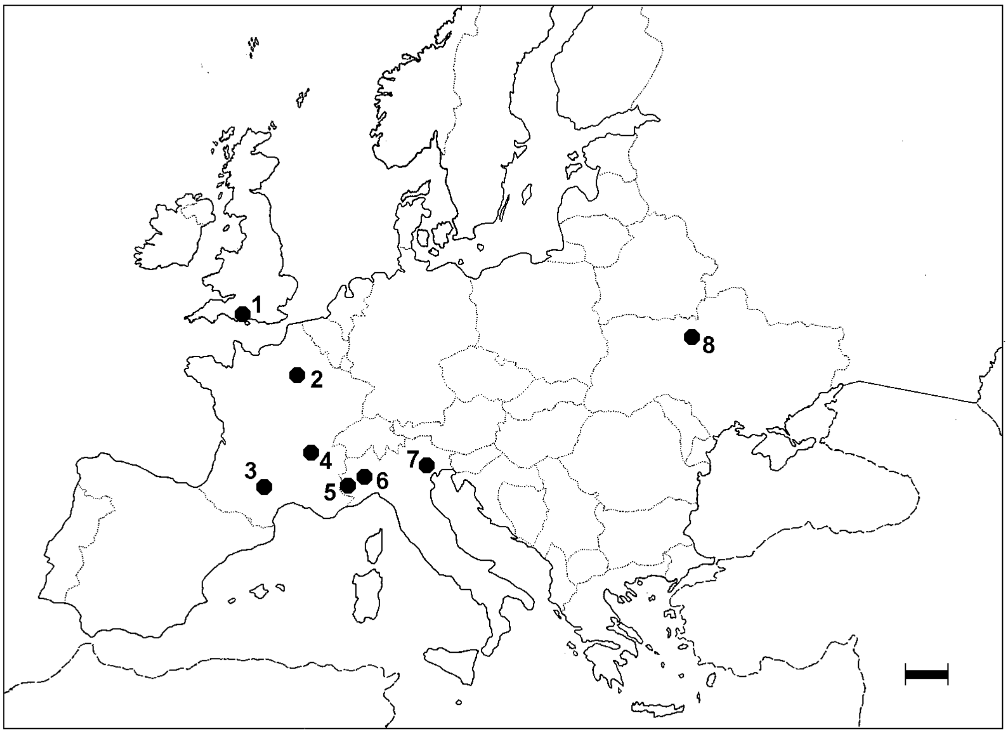

Fig. 6. Type localities of late Eocene (MP 14-20) birds of Europe. 1 - Hordle, Milford, 2 - Montmartre, Romainville, 3 - Quercy (incl. Bouffie, Bretou, Escamps, Perrière, Rosières, Sainte-Néboule), 5 - Argentera, 6 - Verrua Savoia, 7 - Vestena Nova, 8 - Kyjiv. Scale bar = 100 km.

Meilleries-Saint-Sauveur, France (Mourer-Chauviré 1996a, # 11): Roberton 1834. This is a doubtful locality. The age may be late Cretaceous, and the coproliths (the only remains found) may have been produced by dinosaurs (see Mourer-Chauviré 1996a: 573). [Coproliths]

Monte Zuello, Italy (Delle Cave 1996, # 1): Zigno 1884, Portis 1884, Cracraft 1973. [B*]

Yateley, England (Mlíkovský 1996q, # 13): Harrison & Walker 1979a. [B*]

MP 12

Geiseltal L, Germany (new): Peters 1998 [B*]

MP 13

Bouxviller, France (Mourer-Chauviré 1996a, # 9): Kuntz 1983. [E]

Cecilie I, Germany (Mlíkovský & Hesse 1996, # 5a): Lambrecht 1928, 1933, 1935, Houde 1986, 1988, Houde & Haubold 1987, Mlíkovský 1992. [B*, E, F]

Cecilie II, Germany (Mlíkovský & Hesse 1996, # 5b): Weigelt 1933. [B]

Cluj-Manastur, Romania (Kessler 1996, # 1): Lambrecht 1929, Kessler 1986. [B*]

Geiseltal XX, Germany (Mlíkovský & Hesse 1996, # 5e): Fischer 1987, Mlíkovský 1992b. [B*]

Geiseltal XXII, Germany (Mlíkovský & Hesse 1996, # 5f): Mlíkovský, orig. [B]

Geiseltal XXXV, Germany (Mlíkovský & Hesse 1996, # 5g): Fischer 1962, 1978, 1987, Mlíkovský, orig. [B]

Geiseltal XXXVI (Mlíkovský & Hesse 1996, # 5): Fischer 1987, Mayr 2001e. [B]

Geiseltal XXXVII, Germany (Mlíkovský & Hesse 1996, # 5h): Mlíkovský, orig. [B]

Geiseltal XLI, Germany (Mlíkovský & Hesse 1996, # 5i): Fischer 1962, 1978, Mlíkovský, orig. [B]

Leonhard III, Germany (new): Lambrecht 1928, 1933. [B]

MP 14

Lissieu, France (Mourer-Chauviré 1996a, # 10): Gaillard 1936, 1937, 1939, Andors 1992. [B*]

MP 14-16

Barton, England (Mlíkovský 1996q, # 14): Harrison & Walker 1976a. [B*]

Highcliffe, England (Mlíkovský 1996q, # 15): Harrison & Walker 1976a. [B*]

Jantarnyj, Russia (Mlíkovský 1996g, # 1): Berendt 1845, Giebel 1862, H. Meyer 1867, A.B. Meyer 1887, Andrée 1937, Bachofen-Echt 1929, 1936, 1944, 1949, Lambrecht 1933, Katinas 1983. This locality refers to a secondary deposit of the so-called Baltic amber, which originated in pine forests in the territory of the today's Finland (Katinas 1971, 1983). Washed-out pieces of fossiliferous amber can be found anywhere on the coasts of the eastern Baltic Sea. [F]

MP 14-20

Pin, France (Mourer-Chauviré 1996a, # 14): Meunier 1906. [T]

MP 16

Bretou, France (Mourer-Chauviré 1996a, # 12b): Mourer-Chauviré 1988a. [B*]

Lavergne, France (Mourer-Chauviré 1996a, # 12c): Mourer-Chauviré 1983, 1988b, 1989a, 1992b. [B]

MP 16-20

Garrigues, France (Mourer-Chauviré 1996a, # 12l): Mourer-Chauviré 1980, 1983. [B]

MP 16-28

Quercy, France (Mourer-Chauviré 1996a, # 12, 12a): Lydekker 1891a, Milne-Edwards 1892, 1893, Gaillard 1908, 1939, Lambrecht 1933, Lowe 1939, Brodkorb 1963b, 1964, 1967, 1971b, Cracraft & Rich 1972, Cracraft 1973, Collins 1976a, Jollie 1977c: 117, Olson 1977, 1985a, Mourer-Chauviré 1978, 1980a, 1981a, 1982a,b, 1983, 1985a,b, 1987, 1988a,b, 1989a, 1991, 1992a,b,c, 1993a, 1995a,b,c 1996a, Rich 1982, Mourer-Chauviré & Cheneval 1983, Harrison 1975c, 1984c, Hesse 1988, 1990, Karchu 1988, 1992, Fischer & Mauersberger 1989, Mlíkovský 1989a,b, 1998c, 1999d, Peters 1992, Sigé et al. 1998, Mourer-Chauviré et al. 1999, Mayr & Mourer-Chauviré 2000. This is a complex locality, consisting of numerous fissure fillings in a karstic area. Exact sites are unknown for the material from early excavations (henceforth called "Quercy"). Recently excavated sites are listed separately under the names Aubrelong, Baraval, Belgarric, Bouffie, Boussac, Bretou, Crabit, Desse, Escamps, Fonbonne, Fraysse, Garouillas, Garrigues, Gousnat, Itardiès, Lavergne, Lostanges, Mas de Got, Mounayne, Pécarel, Perrière, Phalip, Plante, Pradigues, Ravet-Lupovici, Roqueprune, Rosières, Sainte-Néboule, and Salême. [B*]

MP 17

Bouffie, France (Mourer-Chauviré 1996a, # 12e): Mourer-Chauviré 1983, 1988b, 1991, 1992b, 1995a, see also Mourer-Chauviré 1996a: 577. [B*]

Hordle, England (Mlíkovský 1996q, # 16): Lydekker 1891a, Storer 1956, Cracraft 1973, Olson 1977, 1981, Harrison 1971, 1976, 1986, Harrison & Walker 1976a, 1977a. [B*]

Milford, England (Mlíkovský 1996q, # 17): Lydekker 1891a, Harrison 1971, 1986, Harrison & Walker 1976a. [B*]

Perrière, France (Mourer-Chauviré 1996a, # 12f): Mourer-Chauviré 1980, 1983, 1987, 1988a,b, Peters 1992, Mlíkovský 1998c, Mayr & Mourer-Chauviré 2000. [B*]

Pradigues, France (Mourer-Chauviré 1996a, # 12d): Mourer-Chauviré 1988b. [B]

Salème, France (Mourer-Chauviré 1996a, # 12g): Mourer-Chauviré 1987, Peters 1992. [B]

MP 17-20

Argentera, Italy (Delle Cave 1996, # 4): Portis 1879, 1884. [T*]

Kyjiv, Ukraine (Mlíkovský 1996p, # 1): Rogovič 1875a,b, Aver'janov et al. 1990. [B*]

Verrua Savoia, Italy (Delle Cave 1996, # 3): Portis 1884, 1887, 1900. [T*]

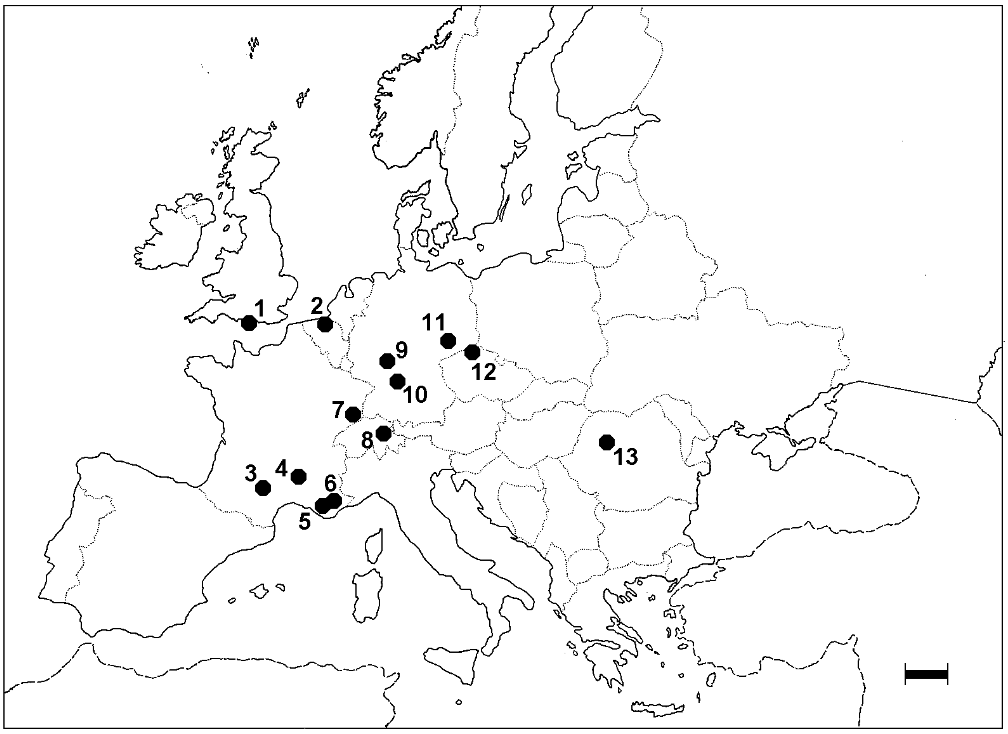

Fig. 7. Type localities of early Oligocene (MP 21-22) and middle Oligocene (MP 23-24) birds of Europe. 1 - Hamstead, Yarmouth, 2 - Rupelmonde, 3 - Quercy (incl. Itardiès), 4 - Ronzon, 5 - Saignon, 6 - Céreste (incl. Lupéron?), 7 - Froidefontaine, 8 - Matt, 9 - Sieblos, 10 - Frauenweiler, 11 - Espenhain, 12 - Skalice, Varnsdorf, 13 - Cetațuie. Scale bar = 100 km.

Vestena Nova, Italy (Delle Cave 1996, # 2): Faujas-Saint-Fond 1801, Pictet 1853, Portis 1887, Omboni 1885. [F*]

MP 18

Gousnat, France (new): Mayr & Mourer-Chauviré 2000. [B]

Sainte-Néboule, France (Mourer-Chauviré 1996a, # 12h): Mourer-Chauviré 1978, 1992b. [B*]

MP 19

Escamps, France (Mourer-Chauviré 1996a, # 12i): Mourer-Chauviré 1978, 1980a, 1983, 1985b, 1988b, 1992b, 1999a, Karchu 1988, 1992). This is a complex locality, which includes also the sites Escamps III, Escamps IV, Escamps A, and Escamps C. [B*]

Lostanges, France (Mourer-Chauviré 1996a, # 12j): Mourer-Chauviré 1983. [B]

Möhren 6, Germany (Mlíkovský & Hesse 1996, # 6): Heissig 1970. [B]

Montmartre, France (Mourer-Chauviré 1996a, # 13): Lamanon 1782, 1783, Delamétherie 1800, 1802, Cuvier 1800a,b, 1807, 1809, 1822, 1825, 1836, Geoffroy-Saint-Hilaire 1842, Gervais 1844a,b, 1849, 1848-1852, 1859, Giebel 1847, Laurillard 1849, Reichenbach 1852, Bonaparte 1856c, Blanchard 1857, Desnoyers 1859a,b, Milne-Edwards 1863, 1867-1868, 1869-1871, 1872, Murie 1873, Woodward 1886, Flot 1892, Lydekker 1891a, Gaillard 1908, 1939, Oberholser 1917, Lambrecht 1933, Brodkorbb 1963c, 1964, 1967, 1971b, 1978, Brunet 1970, Dechauseaux 1970a,b, Cracraft 1973, Olson 1974a, 1977, 1985a, Warter 1976, Harrison 1979b, Mlíkovský 1981, 1995a, Mayr 1998c, 2000a. [B*]

Pécarel, France (new): Mayr & Mourer-Chauviré 2000. [B]

Rosières, France (Mourer-Chauviré 1996a, # 12k): Mourer-Chauviré 1983, 1987, 1992b, 1996a. Mlíkovský 1998c, Mayr & Mourer-Chauviré 2000. This is a complex locality, which includes the sites Rosières 1 and Rosières 2. [B*]

MP 20

Frohnstetten, Germany (Mlíkovský & Hesse 1996, # 7): Meyer 1852: 305, Quenstedt 1853, Lambrecht 1933. [B]

Romainville, France (Mourer-Chauviré 1996a, # 15): Lebedinsky 1927, Brunet 1970, Harrison 1979a. [B*]

MP 21

Aubrelong 1, France (Mourer-Chauviré 1996a, # 12m): Mourer-Chauviré 1983, 1987, Mlíkovský 1998c. [B]

Möhren 19, Germany (Mlíkovský & Hesse 1996, # 9): Heissig 1978. [B]

Ravet-Lupovici, France (Mourer-Chauviré 1996a, # 12n): Mourer-Chauviré 1983, 1987, 1992b, Mlíkovský 1998c. [B]

Ronzon, France (Mourer-Chauviré 1996a, # 16): Gervais 1844a,b, 1849, 1848-1852, 1859, Aymard 1856, Milne-Edwards 1863, 1867-1868, Woodward 1886, Lydekker 1891a, Gaillard 1908, 1939, Cracraft & Rich 1972, Harrison 1975a, Olson 1978, 1985a. [B*, E, F]

Saignon, France (Mourer-Chauviré 1996a, # 17): Demathieu et al. 1984. [T*]

MP 21-22

Barros, Spain (Sánchez Marco 1996b, # 3): Sánchez Marco 1996b. [B]

MP 21-23

Hamstead, England (Mlíkovský 1996q, # 21): Harrison & Walker 1979b. [B*]

Yarmouth, England (Mlíkovský 1996q, # 20): Harrison & Walker 1979b. [B*]

MP 21-24

Agramunt, Spain (Sánchez Marco 1996b, # 2): Casanovas & Santafé 1982. [T]

Burnt Wood, England (Mlíkovský 1996q, # 18): Harrison & Walker 1976a, 1979b. [B]

Cadillac, France (Mourer-Chauviré 1996a, # 26): Gervais 1844a,b, 1849, 1848-1852. [B]

Frauenweiler, Germany (new): Mayr 2000a. [B*]

Gurnard Bay, England (Mlíkovský 1996q, # 19): Harrison & Walker 1979b. [B]

Hoeleden, Belgium (Cheneval 1996a, # 10): Misonne 1958. [B]

Hoogbutsel, Belgium (Cheneval 1996a, # 9): Misonne 1958. [B]

Liedena, Spain (new): Mangin 1962, de Raaf et al. 1965. [F]

Matt, Switzerland (Mlíkovský 1996o, # 3): Escher 1839, Meyer 1839c, 1844, 1865, Gervais 1844a, Heer 1865, 1879, Peyer 1949, 1950, 1957, Stüssi 1958, Baumann 1958, Olson 1976, Mlíkovský 1992b. [B*]

Oppertshofen 2, Germany (Mlíkovský & Hesse 1996, # 12): Dehm 1978. [B]

Sieblos, Germany (Mlíkovský & Hesse 1996, # 8): Hassenkamp 1858: 207, Martini 1967a,b, 1988, 1998, Martini & Tobien 1984. [B*, E]

Weissenburg 9, Germany (Mlíkovský & Hesse 1996, # 13): Dehm 1978. [B]

MP 21-25

Lupéron, France (new): Mayr 2000i. Mayr (2000i: 627) said that Lupéron is "probably" identical with Céreste without any substantiation. A locality named Lupéron was unknown to Mourer-Chauviré (1996a,b) and Cheneval (1996b). However, all localities from southern France, which yielded avian bones in plates, are early Oligocene (MP 21-25) in age (see Mourer-Chauviré 1996a), which makes it probable, that Lupéron is also early Oligocene in age, whether it is a hitherto unidentified locality or it is identical with one of the relevant localities listed in Mourer-Chauviré (1996a). [B*]

MP 21-28

Belgarite 4A, France (Mourer-Chauviré 1996a, # 12aa): Mourer-Chauviré 1980a, 1987. [B]

Boussac, France (Mourer-Chauviré 1996a, # 12z): Mourer-Chauviré 1980a, 1983. This is a complex locality, which includes the sites Boussac 1 and Boussac 2. [B]

Fonbonne 1, France (Mourer-Chauviré 1996a, # 12y): Mourer-Chauviré 1980a, 1985b, 1987, Mlíkovský 1998c. [B]

Phalip, France (Mourer-Chauviré 1996a, # 12bb): Mourer-Chauviré 1987, Mlíkovský 1998c. [B]

MP 21-30

Alliers, France (Mourer-Chauviré 1996a, # 34): Milne-Edwards 1867-1868. [B]

Aurillac, France (new): Gervais 1848-1852. [B]

Peralta de la Sal, Spain (Sánchez Marco 1996b, # 1): Hernández-Pacheco 1929, Casanovas & Santafé 1982. [T]

Sčigry, Ukraine (Mlíkovský 1996p, # 1): Nesov 1992. [B]

Vorochta, Ukraine (Mlíkovský 1996p, # 2): Čerkašenko & Ljaščuk 1960, Ljaščuk 1962. [E]

MP 22

Baraval, France (new): Sigé et al. 1998. [B]

Bechlejovice, Czechia (Mlíkovský 1996e, # 1): Špinar 1986: 95, Mlíkovský 1992b. [F]

Herrlingen 1, Germany (Mlíkovský & Hesse 1996, # 11): Palmowski & Wachendorf 1966. [B]

Mas de Got, France (Mourer-Chauviré 1996a, # 12p): Mourer-Chauviré 1980a, 1983, 1987, 1992b, Mlíkovský 1998c. This is a complex locality, which includes the sites Mas de Got A and Mas de Got B. [B]

Möhren 13, Germany (Mlíkovský & Hesse 1996, # 10): Heissig 1973. [B]

Plante 2, France (Mourer-Chauviré 1996a, # 12o): Mourer-Chauviré 1980a, 1983. [B]

MP 23

Céreste, France (Mourer-Chauviré 1996a, # 19): Lambrecht 1933, Stemvers-van-Bemmel 1984, Mourer-Chauviré 1992b, Mayr 1999a, 2000i. [B*, F]

Crabit 1, France (Mourer-Chauviré 1996a, # 12s): Mourer-Chauviré 1978b, 1983, 1987, Karchu 1988, Mlíkovský 1998c. [B]

Itardiès, France (Mourer-Chauviré 1996a, # 12q): Mourer-Chauviré 1980a, 1981, 1983, 1985b, 1987, 1992b, 1995a. [B*]

Mounayne, France (Mourer-Chauviré 1996a, # 12r): Mourer-Chauviré 1980a. [B]

Roqueprune 2, France (Mourer-Chauviré 1996a, # 12t): Mourer-Chauviré 1980a, 1983, Mourer-Chauviré & Cheneval 1983. [B]

MP 23-24

Burgmagerbein 3, Germany (Mlíkovský & Hesse 1996, # 15): Dehm 1978. [B]

Espenhain, Germany (Mlíkovský & Hesse 1996, # 16): Fischer 1982, 1983a,b, 1985, 1990. [B*]

Froidefontaine, France (Mourer-Chauviré 1996a, # 25): Cheneval 1995. [B*]

Kleinkems, Germany (Mlíkovský & Hesse 1996, # 14): Mieg et al. 1892: 379, Lambrecht 1933: 665. [F]

Rupelmonde, Belgium (Cheneval 1996a, # 11): Beneden 1871, 1872, 1873a,b, 1883, Dollo 1909, Lambrecht 1931a, 1933, Miller & Sibley 1941, Brodkorb 1962a, Cheneval 1984a. [B*]

Skalice, Czechia (Mlíkovský 1996e, # 3): Bayer 1882, 1883, Mlíkovský & Švec 1989. [B*]

Varnsdorf, Czechia (Mlíkovský 1996e, # 2): Bayer 1882, 1883, Mlíkovský & Švec 1989. [B*]

MP 23-25

Nassiet, France (Mourer-Chauviré 1996a, # 20): Viret 1938, Mourer-Chauviré 1996a. [B]

MP 24

Cetăţuie, Romania (Kessler 1996, # 2): Lambrecht 1933: 463, Cracraft 1973, Olson 1977. Dating corrected after Rusu (1989) and Kessler et al. 1998. [B*]

Vachères, France (Mourer-Chauviré 1996a, # 18): Bessonat & Michaux 1973, Mayr 2000i: 635. [B]

MP 25

Antoingt, France (Mourer-Chauviré 1996a, # 21): Lydekker 1891a. [B]

Armissan, France (Mourer-Chauviré 1996a, # 22): Gervais 1862, Milne-Edwards 1863, 1869-1871, Woodward 1886, Lydekker 1891a, Eastman 1905, Schaub 1945, Brodkorb 1964: 313. [B*]

Belgarric, France (Mourer-Chauviré 1996a, # 12u): Mourer-Chauviré 1983, 1987, 1992b. [B]

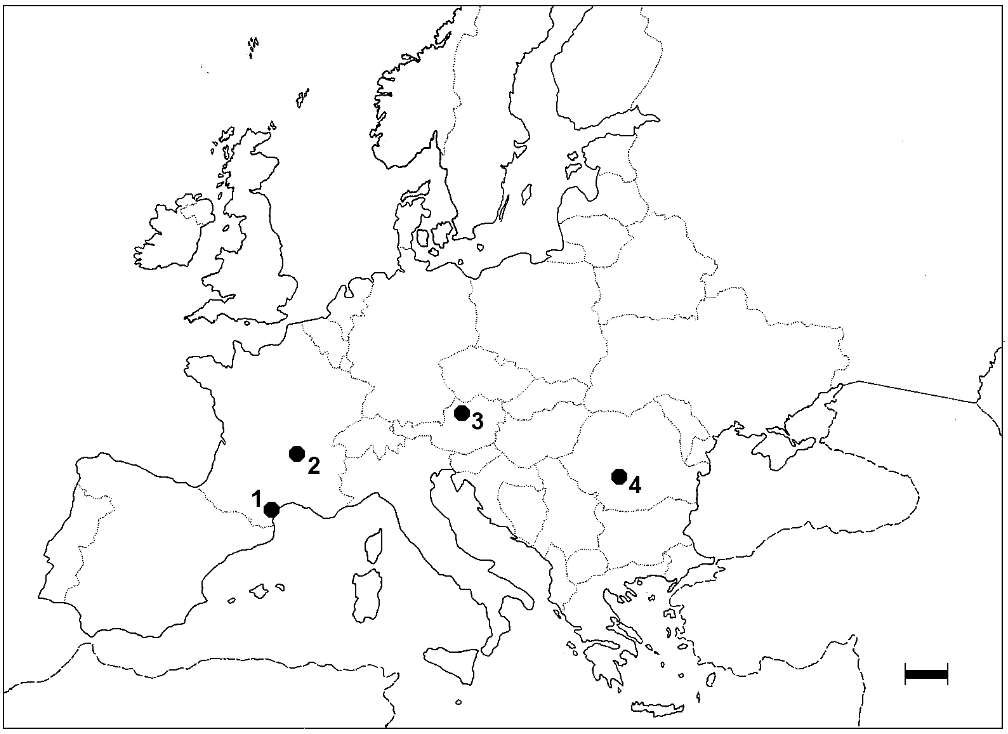

Fig. 8. Type localities of late Oligocene (MP 25-30) birds of Europe. 1 - Armissan, 2 - Chaptuzat, Gannat, Gergovie, 3 - Traun-Pucking, 4 - Câmpu lui Neag. Scale bar = 100 km.

Chaptuzat, France (Mourer-Chauviré 1996a, # 23): Cuvier 1825, Gervais 1844a, 1848-1852, 1849, 1859, Milne-Edwards 1863, 1867-1868, 1869-1871, 1872, Lydekker 1891a, Cheneval 1984a. [B*]

Garouillas, France (Mourer-Chauviré 1996a, # 12v): Mourer-Chauviré 1980a. [B]

Sauvetat, France (Mourer-Chauviré 1996a, # 24): Laizer 1828, Gervais 1844a, 1848-1852, Lydekker 1891a. [B, E]

MP 25-30

Bellingen, Germany (Mlíkovský & Hesse 1996: 627): Böhm 1896, 1898, Abel 1935, Mlíkovský 1992b. No avian remains. The footprints were reidentified as those of a mammal. [T]

Câmpu lui Neag, Romania (new): Rădan & Brustur 1993. [T*]

Perignat, France (Mourer-Chauviré 1996a, # 33): Lydekker 1891a. [B]

Tomerdingen, Germany (Mlíkovský & Hesse 1996, # 17): Seemann & Berckhemer 1930, Lambrecht 1933: 671. [B]

MP 27-30

Lausanne, Switzerland (Mlíkovský 1996o, # 9): Gaudin 1854. [E]

Thalberggraben, Germany (new): U.B. Göhlich in Darga et al. 1999. [B]

MP 28

Cournon, France (Mourer-Chauviré 1996a, # 27): Gervais 1844a, 1848-1852, Milne-Edwards 1867-1868, 1869-1871, 1872. [B, E]

Desse, France (Mourer-Chauviré 1996a, # 12w): Mourer-Chauviré 1980a, 1983, 1992b, 1993a, Mourer-Chauviré & Cheneval 1983. [B]

Fraysse, France (Mourer-Chauviré 1996a, # 12x): Crochet 1971, Mourer-Chauviré 1980a, 1983, 1992b, 1993a, Mourer-Chauviré & Cheneval 1983. [B]

Gaimersheim 1, Germany (Mlíkovský & Hesse 1996, # 18): Ballmann 1970. [B]

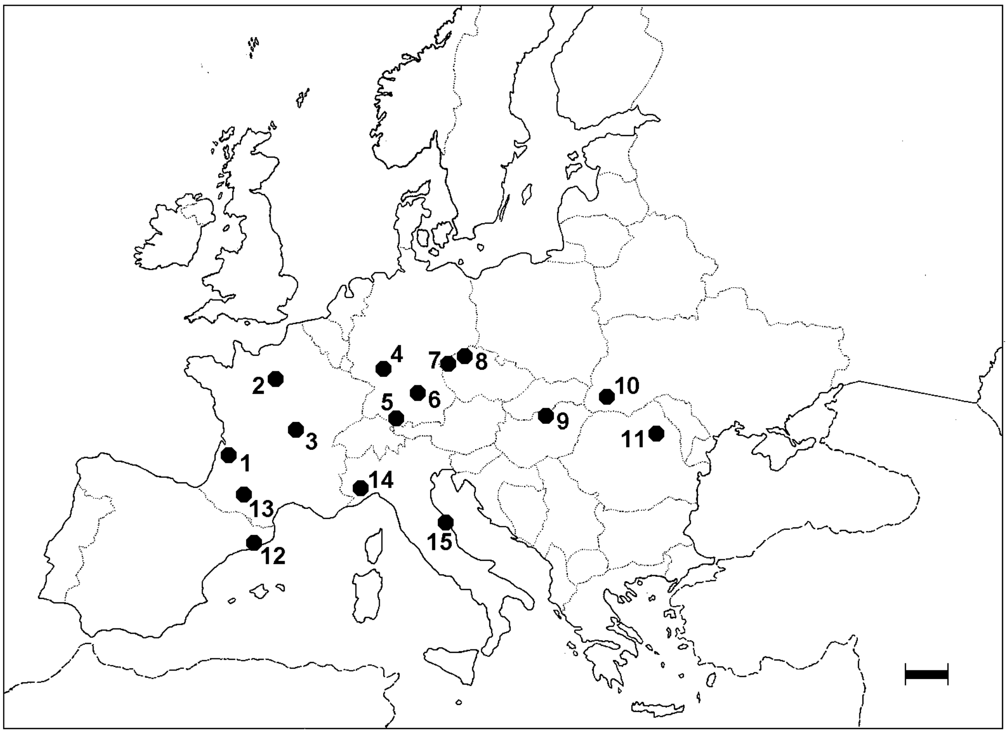

Fig. 9. Type localities of early Miocene (MN 1-4) birds of Europe. 1 - Léognan, Saucats, 2 - Orleanais, Touraine (age uncertain), 3 - Saint-Gérand-le-Puy, 4 - Weisenau, Wiesbaden, 5 - Harbatshofen, 6 - Grafenmühle, Wintershof-West, 7 - Dolnice, 8 - Břešťany, Merkur, Skyřice, 9 - Ipolytarnóc, 10 - Nižnij Strutyn', 11 - Piatra Neamț (incl. Cuejdi), Putna, 12 - Fallol, 13 - Armagnac, 14 - Ceva, 15 - San Angelo. Scale bar = 100 km.

MP 29

Herrlingen 9, Germany (new): Mayr 2001a. [B]

Pont-du-Château, France (Mourer-Chauviré 1996a, # 28): Gervais 1844a, 1848-1852, Milne-Edwards 1869-1871, Cheneval 1984a. [B, E]

MP 29 – MN 1

Chauderon, Switzerland (Mlíkovský 1996o, # 6): Weidmann & Reichel 1979. [T]

Crau Coulet, Switzerland (Mlíkovský 1996o, # 8): Weidmann & Reichel 1979. [T]

Goldau, Switzerland (Mlíkovský 1996o, # 5): Bräm 1954. [T]

Lammschlucht, Switzerland (Mlíkovský 1996o, # 4): Clerq & Holst 1971, Weidmann & Reichel 1979. [T]

Roches, Switzerland (Mlíkovský 1996o, # 7): Weidmann & Reichel 1979. [T]

MP 30

Aix-en-Provence, France (Mourer-Chauviré 1996a, # 35): Gervais 1844a, 1848-1852, 1859, Milne-Edwards 1863, 1869-1871, Bayan 1873, Woodward 1886). [F]

Coderet, France (Mourer-Chauviré 1996a, # 29): Mourer-Chauviré et al. 1989. [B]

Flörsheim, Germany (Mlíkovský & Hesse 1996, # 20): Lambrecht 1933: 671. [B]

Gannat, France (Mourer-Chauviré 1996a, # 30): Gervais 1844a, Milne-Edwards 1867-1868, Lydekker 1891a, Lambrecht 1933, Harrison 1975a,b, Cheneval 1984a, Olson 1985a, Mourer-Chauviré et al. 1989. [B*]

Gergovie, France (Mourer-Chauviré 1996a, # 31): Gervais 1844a, 1848-1852, 1849, Milne-Edwards 1863, 1867-1868, Cheneval 1984a. [B*]

Peublanc, France (Mourer-Chauviré 1996a, # 32): Milne-Edwards 1867-1868. [B]

Rott, Germany (Mlíkovský & Hesse 1996, # 19): Meyer 1859, 1867, Mlíkovský & Hesse 1996. [B, F]

Traun-Pucking, Austria (Mlíkovský 1996c, # 1): Mlíkovský 1987. [B*]

Trebovlje, Slovenia (new): Kolar-Jurovšek & Jurovšek 1996. [F]

MN 1

Oppenheim, Germany (Mlíkovský & Hesse 1996, # 24): Rothausen 1966, Olson & Feduccia 1980a, Mlíkovský 1988, Cheneval & Escuillé 1992. [B]

Paulhiac, France (Cheneval 1996b, # 1): Mourer-Chauviré 1993a. [B]

Pyrimont-Challonges, France (Cheneval 1996b, # 2): Depéret & Douxami 1902, Cheneval 1983c. [B]

Weisenau–AS, Germany (Mlíkovský & Hesse 1996, # 23): Meyer 1839b, 1843, Becker 1849, Milne-Edwards 1869-1871, Lambrecht 1933, Lydekker 1891a, Cheneval 1995. [B*, E]

Zell, Germany (Mlíkovský & Hesse 1996, # 22): Lambrecht 1933: 359. [E]

MN 1-2

Bachów, Poland (Bocheński 1996, # 2): Bocheński 1989, 1993, 1996. [B]

Ceva, Italy (Delle Cave 1996, # 5): Portis 1884. [B*]

Hłudno, Poland (Bocheński 1996, # 1): Bocheński & Szymczyk 1979, Bocheński 1989, 1993. [B]

MN 1-4

Kaltennordheim, Germany (Mlíkovský & Hesse 1996, # 21): Schlotheim 1820: 26. [B]

MN 1-8

Milićevo Brdo, Serbia (Mlíkovský 1996r, # 1): Laskarev 1936. [B]

MN 1-13

Ariuşd, Romania (Kessler 1996, # 3): Lambrecht 1929. [B]

Cevico de la Torre, Spain (Sánchez Marco 1996b, # 16): Olavarría 1898, E. Hernández-Pacheco 1914a, Lambrecht 1933. [E]

Heiligenstadt, Austria (Mlíkovský 1996c, # 7): Lambrecht 1933: 687. There are also Quaternary records from this locality (G. Rabeder, pers. communication 2001). [E]

Lisboa, Portugal (Sánchez Marco 1996a, # 4): Sánchez Marco 1996a. [B]

San Angelo, Italy (Delle Cave 1996, # 10): Procaccini Ricci 1840: 60, Portis 1887. [F*]

Setubal Peninsula, Portugal (Sánchez Marco 1996a, # 5): Sánchez Marco 1996a. [B]

Simeria, Romania (Kessler 1996, # 4): Lambrecht 1929. [F]

MN 2

Budenheim, Germany (Mlíkovský & Hesse 1996, # 25): Lambrecht 1933: 670. [B]

Büchelberg, Germany (Mlíkovský & Hesse 1996, # 32): Kuss 1960. [B]

Fischenbach, Switzerland (Mlíkovský 1996p, # 11): Gasser 1966, Weidmann & Reichel 1979. [F]

Ingelheim, Germany (Mlíkovský & Hesse 1996, # 34): Lambrecht 1933: 670. [B?]

Mombach, Germany (Mlíkovský & Hesse 1996, # 33): Hoeninghaus 1839. [B]

Monsheim, Germany (Mlíkovský & Hesse 1996, # 28): Lambrecht 1933: 341. [B]

Navarrete del Rio, Spain (Sánchez Marco 1996b, # 4): Adrover 1975. [B]

Ravolzhausen, Germany (Mlíkovský & Hesse 1996, # 35): Martini 1974, Eikamp 1980. [B]

Saint-Gérand-le-Puy, France (Cheneval 1996b, # 3): Milne-Edwards 1863, 1867-1868, 1869-1871, 1870, 1872, Lydekker 1891a,c, Shufeldt 1896, Lambrecht 1933, Gaillard 1939, Lowe 1939, Storer 1956, Wetmore 1956, Brodkorb 1963b,c, 1964, 1967, 1970, 1971b, 1978, Ballmann 1969a, Cracraft 1973, Collins 1976b, Harrison & Walker 1976d, Olson 1977, 1981, Harrison 1979a, 1984c, 1986, Mourer-Chauviré & Cheneval 1983, Cheneval 1979, 1983,b,c, 1984a,b, 1987, 1989, Livezey & Martin 1988, Fischer & Mauersberger 1989, Cheneval & Escuillié 1992, Mourer-Chauviré 1992b, 1993a, 1995b, 2000, Mlíkovský 1998c,e, 1999e: 35, 2000e, Mlíkovský & Göhlich 2000. [B*]

Senftenberg, Germany (Mlíkovský & Hesse 1996, # 36): Menzel 1906. [F]
Treuchtlingen 2, Germany (Mlíkovský & Hesse 1996, # 30): Dehm 1978. [B]
Ulm-Westtangente, Germany (Mlíkovský & Hesse 1996, # 29): Mlíkovský & Hesse 1996. [B]
Weissenburg 6, Germany (Mlíkovský & Hesse 1996, # 31): Dehm 1978. [B]
Wiesbaden 1, Germany (Mlíkovský & Hesse 1996, # 27): Meyer 1839b, Lambrecht 1933, Mlíkovský 1992b, 1995a. [B*]
Wiesbaden-Hessler, Germany (Mlíkovský & Hesse 1996, # 26): Meyer 1839b, Lambrecht 1931a, 1933, Rothausen 1966, Eikamp 1979. [B*, E]

MN 2-3

Armagnac, France (Cheneval 1996b, # 6): Lartet 1857, Milne-Edwards 1867-1868, 1874, Harrison & Walker 1996b. [B*]
Grafenmühle 21, Germany (new): Mlíkovský 1998c. [B*]
Léognan, France (Cheneval 1996b, # 5): Lartet 1857, Milne-Edwards 1867-1868, 1874, Brochon 1880, Lydekker 1891a, Lambrecht 1933, Lucazeau 1959, Brodkorb 1963c. [B]
Saucats, France (Cheneval 1996b, # 4): Lartet 1857, Milne-Edwards 1874, Lambrecht 1933, Lucazeau 1959, Brodkorb 1963c. [B*]
Solnhofen, Germany (Mlíkovský & Hesse 1996, # 37): Dehm 1935. [B]

MN 2-5

Touraine, France (Cheneval 1996b, # 7): Milne-Edwards 1869-1871. [B*]

MN 3

Ahníkov, Czechia (Mlíkovský 1996e, # 5): Mlíkovský 1992b. [B]
Augine 7, Switzerland (Mlíkovský 1996o, # 14): Berger 1985. [T]
Bré 8, Switzerland (Mlíkovský 1996o, # 17): Berger 1985. [T]
Břešťany, Czechia (Mlíkovský 1996e, # 7): Laube 1901, 1909, Mlíkovský & Švec 1989, Mlíkovský 1992b, 1999c. [B*]
Burg, Switzerland (Mlíkovský 1996o, # 19): Berger 1985. [T]
Can Mas, Spain (Sánchez Marco 1996b, # 6): Villalta 1963. Age uncertain. [B]
Deljatin, Ukraine (Mlíkovský 1996p, # 3): Vjalov & Flerov 1952, Vjalov 1965, 1966. [T]
Fallol, Spain (Sánchez Marco 1996b, # 5): Crusafont & Villalta 1955, Villalta 1963. Age uncertain. [T*]
Flon Morand, Switzerland (Mlíkovský 1996o, # 12): Weidmann & Reichel 1979. [T]
Harbatshofen, Germany (Mlíkovský & Hesse 1996, # 38): Haushalter 1855, Brodkorb 1980. [B*]
Heitenried 7, Switzerland (Mlíkovský 1996o, # 18): Berger 1985. [T]
Ipolytarnóc, Hungary (Mlíkovský 1996j, # 1): Lambrecht 1912b, 1933: 675, Kordos 1983. [T*]
Kosov, Ukraine (Mlíkovský 1996p, # 4): Vjalov & Flerov 1952, Tkačenko et al. 1967. [T]
Lieffrens 5, Switzerland (Mlíkovský 1996o, # 16): Berger 1985. [T]
Mafflon 1, Switzerland (Mlíkovský 1996o, # 15): Berger 1985. [T]
Mauvières, France (new): Ginsburg et al. 2000. [B]
Merkur, Czechia (Mlíkovský 1996e, # 8): Mlíkovský 1998e,f. [B*]
Nadvornaja, Ukraine (Mlíkovský 1996p, # 5): Dubrovo & Kapelist 1979. [T]
Nižnij Strutyn', Ukraine (Mlíkovský 1996p, # 25): Vjalov 1960, 1965, 1966. [T*]
Renggbach, Switzerland (Mlíkovský 1996o, # 21): Weidmann & Reichel 1979. [T]
Skyřice, Czechia (Mlíkovský 1996e, # 4): Laube 1910, Mlíkovský, 2000d. [B*]
Sloboda, Ukraine (Mlíkovský 1996p, # 6): Vjalov 1951. [T]
Stubersheim, Germany (Mlíkovský & Hesse 1996, # 40): Mlíkovský & Hesse 1996. [T]
Tuchořice, Czechia (Mlíkovský 1996e, # 6): Mlíkovský 1980, 1992b, 1999e: 35. [B, brain casts]
Ussements, Switzerland (Mlíkovský 1996o, # 13): Weidmann & Reichel 1979. [T]
Waldhalde, Switzerland (Mlíkovský 1996o, # 20): Speck 1945, 1952, Peyer 1950. [T]
Wintershof-West, Germany (Mlíkovský & Hesse 1996, # 39): Dehm 1937, Ballmann 1966, 1969b, Olson 1991, Mlíkovský 1998e, Mlíkovský & Göhlich 2000. [B*]

MN 3-4

Andraşiul de Jos, Romania (Kessler 1996, # 7): Paucă 1942. [T]
Călugăr, Romania (new): Panin 1964. [T]
Cuejdi, Romania (new): Panin 1964. [T*]
Limberg, Austria (Mlíkovský 1996c, # 2): Bonaparte 1856a: 781, Bachmayer 1980, Mlíkovský 1998c. [B]
Mîngălar, Romania (new): Panin 1964. [T]
Muntenia, Romania (new): Panin et al. 1966. [T]
Petersbuch 28, Germany (new): Mlíkovský, orig. [B]
Piatra Neamţ, Romania (Kessler 1996, # 6): Panin 1964. This is a complex locality, where footprints were found in the valleys of several brooks, incl. Călugăr, Cuejdi, and Mîngălar. [T*]
Putna, Romania (Kessler 1996, # 8): Panin 1961, 1964, Panin & Avram 1962. [T*]
Schitu Frumeasa, Romania (Kessler 1996, # 5): Grozescu 1914, Vjalov 1966. [T]

MN 4

Allerding, Austria (new): Mlíkovský, orig. (unpublished material in coll. Danninger). [B]
Alto de Ballester, Spain (Sánchez Marco 1996b, # 7): Sánchez Marco 1996b. [B]
Artenay, France (new): Mlíkovský, orig. (unpublished material in MNHN). [B]
Artesilla, Spain (Sánchez Marco 1996b, # 8): Sánchez Marco 1996b. [B]
Casots, Spain (Sánchez Marco 1996b, # 11): Sánchez Marco 1996b. [B]
Córcoles, Spain (Sánchez Marco 1996b, # 9): Sánchez Marco 1996b. [B]
Dolnice, Czechia (Mlíkovský 1996e, # 9): Švec 1980, 1981, 1982, 1983, 1984, 1985, Švec & Mlíkovský 1986, Mlíkovský 1992b, 1999a,b, 2000c, Mourer-Chauviré 1999a. [B*, E]
Erkertshofen 1, Germany (Mlíkovský & Hesse 1996, # 44): Dehm 1978. [B]
Estacion Imperial, Spain (Sánchez Marco 1996b, # 12): Sánchez Marco 1996b. [B]
Kirchberg, Germany (Mlíkovský & Hesse 1996, # 43): Probst 1879, Lambrecht 1933. [B]
Langenau, Germany (Mlíkovský & Hesse 1996, # 45): Mlíkovský & Hesse 1996. [B]
Ořechov, Czechia (Mlíkovský 1996e, # 10): Mlíkovský 1992b. [B]
Orleanais, France (Cheneval 1996b, # 8): Milne-Edwards 1867-1868, 1869-1871. [B*]
Petersbuch 2, Germany (Mlíkovský & Hesse 1996, # 41): Heissig 1978. [B]
Petersbuch 4, Germany (Mlíkovský & Hesse 1996, # 42): Mlíkovský & Hesse 1996. [B]
Petersbuch 38, Germany (new): Mlíkovský & Göhlich 2000. [B]
Retama, Spain (Sánchez Marco 1996b, # 10): Sánchez Marco 1996b. [B]

MN 4-5

Oberdorf, Austria (Mlíkovský 1996c, # 3): Mlíkovský 1998a. [B]
Raitenbuch 2, Germany (Mlíkovský & Hesse 1996, # 46): Heissig 1978. [B]
Zelená, Czechia (Mlíkovský 1996d, # 11): Mlíkovský 1992b. [F]

MN 5

Amôr 2, Portugal (Sánchez Marco 1996a, # 2): Zbyszewski & Ferreira 1967. [B]
Františkovy Lázně, Czechia (Mlíkovský 1996e, # 13): Mlíkovský 1992b. [B]
Mokřina, Czechia (Mlíkovský 1996e, # 14): Novák 1877, Mlíkovský 1992b. [B, F]
Rothenstein 1-13, Germany (new): Mlíkovský, orig. (unpublished material in coll. Rummel). [B]
Sandelzhausen, Germany (Mlíkovský & Hesse 1996, # 52): Fahlbusch & Gall 1970, Göhlich 2000. Dating corrected after Göhlich & Rössner (1999). [B]
Sokolov, Czechia (Mlíkovský 1996e, # 12): Mlíkovský 1992b. [B]
Vieux Collonges, France (Cheneval 1996b, # 9): Balmann 1972, Mlíkovský 1998f. [B*]

MN 5-6

Emmenweid, Switzerland (Mlíkovský 1996p, # 10): Bachmann 1878. [E]
Günzburg, Germany (Mlíkovský & Hesse 1996, # 49): Rühl 1896, Lambrecht 1933. [B]
Heggbach, Germany (Mlíkovský & Hesse 1996, # 48): Probst 1879. [B]

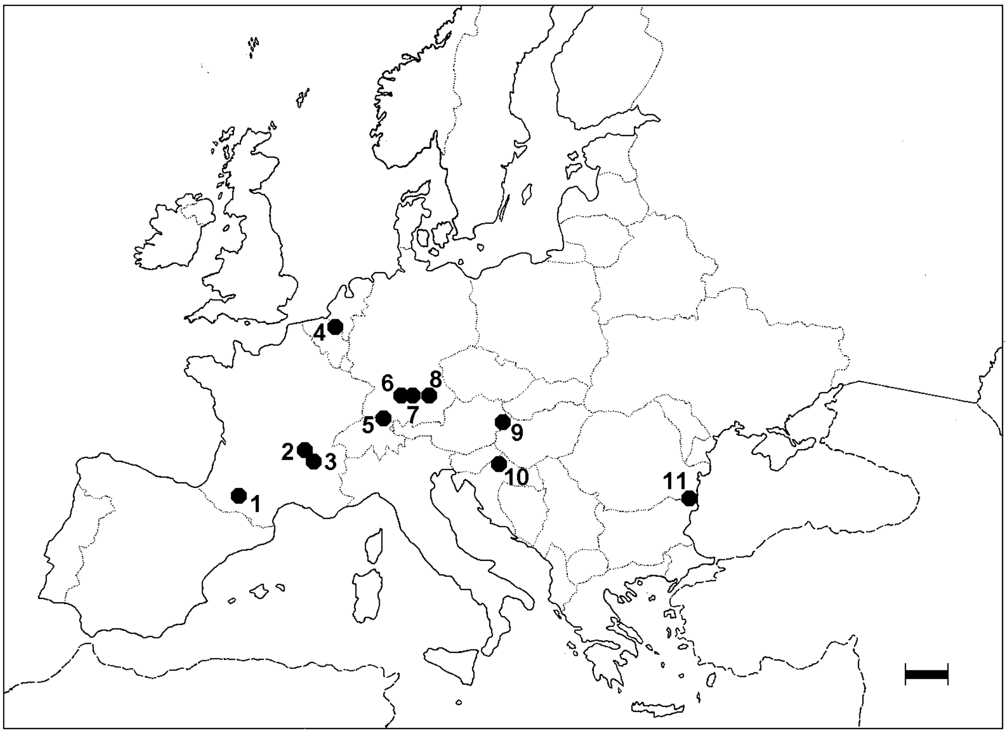

Fig. 10. Type localities of middle Miocene (MN 5-8) birds of Europe. 1 - Sansan, 2 - Vieux Collonges, 3 - Grive-Saint-Alban, 4 - Antwerp, 5 - Öhningen, 6 - Steinheim, 7 - Nördlinger Ries (incl. Hahnenberg, Lierheim, Steinberg), 8 - Dechbetten, 9 - Sankt Margarethen, 10 - Radoboj, 11 - Ciobanița, Credința. Scale bar = 100 km.

Risitobel, Switzerland (Mlíkovský 1996o, # 23): Weidmann & Reichel 1979. [T]
Schönweg, Austria (Mlíkovský 1996c, # 5): Rauscher 1984. [E]
Sulzigtobel, Switzerland (Mlíkovský 1996o, # 22): Weidmann & Reichel 1979. [T]
Weingraben, Austria (Mlíkovský 1996c, # 4): Bachmayer 1964. [F]

MN 5-8

Kardam, Bulgaria (Boev 1996, # 2): Boev 1988, 1992, 1996. [B]
Schemmerberg, Germany (Mlíkovský & Hesse 1996, # 47): Probst 1879, Lambrecht 1933. [B]

MN 5-13

Bela Stena, Serbia (Mlíkovský 1996r, # 3): Stevanović 1959. [F]
Peskovita, Serbia (Mlíkovský 1996r, # 2): Stevanović 1959. [E]

MN 6

Devínská Nová Ves – fissure, Slovakia (Mlíkovský 1996n, # 1): Švec 1986, Mlíkovský 1996n. [B]
Goldberg, Germany (Mlíkovský & Hesse 1996, # 50a): Lambrecht 1933, Seemann 1941, Ballmann 1979. [B]
Hahnenberg, Germany (Mlíkovský & Hesse 1996, # 50b): Fraas 1870, Lydekker 1891a, Ammon 1918, Lambrecht 1933, Mlíkovský 1988. [B*, E]
Lierheim, Germany (Mlíkovský & Hesse 1996, # 50c): Lydekker 1891a, Ammon 1918, Lambrecht 1933. [B*, E, F]
Mátraszőlős 1, Hungary (new): Gál et al. 1999, 2000. [B]
Mátraszőlős 2, Hungary (new): Gál et al. 2000. [B]

Nördlinger Ries, Germany (Mlíkovský & Hesse 1996, # 50): Fraas 1879, Lydekker 1891a, Ammon 1918, Lambrecht 1933, Seemann 1941, Ballmann 1979, 1983, Heizmann & Fahlbusch 1983, Mlíkovský 1988, 1992b, Heizmann & Hesse 1995. This is a complex locality which includes the following sites: Goldberg, Hahnenberg, Lierheim, Steinberg, and Wallerstein. [B*, E, F]

Paracuellos 5, Spain (Sánchez Marco 1996b, # 13): Sánchez Marco 1996b. [B]

Petersbuch 39, Germany (new): Mlíkovský, orig. (unpublished material in coll. Rummel). [B]

Rothenstein, Germany (Mlíkovský & Hesse 1996, # 51): Mlíkovský & Hesse 1996. [B]

Sansan, France (Cheneval 1996b, # 10): Milne-Edwards 1867-1868, 1869-1871, 1872, Woodward 1886, Lydekker 1891a, Lambrecht 1933, Gaillard 1939, Brodkorb 1964, 1967, 1971b, Howard 1964, Cracraft 1973, Olson 1977, Rich & Haarhoff 1985, Cheneval 1987, 2000, Mlíkovský 1998e. [B*]

Steinberg, Germany (Mlíkovský & Hesse 1996, # 50d): Ballmann 1979, 1983, Heizmann & Fahlbusch 1983. [B*]

Wallerstein, Germany (Mlíkovský & Hesse 1996, # 50e): Ammon 1918. [B]

MN 6-7

Baltringen, Germany (Mlíkovský & Hesse 1996, # 54): Probst 1879. [B]

Minişu de Sus, Romania (new): Kessler & Codrea 1996. [B]

Storzingen, Germany (Mlíkovský & Hesse 1996, # 53): Probst 1879. [B]

MN 7

Attenfeld, Germany (Mlíkovský & Hesse 1996, # 58): Schlosser 1916, Lambrecht 1933. [B]

Böttingen, Germany (Mlíkovský & Hesse 1996, # 56): Zeuner 1931. [F]

Climbach 1, Germany (Mlíkovský & Hesse 1996, # 59): Dieffenbach 1853, Engelhardt & Schottler 1914. [B]

Lišov, Czechia (Mlíkovský 1996e, # 15): Mlíkovský 1996d. [B]

Öhningen, Germany (Mlíkovský & Hesse 1996, # 55): Scheuchzer 1708a,b, 1716, Karg 1805, Meyer 1838, 1839a, 1845, 1864, 1865, Heer 1865, Milne-Edwards 1867-1868, Lydekker 1891a, Lambrecht 1933, Mlíkovský 1992b. [B*, F]

Przeworno 2, Poland (Bocheński 1996, # 3): Bocheński 1987. [B]

Radoboj, Croatia (Mlíkovský 1996d, # 1): Meyer 1850, 1864, 1865, Mlíkovský 1997a. [B*]

Sankt Margarethen, Austria (Mlíkovský 1996c, # 6): Mlíkovský 1998b. [B*]

Steinheim, Germany (Mlíkovský & Hesse 1996, # 57): Fraas 1870, 1879, Lydekker 1891a, Lambrecht 1933, Bocheński 1987, Mlíkovský 1992b, Heizmann & Hesse 1995, Mlíkovský & Hesse 1996. [B*]

MN 7-8

Antwerp, Belgium (Cheneval 1996a, # 12): Beneden 1871, 1872, 1873a,b, 1883, Shufeldt 1909: 336, Lambrecht 1933, Brodkorb 1962a, Olson & Walker 1997. [B*]

Braşov, Romania (Kessler 1996, # 10): Andrae 1855, Lambrecht 1933. [F]

Cuesta del Rey, Spain (Sánchez Marco 1996b, # 19): Sánchez Marco 1996b. [B]

Dechbetten, Germany (Mlíkovský & Hesse 1996, # 60): Ammon 1918, Lambrecht 1933, Brodkorb 1980, Olson 1985a, Švec 1986, Bocheński 1987, Mlíkovský 1992b. [B*]

Escobosa de Calatañazor, Spain (Sánchez Marco 1996b, # 18): Sesé & López 1977, López et al. 1977, Sánchez Marco 1996b. [B]

Grive-Saint-Alban – early collections, France (Cheneval 1996b, # 11): Depéret 1887, Lydekker 1891a, 1893, Shufeldt 1896, Regàlia 1897, Ennouchi 1930, Lambrecht 1933, Gaillard 1939, Brodkorb 1964, 1967, 1971a, Ballmann 1969a, Cracraft 1973, Olson 1974a, Bocheński 1987, Cheneval 1987, Mlíkovský 1998c. This is a complex locality, consisting of several fissures. Relevant data are missing for the early collections, but recently excavated fissures (L-7, M) belong to MN 8 (see below). [B*]

Otero, Spain (Sánchez Marco 1996b, # 17): Hernández-Pacheco 1914, Hernández-Pacheco & Dantin 1915, Lambrecht 1933. [B]

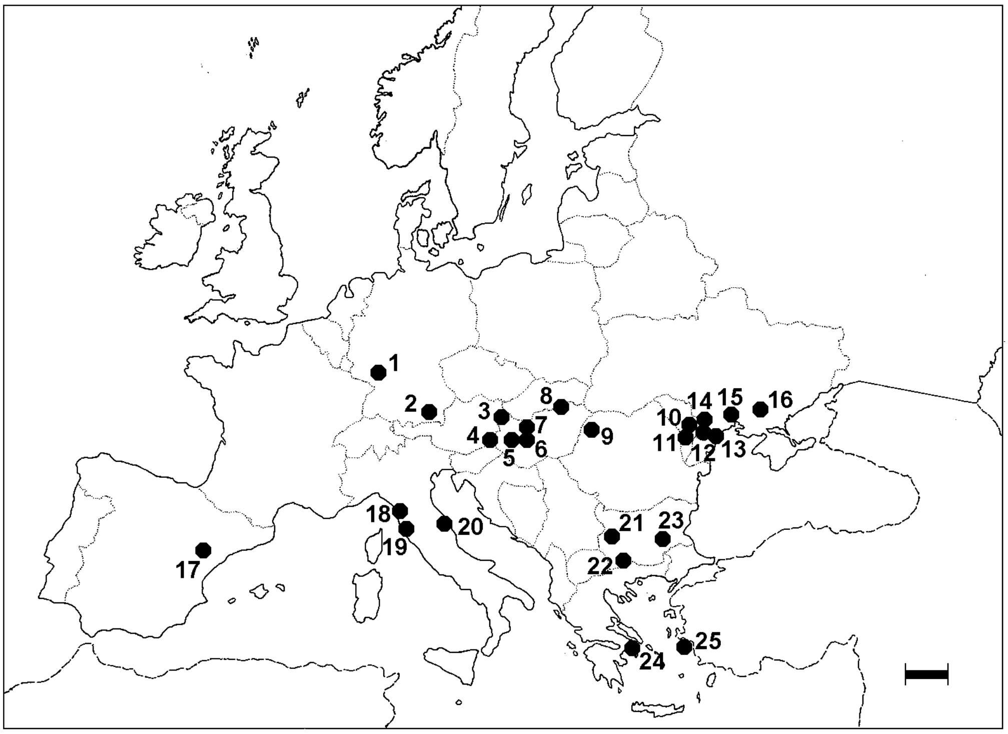

Fig. 11. Type localities of late Miocene (MN 9-13) birds of Europe. 1 - Eppelsheim, 2 - Aumeister, 3 - Vösendorf, 4 - Kohfidisch, 5 - Sümeg, 6 - Polgárdi, 7 - Csákvár, 8 - Rudabánya, 9 - Tataruş-Brusturi, 10 - Chişinău, Golboçica, 11 - Bujoru, 12 - Čebotarevka, Hrebenyky, Nova Emetivka, Varnița, 13 - Novaja Slobodka, 14 - Novoelisavetovka, 15 - Malynivcy, 16 - Apostolovo, 17 - Libros, Mansuetos, 18 - Gabbro, 19 - Bamboli, 20 - Ancona, Senigallia, 21 - Chrabărsko, 22 - Chadžidimovo, 23 - Trojanovo, 24 - Pikermi, 25 - Samos. Scale bar = 100 km.

Paracuellos 3, Spain (Sánchez Marco 1996b, # 14): Sánchez Marco 1996b. [B]
Săcădat, Romania (Kessler 1996, # 9): Andrae 1855, Lambrecht 1933. [F]
Toril 3, Spain (Sánchez Marco 1996b, # 15): Sánchez Marco 1996b. [B]

MN 8

Ciobănița, Romania (Kessler 1996, # 12): Grigorescu & Kessler 1977, Kessler & Gál 1996. [B*]
Collet-Redon, France (Cheneval 1996b, # 12): Jullien et al. 1979. [B]
Credința, Romania (Kessler 1996, # 11): Grigorescu & Kessler 1977, 1988, Cheneval 1987, Kessler 1992. [B*]
Grive-Saint-Alban – fissure L-7, France (Cheneval 1996b, # 11): Ballmann 1969a. [B]
Grive-Saint-Alban – fissure M, France (Cheneval 1996, # 11): Ballmann 1969a, Olson 1974, Bocheński 1987. [B]
Petersbuch 6, Germany (new): Mlíkovský, orig. (unpublished material in coll. Rummel). [B]
Petersbuch 10, Germany (new): Mlíkovský, orig. (unpublished material in coll. Rummel). [B]
Petersbuch 18, Germany (new): Mlíkovský, orig. (unpublished material in coll. Rummel). [B]

MN 8-9

Hostalets de Pierola, Spain (Sánchez Marco 1996b, # 20): Villalta & Crusafont Pairó 1950, Villalta 1963. [B]
Maar am Kaltenbrunnen, Germany (Mlíkovský & Hesse 1996, # 62): Bräuhäuser 1922. [B]

Randecker Maar, Germany (Mlíkovský & Hesse 1996, # 61): Westphal 1963. [F, coprolithes]

MN 9

Aumeister, Germany (Mlíkovský & Hesse 1996, # 63): Stromer 1928, Lambrecht 1933, Mlíkovský 1992b. [B*]

Ballestar, Spain (Sánchez Marco 1996b, # 23): Roset 1974, Agustí 1988. [B]

Can Ponsic, Spain (Sánchez Marco 1996b, # 22): Sánchez Marco 1996b. [B]

Chişinău, Moldova (Mlíkovský 1996l, # 5): Macarovici & Oescu 1941, Kuročkin & Ganea 1972, Kessler 1984b, 1992, Kessler & Gál 1996. [B*]

Croix-Rousse, France (Cheneval 1996b, # 13): Depéret 1887. [B]

Eppelsheim, Germany (Mlíkovský & Hesse 1996, # 65): Lambrecht 1933, Fischer & Stephan 1971, Mourer-Chauviré et al. 1985, Mlíkovský 1992b. [B*]

Golboçica, Moldova (Mlíkovský 1996i, # 4): Kuročkin & Ganea 1972. Age uncertain. [B*]

Höwenegg, Germany (Mlíkovský & Hesse 1996, # 64): Jörg 1957. [B]

Kalfa, Moldova (Mlíkovský 1996l, # 3): Ganea 1965, Kuročkin & Ganea 1972. [B]

Rudabánya, Hungary (Mlíkovský 1996j, # 2): Jánossy 1976b, 1977, 1993. [B*]

Valles de Fuentidueña, Spain (Sánchez Marco 1996b, # 21): Villalta 1963, Sánchez Marco 1996b. [B]

Varniţa, Moldova (Mlíkovský 1996l, # 2): Lungu 1966a,b, 1968, Roška 1967, Kuročkin & Lungu 1970. [B*, E]

MN 9-10

Apostolovo, Ukraine (Mlíkovský 1996p, # 13): Alekseev 1916, Roščin 1959, 1952, Michajlov 1988. [E*]

Aveiras de Baixo, Portugal (Sánchez Marco 1996a): Sánchez Marco 1996a. [B]

Jur'yvka, Ukraine (Mlíkovský 1996p, # 12): Pidopličko 1956. [E]

Kerč' Peninsula 1, Ukraine (Mlíkovský 1996p, # 8): Dubrovo & Kapelist 1979. [B]

Kolkotova Balka, Moldova (Mlíkovský 1996l, # 7): Laskarev 1908, 1912, Lambrecht 1933: 443, Burčak-Abramovič 1951, Burčak-Abramovič & Bendukidze 1971, Cracraft 1973, Kuročkin 1981, Michajlov 1988. [B, E]

Krivoj Roh, Ukraine (Mlíkovský 1996p, # 7): Dubrovo & Kapelist 1979. [B]

Kubanka, Ukraine (Mlíkovský 1996p, # 9): Vojinstvens'kyj 1967. [B]

Libros, Spain (Sánchez Marco 1996b, # 24): Navás 1922, Lambrecht 1933, Cracraft 1973, Olson 1995a. [B*]

Pokşeşti, Moldova (Mlíkovský 1996l, # 6): Michajlov 1988. [E]

Sokolov, Ukraine (Mlíkovský 1996p, # 10): Vojinstvens'kyj 1967. [B]

Suchomasty 3, Czechia (Mlíkovský 1996e, # 16): Mlíkovský 1996e. [B]

Tjaginka, Ukraine (Mlíkovský 1996p, # 11): Vojinstvens'kyj 1967. [B]

MN 9-11

Bujoru, Moldova (Mlíkovský 1996l, # 1): Kuročkin & Ganea 1972, Olson 1977. Age = MN 9 (Mein 1990) or MN 11 (Fejfar & Heinrich 1990). [B*]

MN 10

Batallones, Spain (Sánchez Marco 1996b, # 25): Sánchez Marco 1996b. [B]

Götzendorf, Austria (Mlíkovský 1996c, # 9): Mlíkovský 1992a. [B]

Kohfidisch, Austria (Mlíkovský 1996c, # 10): Mlíkovský 1998c, orig. (new taxa to be described) [B*]

Tataruş-Brusturi, Romania (Kessler 1996, # 13): Lambrecht 1916a, 1933. [B*]

Viladecavalls, Spain (Sánchez Marco 1996b, # 26): Villalta 1963. [B]

Vösendorf, Austria (Mlíkovský 1996c, # 8): Thenius 1954, Mlíkovský 1997b. [B*]

MN 11

Crevillente 2, Spain (Sánchez Marco 1996b, # 27): Sánchez Marco 1996b. [B]

Csákvár, Hungary (Mlíkovský 1996h, # 3): Lambrecht 1933, Kretzoi 1954b, 1957, Jánossy 1977, Mlíkovský 1992b, 1998f. [B*]

Hrebenyky, Ukraine (Mlíkovský 1996p, # 16): Voznesens'kyj 1937, Burčak-Abramovič 1939, 1949, 1951, 1953a,b, Umans'ka 1979a, Kuročkin 1981. [B*]

Puente Minero, Spain (Sánchez Marco 1996b, # 28): Sánchez Marco 1996b. [B]

Samos 1, Greece (Mlíkovský 1996h, # 1): Forsyth Major 1888, 1892, 1894, Lydekker 1891a, Martin 1903, Lambrecht 1933, Cracraft 1973, Harrison 1981, Kuročkin 1981, Solounias 1981, Karchu 1997. [B*]

MN 11-12

Chadžidimovo, Bulgaria (new): Boev & Kovačev 1998. [B*]

Novoelisavetovka, Ukraine (Mlíkovský 1996p, # 21): Alekseev 1916, Burčak-Abramovič 1939, Vojinstvens'kyj 1967, Kuročkin & Lungu 1970, Umans'ka 1981. [B*]

Sümeg, Hungary (Mlíkovský 1996j, # 4): Jánossy 1976b, 1977, Mlíkovský 1992b. [B*]

MN 11-13

Ancona, Italy (Delle Cave 1996, # 11): Portis 1887. [F*]

Andreevka, Ukraine (Mlíkovský 1996p, # 14): see Dubrovo & Kapelist 1979. [B]

Belka, Ukraine (Mlíkovský 1996p, # 15): Vojinstvens'kyj 1967. [B]

Čebotarevka, Ukraine (Mlíkovský 1996p, # 24): Vojinstvens'kyj 1967, Umans'ka 1973, 1979b, 1981, Kuročkin 1981, Michajlov 1988. [B*, E]

Chrabărsko, Bulgaria (Boev 1996, # 3): Burčak-Abramovič & Nikolov 1984, Boev 1988, 1992, 1996, 2000d. [B*]

Çimişlia, Moldova (Mlíkovský 1996l, # 8): Michajlov 1988, Michajlov & Kuročkin 1988. [E]

Corund, Romania (Kessler 1996, # 14): Gheorghiu et al. 1965. [F]

Il'inka, Ukraine (Mlíkovský 1996p, # 18): Burčak-Abramovič 1953a, Vojinstvens'kyj 1967. [B, E]

Kujal'nik, Ukraine (Mlíkovský 1996p, # 19): Laskarev 1912, Pržemysskij 1912, 1914, Alekseev 1916, Korotkevič 1961, 1972, Kuročkin & Lungu 1970. [B]

Licata, Italy (Delle Cave 1996, # 7): Milne-Edwards 1869-1871, Portis 1879, 1887. [B]

Malynivcy, Ukraine (Mlíkovský 1996p, # 26): Brandt 1873, 1874, 1885, Mäklin 1873, Nathusius 1886, Bakulovskij 1892, Bensley 1921, Burčak-Abramovič 1953a, Schönwetter 1960, Roščin 1962. [E*]

Naumovka, Ukraine (Mlíkovský 1996p, # 27): Dubrovo & Kapelist 1979. [B]

Novaja Slobodka, Ukraine (Mlíkovský 1996p, # 28): Vidgal'm 1886, Tugarinov 1940a, Burčak-Abramovič 1958, Miller 1966, Ganea & Kuročkin 1967, Vojinstvens'kyj 1967, Burčak-Abramovič & Nikolov 1984. [B*]

Novoukrainka, Ukraine (Mlíkovský 1996p, # 22): Vojinstvens'kyj 1967. [B]

Odesa – surroundings, Ukraine (Mlíkovský 1996p, # 29): Nordmann 1847, Dubrovo & Kapelist 1979. This is not a locality in the strict sense. There are several late Miocene fossiliferous localities in the surroundings of Odesa, but they were not indicated for some old collections. [B]

Škodova Gora, Ukraine (Mlíkovský 1996p, # 30): Vojinstvens'kyj 1967. [B]

Snigirevka, Ukraine (Mlíkovský 1996p, # 23): Burčak-Abramovič 1953a. [E]

Sofija 1, Bulgaria (Boev 1996, # 4): Popov et al. 1921, Boev 1988 1992. [B]

Žovten', Ukraine (Mlíkovský 1996p, # 17): Ganea & Kuročkin 1967. [B]

MN 11-15

Trojanovo, Bulgaria (Boev 1996, # 6): Burčak-Abramovič & Nikolov 1984. [B*]

MN 12

Aljezar B, Spain (Sánchez Marco 1996b, # 32): Adrover 1986, Cheneval & Adrover 1993. [B]

Concud 1, Spain (Sánchez Marco 1996b, # 29): Sánchez Marco 1996b. [B]

Mansuetos, Spain (Sánchez Marco 1996b, # 30): Villalta 1963. [B*]

Tardosbánya, Hungary (Mlíkovský 1996j, # 5): Jánossy 1976b. [B]

Valdecebro 5, Spain (Sánchez Marco 1996b, # 31): Sánchez Marco 1996b. [B]

MN 12-13

Kremnikovci, Bulgaria (Boev 1996, # 1): Boev 1996. [B]

Pikermi, Greece (Mlíkovský 1996h, # 2): Roth & Wagner 1855, Gaudry 1862a,b,c, 1862-1867, Weithofer 1888, Lambrecht 1933, Bachmayer & Zapfe 1962, Cracraft 1973, Jánossy 1976b, Mourer-Chauviré et al. 1985, Mlíkovský 1996h. [B*]

Veles, Macedonia (Mlíkovský 1996k): Schlosser 1921, Lambrecht 1933: 692; see also Cirić 1957. [B]

MN 13

Amandoli, Italy (Delle Cave 1996, # 6a): Delle Cave 1996. [B, F]

Arquillo, Spain (Sánchez Marco 1996b, # 33): Sánchez Marco 1996b. [B]

Bamboli, Italy (Delle Cave 1996, # 12): Gastaldi 1866a,b, Portis 1884, Weithofer 1888, Ristori 1891, Howard 1964. [B*]

Cherasco, Italy (Delle Cave 1996, # 12a): Cheneval 1993, see also Cavallo & Gaudant 1984, Cavallo et al. 1986. [B]

Gabbro, Italy (Delle Cave 1996, # 8): Bosniaski 1879, Portis 1887, Pycraft 1909, Lambrecht 1933, Bradley & Landini 1984. [B*, F*]

Mondaino, Italy (Delle Cave 1996, # 6c): Delle Cave 1996. [B, F]

Nova Emetivka, Ukraine (Mlíkovský 1996p, # 20): Voznesens'kyj 1939, Burčak-Abramovič 1939, 1953a, Ganea & Kuročkin 1967, Vojinstevs'kyj 1967, Burčak-Abramovič & Vekua 1971, Umans'ka 1979a. [B*]

Polgárdi, Hungary (Mlíkovský 1996j, # 6): Lambrecht 1912a,b, Jánossy 1976b, 1979, 1991, 1995, Mlíkovský 1998c. This is a complex locality, consisting of several fissures, incl. Polgárdi 2, 4 and 5. Relevant data are missing for some of the collections. [B*]

Polgárdi 2, Hungary (Mlíkovský 1996j, # 6): V. Čapek in Lambrecht 1933: 780, Jánossy 1991. [B]

Polgárdi 4, Hungary (Mlíkovský 1996j, # 6): Jánossy 1976b, 1991. [B*]

Polgárdi 5, Hungary (Mlíkovský 1996j, # 6): Jánossy 1991, Mlíkovský 1998c. [B*]

Roddi, Italy (Delle Cave 1996, # 12c): Cavallo et al. 1986. [B]

Scaparoni, Italy (Delle Cave 1996, # 12b): Cavallo et al. 1986. [F]

Senigallia, Italy (Delle Cave 1996, # 9): Procaccini Ricci 1840, Massalongo & Scarabelli-Gommi-Flamini 1859, Portis 1887, Olson 1977, Brodkorb 1978. [B*]

Val Mala, Italy (Delle Cave 1996, # 6b): Delle Cave 1996. [F]

Venta del Moro, Spain (Sánchez Marco 1996b, # 34): Aguirre et al. 1974, Morales & Aguirre 1976. [B]

MN 14

Dorkovo, Bulgaria (Boev 1996, # 8): Boev 1988d, 1992, 1996. [B*]

Kamenskoe, Ukraine (Mlíkovský 1996p, # 31): Vojinstvens'kyj 1967. [B]

Montpellier, France (Mourer-Chauviré 1996b, # 1): Christol 1835, Serres 1838a,b, Serres et al. 1839, Gervais 1844a, 1849, 1848-1852, 1859, Milne-Edwards 1863, 1869-1871, Depéret 1897, Lambrecht 1933. [B]

Osztramos 1, Hungary (Mlíkovský 1996j, # 7): Jánossy 1976b, 1979, Mlíkovský 1992b. [B*]

Osztramos 9, Hungary (Mlíkovský 1996j, # 8): Jánossy 1979, Mlíkovský 1992b. [B*]

Vojničevo, Ukraine (Mlíkovský 1996p, # 33): Burčak-Abramovič 1953a, Vojinstvens'kyj 1967, Bocheński & Kuročkin 1987a. [B, E]

MN 14-15

Aegina, Greece (Mlíkovský 1996e, # 3): Lambrecht 1933: 689. [B]

Biancone 1, Italy (Delle Cave 1996, # 13e): Ballmann 1973, 1976a. [B*]

Biancone 2, Italy (Delle Cave 1996, # 13f): Ballmann 1973, 1976a. [B]

Cantatore 3A, Italy (Delle Cave 1996, # 13g): Ballmann 1973, 1976a. [B]

Chirò 2, 2N, 2S, Italy (Delle Cave 1996, # 13h,i,j): Ballmann 1973, 1976a. [B]

Chirò 3, Italy (Delle Cave 1996, # 13k): Ballmann 1973, 1976a. [B]

Chirò 4, Italy (Delle Cave 1996, # 13l): Ballmann 1973, 1976a. [B]

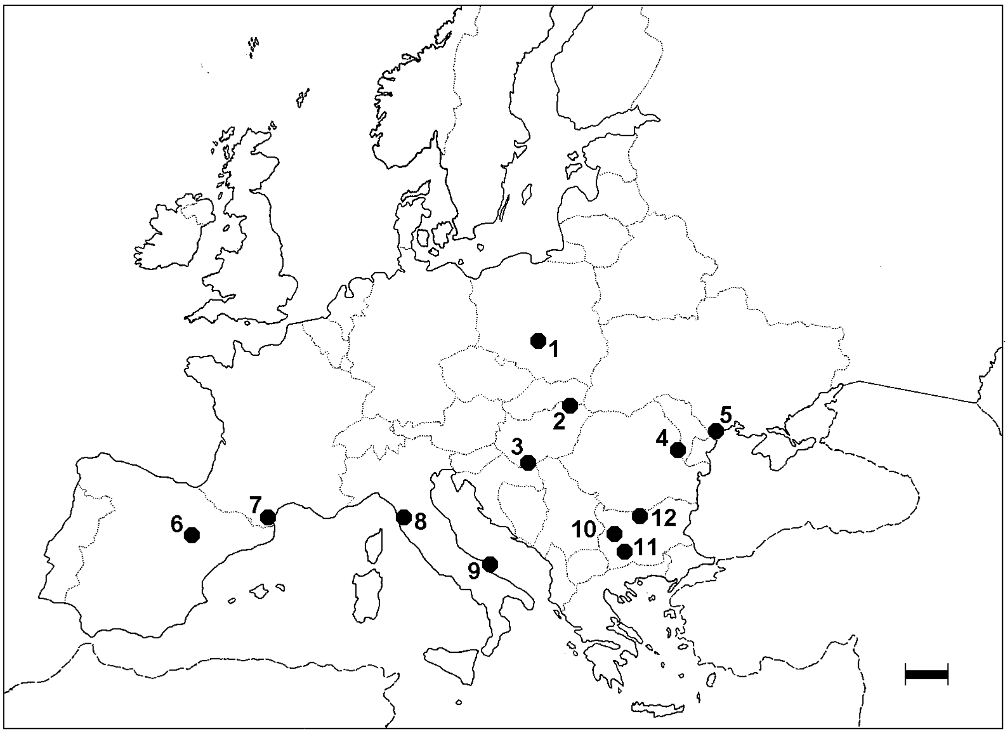

Fig. 12. Type localities of early Pliocene (MN 14-15) birds of Europe. 1 - Węże, 2 - Osztramos, 3 - Csarnóta, 4 - Maluşteni-Bereşti, 5 - Odesa, 6 - Layna, 7 - Perpignan, 8 - Orciano Pisano (dating uncertain), 9 - Gargano (incl. Biancone, Chirò, San Giovannino), 10 - Lozenec, 11 - Dorkovo, 12 - Muselievo. Scale bar = 100 km.

Chirò 5, 5A, 5B, Italy (Delle Cave 1996, # 13m,n,o): Ballmann 1973, 1976a. [B]
Chirò 6, Italy (Delle Cave 1996, # 13p): Ballmann 1973, 1976a. [B]
Chirò 7A, 7C, Italy (Delle Cave 1996, # 13q,r): Ballmann 1973, 1976a. [B]
Chirò 9, Italy (Delle Cave 1996, #13s): Ballmann 1973, 1976a. [B]
Chirò 10A, 10C, Italy (Delle Cave 1996, # 13b,t): Ballmann 1973, 1976a. [B*]
Chirò 11A, 11B, Italy (Delle Cave 1996, # 13u,v): Ballmann 1973, 1976a. [B]
Chirò 12, Italy (Delle Cave 1996, # 13c): Ballmann 1973, 1976a. [B*]
Chirò 14A, 14B, Italy (Delle Cave 1996, # 13w,x): Ballmann 1973, 1976a. [B]
Chirò 15, Italy (Delle Cave 1996, # 13y): Ballmann 1973, 1976a. [B]
Chirò 20, 20A, 20B, 20C, 20D, 20E, Italy (Delle Cave 1996, # 13z,aa,bb,cc,dd,ee): Ballmann 1973, 1976a. [B]
Chirò 22, Italy (Delle Cave 1996, # 13 ff): Ballmann 1973, 1976a. [B]
Chirò 24, Italy (Delle Cave 1996, # 13d): Ballmann 1973, 1976a. [B*]
Chirò 27, Italy (Delle Cave 1996, #13gg): Ballmann 1973, 1976a. [B]
Empoli, Italy (new): Delle Cave et al. 1984. [B]
Falcone 2A, 2B, Italy (Delle Cave 1996, # 13hh,ii): Ballmann 1973, 1976a. [B]
Fina D, Italy (Delle Cave 1996, # 13jj): Ballmann 1973, 1976a. [B]
Fina E, Italy (Delle Cave 1996, # 13kk): Ballmann 1973, 1976a. [B]
Fina H, Italy (Delle Cave 1996, # 13ll): Ballmann 1973, 1976a. [B]
Gargano, Italy (Delle Cave 1996, # 13): Ballmann 1973, 1976a, Mlíkovský 1998c. This is a complex locality, composed of numerous fossiliferous fissures, which can be found under the following names: Biancone, Cantatore, Chirò, Falcone, Fina, Gervaisio, Monte Granata, Nazario, Pirro, Pizzioli, Posticchia, Rinascita, and San Giovannino. [B*]

Gervaisio 1, Italy (Delle Cave 1996, # 13mm): Ballmann 1973, 1976a. [B]
Gervaisio 2, Italy (Delle Cave 1996, # 13nn): Ballmann 1973, 1976a. [B]
Grotte, Italy (Delle Cave 1996, # 18): Delle Cave et al. 1984. [B]
Kerč' Peninsula 2, Ukraine (Mlíkovský 1996q, # 32): Dubrovo & Kapelist 1979. [B]
Lozenec, Bulgaria (new): Boev 1999a, 2000b. [B*]
Monte Granata, Italy (Delle Cave 1996, # 13oo): Ballmann 1973, 1976a. [B]
Nazario 2B, Italy (Delle Cave 1996, # 13pp): Ballmann 1973, 1976a. [B]
Nazario 3, Italy (Delle Cave 1996, # 13qq): Ballmann 1973, 1976a. [B]
Nazario 4, Italy (Delle Cave 1996, # 13rr): Ballmann 1973, 1976a. [B]
Pirro 11A, 11C, Italy (Delle Cave 1996, # 13ss,tt): Ballmann 1973, 1976a. [B]
Pizzioli 4, Italy (Delle Cave 1996, # 13uu): Ballmann 1973, 1976a. [B]
Posticchia 1B, Italy (Delle Cave 1996, # 13vv): Ballmann 1973, 1976a. [B]
Rinascita 1, Italy (Delle Cave 1996, # 13ww): Ballmann 1973, 1976a. [B]
San Giovannino, Italy (Delle Cave 1996, # 13a): Ballmann 1973, 1976a. [B*]
Sofija 2, Bulgaria (Boev 1996, # 5): Boev 1996. [B]

MN 14-17

Gérce, Hungary (Mlíkovský 1996j, # 15): Fischer & Hably 1991. [F]
Semenovka, Russia (Mlíkovský 1996m, # 4): Pidopličko & Goldin 1964. [E]

MN 15

Arquillo 3, Spain (Sánchez Marco 1996b, # 36): Adrover et al. 1978. [B]
Ciuperceni, Romania (Kessler 1996, # 16): Kessler 1979. [B]
Csarnóta 1, Hungary (new): Kretzoi 1956, Jánossy 1979. [B]
Csarnóta 2, Hungary (Mlíkovský 1996j, # 9): Jánossy 1976a, 1977, 1979, 1986, Mlíkovský 1992b, 1995b. [B*]
Gundersheim, Germany (Mlíkovský & Hesse 1996, # 66): Heller 1936. [B]
Ivanovce 1, Slovakia (Mlíkovský 1996n, # 2): P. Švec in Fejfar & Heinrich 1985, Mlíkovský 1996n, orig. [B]
Layna, Spain (Sánchez Marco 1996b, # 35): Mourer-Chauviré & Sánchez Marco 1988 Sánchez Marco 1990a. [B*]
Maluşteni-Bereşti, Romania (Kessler 1996, # 15): Kessler 1979, 1984a, 1992. [B*]
Megalo Emvolon, Greece (new): Boev & Koufos 2000. [B]
Muselievo, Bulgaria (Boev 1996, # 7): Boev 1998e, 1999a, 2000a. [B*]
Odesa – catacombs, Ukraine (Mlíkovský 1996p, # 34): Grycaj 1938, 1939, Zubareva 1939, 1948, Burčak-Abramovič 1939, 1953a,b, Tugarinov 1940a,b, Serebrovs'kyj 1941b, Tret'jakov 1941, Vojinstvens'kyj 1959, 1967, Kuročkin 1985, Michajlov 1988, Michajlov & Kuročkin 1988. [B*]
Perpignan, France (Mourer-Chauviré1996b, # 2): Depéret 1892, 1897, Gaillard 1908, 1939, Lambrecht 1933, Brodkorb 1964, 1978, Mourer-Chauviré 1989b, 1990. [B*]
Sète, France (Mourer-Chauviré 1996b, # 3): Cuvier 1825, Serres 1830, 1838b, Gervais 1844a, 1848-1852, 1859, Milne-Edwards 1863, 1869-1871, Mourer-Chauviré & Sánchez Marco 1988. [B]
Węże 1, Poland (Bocheński 1996, # 4): Jánossy 1974a, 1981, Bocheński 1991, Mlíkovský 1992b. [B*]

MN 15-16

Castelnuevo Berardenga Scalo, Italy (Delle Cave 1996, # 16): Delle Cave 1996. [B]
Hosťovce 2, Slovakia (Mlíkovský 1996n, # 3): Ložek & Horáček 1992. [B]
Orciano Pisano, Italy (Delle Cave 1996, # 14): Portis 1887, 1889, Regàlia 1902, 1907. This is a composite locality. [B*]

MN 16

Ardé, France (Mourer-Chauviré 1996b, # 4): Gervais 1844a, 1848-1852, 1859, Milne-Edwards 1863, 1869-1871, Lambrecht 1933, Gaillard 1939, Mourer-Chauviré 1989b, 1990. [B*]

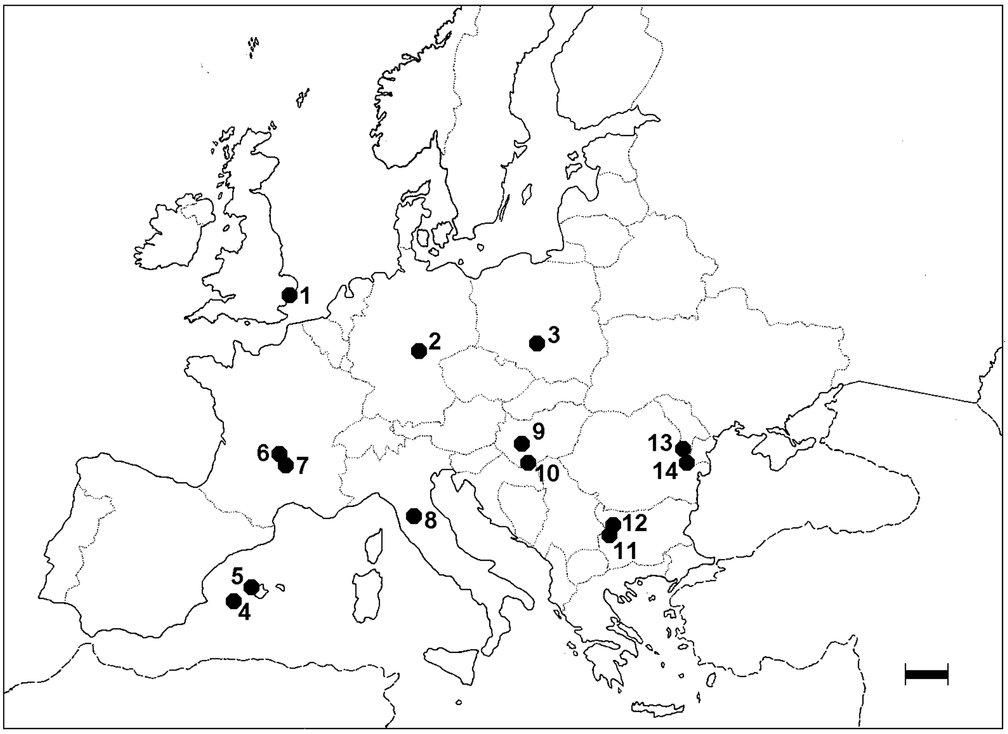

Fig. 13. Type localities of late Pliocene (MN 16-18) birds of Europe. 1 - Foxhall, 2 - Beremend, Villány, 3 - Rębielice Królewskie, 4 - Ca Na Reia, 5 - Canet, 6 - Ardé, 7 - Chilhac, 8 - Montecarlo, 9 - Kisláng, 10 - Beremend, 11 - Slivnica, 12 - Vāršec, 13 - Luçeşti, 14 - Etulia. See also Fig. 12 for Orciano Pisano, which is potentially late Pliocene in age. Scale bar = 100 km.

Balaruc 2, France (Mourer-Chauviré 1996b, # 5): Mourer-Chauviré & Sánchez Marco 1988. [B]

Beremend 5, Hungary (Mlíkovský 1996j, # 10): Kretzoi 1956, Jánossy 1976b, 1977. [B*]

Beremend 15, Hungary (new): Jánossy 1987b, 1990b, 1991, 1992. [B*]

Çişmikioi, Moldova (Mlíkovský 1996l, # 10): Bocheński & Kuročkin 1987b. [B]

Escorihuela, Spain (Sánchez Marco 1996b, # 39): Sánchez Marco 1996b. [B]

Espejos, Spain (Sánchez Marco 1996b, # 38): Adrover 1975. [B]

Etulia, Moldova (Mlíkovský 1996l, # 9): Chozackij & Kuročkin 1966, Kuročkin & Chozackij 1972, Bocheński & Kuročkin 1987a,b, Michajlov & Kuročkin 1988, Michajlov 1988, Mourer-Chauviré 1990. [B*, E]

Hajnáčka, Slovakia (Mlíkovský 1996n, # 4): P. Švec in Fejfar & Heinrich 1985, Mlíkovský 1996n. [B]

Higueruelas, Spain (Sánchez Marco 1996b, # 42): Sánchez Marco 1996b. [B]

Kotlovina, Ukraine (Mlíkovský 1996p, # 35): Kuročkin & Chozackij 1972, Bocheński & Kuročkin 1987b. [B]

Luçeşti, Moldova (Mlíkovský 1996l, # 11): Bocheński & Kuročkin 1987a,b, Mourer-Chauviré 1989b, 1990. [B*]

Moreda, Spain (Sánchez Marco 1996b, # 40): Sánchez Marco 1996b. [B]

Orrios 3, Spain (Sánchez Marco 1996b, # 37): Adrover 1986. [B]

Osztramos 7, Hungary (Mlíkovský 1996j, # 11): Jánossy 1976a,b, 1977, 1986, Mlíkovský 1992b, 1995b. [B]

Puebla de Almoradiel, Spain (Sánchez Marco 1996b, # 41): Hernández-Pacheco 1914b. [E]

Rębielice Królewskie 1, Poland (Bocheński 1996, # 5a): Jánossy 1974a, Mlíkovský 1992b, 1995b [B*]
Rębielice Królewskie 2, Poland (Bocheński 1996, # 5b): Jánossy 1974a, Mlíkovský 1995b. [B]
Suvorovskoe, Moldova (new): Ganea 1972. [E]
Tatareşti, Moldova (new): Ganea 1972 [E]

MN 16-17

Armaiolo, Italy (Delle Cave 1996, # 17): Delle Cave 1996. [B]
Beremend 4, Hungary (Tyrberg 1998, # HU-4): Kretzoi 1956, Jánossy 1977. Most of the bones from this site are late Pliocene in age, but early Pleistocene bones (MQ 1) are admixed (Kretzoi 1956). [B]
Dolinskoe, Ukraine (Mlíkovský 1996p, # 36): Dubrovo & Kapelist 1979. [B]
Foxhall, England (Mlíkovský 1996q, # 22): Lydekker 1886, 1891a,c,e, Newton 1891, Harrison & Walker 1978b. [B*]
Orford, England (new): Lydekker 1886, 1891a,b, Newton 1891, Harrison & Walker 1978b. [B]
Tourkobounia 1, Greece (new): Mourer-Chauviré 1980b, 1993. [B]

MN 16 – MQ 1

Beremend 1-3, Hungary (new): Lambrecht 1916b, 1933, Jánossy 1976b [B]
Bobila Ordis, Spain (Tyrberg 2001, # SP-104): Mayr & Gregor 1999. [B]
Montecarlo, Italy (Delle Cave 1996, # IT-19, Tyrberg 1998, # IT-121): Portis 1887, 1889, Lambrecht 1933, Brodkorb 1964. [B*]
Strette, Italy (Tyrberg 1998, # IT-124): Portis 1889. [B]

MN 17

Beremend 11, Hungary (Mlíkovský 1996j, # 14): Jánossy 1986. [B]
Koliňany 2, Slovakia (Mlíkovský 1996n, # 5): Mlíkovský 1992b, 1996n. [B]
Kryžanovka 1, Ukraine (Mlíkovský 1996p, # 37): Dubrovo & Kapelist 1979. [B]
Matveev Kurgan, Russia (Mlíkovský 1996m, # 2): Gromov 1948, Burčak-Abramovič 1953a. [B]
Obitočnoe, Ukraine (Mlíkovský 1996p, # 38): Vojinstvens'kyj 1967. [B]
Puebla de Valverde, Spain (Sánchez Marco 1996b, # 43): Adrover et al. 1974. [B]
Saint-Vallier, France (Mourer-Chauviré 1996b, # 8): Viret 1954, Mourer-Chauviré 1975a, 1989b, 1990. [B]
Šandalja 1 – layer 6, Croatia (Mlíkovský 1996d, # 2): Malez-Bačić 1979. [B]
Sant'Andrea, Italy (Delle Cave 1996, # 15): Delle Cave 1996. [B]
Schernfeld, Germany (Mlíkovský & Hesse 1996, # 68): Dehm 1962. [B]
Tegelen, Holland (Mlíkovský 1996i, # 1): Junge 1953. [B]
Văršec, Bulgaria (Boev 1996, # 9): Boev 1991, 1995a, 1996, 1997b, 1998a,b,f, 1999a,c,d,e,f, g,h, 2000e. [B*]
Včeláre 3, Slovakia (Mlíkovský 1996n; # 6): Horáček 1985. [B]

MN 18

Aldeby, England (Mlíkovský 1996q, # 23): Newton 1882a,b, 1887, Lydekker 1891d, Harrison 1979c. [B]
Almenara 1, Spain (Sánchez Marco 1996b, # 44): Mourer-Chauviré & Sánchez Marco 1988. [B]
Betfia 13, Romania (Tyrberg 1998, # RM-2): Kessler 1975. [B]
Binigaus, Menorca, Spain (Sánchez Marco 1996b, # 47): Mourer-Chauviré et al. 1980b, Alcover et al. 1981. [B]
Ca Na Reia, Eivissa, Spain (Sánchez Marco 1996b, # 48): Alcover 1989. [B*]
Canet, Mallorca, Spain (Sánchez Marco 1996b, # 45): Mourer-Chauviré et al. 1980b. [B*]
Chilhac 2b, France (Mourer-Chauviré 1996b, # 6a): Boeuf & Mourer-Chauviré 1992. [B]
Chilhac 3, France (Mourer-Chauviré 1996b, # 6b): Boeuf & Mourer-Chauviré 1992. [B*]
Chillesford, England (Mlíkovský 1996q, # 24; Tyrberg 1998, # UK-11): Harrison 1979d. [B]
Meda Gran, Spain (Sánchez Marco 1996b, # 49): Villalta 1965, Sánchez Marco 1996b. [B]

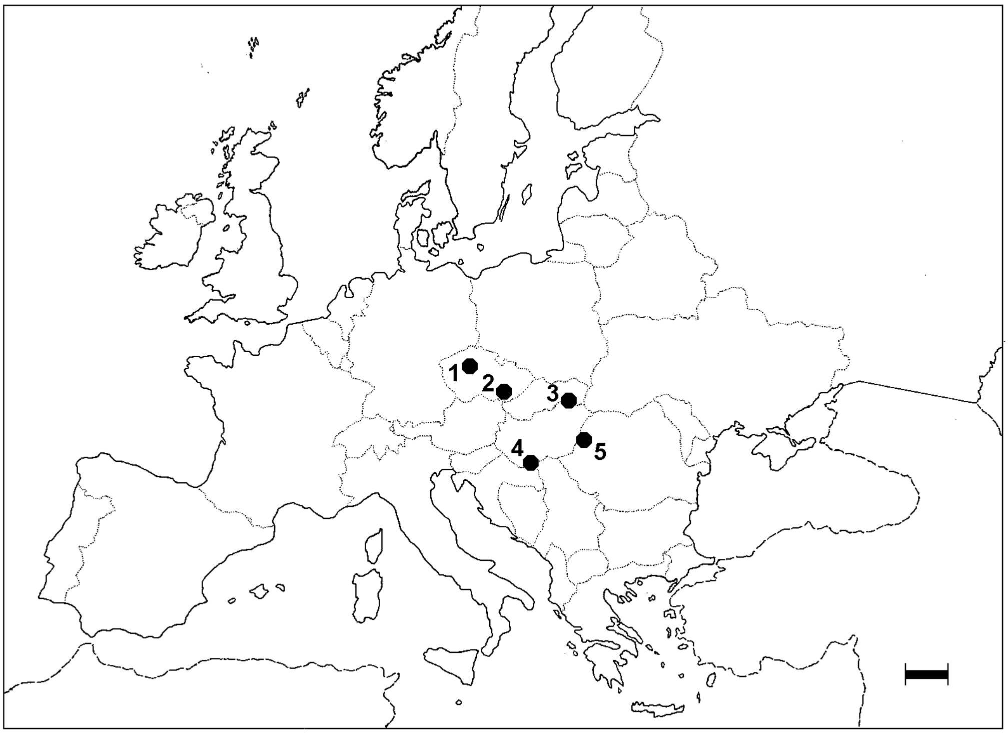

Fig. 14. Type localities of early Pleistocene (MQ 1) birds of Europe. 1 - Přezletice, 2 - Stránská skála, 3 - Včeláre, 4 - Beremend, Nagyharsányhegy, 5 - Betfia. Scale bar = 100 km.

Kadzielnia 1, Poland (Bocheński 1996, # 7): Jánossy 1974a, Bocheński 1989. [B]
Kielniki 3B, Poland (Bocheński 1996, # 6): Jánossy 1974a, Bocheński 1991. [B]
Kisláng, Hungary (Mlíkovský 1996j, # 12): Kretzoi 1954a, 1955a, Jánossy 1986, Michajlov 1988, Michajlov & Kuročkin 1988. [B*, E]
Liveneck, Russia (Mlíkovský 1996j, # 3, Tyrberg 1998, # RO-22): Jan'kova 1959. [B]
Montoussé 5, France (Mourer-Chauviré 1996b, # 7): Clot et al. 1976a,b,. [B]
Rippersroda 1, Germany (Mlíkovský & Hesse 1996, # 67): Giebel 1860, Brodkorb 1980, Mlíkovský 1992b. Age corrected following Heinrich (1990). [B*]
Senèze, France (Mourer-Chauviré 1996b, # 9): Stehlin 1923, Lambrecht 1933, Gaillard 1939, Mourer-Chauviré 1989b, 1990. [B]
Slivnica, Bulgaria (Boev 1996, # 10): Boev 1995a, 1998b,c. [B*]
S'Onix, Mallorca, Spain (Sánchez Marco 1996b, # 46): Mourer-Chauviré et al. 1977, 1980b, Sondaar et al. 1995. [B]
Tourkobounia 2, Greece (new): Mourer-Chauviré 1980b. [B]
Villány 3, Hungary (Mlíkovský 1996j, # 13): Jánossy 1974b, 1976a,b, 1977, 1979, 1980, Mlíkovský 1981, 1982a, 1995b. [B*]

MQ 1a

Balša, Bulgaria (new): Boev, in litt. [B]
Beremend 16, Hungary (Tyrberg 1998, # HU-5 partim): Jánossy 1992, 1996. [B*]
Beremend 17, Hungary (Tyrberg 1998, # HU-5): Jánossy 1992, 1996. [B]
Betfia 1, Romania (Tyrberg 1998, # RM-2): Jánossy 1976a. [B]
Betfia 2, Romania (Tyrberg 1998, # RM-2): Čapek 1917, Lambrecht 1933, Kretzoi 1941, 1962, Jánossy 1972, 1976b, 1977, 1979, 1980a. [B*]

Čerdženica – trench 6, Bulgaria (Tyrberg 2001, # BU-10): Boev 2000c. [B]
Deutsch-Altenburg $2C_1$, Austria (Tyrberg 1998, # AU-2): Jánossy 1981, Mlíkovský 1998d. [B]
Deutsch-Altenburg 4B, Austria (Tyrberg 1998, # AU-2): Jánossy 1981, Mlíkovský 1998d. [B]
Huéscar 1, Spain (new): Sánchez Marco 1989. [B]
Kairy, Ukraine (Tyrberg 1998, UR-32): Vojinstvens'kyj 1967. [B]
Kőröshegy, Hungary (Tyrberg 1998, # HU-26): Kretzoi & Krolopp 1977. [B]
Kryžanovka, Ukraine (Tyrberg 1998, # UR-36): Dubrovo & Kapelist 1979. Note: Two horizons are distinguished: lower (Kryžanovka 1) and upper (Kryžanovka 2). [B]
Mas Rambault, France (Tyrberg 1998, # FR-196): Mourer-Chauviré 1975a. [B]
Osztramos 2, Hungary (Tyrberg 1998, # HU-33): Jánossy 1976a,b,c, 1977, 1978, 1980, 1986, Jánossy & Kordos 1976a. [B]
Osztramos 5, Hungary (Tyrberg 1998, # HU-34): Jánossy & Kordos 1977, Jánossy 1976b, 1977. [B]
Osztramos 8, Hungary (Tyrberg 1998, # HU-35): Jánossy 1976a,b,c, 1977, 1986, Jánossy & Kordos 1977. [B]
Primorsk, Ukraine (new): Vojinstvens'kyj 1967. [B]
Quibas, Spain (Tyrberg 2001, # SP-101): Montoya et al. 1999, 2001. [B]
Tarchankut, Ukraine (Tyrberg 1998, # UR-35): Vojinstvens'kyj 1967. [B]
Untermassfeld, Germany (Tyrberg 1998, # BRD-141): Jánossy 1988, 1997. [B]
Valerots, France (Tyrberg 1998, # FR-189): Mourer-Chauviré 1975a. [B]
Vallonnet, France (Tyrberg 1998, # FR-187): Mourer-Chauviré 1975a. [B]
Żabia Cave, Poland (Tyrberg 1998, # PO-26): Bosák et al. 1982, Mlíkovský orig. [B]
Ževachova Hill, Ukraine (Tyrberg 1998, # UR-33): Dubrovo & Kapelist 1979. [B]

MQ 1a-b

Betfia 7, Romania (Tyrberg 1998, # RM-2): Kessler 1975. [B]
Betfia 10, Romania (new): Terzea & Jurcsák 1968. [B]
Betfia – Aven, Romania (Tyrberg 1998, # RM-2): Kessler 1978. [B]
Gènova, Mallorca, Spain (Tyrberg 1998, # SP-63): Mourer-Chauviré et al. 1977. [B]
Kunino, Bulgaria (new): Boev 2001. [B]
Monte Argentario, Italy (Tyrberg 1998, # IT-78): Cassoli 1980. [B]
Zalesiaki 1A, Poland (Tyrberg 1998, # PO-28): Bocheński 1989. [B]

MQ 1b

Aldeby, England (Tyrberg 1998, # UK-1): Newton 1882b, Harrison 1979f. [B]
Bacton, England (Tyrberg 1998, # UK-4): Harrison 1979f, 1985b. [B]
Belle-Roche, Belgium (Tyrberg 1998, # BE-1): Cordy 1993. [B]
Betfia 5, Romania (Tyrberg 1998, # RM-2): Kretzoi 1962, Jurcsák & Kessler 1973, Kessler 1975, Mourer-Chauviré 1975a, Jánossy 1976a, 1980. [B*]
Betfia 7 (Tyrberg 1998, # RM-2): Kessler 1975. [B]
Bourgade, France (Tyrberg 1998, # FR-51): Mourer-Chauviré 1976, 1980b. [B]
Boxgrove, England (Tyrberg 2001, # UK-75): Harrison & Stewart 1999. [B]
Červený Hill (new): Mlíkovský 1996t. [B]
Chlum 6, Czechia (Tyrberg 1998, # CZ-54): Mlíkovský 1996t. [B]
East Runton, England (Tyrberg 1998, # UK-23): Newton 1882b, Bell 1915, Harrison 1979f, 1985b. [B]
Erpfingen, Germany (Tyrberg 1998, # BRD-30): Jánossy 1976a,b. [B]
Holštejn 1, Czechia (Tyrberg 1998, # CZ-10): Musil 1966. [B]
Koněprusy C-718, Czechia (Tyrberg 1998, # CZ-19 and CZ-55): Mlíkovský 1996t, see also Jánossy 1972, 1976c, 1977a, 1979. [B]
Kövesvárad, Hungary (Tyrberg 1998, # HU-28): Jánossy 1963, 1977, 1986. [B]
Kozi Grzbiet, Poland (Tyrberg 1998, # PO-10): Bocheński 1984. [B]

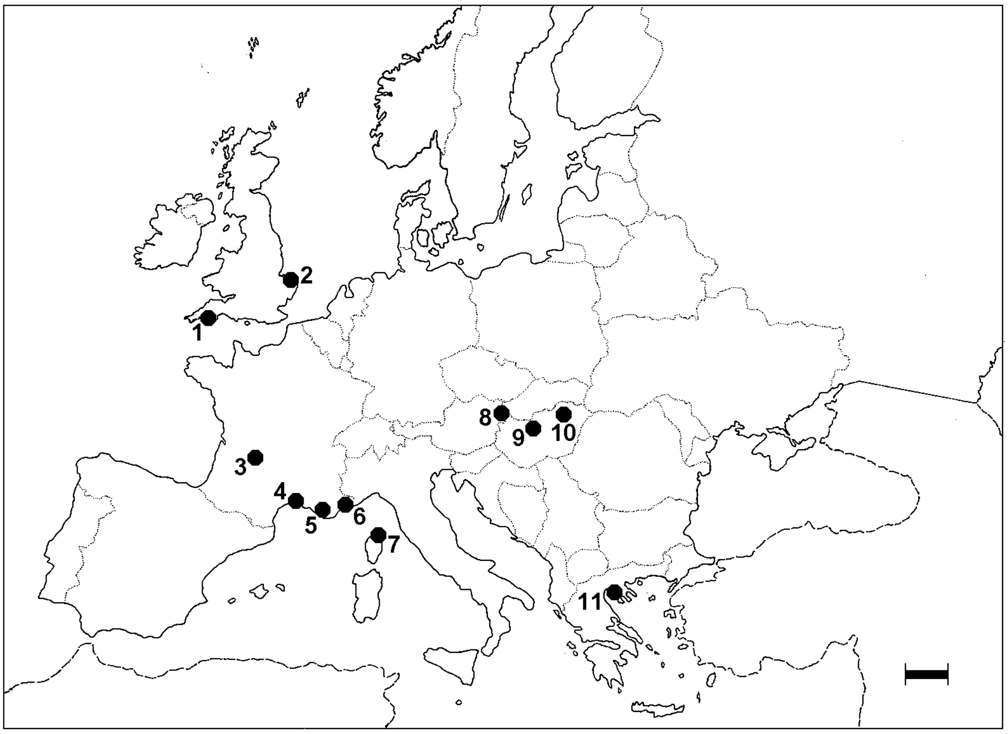

Fig. 15. Type localities of middle (MQ 2A-B) Pleistocene birds of Europe. 1 - Tornewton, West Runton, 2 - Ostend, 3 - Fage, 4 - Lunel-Viel, 5 - Saint-Estève-Janson, 6 - Lazaret, 7 - Castiglione, 8 - Hundsheim, 9 - Várhegy, 10 - Tarkő, 11 - Petralona. See Fig 16 for Monte Reale, which is potentially of this age. Scale bar = 100 km.

Nagyharsányhegy 1-4, Hungary (Tyrberg 1998, # HU-31 and HU-32): Lambrecht 1916b, Mourer-Chauviré 1975a, Jánossy 1976a,b, 1977, 1979, 1980a. Most bones from the early collections at Nagyharányhegy cannot be assigned to any one of the four fissures known at that time (see Kretzoi 1956, Jánossy 1986). [B*]

Overstrand, England (Tyrberg 1998, # UK-50): Harrison 1979f, 1985b. [B]

Petralona – layers 11, 13, 15, 24, 26, and "mausoleum", Greece (Tyrberg 1998, # GR-13): Kretzoi 1977, Kretzoi & Poulianos 1981, Poulianos 1996. The age is uncertain; these layers may well be early MQ 2 in age. [B]

Podumci, Croatia (Tyrberg 1998, # CR-9): Malez 1973, 1986. [B]

Přezletice, Czechia (Tyrberg 1998, # CZ-33): Jánossy 1982, 1983, Mlíkovský 1997c. [B*]

Razvode, Croatia (Tyrberg 1998, # CR-10): Malez 1973, 1984b, 1986. [B]

Sackdilling, Germany (Tyrberg 1998, # BRD-154): Brunner 1933, Lambrecht 1933, Jánossy 1976a,b. [B]

Sima del Elefante, Spain (Tyrberg 2001, # SP-111): Rosas et al. 2001. [B]

Soave, Italy (Tyrberg 1998, # IT-22): Mourer-Chauviré 1980b, 1993b. [B]

Somssichhegy 2, Hungary (Tyrberg 1998, # HU-46): Toula 1910, Jánossy 1983, 1986. [B]

Stránská skála – Absolon's 2nd cave, Czechia (Tyrberg 1998, # CZ-41): Skutil & Stehlík 1939, Musil 1965, Musil & Valoch 1968, Jánossy 1972. [B*]

Stránská skála – Čapek's site 4, Czechia (Tyrberg 1998, # CZ-41): Čapek 1925, Skutil & Stehlík 1939, Musil 1965, Musil & Valoch 1968, Jánossy 1972. [B]

Stránská skála – Čapek's site 5, Czechia (Tyrberg 1998, # CZ-41): Čapek 1925, Skutil & Stehlík 1939, Musil 1965, Musil & Valoch 1968, Jánossy 1972. [B]

Stránská skála – Čapek's site 8, Czechia (Tyrberg 1998, # CZ-41): Čapek 1925, Skutil & Stehlík 1939, Musil 1965, Musil & Valoch 1968, Jánossy 1972. [B]

Stránská skála – Čapek's site 9, Czechia (Tyrberg 1998, # CZ-41): Čapek 1925, Skutil & Stehlík 1939, Musil 1965, Musil & Valoch 1968, Jánossy 1972. [B]

Stránská skála – Čapek's sites 1-3, Czechia (Tyrberg 1998, # CZ-41): Čapek 1925, Skutil & Stehlík 1939, Musil 1965, Musil & Valoch 1968, Jánossy 1972. These three sites cannot be separated from each other any more (Musil 1965, 1972). [B]

Stránská skála – Musil's talus cone, layers 3-16, Czechia (Tyrberg 1998, # CZ-41): Mlíkovský 1995c, Musil 1995b. [B*, E]

Stránská skála, Czechia (Tyrberg 1998, # CZ-41): (Čapek 1925, Skutil & Stehlík 1939, 1944, Musil 1965, 1995a,b, Musil & Valoch 1968, Jánossy 1972, Mlíkovský 1995b. This is a complex locality, consisting of several fissures and a talus cone, as follows: Čapek's sites 1-3, 4, 5, 7, 8, 9, Absolon's cave, Musil's talus cone. [B*, E]

Tatinja Draga, Croatia (Tyrberg 1998, # CR-14): Malez 1973, 1984b. [B]

Uppony 1 – layer 10, Hungary (Tyrberg 1998, # HU-58): Jánossy 1979, 1986. [B]

Üromhegy, Hungary (new): Jánossy 1986. [B]

Včeláre 1, Slovakia (Tyrberg 1998, # SK-5): Kretzoi 1975, Jánossy 1969, 1976a,b, 1977, 1979, Horáček 1985, Ložek & Horáček 1992. [B*]

Včeláre 4E, Slovakia (new): Mlíkovský orig. [B]

Venta Micena, Spain (new): Agustí et al. 1984, Sánchez Marco 1999a. [B]

Villány 6, Hungary (new): Kretzoi 1956. [B]

Villány 8, Hungary (new): Kretzoi 1956, Jánossy 1986. [B]

Voigtstedt, Germany (Tyrberg 1998, # BRD-144): Jánossy 1965, 1976a, 1980a, Mlíkovský 1982c. [B]

West Runton – Upper Freshwater Bed, England (Tyrberg 1998, # UK-68): Newton 1882a,b, 1887, 1891, Lydekker 1891a, Bell 1915, Harrison 1979d, Mlíkovský 1982c. [B*]

MQ 2A

Ambrona, Spain (Tyrberg 1998, # SP-5): Jánossy 1983, Sánchez Marco 1990b, 1999c. [B]

Arago, France (Tyrberg 1998, # FR-59): Mourer-Chauviré 1975a. [B]

Čertkov 2, Ukraine (Tyrberg 1998, # UR-21): Vojinstvens'kyj 1967. [B]

Cimay, France (Tyrberg 1998, # FR-67): Mourer-Chauviré 1975a. [B]

Gombasek, Slovakia (Tyrberg 1998, # SK-4): Jánossy 1976a, 1980b. [B]

Hundsheim, Austria (Tyrberg 1998, # AU-7): Freudenberg 1914, Jánossy 1974b, 1977, Mlíkovský 1998g. [B*]

Monte Peglia, Italy (new): Cassoli 1980. [B]

Montoussé 3, France (Tyrberg 1998, # FR-202): Clot et al. 1976a. [B]

Montoussé 4, France (Tyrberg 1998, # FR-203): Clot et al. 1976a. [B]

Mosbach, Germany (Tyrberg 1998, # BRD-94): Mourer-Chauviré 1977, Mlíkovský 1998g. [B]

Ostend, England (Tyrberg 1998, # UK-49): Lydekker 1891a, Harrison 1978, 1979d, 1985b. [B*]

Petralona – layers 2, 8 and 10, Greece (Tyrberg 1998, # GR-13): Kretzoi 1977, Kretzoi & Poulianos 1981, Poulianos 1996. [B*]

Saint-Estève-Janson, France (Tyrberg 1998, # FR-157): Mourer-Chauviré 1975a. [B*]

Spinagallo, Italy (Tyrberg 1998, # IT-123): Pavia 1999b. [B]

Tarkő, Hungary (Tyrberg 1998, # HU-55): Jánossy 1972, 1974b, 1976a,c, 1977, 1979, 1980a, 1986. [B*]

Terra Amata (Tyrberg 1998, # FR-242): Mourer-Chauviré 1975a. [B]

Tourkobounia 5, Greece (Tyrberg 1998, # GR-19): Mourer-Chauviré 1980b. [B]

Uppony 1 – layers 1, 3, 6 and 7, Hungary (Tyrberg 1998, # HU-58): Jánossy 1977. [B]

Várhegy – Fortuna Street 25, Hungary (Tyrberg 1998, # HU-62): Jánossy 1969, 1976a,b, 1979, 1986. [B]

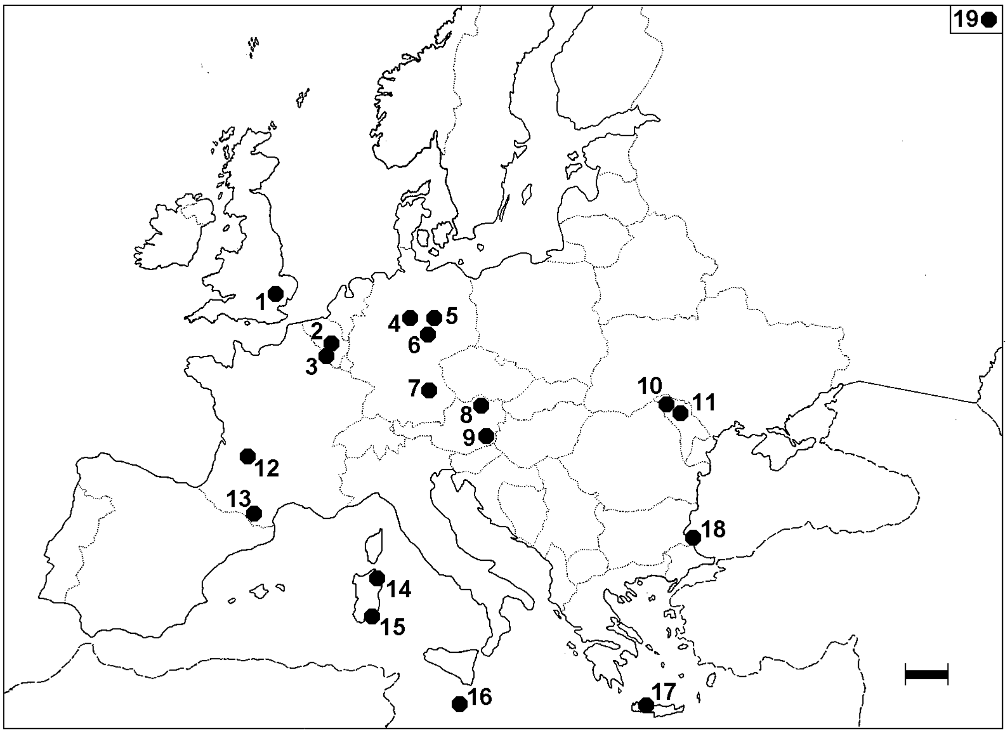

Fig. 16. Type localities of late Pleistocene (MQ 2C-D) and Holocene (MQ E) birds of Europe. 1 - Reach, 2 - Goyet, 3 - Nichet, 4 - Salzgitter-Lebenstedt, 5 - Westeregeln, 6 - Seveckenberg, 7 - Breitenberghöhle, 8 - Schusterlucke, 9 - Repolusthöhle, 10 - Trinka, 11 - Brynzeny, 12 - Eyzies, 13 - Massat, 14 - Figari, Pietro Tampoia Cave, 15 - Monte Reale (age uncertain), 16 - Ghar Dalam, Zebbug, 17 - Liko, 18 - Sozopol, 19 - Medvež'ja Cave (outside the picture at NE Ural Mountains). Not exactly localized site: Peschiera, Italy. Scale bar = 100 km.

Várhegy – Uri Street 72, Hungary (Tyrberg 1998, # HU-63): Jánossy 1969. [B*]

Vértesszőllős 2, Hungary (Tyrberg 1998, # HU-65): Jánossy 1976a,b, 1977, 1979, 1986, 1990a, Mlíkovský 1998g. [B]

MQ 2A-B

Rapaci, Sardinia, Italy (Tyrberg 1998, # IT-40): Mourer-Chauviré & Weesie 1986. [B]

MQ 2A-C

Capins, France (Tyrberg 1998, # FR-257): Mourer-Chauviré et al 1975. [B]

Monte Reale, Sardinia, Italy (Tyrberg 1998, # IT-122): Wagner 1828, 1832, 1833, Marmora 1831, Studiati 1857, Milne-Edwards 1869-1871, Mlíkovský 1995a, 2000b. [B*]

Son Bauçà, Mallorca, Spain (Tyrberg 1998, # SP-80): Ballmann & Adrover 1970, Mourer-Chauviré et al. 1980. [B]

MQ 2B

Aldène, France (Tyrberg 1998, FR-30): Mourer-Chauviré 1975a. [B]

Aridos 1, Spain (Tyrberg 1998, # SP-9): Mourer-Chauviré 1980c. [B]

Atapuerca, Spain (Tyrberg 1998, # SP-10): Sánchez Marco 1987a,b, 1995, 1999d. [B]

Azé 2, France (Tyrberg 1998, # FR-216): Mourer-Chauviré 1975a. [B]

Biehle, France (Tyrberg 1998, # FR-54): Mourer-Chauviré 1975a,b. [B]

Carrière, France (Tyrberg 1998, # FR-126): Mourer-Chauviré 1975a. [B]

Castiglione 3, Corsica, France (Tyrberg 2001, # FR-259): Mourer-Chauviré et al. 1997, Salotti et al. 1997. [B*]

Combe Grenal, France (Tyrberg 1998, # FR-69): Mourer-Chauviré 1975a. [B]
Fage, France (Tyrberg 1998, # FR-171): Mourer-Chauviré 1975a,b,c. [B*]
Fournier Quarry, France (Tyrberg 1998, # FR-56): Mourer-Chauviré 1975a. [B]
Hórvölgy, Hungary (Tyrberg 1998, # HU-19): Jánossy 1976a, 1977, 1979. [B]
Hunas, Germany (Tyrberg 1998, # BRD-66): Jánossy 1983b. [B]
Lazaret, France (Tyrberg 1998, # FR-147, 148): Mourer-Chauviré 1975a, Vilette 1994. Several sites within the cave yielded bird bones. [B*]
Lunel-Viel, France (Tyrberg 1998, # FR-197): Serres et al. 1839, Milne-Edwards 1869-1871, Mourer-Chauviré 1975a. [B*]
Orgnac 3, France (Tyrberg 1998, # FR-211): Mourer-Chauviré 1975a. [B]
Saint-Sol-Belcastel, France (Tyrberg 1998, # FR-164): Philippe et al. 1980. [B]
Suard, France (Tyrberg 1998, # FR-13): Mourer-Chauviré 1975a. [B]
Tornewton, England (Tyrberg 1998, # UK-64): Harrison 1980b, Stewart 1996. [B*]
Westbury-sub-Mendip, England (Tyrberg 1998, # 69): Andrews 1990. [B]

MQ 2C

Archi, Italy (Tyrberg 1998, # IT-2): Ascenzi & Segre 1971, Cassoli & Segre 1985. [B]
Avenc de Na Corna, Mallorca, Spain (Tyrberg 1998, # SP-11): Mourer-Chauviré et al. 1975, 1977, Northcote & Mourer-Chauviré 1988. [B]
Balauzière, France (Tyrberg 1998, # FR-38): Mourer-Chauviré 1975a. [B]
Benghisa, Malta (Tyrberg 1998, # MA-1): Lambrecht 1933. [B]
Bordu Mare, Romania (Tyrberg 1998, RM-12): Jurcsák & Kessler 1988. [B]
Brynzeny 1 – lower cultural layer, Moldova (Tyrberg 1998, # MO-1): Ganea & Ketraru 1965, Ganea 1969a,b, 1972. [B*]
Buteşti – cultural layer, Moldova (Tyrberg 1998, # MO-2): Ganea 1972. [B]
Calafrana, Malta (Tyrberg 1998, # MA-2): Lambrecht 1933. [B]
Corbeddu, Sardinia, Italy (Tyrberg 1998, # IT-63): Mourer-Chauviré & Weesie 1986, Weesie 1999. [B]
Coscia, France (Tyrberg 2001, # FR-260): Bonifay et al. 1998. [B]
Crayford, England (Tyrberg 1998, # UK-16): Harrison & Walker 1977b. [B]
Devetaška Cave, Bulgaria (Tyrberg 2001, # BU-11): Boev 1999a. [B]
Devil's Tower, Gibraltar (Tyrberg 1998, # SP-53): Bate 1928. [B]
Dorgali, Sardinia, Italy (Tyrberg 1998, # IT-15): Kotsakis 1980, Mourer-Chauviré & Weesie 1986. [B]
Dürrloch, Germany (Tyrberg 1998, # BRD-26): Schlosser 1900. [B]
Figari, Sardinia, Italy (Tyrberg 2001, # IT-127): Dehaut 1911, 1914, 1920, Comaschi Caria 1969, 1970, Pavia 1999a. [B*]
Figueira Brava – layers 2-4, Portugal (Tyrberg 1998, # PG-3): Mourer-Chauviré & Antunes 1991, 2000. [B]
Fontéchevade, France (Tyrberg 1998, # FR-84): Mourer-Chauviré 1975a. [B]
Ghaqba, Malta (Tyrberg 1998, # MA-8): Northcote 1982a, 1984, 1992. [B]
Ghar Dalam, Malta (Tyrberg 1998, # MA-4): Bate 1916, Fischer & Stephan 1974, Olson 1976b, Northcote 1992. [B*]
Gnien, Malta (Tyrberg 1998, # MA-9): Harrison 1979, Harrison & Cowles 1977, Northcote 1983, 1984, 1985, 1992. [B]
Gonvillard, France (Tyrberg 1998, # FR-42): Mourer-Chauviré 1975a. [B]
Gorham's Cave, Gibraltar (Tyrberg 1998, # SP-64): Eastham 1968. [B]
Goyet, Belgium (Tyrberg 1998, # BE-2): Friant 1950c, 1951, Mlíkovský 2000a. [B*]
Grappin, France (Tyrberg 1998, # FR-96): Mourer-Chauviré 1975a. [B]
Gumbes B, Greece (Tyrberg 1998, # GR-6): Weesie 1982, 1987a,b, 1988. [B]
Gumbes C, Greece (Tyrberg 1998, # GR-7): Weesie 1982, 1987a,b, 1988. [B]
Ilford, England (Tyrberg 1998, # UK-34): Bell 1915, Harrison & Cowles 1977, Harrison & Walker 1977c. [B]

Kalafrana, Malta (new): Lambrecht 1933. [B]

Kálmán Lambrecht Cave, Hungary (Tyrberg 1998, # HU-22): Jánossy 1964, 1977, 1986, 1989, Mlíkovský 1998g. [B]

Kiik-Koba, Ukraine (Tyrberg 1998, # UR-9): Tugarinov 1937, Vojinstvens'kyj 1967, Baryšnikov & Potapova 1992. [B]

Liko, Crete, Greece (Tyrberg 1998, # GR-10): Weesie 1982, 1987a,b, 1988. [B*]

Macinaggio, Corsica, France (Tyrberg 1998, # FR-145): Mourer-Chauviré & Weesie 1986, Mourer-Chauviré in Tyrberg 1998: 136. [B]

Mnajdra, Malta (Tyrberg 1998, # MA-6): Northcote 1982b, 1985, 1992. [B]

Monte San Giovanni, Sardinia, Italy (Tyrberg 1998, # IT-79): Lydekker 1891b, Mourer-Chauviré & Weesie 1986. [B]

Nichet – lower layer, France (Tyrberg 1998, # FR-118): Bastin 1933. [B*]

Nižnekryvčansk, Ukraine (Tyrberg 1998, # UR-15): Marisova & Tatarinov 1962, Marisova 1968. [B]

Petit Puymoyen, France (Tyrberg 1998, # FR-217): Mourer-Chauviré 1975a. [B]

Prince, Italy (Tyrberg 1998, # IT-55): Boule 1910, Mourer-Chauviré 1975a. [B]

Rapaci, Sardinia, Italy (Tyrberg 1998, # 39): Mourer-Chauviré & Weesie 1986. [B]

Repolusthöhle, Austria (Tyrberg 1998, # AU-11): Mottl 1951, Jánossy 1989, Mlíkovský 1998g. [B*]

Schusterlucke, Austria (Tyrberg 1998, # AU-16): Woldřich 1893, Mlíkovský & Lukáš 1991, Mlíkovský 1997d. [B*]

Seveckenberg, Germany (Tyrberg 1998, # BRD 124): Giebel 1847, Nehring 1880, 1904. [B*]

Simonelli, Crete, Greece (Tyrberg 1998, # GR-15): Suriano 1980, Weesie 1987a,b, 1988. [B]

Soulabé (partim), France (Tyrberg 1998, # FR-240): Mourer-Chauviré 1975a. [B]

Starye Duruitory – layers II-IV, Moldova (Tyrberg 1998, # MO-3): Ganea & Ketraru 1964, Ganea 1972. [B]

Sungir, Moskva Province, Russia (Tyrberg 1998, # RO-35): Gromov 1966, Burčak-Abramovič 1972, 1975. [B]

Ta'Kandja, Malta (Tyrberg 1998, # MA-3): Despott 1929, Lambrecht 1933. [B]

Trinka 1 – middle Paleolithic layer, Moldova (Tyrberg 1998, # MO-4): Ganea 1969a, 1972. [B]

Vindija, Croatia (Tyrberg 1998, # CR-19): Malez 1988. [B]

Westeregeln, Germany (Tyrberg 1998, # BRD-150): Germar 1826, Keferstein 1834, Giebel 1847, Nehring 1877, 1880, Mlíkovský 1998g. [B*]

Zebbug, Malta (Tyrberg 1998, # MA-10): Parker 1865, 1869, Falconer 1868, Lydekker 1890, 1891a, Northcote 1982a, 1984, 1985, 1992. [B*]

Zwergloch, Germany (Tyrberg 1998, # BRD-156): Ranke 1879. [B]

MQ 2D

Arene Candide, Italy (Tyrberg 1998, # IT-3): Cassoli 1980. [B]

Blomvåg, Norway (Tyrberg 1998, # NO-1): Lie 1986. [B]

Breitenberghöhle, Germany (Tyrberg 1998, # BRD-14): Brunner 1958. This locality may contain also remains from older and younger strata (see Tyrberg 1998: 205). [B*]

Castiglione 1, Corsica, France (Tyrberg 2001, # FR-258): Mourer-Chauviré et al. 1997. [B]

Cave 16, Bulgaria (Tyrberg 1998, BU-2): Boev 1999a. [B]

Colombière, France (Tyrberg 1998, FR-169): Mourer-Chauviré 1975a. [B]

Cosquer, France (Tyrberg 1998, # FR-94): Clottes et al. 1992, Clottes & Courtin 1993, d'Errico 1994a,b,c, McDonald 1994. [B]

Duruthy, France (Tyrberg 1998, # FR-76): Delpech 1968, 1983. [B]

Eyzies, France (Tyrberg 1998, # FR-138): Milne-Edwards 1869-1871, 1875a,b. [B*]

Gargas, Jersey, England (new): Andrews 1920, Breuil & Begouën 1936, d'Errico 1994a,c, McDonald 1994. The record is invalid. [B]

Gouërris, France (Tyrberg 1998, # FR-107): Saint-Périer 1927. [B]

Gourdan, France (Tyrberg 1998, # FR-108): Clot & Mourer-Chauviré 1986. [B]
Grand Baille, France (Tyrberg 1998, # FR-173): Mourer-Chauviré 1975a. [B]
Happurg, Germany (Tyrberg 1998, # BRD-62): Hörmann 1913. [B]
Harpons, France (Tyrberg 1998, # FR-141): Saint-Périer 1920, Mourer-Chauviré 1975a, Clot & Mourer-Chauviré 1986. [B]
Hermanstorp, Sweden (Tyrberg 1998, # SV-3): Munthe 1914, Löppenthin 1952. [E]
Hohen Vielchen, Germany (new): Soergel 1961. [B]
Kozarnika, Bulgaria (Tyrberg 2001, # BU-9): Boev 1999a. [B]
Lafaye, France (Tyrberg 1998, # FR-8): Mourer-Chauviré 1975a. [B]
Madelaine, France (Tyrberg 1998, # FR-174): Milne-Edwards 1875a,b. [B]
Massat, France (Tyrberg 1998, # FR-116): Milne-Edwards 1875a,b, Mourer-Chauviré 1975a. [B*]
Medvež'ja Cave, Russia (Tyrberg 1998, # RO-26): Potapova 1986, 1990. [B*]
Mège, France (Tyrberg 1998, # FR-9): Capitan et al. 1906. [B]
Morin, France (Tyrberg 1998, # FR-206): Delpech 1983. [B]
Nerja, Spain (Tyrberg 1998, # SP-41): Eastham 1986. [B]
Pageyral, France (Tyrberg 1998, # FR-17): Rivière 1887, 1892. [B]
Paglicci, Italy (new): Mezzena & Palma di Cesnola 1992. [B]
Pendo, Spain (Tyrberg 1998, # SP-57): Alcalde del Río et al. 1912, Eastham 1968, Gonzales Morales 1980, d'Errico 1994a,b,c, McDonald 1994. [Wall engravings.]
Pietro Tampoia Cave, Sardinia, Italy (Tyrberg 1998, # IT-37): Shufeldt 1896, Regàlia 1897, Mayaud & Schaub 1950. [B*]
Pouàs, Eivissa, Spain (Tyrberg 1998, # SP-61): J.A. Alcover in Tyrberg 1998. [B]
Raymonden, France (new): Hardy 1891, Breuil et al. 1909, Alcalde del Río et al. 1912, Lambrecht 1933, d'Errico 1994a,c, McDonald 1994. [Sculpture.]
Raziška Cave, Bulgaria (Tyrberg 2001, # BU-15): Boev 1999a. [B]
Romanelli, Italy (Tyrberg 1998, # IT-40): Regàlia 1904, Blanck 1927, 1928, Cassoli & Segre 1985, Cassoli 1992, Cassoli & Tagliacozzo 1997, Gál 1999. [B]
Salzgitter-Lebenstedt, Germany (Tyrberg 1998, # BRD-116): Kleinschmidt 1953a,b, Mlíkovský 1998g. [B]
Soulabé (partim), France (Tyrberg 1998, # FR-240): Mourer-Chauviré 1975a. [B]
Temnata Cave, Bulgaria (Tyrberg 1998, # BU-4): Boev 1999a. [B]
Trois Frères, France (Tyrberg 1998, # FR-246): Mourer-Chauviré 1975a. [B]
Urtiaga, Spain (Tyrberg 1998, # SP-83): Eastham 1985, 1989. [B]
Veyrier, France (Tyrberg 1998, # FR-159): Rütimeyer 1873. [B]
Vieulac, France (new): Rivière 1887, 1892. [B]

MQ 2E

Burwell, England (new): Milne-Edwards 1869-1871: 108, Lydekker 1891c, Bell 1915, Friant 1950a,b, Northcote 1980, 1982d. [B]
Ehrenstein, Germany (new): Soergel 1955. [B]
Figueira Brava – "upper layers", Portugal (new): Mourer-Chauviré & Antunes 2000. [B]
Peschiera, Italy (new): Portis 1884, Lambrecht 1933. [B*]
Reach, England (new): Milne-Edwards 1869-1871: 108, Lydekker 1891c, Bell 1915, Friant 1950a,b, Northcote 1980, 1982d. [B*]
Somerset, England (new): Harrison & Cowles 1977. [B]
Sozopol, Bulgaria (new): Boev 1995c, Boev & Karajvanova 1998. [B*]
Strathclyde, Isle of Jura, Scotland (new): Harrison & Cowles 1977. [B]

Order Tinamiformes Huxley

Tinamomorphae Huxley, 1872 [Modern order.]
Lithornithiformes Houde, 1988: 19 [Type genus: *Lithornis* Owen, 1840.]

Family Tinamidae Gray

Tinamidae Gray, 1840 [Modern family.]
Lithornithidae Houde, 1988: 19 [Type genus: *Lithornis* Owen, 1840.]
Lithornithinae Houde: Mlíkovský, this paper [New rank.]

Distribution: Early Eocene (MP 8-9) of England and Denmark. Extralimital record of the subfamily is known from the late Paleocene to the middle Eocene of Montana and Wyoming (Houde 1988, see also Houde 1981, 1986, Witmer 1989).

Remarks: I see no reason for placing the lithornithids in a separate family or even order, as suggested by Houde (1988). The lithornithids seem to represent an ancient radiation of the Tinamidae, and should be separated at the subfamily level. All European forms of tinamids belong to the Lithornithinae.

Genus *Lithornis* Owen

Lithornis Owen, 1840: 162 [Type by monotypy: *Lithornis vulturinus* Owen, 1840.]
Pediorallus Harrison & Walker, 1977a: 36 [Type by original designation: *Pediorallus barbarae* Harrison & Walker, 1977a.]
Promusophaga Harrison & Walker, 1977a: 40 [Type by original designation: *Promusophaga meini* Harrison & Walker, 1977a.]

Distribution: Early Eocene (MP 8-9) of England. Extralimital record is available from the late Paleocene of Montana (Houde 1988), and the early Eocene of Wyoming (Houde 1988).

Remarks: *Lithornis* Owen was described as a member of the Vulturidae, then comprising both New World and Old World vultures (Owen 1840, 1841, 1846). Cracraft & Rich (1972) doubted the vulturine relationships of the genus, Harrison & Walker (1977a) transferred it to the Threskiornithidae, but Houde (1988) showed, that it belongs to a separate family, related to the modern Tinamidae (here included in the Tinamidae as a subfamily).

Pediorallus Harrison & Walker was described in the Rallidae, and *Promusophaga* Harrison & Walker as a member of the Musophagidae (Harrison & Walker 1977a). Houde (1988) synonymized both these genera with *Lithornis* Owen.

Lithornis vulturinus Owen

Lithornis vulturinus Owen, 1840: 162 [Holotype from Sheppey: associated partial sternum, thoracic vertebra, ribs, distal end of left femur, and proximal end of left tibiotarsus; destroyed during World War II (Rich & Cracraft 1972: 281, Harrison & Walker 1977a: 29). Figured by Owen 1841, pl. 21, fig. 5-6, Owen 1846, fig. 232, Lambrecht 1933, fig. 134, Harrison & Walker 1977a, fig. 12, and Houde 1988, fig. 32. Neotype from Sheppey (designed by Houde 1988: 25): partial skeleton, incl. 5 cervical vertebrae, 1 thoracic vertebra, right scapula, right half of sternum, ribs, right humerus, radius and ulna, all lacking distal ends, distal ends of left radius and ulna, proximal end of left femur, and proximal end of right tibiotarsus; BMNH 38934 (formerly BMNH A-5204). Figured by Houde 1988, fig. 33.]
Pediorallus barbarae Harrison & Walker, 1977a: 36 [Holotype from High Ongar: proximal end of right tarsometatarsus; BMNH A-2681. Figured by Harrison & Walker 1977a, text-fig. 13a-f.]
Promusophaga magnifica Harrison & Walker, 1977a: 41 [Holotype from Sheppey: associated distal end of right coracoid, proximal end of left humerus, incomplete sternum, and ribs;

BMNH 33138. Figured by Lambrecht 1933, fig. 134a (sub *Lithornis vulturinus*), and Harrison & Walker 1977a, text-fig. 14a-b, pl. 9, fig. i-m.]

Pediorallus nasi Harrison 1984b:19 [Holotype from Walton-on-the-Naze: associated proximal end of left humerus, proximal end of right ulna, distal end of right femur, distal end of right tibiotarsus, and two vertebrae; BMNH A-5200. Figured by Harrison 1984b, fig. 3a-e, 4a-e, 5a-b.]

Lithornis nasi (Harrison): Houde 1988: 31 [New combination.]

Distribution: Early Eocene (MP 8) of Walton-on-the-Naze, England (Harrison 1984b, Houde 1988), and Mariager Fjord, Denmark (Hoch 1975 sub Galliformes indet; was tentatively assigned to this species by Houde 1988); and early Eocene (MP 8-9) of Sheppey, England (Owen 1840, 1841, 1846, Hunter 1845, Lydekker 1891a, Cracraft & Rich 1972, Harrison & Walker 1977a [also sub *Neptuniavis minor* and *Parvigyps praecox*], Harrison 1984b, Houde 1988), and Saint James Park, England (Lydekker 1891a: 362 sub *Proherodius oweni*, Houde 1988).

Remarks: *Pediorallus barbarae* Harrison & Walker (described in the Rallidae), and *Promusophaga magnifica* Harrison & Walker (described in the Musophagidae) were synonymized with *Lithornis vulturinus* Owen by Houde (1988). *Lithornis nasi* (Harrison) was said to differ from *Lithornis vulturinus* Owen by size alone (Houde 1988), but Houde's tables of measurements convincingly show, that this is not the case. Hence, I synonymize here *Pediorallus* [= *Lithornis*] *nasi* Harrison with *Lithornis vulturinus* Owen.

Lithornis hookeri (Harrison)

Pediorallus hookeri Harrison, 1984b: 21 [Holotype from Warden Point on the Isle of Sheppey: distal end of left tibiotarsus; BMNH A-5202. Figured by Houde 1988, fig. 25e.]

Lithornis hookeri (Harrison): Houde 1988: 32 [New combination.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison 1984b, Houde 1988), and Bognor Regis, England (Harrison & Walker 1977a sub *Pediorallus barbarae*, Houde 1988).

Order Struthioniformes Latham

Struthiones Latham, 1790 [Modern order.]

Family Palaeotididae Houde & Haubold

Palaeotididae Houde & Haubold, 1987: 32 [Type genus: *Palaeotis* Lambrecht, 1928.]

Distribution: Middle Eocene (MP 11-13) of Germany.

Genus *Palaeotis* Lambrecht

Palaeotis Lambrecht, 1928: 20 [Type by monotypy: *Palaeotis weigelti* Lambrecht, 1928.]

Palaeotis weigelti Lambrecht

Palaeotis Weigelti Lambrecht, 1928: 20 [Holotype from Cecilie I: distal end of left tarsometatarsus with associated phalanx 1 digiti II; GM 4415 (tarsometatarsus; present location unknown) and GM 4418 (phalanx). Figured by Lambrecht 1928, pl. 1, fig. 1-4, and Lambrecht 1933, fig. 157a.]

Palaeogrus geiseltalensis Lambrecht, 1935: 361 [Holotype from Cecilie I: associated right tibiotarsus, right tarsometatarsus, and two basal phalanges digitorum pedis; GM 5882. Figured by Lambrecht 1935, pl. 1, fig. 1. The phalanges were not described or figured by Lambrecht 1935.]

Ornitocnemus geiseltalensis (Lambrecht): Brodkorb 1967: 148 [New combination.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Houde & Haubold 1987, Peters 1988a), and middle Eocene (MP 13) of Geiseltal – Cecilie I, Cecilie II, and Leonhard III, Germany (Lambrecht 1928, 1933, Houde & Haubold 1987, Mlíkovský 1992b).

Remarks: *Palaeotis weigelti* Lambrecht was originally described as a bustard (Lambrecht 1928, 1933), while *Palaeogrus geiseltalensis* Lambrecht as a crane (Lambrecht 1935). *Palaeotis weigelti* Lambrecht was recognized as a paleognathous bird by Houde (1986, Houde & Haubold 1987), and *Palaeogrus geiseltalensis* Lambrecht was synonymized with it by Houde & Haubold (1987: 34).

Family Struthionidae Vigors

Struthionidae Vigors, 1825 [Modern family.]

Struthiolithidae Vjalov, 1971: 49 [Type genus: *Struthiolithus* Brandt, 1873. This family-group name is not available for nomenclatural purposes, because the genus name was created to denote fossil eggshell remains of *Struthio* Linnaeus; see Mlíkovský 2000d: 81.]

Genus *Struthio* Linnaeus

Struthio Linnaeus, 1758 [Modern genus.]

Struthiolithus Brandt, 1873: 158 [Type by monotypy: *Struthiolithus chersonensis* Brandt, 1873. Vjalov (1971: 44) argued that this name should be retained for the eggs of *Struthio* Linnaeus, which is unsubstantiated.]

Palaeostruthio Burčak-Abramovič, 1953a: 81 [Type by monotypy: *Palaeostruthio sternatus* Burčak-Abramovič, 1953a.]

Pachystruthio Kretzoi, 1954a: 233 [Type by monotypy: *Struthio pannonicus* Kretzoi, 1954a. Established as a subgenus of *Struthio* Linnaeus.]

Struthio chersonensis (Brandt)

Struthiolithus chersonensis Brandt, 1873: 158 [Holotype from Malynivcy: entire eggshell;

present location unknown. Not figured.]

Struthio novorossicus Alekseev, 1916: 388 [Syntypes from Novoelisavetovka: distal ends of three tarsometatarsi; GUN 1559-1561. Figured by Alekseev 1916, fig. 55-56, and Lambrecht 1933, fig. 43.]

Struthio chersonensis (Brandt): Lambrecht 1921: 2 [New combination.]

Struthio brachydactylus Burčak-Abramovič, 1939: 95 [Not seen. Probably based on the same material as *S. brachydactylus* Burčak-Abramovič, 1949, which would then be a younger objective synonym of this species. Note, that Burčak-Abramovič (1949: 141) listed *Struthio brachydactylus* Burčak-Abramovič, 1939 in the synonymy of *Struthio brachydactylus* Burčak-Abramovič, 1949.]

Struthio brachydactylus Burčak-Abramovič, 1949: 141 [Holotype from Hrebenyky: associated skull, 10 cervical vertebrae (1-2, 11-18), pelvis, left tibiotarsus with co-ossified left fibula, left tarsometatarsus, phalanges 1-4 digiti pedis III, and phalanges 1-4 digiti pedis IV; GMK 408/381(skull and cervical vertebrae), GMK 408/359 (tibiotarsus, fibula, tarsometatarsus, phalanges digiti pedis III), and GMK 408/352 (phalanges digiti pedis IV). All bones were transported away by German troops in 1943 (Burčak-Abramovič 1953a: 5) or in 1944 (Burčak-Abramovič 1949: 142); their present location is unknown. Figured by Burčak-Abramovič 1949, fig. 1 (skull), 2 (vertebrae 10-13), 3a (tibiotarsus and fibula), 3b (tarsometatarsus), 4 (phalanges pedis); Burčak-Abramovič 1953a, pl. 7, fig. 1 (skull), pl. 7, fig. 2-4 (vertebrae), pl. 8, fig. 1-2 (vertebrae), pl. 10, fig. 3-4 (tibiotarsus and fibula), pl. 10, fig. 5 (tibiotarsus), pl. 11, fig. 1-2 (tibiotarsus), pl. 12, fig. 1-4 (tarsometatarsus), pl. 13, fig. 1-6 (phalanges digiti III), pl. 14, fig. 1-4 (phalanges digiti III), pl. 14, fig. 5-7 (phalanges digiti IV), pl. 15, fig. 1-7 (phalanges digiti IV), pl. 15, fig. 8 (reconstructed foot); and Dement'ev 1964, fig. 670a (epistropheus), 670b,v (tibiotarsus), 670g,d (tarsometatarsus), and 670e,ž,z,i (pedal phalanges).]

Palaeostruthio sternatus Burčak-Abramovič, 1953a: 81 [Holotype from Hrebenyky: sternum; GIK 408/367. Figured by Burčak-Abramovič 1953a, pl. 18, fig. 1.]

Struthio (Pachystruthio) pannonicus Kretzoi, 1954a: 233 [Holotype from Kisláng: left pedal phalanx 1 digiti III; GIB, uncatalogued. Figured by Kretzoi 1954a, pl. 1, fig. 1., pl. 2, fig. 1-2.]

Struthiolithus alexejevi Roščin, 1962. [Holotype from Apostolovo: eggshell; present location unknown. Figured by Roščin 1962.]

Struthiolithus adzalycensis Roščin, 1962. [Holotype from Apostolovo: eggshell; present location unknown. Figured by Roščin 1959, p. 536.]

Struthio orlovi Kuročkin & Lungu, 1970: 119 [Holotype from Varniţa: distal end of right tibiotarsus; TGPI 6-3. Figured by Kuročkin & Lungu 1970, text-fig. 1a,b,v, pl. 7, fig. 1.]

Distribution: Late Miocene (MN 9) of Varniţa, Moldova (Lungu 1966a,b, Roška 1967, Kuročkin & Lungu 1970); late Miocene (MN 9-10) of Pokşeşti, Moldova (Michajlov 1988), Kolkotova Balka, Moldova (Michajlov 1988), Kubanka, Ukraine (Vojinstvens'kyj 1967), Tjaginka, Ukraine (Vojinstvens'kyj 1967), Jur'yvka, Ukraine (Pidopličko 1956), and Apostolovo, Ukraine (Alekseev 1916, Roščin 1959, 1962, Michajlov 1988);

late Miocene (MN 11) of Hrebenyky, Ukraine (Burčak-Abramovič 1939, 1949, 1951, 1953a,b), and Novoelisavetovka, Ukraine (Alekseev 1916, Burčak-Abramovič 1939, Vojinstvens'kyj 1967, Kuročkin & Lungu 1970); late Miocene (MN 11-13) of Çimişlia, Moldova (Michajlov 1988, Michajlov & Kuročkin 1988), Belka, Ukraine (Vojinstvens'kyj 1967), Žovten', Ukraine (Ganea & Kuročkin 1967), Il'inka, Ukraine (Burčak-Abramovič 1953, Vojinstvens'kyj 1967), Kujal'nik, Ukraine (Prževmysskij 1912, 1914, Alekseev 1916, Korotkevič 1961, Kuročkin & Lungu 1970), Nova Emetivka, Ukraine (Burčak-Abramovič 1939, 1953a, Ganea & Kuročkin 1967, Vojinstvens'kyj 1967, Burčak-Abramovič & Vekua 1971), Novoukrainka, Ukraine (Vojinstvens'kyj 1967), Snigirevka, Ukraine (Burčak-Abramovič 1953a), Čebotarevka, Ukraine (Vojinstvens'kyj 1967, Michajlov 1988), and Malynivcy, Ukraine (Brandt 1873, 1874, 1885, Mäklin 1873, Nathusius 1886, Bakulovskij

1892, Bensley 1921, Burčak-Abramovič 1953a, Schönwetter 1960: 8-10, Roščin 1962); late Miocene (MN 12) of Pikermi, Greece (Bachmayer & Zapfe 1962);

early Pliocene (MN 14) of Vojničevo, Ukraine (Burčak-Abramovič 1953a, Vojinstvens'kyj 1967); early Pliocene (MN 15) of Odesa – catacombs, Ukraine (Burčak-Abramovič 1953a,b, Vojinstvens'kyj 1967, Michajlov 1988, Michajlov & Kuročkin 1988);

late Pliocene (MN 16) of Etulia, Moldova (Michajlov 1988, Michajlov & Kuročkin 1988), Suvorovskoe, Molavia (Ganea 1972: 24), Tatareşti, Moldova (Ganea 1972: 25), Kotlovina, Ukraine (Dubrovo & Kapelist 1979); late Pliocene (MN 16-17) of Dolinskoe, Ukraine (Dubrovo & Kapelist 1979); late Pliocene (MN 17) of Matveev Kurgan, Russia (Gromov 1948, Burčak-Abramovič 1953a), Liveneck, Russia (Jan'kova 1959); late Pliocene (MN 18) of Kisláng, Hungary (Kretzoi 1954a, 1955a, Jánossy 1986, Michajlov 1988, Michajlov & Kuročkin 1988);

undated Pliocene (MN 14-17) of Semenovka, Russia (Pidopličko & Goldin 1964); and doubtfully early Pleistocene (MQ 1a) of Kryžanovka 2, Ukraine (Dubrovo & Kapelist 1979).

Extralimital records of *chersonensis* from the Pleistocene of China (Eastman 1898a,b, Andersson 1923), based on eggshells, refer probably to another *Struthio* species (Lowe 1931, Lambrecht 1933).

Additional reference: Burčak-Abramovič & Kon'kova (1967).

Remarks: Until the opposite is proved, I believe that only one *Struthio* species inhabited Europe, that this species spread to it from the east in MN 9-10 and became extinct at the Plio-Pleistocene boundary. Brodkorb (1963: 197) included also *Struthio karatheodoris* Forsyth Major in the synonymy of *Struthio chersonensis* (Brandt), but I prefer to treat *karatheodoris* as a species separate from *chersonensis* for zoogeographical grounds. The areas of *Struthio chersonensis* (Brandt) and *Struthio karatheodoris* Forsyth Major were separated by Caucasus Mountains. Turkey and Greece were connected by land only in MN 13 (Steiniger & Rögl 1984), i.e. long after ostriches were recorded from both eastern Europe and southwestern Asia.

Struthio karatheodoris Forsyth Major

Struthio karatheodoris Forsyth Major, 1888: 1178 [Holotype from Samos 1: femur. Said to be in coll. Barbey (Lambrecht 1933: 100); present location unknown. Figured by Martin 1903, fig. 30-31.]

Distribution: Late Miocene (MN 11) of Samos 1, Greece (Forsyth Major 1888, 1892, 1894, Lydekker 1891a, Martin 1903, Lowe 1931, Lambrecht 1933: 100-101, Solounias 1981).

Remarks: The island of Samos was connected with the Asian mainland during the late Miocene (Solounias 1981). Martin (1903) suggested, that *Struthio asiaticus* Milne-Edwards is a direct descendant of *Struthio karatheodoris* Forsyth Major. It is well possible, that *Struthio karatheodoris* Forsyth Major is identical with some or all of the Mio-Pliocene ostriches described from Siwalik Hills in NW India and adjacent parts of Pakistan (see Brodkorb 1963c: 197). If so, *Struthio asiaticus* Milne-Edwards, 1871 would be the oldest available name for the species. The case requires further study.

Order Phaethontiformes Sharpe

Phaethontes Sharpe, 1891 [Modern order.]
Gaviiformes Wetmore & Miller, 1926 [Modern order.]

Family Gaviidae Allen

Gaviidae Allen, 1897 [Modern family.]
Colymboididae Brodkorb, 1963c: 222 [Type genus: *Colymboides* Storer, 1956.]

Genus *Colymboides* Storer

Colymboides Milne-Edwards, 1867: 297 [Type by monotypy: *Colymboides minutus* Milne-Edwards, 1867.]

Hydrornis Milne-Edwards, 1867: 362 [Type by monotypy: *Hydrornis natator* Milne-Edwards, 1867b. This is a junior homonym of *Hydrornis* Blyth, 1843.]

Dyspetornis Oberholser, 1905: 60 [New name for *Hydrornis* Milne-Edwards, 1867.]

Distribution: Late Eocene (MP 17) of England, and early Miocene (MN 2-4) of France and Czechia.

Colymboides anglicus Lydekker

Colymboides anglicus Lydekker, 1891a: 43 [Holotype from Hordle: left coracoid; BMNH 303330. Figured by Lydekker 1891a, fig. 43, and Harrison & Walker 1976a, pl. 1, fig. m-p.]

Distribution: Late Eocene (MP 17) of Hordle, England (Lydekker 1891a: 192-193, Harrison 1976, Harrison & Walker 1976a).

Colymboides minutus Milne-Edwards

Colymboides minutus Milne-Edwards, 1867b: 297 [Holotype from Saint-Gérand-le-Puy: left humerus; MNHN Av-6581. Figured by Milne-Edwards 1867-1868, pl. 54, fig. 1-3. Cheneval (1984a: 40, 44) erroneously called this specimen lectotype.]

Hydrornis natator Milne-Edwards, 1867b: 362 [Holotype from Saint-Gérand-le-Puy: right tarsometatarsus. Figured by Milne-Edwards 1867-1868, pl. 57, fig. 18-22. Cheneval (1984a: 40) erroneously listed this specimen as a paralectotype of *Colymboides minutus* Milne-Edwards.]

Dyspetornis natator (Milne-Edwards): Oberholser, 1905: 60 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1867-1868, Storer 1956, Cheneval 1984a); early Miocene (MN 2-3) of Saucats, France (Lucazeau 1959); and early Miocene (MN 4b) of Dolnice, Czechia (Švec 1982, 1985).

Remarks: *Hydrornis natator* Milne-Edwards was synonymized with *Colymboides minutus* Milne-Edwards by Storer (1956: 423).

Genus *Gavia* Foster

Gavia Forster, 1788 [Modern genus.]

Gavia egeriana Švec

Gavia egeriana Švec, 1982: 251 [Holotype from Dolnice: distal end of left humerus; DP FNSP 4816. Figured by Švec 1982, pl. 1, fig. 1a, text-fig. 8a.]

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Švec 1982). Tentative extralimital records were reported from the middle Miocene of Virginia, Maryland, North Carolina and Delaware (Rasmussen 1998).

Gavia schultzi Mlíkovský

Gavia schultzi Mlíkovský, 1998b: 332 [Holotype from Sankt Margarethen: right coracoid; NHMW 1986/92. Figured by Mlíkovský 1998b, pl. 1, fig. 1-3.]

Distribution: Middle Miocene (MN 7) of Sankt Margarethen, Austria (Mlíkovský 1998b).

Gavia moldavica Kessler

Gavia moldavica Kessler, 1984b: 522 [Holotype from Chişinău: proximal end of right carpometacarpus; LPUB 273/1. Figured by Kessler 1984b, fig. 1-2.]

Distribution: Late Miocene (MN 9?) of Chişinău, Moldova (Kessler 1984b).

Gavia paradoxa Umans'ka

Gavia paradoxa Umans'ka, 1981: 17 [Holotype from Čebotarevka: proximal end of left ulna; IZAN 45-4043. Figured by Umans'ka 1981, fig. 1a,b,v.]

Distribution: Late Miocene (MN 11-13) of Čebotarevka, Ukraine (Umans'ka 1981).

Gavia sp.

Distribution: Middle Miocene (MN 7) of Steinheim, Germany (Heizmann & Hesse 1995: three different species); early Pliocene (MN 14-15) of Kerč' Peninsula 2, Ukraine (Kuročkin in Delle Cave et al. 1984: 89), and Empoli, Italy (Delle Cave et al. 1984 sub cf. *Gavia concinna*); and early Pleistocene (MQ 1a) of Kairy, Ukraine (Vojinstvens'kyj 1967). The record from the middle Eocene (MP 11-13) of Geiseltal, Germany (Mlíkovský in Delle Cave et al. 1984: 88) is invalid (Mlíkovský 1998b: 333).

Remarks: The record from Empoli (Delle Cave et al. 1984) is based on a skull, which was tentatively referred to *Gavia concinna* Wetmore, originally described from the late Miocene (late Hemphillian) of California (Wetmore 1940a), and later reported also from the late Miocene of Florida (Brodkorb 1953, Emslie 1995), and the late Pliocene of California (Howard 1949, Miller 1956). The Pliocene record from California is invalid according to Chandler (1990). The Italian skull fits the same element of the modern European *Gavia arctica* (Linnaeus, 1758) in size and morphology, and may belong to the latter species. There is no indication, that *Gavia concinna* Wetmore occurred in Europe.

Family Phaethontidae Brandt

Phaethontidae Brandt, 1840 [Modern family.]

Prophaethontidae Harrison & Walker, 1976c: 28 [Type genus: *Prophaethon* Andrews, 1899.]

Genus *Prophaethon* Andrews, 1899

Prophaethon Andrews, 1899: 776 [Type by monotypy: *Prophaethon shrubsolei* Andrews, 1899.]

Remarks: Some authors prefer to separate this genus at the family level (Harrison & Walker 1976c, 1977a, Olson 1985a).

Prophaethon shrubsolei Andrews

Prophaethon shrubsolei Andrews, 1899: 776 [Holotype from Sheppey: associated bones, incl. imperfect skull, mandible, anterior fragment of sternum, distal end of left coracoid, left scapula, 11 vertebrae, synsacrum, right femur, proximal end of left femur, proximal end of right tibiotarsus; BMNH A-683. Figured by Andrews 1899, text-fig. 1-2, pl. 51, fig. 1-2, Harrison & Walker 1976c, 1977a, text-fig. 9-11, pl. 5, fig. A-E.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Andrews 1899, Harrison & Walker 1976c, 1977a).

Genus *Heliadornis* Olson

Heliadornis Olson, 1985b: 852 [Type by original designation: *Heliadornis ashbyi* Olson, 1985b.]

Distribution: Middle Miocene (MN 7-8) of Belgium and late Miocene (MN 10) of Austria. Extralimital record comes from the middle Miocene of Maryland (Olson 1985b).

Heliadornis ashbyi Olson

Heliadornis ashbyi Olson, 1985b: 852 [Holotype from Parker Creek: associated proximal end of left humerus and proximal end of left scapula; USNM 237226. Figured by Olson 1985b, fig. 1a,c,e (humerus), and 1g,i (scapula).]

Distribution: Middle Miocene (MN 7-8) of Antwerp, Belgium (Olson & Walker 1997). An extralimital record is known from the middle Miocene (Langhian) of Parker Creek, Maryland (Olson 1985a, Olson & Walker 1997).

Heliadornis paratethydicus Mlíkovský

Heliadornis paratethydicus Mlíkovský, 1997b: 152 [Holotype from Vösendorf: proximal end of right ulna; NHMW 1996/0184/0001. Figured by Mlíkovský 1997b, fig. 1.]

Distribution: Late Miocene (MN 10) of Vösendorf, Austria (Mlíkovský 1997b).

Order Ardeiformes Wagler

Ardeae Wagler, 1831 [Modern order.]

Family Sulidae Reichenbach

Sulidae Reichenbach, 1849 [Modern family.]

Pseudosulidae Harrison, 1975a: 53 [Type genus: *Pseudosula* Harrison, 1975a = *Enkurosula* Kašin, 1975a.]

Enkurosulidae Kašin, 1977: 139 [Type genus: *Enkurosula* Kašin, 1977.]

Remarks: Generic position of European Tertiary sulids is far from understood (Olson 1985a: 203-204). It is well possible, that at least some of the Oligo-Miocene sulids will be attributed to modern genera after a proper restudy.

If *Enkurosula* Kašin is separated at a suprageneric level, then the the family-group name Enkurosulidae Kašin has precedence over Pseudosulidae Harrison (Mlíkovský 2000d: 79).

Genus *Eostega* Lambrecht

Eostega Lambrecht, 1929: 1272 [Type by monotypy: *Eostega lebedinskyi* Lambrecht, 1929.]

Eostega lebedinskyi Lambrecht

Eostega Lebedinskyi Lambrecht, 1929: 1272 [Holotype from Cluj-Manastur: incomplete lower jaw; NHMW 1930/I/13. Figured by Lambrecht, 1929, fig. 12-13, Lambrecht 1933, fig. 103, and Jurcsák & Kessler 1973, fig. 8.]

Distribution: Middle Eocene (MP 13) of Cluj-Manastur, Romania (Lambrecht 1929, Kessler 1986, Mlíkovský in prep.).

Remarks: Lambrecht (1929) did not include the species in a family, indicating that is represents a "steganopode" (= a pelecaniform bird). Subsequently, the species was included in the family Elopterygidae (Lambrecht 1933, Brodkorb 1963c). I reexamined the fossil, concluding that it is a member of the Sulidae (Mlíkovský orig.).

Genus *Empheresula* Harrison

Parasula Harrison, 1975a: 53 [Type by original designation: *Sula arvernensis* Milne-Edwards, 1867b. This is junior homonym of *Parasula* Mathews, 1913.]

Empheresula Harrison, 1975b: 175 [Type by original designation: *Sula arvernensis* Milne-Edwards, 1867b.]

Empheresula arvernensis (Milne-Edwards)

Sula arvernensis Milne-Edwards, 1867b: 267 [Lectotype from Gannat (selected by Cheneval 1984a: 65): incomplete pelvis in slab; MNHN 1903-16. Figured by Milne-Edwards 1867-1868, pl. 43, fig. 12. Paralectotype from Gannat: incomplete sternum in slab; MNHN 1903-16. Figured by Milne-Edwards 1867-1868, pl. 42, fig. 13. Cheneval (1984a: 65) stated that the selection of the lectotype was done by Lydekker (1891a: 46), but the latter author just diagnosed *Sula arvernensis* on the basis of the morphology of its pelvis, not mentioning the syntypical sternum. This cannot be interpreted as a selection of a lectotype, so that this action has to be attributed to Cheneval (1984a) himself. Note that the catalogue number in NMNH is the same for both syntypes of *Sula arvernensis* Milne-Edwards and for *Tetrao pessieti* Gervais.]

Parasula arvernensis (Milne-Edwards): Harrison 1975a: 53 [New combination.]

Empheresula arvernensis (Milne-Edwards): Harrison 1975b: 175 [New combination.]

Distribution: Late Oligocene (MP 30) of Gannat, France (Milne-Edwards 1867-1868, Lydekker 1891a, Harrison 1975a,b, Cheneval 1984a), and early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Cheneval 1984a, tentatively included).

Remarks: The paralectotypical sternum does not belong to the Sulidae according to Lambrecht (1933: 285).

Genus *Enkurosula* Kašin

Pseudosula Harrison, 1975a: 53 [Type by original designation: *Sula pygmaea* Milne-Edwards, 1874. This is a junior homonym of *Pseudosula* Boetticher, 1955]

Enkurosula Kašin, 1977: 139 [New name for *Pseudosula* Harrison, 1975a; hence its junior objective synonym.]

Enkurosula pygmaea (Milne-Edwards)

Sula pygmaea Milne-Edwards, 1874: 8 [Holotype from Léognan: left humerus; formerly in coll. Delfortrie, present location unknown. Figured by Milne-Edwards 1874, pl. 12, fig. 2.]

Microsula pygmaea (Milne-Edwards): Brodkorb 1963c: 259 [New combination.]

Pseudosula pygmaea (Milne-Edwards): Harrison 1975a: 53 [New combination.]

Enkurosula pygmaea (Milne-Edwards): Kašin 1977: 139 [New combination.]

Distribution: Early Miocene (MN 2-3) of Léognan, France (Milne-Edwards 1874, Harrison 1975a).

Genus *Sarmatosula* Grigorescu & Kessler

Sarmatosula Grigorescu & Kessler, 1977: 94 [Type by monotypy: *Sarmatosula dobrogensis* Grigorescu & Kessler, 1977.]

Sarmatosula dobrogensis Grigorescu & Kessler

Sarmatosula dobrogensis Grigorescu & Kessler, 1977: 94 [Holotype from Credința: proximal end of left humerus; LPUB 251. Figured by Grigorescu & Kessler 1977, pl. 1, fig. 1a-b, pl. 4, fig. B.]

Distribution: Middle Miocene (MN 8) of Credința, Romania (Grigorescu & Kessler 1977), and Ciobanița, Romania (Grigorescu & Kessler 1977).

Genus *Morus* Vieillot

Morus Vieillot, 1816 [Modern genus.]

Morus olsoni Grigorescu & Kessler

Morus olsoni Grigorescu & Kessler, 1988: 94 [Holotype from Credința: right carpometacarpus; LPUB 281. Figured by Grigorescu & Kessler 1998, fig. 2, 3a-b.]

Distribution: Middle Miocene (MN 8) of Credința, Romania (Grigorescu & Kessler 1988), and Ciobănița, Romania (Grigorescu & Kessler 1988).

Family Ardeidae Leach

Ardeidae Leach, 1820 [Modern family.]

Remarks: All Oligo-Miocene species included in this family require revision.

Genus *Proardeola* Harrison

Proardeola Harrison, 1979a: 14 [Type by original designation: *Proardeola walkeri* Harrison, 1979a.]

Proardeola walkeri Harrison

Ardea formosa Milne-Edwards, 1871: 572 [Nomen nudum; no description or indication.]

Proardeola walkeri Harrison, 1979a: 14 [Holotype from Saint-Gérand-le-Puy: left tarsometatarsus; BMNH A-777. Figured by Harrison 1979a, fig. 2, and Cheneval 1984a, pl. 5, fig. 7a-b.]

Ardeola walkeri (Harrison): Mlíkovský & Švec 1989: 200 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Harrison 1979a, Cheneval 1984a); and middle Miocene (MN 6) of Mátraszőlős 2, Hungary (Gál & Kessler in Gál et al. 2000).

Remarks: *Ardea formosa* Milne-Edwards was neither described nor figured by Milne-Edwards (1869-1871), hence it is a nomen nudum (see also Lydekker 1891a: vii, Lambrecht 1933: 312, Brodkorb 1978: 222; contra Cheneval 1984a: 77). Cheneval (1984a: 77-78) discovered in MNHN right coracoid (MNHN Av-2872, figured by Cheneval 1984a, pl. 5, fig. 6a-b) from Saint-Gérand-le-Puy, which was available to Milne-Edwards, and believed accordingly that *Ardea formosa* Milne-Edwards is an available name. This is not true (ICZN 1999, Art. 12.3), but Cheneval's discovery of the "type" allows to list *Ardea formosa* Milne-Edwards as a nomen nudum in the synonymy of *Proardeola walkeri* Harrison.

Proardeola Harrison is possibly synonymous with *Proardea* Lambrecht (C. Mourer-Chauviré in Olson 1985a: 167), and it is even possible that *Proardeola walkeri* Harrison is synonymous with *Ardea* (= *Proardea*) *amissa* Milne-Edwards (Mlíkovský orig.).

Genus *Proardea* Lambrecht

Proardea Lambrecht, 1933: 311 [Type by monotypy: *Ardea amissa* Milne-Edwards, 1892.]

Proardea amissa (Milne-Edwards)

Ardea amissa Milne-Edwards, 1892: 73 [Holotype from Quercy: right tarsometatarsus; MNHN QU-15720. Not figured.]

Proardea amissa (Milne-Edwards): Lambrecht 1933: 311 [New combination.]

Egretta amissa (Milne-Edwards): Mlíkovský & Švec 1989: 200 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892).

Remarks: This species was said to belong in the subfamily Ardeinae (C. Mourer-Chauviré in Cheneval 1984a: 81), similarly as *Proardeola walkeri* Harrison. Both *Ardea amissa* Milne-Edwards and *Proardeola walkeri* Harrison were said to be rather similar to the modern *Ardeola* Boie, 1822, and their holotypical tarsometatarsi are similar in size. I suspect that further research will show that these two forms are conspecific.

Genus *Ardeagrandis* Kuročkin & Ganea

Ardeagrandis Kuročkin & Ganea, 1972: 51 [Type by original designation: *Ardeagranda* [sic!] *arborea* Kuročkin & Ganea, 1972.]

Ardeagrandis arborea Kuročkin & Ganea

Ardeagrandis arborea Kuročkin & Ganea, 1972: 52 [Holotype from Golboçica: proximal end of right tarsometatarsus; GIKM 12173/1. Figured by Kuročkin & Ganea 1972, text-fig. 3, pl. 1, fig. 4.]

Distribution: Late Miocene (MN 9) of Golboçica, Moldova (Kuročkin & Ganea 1972).

Genus *Ardea* Linnaeus

Ardea Linnaeus, 1758 [Modern genus.]

Ardea aurelianensis Milne-Edwards

Ardea aurelianensis Milne-Edwards, 1871: 585 [Holotype from Orleanais: a humerus; present location unknown – Cheneval 1996: 604. Not figured.]

Distribution: Early Miocene (MN 4) of Orleanais, France (Milne-Edwards 1871).

Remarks: The holotypical humerus was said to be by 1/7 longer than the same element of the modern *Ixobrychus minutus* (Linnaeus, 1766), but still slightly shorter that that of the modern *Ardeola ralloides* (Scopoli, 1769) (Milne-Edwards 1871: 585). Hence *Ardea aurelianensis* falls in the same size class as *Prordea amissa* (Milne-Edwards) and *Proardeola walkeri* Harrison. It is possible that these three forms are conspecific.

Ardea cinerea Linnaeus – Grey Heron

Ardea cinerea Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965 sub. *A*. cf. *cinerea*).

Ardea sp.

Remarks: Diaphysis of a tibiotarsus from the late Miocene (MN 9) of Kalfa, Moldova, was referred to *Ardea* sp. by Ganea (1965), but it represents an unidentified member of the Anatidae (Kuročkin & Ganea 1972).

Genus *Egretta* Forster

Egretta Forster, 1817 [Modern genus.]

Egretta garzetta Linnaeus – Little Egret

Ardea Garzetta Linnaeus, 1766 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *E.* cf. *garzetta*).

Genus *Botaurus* Stephen

Botaurus Stephen, 1819 [Modern genus.]

Botaurus stellaris (Linnaeus) – Great Bittern

Ardea stellaris Linnaeus, 1758 [Modern species.]

Nycticorax fenensis Friant, 1950a: 2126 [Lectotype from Reach (here selected): partial skeleton, incl. partial skull (SMC 753), mandible (SMC 790), coracoid, humerus, ulna, carpometacarpus, and femur; SMC Reach-1901. Figured by Friant 1950a, unnumbered fig. (skull and mandible), and Friant 1950b, fig. 2 (skull and mandible). Paralectotypes from Reach and Burwell: incomplete skeletons Reach-1902, incl. humerus and femur; Reach-1904, incl. coracoid, sternum, humerus, ulna, carpometacarpus, femur and tarsometatarsus; Burwell-1897, incl. skull, mandible (SMC 162), coracoid (SMC 149), sternum (SMC 136), ulna, carpometacarpus (SMC 146), femur, tibiotarsus and tarsometatarsus; Burwell-1900, incl. carpometacarpus, femur and tibiotarsus; Burwell-1903, incl. skull (SMC 1252); and Burwell-1907, incl. skull (SMC 1554), cervical vertebra (SMC 1568), coracoid, scapula (SMC 1569), furcula (SMC 1578), humerus (SMC 1555), ulna (SMC 1557), radius (SMC 1560), femur (SMC 1561), tibiotarsus (SMC 1564), tarsometatarsus (SMC 1565), and pedal phalanx (SMC 1572). Figured by Friant 1950b, pl. 1 (SMC 136, 146, 149, 162 and 1252), pl. 2 (SMC 1555, 1557, 1560, 1569 and 1578), and pl. 3 (SMC 1554, 1561, 1564, 1565, 1572, 1579 and 1586). List of specimens and catalogue numbers were derived from Friant 1950b. More bones and bone fragments than indicated are probably available per syntypical skeleton.]

Nycticorax fenensis Friant, 1950b: 333 [Same syntypes as for *Nycticorax fenensis* Friant, 1950a. This is both a junior objective synonym and a junior primary homonym of *Nycticorax fenensis* Friant, 1950a.]

Distribution: Holocene (Mesolithic) of Burwell and Reach, Cambridgeshire fens, England (Milne-Edwards 1869-1871: 108, Lydekker 1891c, Bell 1915, Friant 1950a,b sub *N. fenensis*, Northcote 1980, 1982d).

Remarks: In describing the species, Friant (1950a,b) was apparently mislead by the length and shape of the bill of a juvenile Bittern found in the collections under the catalogue number Reach-1901. Northcote (1980, 1982d) overlooked Friant's identification of these bones and restudied them, finding that they belong to the modern *Botaurus stellaris* (Linnaeus). Based on her results I formally synonymize here *Nycticorax fenensis* Friant, 1950a and *Nycticorax fenensis* Friant, 1950b with the modern *Botaurus stellaris* (Linnaeus, 1758).

Genus incertae sedis

"*Anas*" *basaltica* Bayer

Anas basaltica Bayer, 1882: 20 [Holotype from Varnsdorf: cranial end of left coracoid, cranial end of left scapula, proximal end of left humerus and a rib fragment, all probably from a single individual, in slab and counter-slab; NMP ČM-119, cast in NHMW, uncatalogued. Figured by Bayer 1882, fig. 8/1, Bayer 1883, fig. 1, and Mlíkovský & Švec 1989, pl. 1, fig. a,c.]

Anas basaltica Bayer, 1883: 62 [Same holotype, repeated description.]

Distribution: Middle Oligocene (MP 23-24) of Varnsdorf, Czechia (Bayer 1882, 1883, Mlíkovský & Švec 1989).

Remarks: Described as a duck. This is an indeterminate heron of the subfamily Ardeinae (Mlíkovský & Švec 1989).

Family Phalacrocoracidae Reichenbach

Phalacrocoracidae Reichenbach, 1850 [Modern family.]

Genus *Nectornis* Cheneval

Nectornis Cheneval, 1984a: 56 [Type by original designation: *Graculus miocaenus* Milne-Edwards, 1867b.]

Distribution: Early Miocene (MN 2a-4b) of France, Germany and Czechia. Extralimital record is confined to *Nectornis anatolicus* (Mourer-Chauviré) from the middle Miocene (MN 6-8) of Bes-Konak in Turkey (Mourer-Chauviré 1978, Mlíkovský 1999c).

Nectornis miocaenus (Milne-Edwards)

Graculus miocaenus Milne-Edwards, 1867b: 255 [Lectotype from Saint-Gérand-le-Puy (selected by Cheneval 1984a: 56): right tarsometatarsus; MNHN Av-9416. Figured by Milne-Edwards 1867-1868, pl. 39, fig. 5-9, Cheneval 1984a, pl. 3, fig. 7a,b. Paralectotypes from Saint-Gérand-le-Puy: sternum (MNHN Av-9323), right wing of furcula (MNHN Av-9442), right coracoid (MNHN Av-9326), scapula (MNHN Av-9375), left ulna (MNHN Av-9375), pelvis (MNHN Av-9452), left femur (MNHN Av-9406). Figured by Milne-Edwards 1867-1868, pl. 39, fig. 5, 13-16 (femur), 17-18 (pelvis), pl. 41, fig. 1-4 (sternum), 5-6 (furcula), 7-8 (coracoid), 9-10 (scapula), pl. 42, fig. 3-4 (ulna), and Cheneval 1984a, pl. 3, fig. 1(furcula), 2a,b (coracoid), 4a,b (ulna), 5a,b (femur).

Phalacrocorax miocaenus (Milne-Edwards): Lydekker 1891a: 54 [New combination.]

Oligocorax miocaenus (Milne-Edwards): Lambrecht 1931b: 81 [New combination, but *Oligocorax* was nomen nudum at this point.]

Nectornis miocaenus (Milne-Edwards): Cheneval 1984a: 56 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards, 1867-1868, Cheneval 1984a), early Miocene (MN 2) of Ravolzhausen, Germany (Martini 1974 sub *Phalacrocorax littoralis*, Cheneval 1984a), and early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský orig.).

Genus *Phalacrocorax* Brisson

Phalacrocorax Brisson, 1760 [Modern genus.]

Botaurites Ammon, 1918: 31 [Type by monotypy: *Botaurites avitus* Ammon, 1918.]

Oligocorax Lambrecht, 1931b: 80 [Nomen nudum; type not fixed after 1930.]

Oligocorax Lambrecht, 1933: 290 [Nomen nudum; type not fixed after 1930.]

Paracorax Lambrecht, 1933: 292 [Type by monotypy: *Phalacrocorax destefanii* Regàlia, 1902.]

Pliocarbo Tugarinov, 1940a: 205 [Type by original designation: *Pliocarbo longipes* Tugarinov, 1940a.]

Oligocorax Brodkorb, 1952: 175 [Type by original designation: *Graculus littoralis* Milne-Edwards, 1863.]

Phalacrocorax littoralis (Milne-Edwards)

Graculus littoralis Milne-Edwards, 1863: 161 [Holotype from Saint-Gérand-le-Puy: proximal end of right tarsometatarsus, MNHN Av-9434. Figured by Milne-Edwards 1867-1868, pl. 42, fig. 5-8, Cheneval 1984a, pl. 2, fig. 7a-c. Cheneval (1984a: 53, 55) overlooked that Milne-Edwards (1863: 161) expressly based this species only on the tarsometatarsus, and erroneously considered all the five elements figured by Milne-Edwards (1867-1868) syntypes, selecting left humerus, MNHN Av-9421, as the lectotype of the species. His action is invalid. The "lectotype" was figured by Milne-Edwards 1867-1868, pl. 44, fig. 1-5, and Cheneval 1984a, pl. 2, fig. 3a-b.]

Phalacrocorax littoralis (Milne-Edwards): Lydekker 1891a: 56 [New combination.]

Oligocorax littoralis (Milne-Edwards): Lambrecht 1931b: 81 [New combination, but *Oligocorax* was nomen nudum at this point.]

Distribution: Early Miocene (MN 1) of Weisenau-AS, Germany (Lambrecht 1933: 290, locality uncertain); early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1867-1868, Cheneval 1984a); and early Miocene (MN 3) of Merkur, Czechia (Mlíkovský orig.). The record from the early Miocene (MN 2) of Ravolzhausen, Germany (Martini 1974), is invalid, because the material belongs to *Nectornis miocaenus* (Milne-Edwards) (Cheneval 1984a). The extralimital record from the late Miocene (MN 9) of Bled ed Dourah in Tunisia (Rich 1972) is dubious because of its age (Mlíkovský orig.).

Phalacrocorax intermedius (Milne-Edwards)

Graculus intermedius Milne-Edwards, 1867b: 266 [Holotype humerus from Orleanais: proximal end of left; formerly in coll. Nouel, present location unknown. Figured by Milne-Edwards 1867-1868, pl. 43, fig. 8-11. Brodkorb (1963: 251) stated that the holotypical humerus is from the right side of the body. However, bones are drawn side-reversed in Milne-Edwards 1867-1868, which makes it probable, that the specimen originated from the left side of body.]

Phalacrocorax intermedius (Milne-Edwards): Lydekker 1891a: 53 [New combination.]

Phalacrocorax praecarbo Ammon, 1918: 28 [Holotype from Dechbetten: humeral end of left coracoid, SMF, uncatalogued. Figured by Ammon 1918, fig. 3.]

Ardea brunhuberi Ammon, 1918: 30 [Holotype from Dechbetten: proximal end of left carpometacarpus, SMF, uncatalogued. Figured by Ammon 1918, fig. 4.]

Botaurites avitus Ammon, 1918: 31 [Holotype from Dechbetten: cervical vertebra, SMF, uncatalogued. Figured by Ammon 1918, fig. 5-6.]

Miocorax intermedius (Milne-Edwards): Lambrecht 1933: 292 [New combination.]
Phalacrocorax brunhuberi (Milne-Edwards): Brodkorb 1980: 91 [New combination.]

Distribution: Early Miocene (MN 3) of Břešťany, Czechia (Mlíkovský 1999c), early Miocene (MN 4) of Orleanais, France (Milne-Edwards 1867-1868, Mlíkovský 1992b); and middle Miocene (MN 7-8) of Dechbetten, Germany (Ammon 1918, Lambrecht 1933, Brodkorb 1980, Olson 1985a, Mlíkovský 1992b).

Remarks: *Phalacrocorax praecarbo* Ammon and *Botaurites avitus* Ammon were synonymized with *Phalacrocorax brunhuberi* (Ammon) by Brodkorb (1980) and Olson (1985a: 67). The latter species was subsequently synonymized with *Phalacrocorax intermedius* (Milne-Edwards) by Mlíkovský (1992b: 437).

Phalacrocorax ibericus Villalta

Phalacrocorax ibericum Villalta, 1963: 267 [Holotype from Valles de Fuentidueña: distal end of right humerus; CV 3362. Figured by Villalta 1963, pl. 2, fig. 4, 4a.]
Phalacrocorax ibericus Villalta: Mlíkovský, this paper [Ending corrected.]

Distribution: Late Miocene (MN 9) of Valles de Fuentidueña, Spain (Villalta 1963).

Remarks: The figures show a highly abraded fragment, unsuitable for exact identification.

Phalacrocorax lautus Kuročkin & Ganea

Phalacrocorax lautus Kuročkin & Ganea, 1972: 47 [Holotype from Golboçica: proximal end of right femur; GIKM 12173/3c. Figured by Kuročkin & Ganea 1972, text-fig. 1, pl. 1, fig. 1.]

Distribution: Late Miocene (MN ?9) of Golboçica, Moldova (Kuročkin & Ganea 1972). The partial carpometacarpus from the late Miocene (MN ?9) of Chişinău, Moldova, tentatively attributed to *Phalacrocorax lautus* Kuročkin & Ganea by Kessler (1984b), became later holotype of *Branta minor* Kessler & Gál (Kessler & Gál 1996).

Remarks: This species agrees in size and age with *Phalacrocorax ibericus* Villalta, with which it was not compared (but see above under *Phalacrocorax ibericus* Villalta).

Phalacrocorax longipes (Tugarinov)

Pliocarbo longipes Tugarinov, 1940a: 205 [Lectotype from Novaja Slobodka (selected by Brodkorb 1963c: 254): right tarsometatarsus; PIN 228-2. Figured by Tugarinov 1940a, fig. 1a-b; and Dement'ev 1964, fig. 693b,v. Paralectotype from Novaja Slobodka: right femur; PIN 228-1. Figured by Tugarinov 1940a, fig. 2; and Dement'ev 1964, fig. 693a. Brodkorb (1963c: 254) stated that this species was based on a tarsometatarsus, not mentioning the syntypical femur. Nevetheless, this can be interpreted as a selection of the lectotype.]
Phalacrocorax longipes (Tugarinov): Mlíkovský, this paper [New combination.]

Distribution: Late Miocene (MN 11-13) of Novaja Slobodka, Ukraine (Vidgal'm 1886 sub *Haliaeus fossilis* var. *odessana major*, Tugarinov 1940a, Burčak-Abramovič & Nikolov 1984), Škodova Hill, Ukraine (Vojinstens'kyj 1967), unspecified surroundings of Odesa, Ukraine (Dubrovo & Kapelist 1979); and early Pliocene (MN 15) of Odesa – catacombs, Ukraine (Vojinstves'kyj 1967).

Remarks: Burčak-Abramovič (in Burčak-Abramovič & Nikolov 1984: 24) concluded that *Pliocarbo longipes* is a typical cormorant, differing from *Phalacrocorax carbo* (Linnaeus) in being larger, but retained its generic position. Accordingly, I synonymize here *Pliocarbo* Tugarinov with the modern genus *Phalacrocorax* Brisson.

Phalacrocorax serdicensis Burčak-Abramovič & Nikolov

Phalacrocorax serdicensis Burčak-Abramovič & Nikolov, 1984: 25 [Holotype from Chrabărsko: proximal end of right humerus; NMNHS 1-1/15. Figured by Burčak-

Abramovič & Nikolov 1984, fig. 1, 1a.]

Distribution: Late Miocene (MN 11-13) of Chrabărsko, Bulgaria (Burčak-Abramovič & Nikolov 1984).

Remarks: This species agrees in size, habitat and geographic distribution with the modern *Phalacrocorax aristotelis* (Linnaeus), with which it was not compared.

Phalacrocorax aristotelis (Linnaeus) – European Shag

Pelecanus aristotelis Linnaeus, 1761 [Modern species.]

Phalacrocorax De Stefanii Regàlia, 1902: 225 [Syntypes from Orciano Pisano: one cervical and two thoracic vertebrae, fragmentary furcula, right coracoid, proximal end of left humerus, distal end of left humerus, left ulna, proximal end of left femur, fragmentary shaft of tibiotarsus, right tarsometatarsus, pedal phalanx; present location unknown – Delle Cave 1996. Figured by Regàlia 1902, pl. 27, fig. 4 (cervical vertebra), 5-6 (furcula), 7 (coracoid), 8 (proximal end of humerus), 9 (distal end of humerus), 10 (ulna), 11 (femur), 12 (tibiotarsus), 13-14 (tarsometatarsus).]

Paracorax De Stefanii (Regàlia): Lambrecht 1933: 292 [New combination.]

Phalacrocorax destefani Regàlia: Brodkorb 1963: 252 [Spelling emended.]

Phalacrocorax destefanii Regàlia: Mlíkovský this paper [Spelling emended.]

Distribution: Middle Pliocene (MN 15-16) of Orciano Pisano, Italy (Regàlia 1902).

Remarks: *Phalacrocorax destefanii* Regàlia was found in marine deposits and falls in the size class of the modern *Phalacrocorax aristotelis* (Linnaeus), which still inhabits the region. In absence of the evidence to the contrary, I synonymize here the former with the latter species.

Phalacrocorax carbo (Linnaeus) – Great Cormorant

Pelecanus Carbo Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Overstrand, England (Harrison 1979d, 1985b), West Runton – unknown bed, England (Newton 1891, Harrison 1979d), and Přezletice, Czechia (Jánossy 1983 sub *P.* cf. *carbo*, Mlíkovský orig.).

Family Anhingidae Reichenbach

Anhingidae Reichenbach, 1849 [Modern family.]

Genus *Anhinga* Ridgway

Anhinga Ridgway, 1887 [Modern genus.]

Anhinga pannonica (Lambrecht)

Plotus pannonicus Lambrecht, 1916a: 9 [Holotype from Tataruş-Brusturi: 6th cervical vertebra; ?GIB. Figured by Lambrecht 1916a, fig. 1, 3, 5. Rich (1972: 45) selected the 6th cervical vertebra from Tataruş-Brusturi as a lectotype of the species, erroneously believing that the species was based on the vertebra and on a carpometacarpus. Nevertheless, Lambrecht (1916a: 9) clearly based the species only on the vertebra, the carpometacarpus being a referred specimen (see also Brodkorb & Mourer-Chauviré 1982: 510). Rich's (1972) action is invalid.]

Anhinga pannonica (Lambrecht): Brodkorb 1963: 256 [New combination.]

Distribution: Late Miocene (MN 10) of Tataruş-Brusturi, Romania (Lambrecht 1916a), and Götzendorf, Austria (Mlíkovský 1992a). Extralimital record includes late Miocene (MN 9) of Bled ed Dourah 20, Tunisia (Rich 1972) and Miocene (MN 4-13) of Siwalik Mts., Pakistan (Harrison & Walker 1982).

Anhinga sp.

Distribution: Middle Miocene (MN 6-8) of Mátraszőlős 1, Hungary (Gál & Kessler in Gál et al. 1999 sub aff. *Anhinga* sp.).

Order Bucerotiformes Fürbringer

Bucerotes Fürbringer, 1888 [Modern order.]

Family Laurillardiidae Harrison

Laurillardiidae Harrison, 1979b: 108 [Type genus: *Laurillardia* Milne-Edwards, 1871.]
Messelirrisoridae Mayr, 1998c: 13 [Type genus: *Messelirrisor* Mayr, 1998c.]

Distribution: Early Eocene (MP 8) of England, middle Eocene (MP 11 or 13) of Germany, and late Eocene (MP 19) of France. In addition to the record listed below, Mayr (1998c: 27) listed the family also from the early Eocene (MP 8) of Walton-on-the-Naze, England, and from the middle Eocene (MP 11 or 13) of Geiseltal, Germany.

Remarks: Messelirrisoridae Mayr is synonymized here with the Laurillardiidae Harrison, following the discussion in Mayr (1998c).

Genus *Messelirrisor* Mayr

Messelirrisor Mayr, 1998c: 24 [Type by original designation: *Messelirrisor parvus* Mayr, 1998c.]

Distribution: Middle Eocene (MP 11) of Germany.

Remarks: Differences between *Messelirrisor* Mayr and *Laurillardia* Milne-Edwards were not demonstrated by Mayr (1998c), and it is well possible that the former will fall in the synonymy of the latter genus.

Messelirrisor parvus Mayr

Messelirrisor parvus Mayr, 1998c: 25 [Holotype from Messel: skeleton in slab; SMF ME-2793. Figured by Mayr 1998c, pl. 2.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1998c).

Messelirrisor halcyrostris Mayr

Messelirrisor halcyrostris Mayr, 1998c: 26 [Holotype from Messel: skeleton in slab; SMF ME-1883a,b. Figured by Mayr 1998c, pl. 1, pl. 3 left, and cover; and Mayr 2000g, fig. 1.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1998c).

Messelirrisor grandis Mayr

Messelirrisor grandis Mayr, 2000f: 965 [Holotype from Messel: partial skeleton in slab, incl. sternum, pectoral girdle and both wings; SMNK PAL-3803. Figured by Mayr 2000f, fig. 5.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 2000f).

Genus *Laurillardia* Milne-Edwards

Laurillardia Milne-Edwards, 1871: 374 [Type by monotypy: *Laurillardia longirostris* Milne-Edwards, 1871.]

Laurillardia longirostris Milne-Edwards

Laurillardia longirostris Milne-Edwards, 1871: 374 [Holotype from Montmartre: partial skeleton in slab; MNHN 7964. Figured by Cuvier 1822, pl. 75, fig. 6 (sub 9e espèce); Cuvier 1836, pl. 156, fig. 6 (sub 9e espèce); Milne-Edwards 1869-1871, pl. 161, fig. 1; Zittel 1890, fig. 719; and Mayr 1998c, pl. 3 right.]

Laurillardia parisiensis Flot, 1892: 1 [Holotype from Montmartre: incomplete skeleton in a slab and conterslab; present location unknown. Figured by Flot 1892, pl. 18, fig. 1-2, and text-fig. 1.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Cuvier 1822, 1836 sub 9[e] espèce, Milne-Edwards 1869-1871, Flot 1892 sub *Laurillardia parisiensis*, Brunet 1970, Harrison 1979b, Mayr 1998c).

Remarks: Milne-Edwards (1869-1871) placed this species in his "Passereaux", which included most arboreal birds, incl. the Wetmorean orders Cuculiformes, Coraciiformes, Piciformes and Passeriformes. Paris (1912: 284) and Brunet (1970: 47) included it in the Sturnidae (= Eulabeidae in Paris 1912) without explanation, Harrison (1979b: 107) believed that it is an ancient songbird (order Passeriformes), and Brodkorb (1978: 214) relegated this species in the category of Aves incertae sedis. Mayr (1998c: 13) identified the species as a relative of hoopoes.

Laurillardia parisiensis Flot was synonymized with *Laurillardia longirostris* Milne-Edwards by Brunet (1970), with whom I concur in this point.

Laurillardia munieri Flot

Laurillardia Munieri Flot, 1892: 7 [Holotype from Montmartre: incomplete skeleton in a slab; present location unknown. Figured by Flot 1892, pl. 18, fig. 3, and text-fig. 3.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Flot 1892, Brunet 1970).

Remarks: Brunet (1970) synonymized this species with *Laurillardia longirostris* Milne-Edwards, which however is larger in dimensions (Mlíkovský, orig.).

Family Upupidae Leach

Upupidae Leach, 1819 [Modern family.]

Genus *Upupa* Linnaeus

Upupa Linnaeus, 1758 [Modern genus.]

Upupa epops Linnaeus – Eurasian Hoopoe

Upupa epops Linnaeus, 1758 [Modern species]

Upupa phoeniculides Jánossy, 1974b: 231 [Holotype from Hundsheim: right coracoid; UWPI 1889/65. Not figured.]

Distribution: Middle Pleistocene (MQ 2A) of Hundsheim, Austria (Jánossy 1974b sub *Upupa phoeniculides*).

Remarks: Jánossy (1974b) separated this species from the modern *Upupa epops* Linnaeus on the basis of the shape of the ligamentum acrocoraco-procoracoideum, which is ossified in *Upupa* species, observing that the distal-medial edge of this ligament is smooth in *Upupa epops*, but edged in the holotype of *Upupa phoeniculides* and in the modern *Phoeniculus* Jarocki, 1821. I restudied the holotype and confirmed the condition for it and for *Phoeniculus* coracoids. However, I found that the edge of the ligament is smooth only in the modern *Upupa epops* from Europe, while it exhibits the *Phoeniculus* condition in all specimens of modern Hoopoes from Africa and southern Asia (ca. 20 specimens examined in USNM and two specimens in my comparative collection). Hence, I synonymize here *Upupa phoeniculides* Jánossy with the modern *Upupa epops* Linnaeus.

Upupa sp.

Distribution: Early Miocene (MN 3) of Merkur, Czech Republic (Mlíkovský, orig.).

Family Phoeniculidae Bonaparte

Phoeniculidae Bonaparte, 1831 [Modern family.]

Genus *Phirriculus* Mlíkovský & Göhlich

Phirriculus Mlíkovský& Göhlich, 2000: 419 [Type by original designation: *Phirriculus pinicola* Mlíkovský & Göhlich, 2000.]

Phirriculus pinicola Mlíkovský & Göhlich

Phirriculus pinicola Mlíkovský & Göhlich, 2000: 420 [Holotype from Wintershof-West: distal end of left humerus; BSP 1037-II-18188. Figured by Mlíkovský & Göhlich 2000, fig. 1a,b, 6a-c.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1871 sub *Limnatornis paludicola*, Ballmann 1969b sub *Limnatornis paludicola*, Mlíkovský & Göhlich 2000); early Miocene (MN 3a) of Wintershof-West, Germany (Ballmann 1969b sub Phoeniculidae indet., Mlíkovský & Göhlich 2000); and early Miocene (MN 4) of Petersbuch 38, Germany (Mlíkovský & Göhlich 2000).

Order Procellariiformes Fürbringer

Procellariiformes Fürbringer, 1888 [Modern order.]

Family Procellariidae Leach

Procellariidae Leach, 1820 [Modern family.]

Diomedeoididae Fischer, 1985: 113 [Type genus: *Diomedeoides* Fischer, 1985.]

Remarks: I regard all modern procellariiforms as belonging to a single family. In this broad sense, the Procellariidae encompass also the fossil Diomedeoididae. All fossil forms listed below are in need of revision.

Genus *Neptuniavis* Harrison & Walker

Neptuniavis Harrison & Walker, 1977a: 9 [Type by original designation: *Neptuniavis miranda* Harrison & Walker, 1977.]

Remarks: The taxonomic position of this genus is uncertain (see Cheneval 1995).

Neptuniavis miranda Harrison & Walker

Neptuniavis miranda Harrison & Walker, 1977a: 9 [Holotype from Sheppey: proximal end of right tarsometatarsus; BMNH A-3682. Figured by Harrison & Walker 1977a, fig. 2a-e.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1977a).

Neptuniavis minor Harrison & Walker

Neptuniavis minor Harrison & Walker, 1977a: 11 [Holotype from Sheppey: proximal end of right tarsometatarsus; BMNH A-134. Figured by Harrison & Walker 1977a, pl. 1, fig. F-J.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1977a).

Genus *Primodroma* Harrison & Walker

Primodroma Harrison & Walker, 1977a: 8 [Type by original designation: *Primodroma bournei* Harrison & Walker, 1977a.]

Primodroma bournei Harrison & Walker

Primodroma bournei Harrison & Walker, 1977a: 8 [Holotype from Sheppey: distal end of right humerus; BMNH A-3678. Figured by Harrison & Walker 1977a, pl. 1, fig. a-e.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1977a).

Genus *Diomedeoides* Fischer

Diomedeoides Fischer, 1985: 114 [Type by original designation: *Diomedeides minimus* Fischer, 1985.]

Diomedeoides minimus Fischer

Diomedeoides minimus Fischer, 1985: 114 [Holotype from Espenhain: right femur; NKMB Av-764. Figured by Fischer 1985, fig. 1-6, 12-14.]

Distribution: Middle Oligocene (MP 23-24) of Espenhain, Germany (Fischer 1985).

Genus *Frigidafons* Cheneval

Frigidafons Cheneval, 1995: 189 [Type by monotypy: *Frigidafons brodkorbi* Cheneval, 1995.]

Distribution: Extralimital record is limited to *Frigidafons babaheydariensis* Peters & Hamedani, 2000 from the Oligocene of Iran (Peters & Hamedani 2000).

Frigidafons brodkorbi Cheneval

Frigidafons brodkorbi Cheneval, 1995: 189 [Holotype from Froidefontaine: almost complete skeleton in slab and counter-slab; coll. P. Paupe (slab) and coll. S. Michel (counter-slab). Figured by Cheneval & Pharisat 1995, text-fig. 1, pl. 1, fig. 1; and Cheneval 1995, fig. 1-2.]

Distribution: Middle Oligocene (MP 23-24) of Froidefontaine, France (Cheneval 1995); and early Miocene (MN 1) of Weisenau-AS, Germany (Cheneval 1995).

Genus *Puffinus* Brisson

Puffinus Brisson, 1760 [Modern genus.]

Puffinus raemdonckii (Beneden)

Larus Raemdonckii Beneden, 1871: 258 [Holotype from Rupelmonde: left humerus lacking proximal end; IRScNB, uncatalogued. Figured by Beneden 1871, fig. 1. Brodkorb (1962a: 707) incorrectly believed that the species was based on two syntypical humeri, and selected the holotypical one as a lectotype of the species. His action is invalid.]

Puffinus raemdonckii (Beneden): Brodkorb 1962: 707 [New combination.]

Distribution: Middle Oligocene (MP 23-24) of Rupelmonde, Belgium (Beneden 1871, 1872, Miller & Sibley 1941, Brodkorb 1962a).

Puffinus aquitanicus (Milne-Edwards)

Procellaria aquitanica Milne-Edwards, 1874: 6 [Holotype from Léognan: distal end of a humerus; MBo, uncatalogued. Figured by Milne-Edwards 1874, pl. 12, fig. 1, 1a-c.]

Puffinus aquitanicus (Milne-Edwards): Brodkorb 1963: 243 [New combination.]

Distribution: Early Miocene (MN 2-3) of Léognan, France (Milne-Edwards 1874).

Puffinus antiquus (Milne-Edwards)

Procellaria antiqua Milne-Edwards, 1874: 7 [Holotype from Léognan: proximal end of a humerus; MHNB, uncatalogued. Not figured.]

Puffinus antiquus (Milne-Edwards): Brodkorb 1963c: 243 [New combination.]

Distribution: Early Miocene (MN 2-3) of Léognan, France (Milne-Edwards 1874).

Puffinus nestori Alcover

Puffinus nestori Alcover, 1989.

Distribution: Late Pliocene (MN 18) of Ca Na Reia, Eivissa, Spain (Alcover 1989).

Remarks: Not seen.

Puffinus holeae Walker et al.

Puffinus holei Walker, Wragg & Harrison, 1990. [Holotype from Barca.]

Puffinus holeae Walker et al.: Mourer-Chauviré & Antunes 2000: 132 [Spelling emended.]

Distribution: Late Pleistocene (MQ 2C) of Figueira Brava – layer 2, 3 and 4, Portugal (Mourer-Chauviré & Antunes 2000), and early Holocene (MQ 2E) of Figueira Brava – "upper layers" (Mourer-Chauviré & Antunes 2000). Extralimital record is available from the late Pleistocene (MQ 2C-D) of Fuerteventura (incl. type locality), Canary Islands (Walker et al. 1990), and Lanzarote, Canary Islands (McMinn et al. 1990).

Genus *Plotornis* Milne-Edwards

Plotornis Milne-Edwards, 1874: 5 [Type by monotypy: *Plotornis delfortrii* Milne-Edwards, 1874.]

Plotornis arvernensis (Milne-Edwards)

Puffinus arvernensis Milne-Edwards, 1871: 572 [Nomen nudum; no description or indication.]

Puffinus arvernensis Milne-Edwards in Shufeldt, 1896: 510 [Holotype from Saint-Gérand-le-Puy: left tarsometatarsus; MNHN Av-2929. Figured by Shufeldt 1896, pl. 24, fig. 1-2; and Cheneval 1984b, pl. 2, fig. 1a-b.]

Plotornis arvernensis ("Milne-Edwards" = Milne-Edwards in Shufeldt): Cheneval 1984a: 48. [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1874, Cheneval 1984a). The record from the Holocene of Pietro Tampoia cave, Tavolara island near Sardinia, Italy (Shufeldt 1896, Regàlia 1897) is invalid, as the bones belong to the modern *Puffinus yelkouan* (Acerbi, 1827) (Mayaud & Schaub 1950, see also Lambrecht 1933: 269).

Remarks: Wetmore (1930a), Lambrecht (1933: 268) and Brodkorb (1963c: 243) correctly observed, that the binomen *Puffinus arvernensis*, as published by Milne-Edwards (1871: 572), is a nomen nudum, Cheneval's (1984a: 51) arguments to the contrary (under the reference to ICZN 1961, Art. 12 and 16) being incorrect. Wetmore (1930a) attributed the name to Shufeldt (1896), while Brodkorb (1963c) to Milne-Edwards in Shufeldt (1896). The latter interpretation is in accordance with the Code of zoological nomenclature (ICZN 1999, Art. 50.1.).

Plotornis delfortrii Milne-Edwards

Plotornis delfortrii Milne-Edwards, 1874: 5 [Syntypes from Léognan: left tarsometatarsus and distal part of right humerus; MHNB, uncatalogued. Figured by Milne-Edwards 1874, pl. 1, fig. 1, 1a-e (tarsometatarsus), 2, 2a-d (humerus).]

Distribution: Early Miocene (MN 2-3) of Léognan, France (Milne-Edwards 1874), and Saucats, France (Lucazeau 1959).

Genus *Diomedea* Linnaeus

Diomedea Linnaeus, 1758 [Modern genus.]

Diomedea rumana Grigorescu & Kessler

Diomedea rumana Grigorescu & Kessler, 1988: 92 [Lectotype from Credința (here selected): proximal part of right ulna; LPUB 279. Figured by Grigorescu & Kessler 1988, fig. 1a, b, a', b'. Paralectotype from Credința: distal part of right ulna; LPUB 280. Figured by Grigorescu & Kessler 1988, fig. 1b, b', c, c', d, d'. Grigorescu & Kessler (1988) considered both these bone fragments the holotype of the species, but presented no evidence that they originated from the same individual.]

Distribution: Middle Miocene (MN 8) of Credința, Romania (Grigorescu & Kessler 1988).

Diomedea anglica Lydekker

Diomedea anglica Lydekker, 1891a: 189 [Holotype from Foxhall: right tarsometatarsus with associated phalanx I of digit 4; IM, uncatalogued (cast in BMNH A-87). Figured by Lydekker 1891a, fig. 42a-b.]

Distribution: Late Pliocene (MN 16-17) of Foxhall, England (Lydekker 1886, 1891a,d, Harrison & Walker 1978b), and Orford, England (Lydekker 1886, 1891a,d, Harrison & Walker 1978b). A tentative extralimital record is from the early Pliocene of Bone Valley in Florida (Wetmore 1943, Harrison & Walker 1978b). Fisher (1966) attributed to this species an ulna supposedly originating from the late Pleistocene (MQ 2C) of Ilford, England, and formerly described as belonging to the modern *Diomedea exulans* Linnaeus, 1758 by Newton (1891). Harrison & Walker (1977c) showed, that the specimen is at most sub-Recent in age, concluding that “it is plausible that ... [it] did not reach England unaided.”

Remarks: Wilkinson (1969: 49) suggested, that *D. anglica* Lydekker is synonymous with the modern *D. albatrus* Pallas, 1769 (see also Miller 1962).

Genus *Calonectris* Mathews & Iredale

Calonectris Mathews & Iredale, 1915 [Modern genus.]

Calonectris diomedea (Scopoli) – Cory's Shearwater

Puffinus diomedea Scopoli, 1769 [Modern species.]

Puffinus eyermani Shufeldt, 1896: 511 [Lectotype from Pietro Tampoia Cave (here selected): right tibiotarsus (USNM; # 11 in Shufeldt 1896). Figured by Shufeldt 1896, pl. 24, fig. 8. Paralectotype from Pietro Tampoia Cave: right tarsometatarsus (USNM; # 10 in Shufeldt 1896).]

Distribution: Holocene (MQ 2E) of Pietro Tampoia Cave, Tavolara island near Sardinia (Shufeldt 1896 sub *P. eyermani*, Regàlia 1897 sub *P. eyermani*, Lambrecht 1933: 268 sub *P. eyermani*, Mayaud & Schaub 1950).

Remarks: *Puffinus eyermani* Shufeldt was synonymized with the modern *Calonectris diomedea* (Scopoli, 1769) by Mayaud & Schaub (1950).

Family Pelagornithidae Fürbringer

Pelagornithidae Fürbringer, 1888: 1565 [Type genus: *Pelagornis* Lartet, 1857.]

Odontopterygidae Lydekker, 1891a: 57 [Type genus: *Odontopteryx* Owen, 1873.]

Cyphornithidae Wetmore, 1928: 4 [Type genus: *Cyphornis* Cope, 1894.]

Pseudodontornithidae Lambrecht, 1933: 305 [Type genus: *Pseudodontornis* Lambrecht, 1930.]

Dasornithidae Harrison & Walker, 1976b: 24 [Type genus: *Dasornis* Owen, 1870.]

Distribution: Early Eocene (MP 8-9) of England, middle Eocene (MP 11-13) of Belgium (record tentative), late Eocene (MP 19) of France, and early Miocene (MN 2-3) of France. Extralimital record is very rich, ranging from the Paleocene to the Pliocene, and including all continents (Harrison & Walker 1976b, Olson 1985a: 194-201). Extralimital record from the Asian part of the Paratethys is limited to the Paleocene through Oligocene (Aslanova & Burčak-Abramovič 1982, 1999, Aver'janov et al. 1991). Further records from the Atlantic Ocean were reported from the ?Eocene of Nigeria (Andrews 1916, Harrison & Walker 1976b), and South Shetland Islands near Antarctica (Tonni 1980, Tonni & Tambussi 1985), Oligocene of South Carolina (see Hopson 1964, Harrison & Walker 1976b, Olson 1985), and the Miocene of Maryland (Olson 1985a), Virgina (Olson 1984, 1985a), North Carolina (Becker 1987), and Canary Islands (García Talavera 1990).

Remarks: The classification of this family basically follows Harrison & Walker (1976b) in absence of more recent data, although it apparently does not reflect the real phylogeny of the family (Olson 1985a, pers. communication 1997). All the taxa listed below are in need of revision. Subsequent research will certainly result in a marked decrease of pelagornithid taxa recognized from the European Eocene.

Genus *Odontopteryx* Owen

Odontopteryx Owen, 1873: 511 [Type by monotypy: *Odontopteryx toliapica* Owen, 1873.]

Remarks: Extralimital records include *Odontopteryx tschulensis* Aver'janov et al., 1991 from the late Paleocene of Kazakhstan (Aver'janov et al. 1991), *Odontopteryx* sp. from the middle Eocene of Uzbekistan (Aver'janov et al. 1991), and tentatively also from the early Eocene of Virginia (Olson 1999b sub cf. *Odontopteryx* sp.).

Odontopteryx toliapica Owen

Odontopteryx toliapica Owen, 1873: 511 [Holotype from Sheppey: imperfect skull with parts of lower jaws; BMNH 44096. Figured by Owen 1873, pl. 16, fig. 1-8, pl. 17, fig. 1-2 (longitudinal section of a tooth); Krejčí 1877, fig. 869; Woodward 1890. fig. 115; Zittel

1890, fig. 717; Lambrecht 1933, fig. 108; Dement'ev 1964, fig. 691; Harrison & Walker 1976b, text-fig. 1-5, pl. 1, fig. a-f, pl. 2, fig. a-m; and Harrison & Walker 1977a, text-fig. 4-5, pl. 1, fig. k-p.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Owen 1873, Martin 1874, Desor 1876, Harrison & Walker 1976b, 1977a).

Genus *Macrodontopteryx* Harrison & Walker

Macrodontopteryx Harrison & Walker, 1976b: 12 [Type by original designation: *Macrodontopteryx oweni* Harrison & Walker, 1976b.]

Macrodontopteryx oweni Harrison & Walker

Macrodontopteryx oweni Harrison & Walker, 1976b: 12 [Holotype from Sheppey: imperfect skull; BMNH A-1. Figured by Harrison & Walker 1976b, text-fig. 6-10, pl. 3, fig. g,h, pl. 4, fig. a-d, Harrison & Walker 1977a, text-fig. 6-7.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1976b, 1977a).

Genus *Pseudodontornis* Lambrecht

Pseudodontornis Lambrecht, 1930: 1 [Type by monotypy: *Odontopteryx longirostris* Spulski, 1910.]

Pseudodontornis longirostris (Spulski)

Odontopteryx longirostris Spulski, 1910: 507 [Holotype from an unknown locality: partial skull; present location unknown. Figured by Spulski 1910, fig. 1-7.]

Pseudodontornis longirostris (Spulski): Lambrecht 1930: 1 [New combination.]

Distribution: Unknown (Spulski 1910, Lambrecht 1930, Harrison & Walker 1976b). Spulski (1910: 508) reported, that the specimen was purchased for the Institute of Zoology of the Königsberg University in Prussia (now Kaliningrad in Russia) by Professor Braun in 1905 from a local merchant, who said he bought it some five years before that date from a seaman, who reportedly brought it from Brazil. Brodkorb (1963c: 263) conjectured, that the holotype could originate from the Miocene of Germany, but there are no suitable localities of this age in this part of Europe (see Mlíkovský 1996a). If the specimen is from Europe, then it would most probably come from the marine Eocene deposits of the North Sea Basin, which are particularly well represented in northern Germany, Denmark and England (Mlíkovský 1996a).

A mandible, tentatively referred to *Pseudodontornis longirostris* (Spulski), is known from the late Oligocene of Charleston, South Carolina (Hopson 1964, Harrison & Walker 1976b: 15, Olson 1985a: 196-197).

Pseudodontornis longidentata Harrison & Walker

Pseudodontornis longidentata Harrison & Walker, 1976b: 17 [Holotype from Sheppey: portion of rostrum and associated imperfect atlas vertebra; IGS GSM-107876. Figured by Harrison & Walker 1976b, text-fig. 11-13, pl. 5, fig. A-G, 1977, text-fig. 8, pl. 1, fig. Q-S.]

Distribution: Early Eocene (MP 8-9) from Sheppey, England (Harrison & Walker 1976b, 1977a).

Genus *Dasornis* Owen

Dasornis Owen, 1869: 59 [Nomen nudum; no description or indication.]

Dasornis Owen, 1870: 145 [Type by monotypy: *Dasornis londinensis* Owen, 1870.]

Remarks: This genus was included in the Gastornithidae by Lambrecht (1933), and transferred to the Odontopterygiformes by Harrison & Walker (1976b).

Dasornis londinensis Owen

Dasornis londinensis Owen, 1869: 59 [Nomen nudum; no description or indication.]

Dasornis londinensis Owen, 1870: 145 [Holotype from Sheppey: imperfect skull; BMNH 31929. Figured by Owen 1870, pl. 16, Harrison & Walker 1976b, pl. 8, fig. A-C, 1977, pl. 3, fig A-D.]

Dasornis londiniensis Lydekker, 1891a: 359 [Unsubstantiated emendation. However, it is not a young objective synonym of *Dasornis londinensis*, because this variant spelling is deemed to be identical with the original spelling – ICZN 1999, Art. 58.15.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Owen 1869, 1870, Harrison & Walker 1976b, 1977a).

Genus *Argillornis* Owen

Megalornis Seeley, 1866: 110 [Type by monotypy: *Lithornis emuinus* Bowerbank, 1854. This is a junior homonym of *Megalornis* Gray, 1841, and *Megalornis* Owen, 1843.]

Argillornis Owen, 1878: 124 [Type by monotypy: *Argillornis longipennis* Owen, 1878.]

Argillornis emuinus (Bowerbank)

Lithornis emuinus Bowerbank, 1854: 263 [Holotype from Sheppey: partial shaft of right humerus, originally described as part of a tibiotarsus; BMNH 38941. Figured by Bowerbank 1854, unnumbered fig.; and Harrison & Walker 1977, pl. 4, fig. a.]

Megalornis emuianus (Bowerbank): Seeley, 1866: 110 [New combination, specific name misspelled.]

Argillornis emuinus (Bowerbank): Brodkorb 1963: 248 [New combination.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Bowerbank 1854, Quekett 1855, Seeley 1866, 1869, 1874, Owen 1878, Lydekker 1891a, Lambrecht 1933: 282-284, Harrison & Walker 1976b, 1977a); and middle Eocene (MP 11-13) of Etterbeek, Belgium (Dollo 1909: 111).

Remarks: Lambrecht (1921) attributed *Megalornis emuinus* [sic!] on p. 17 to Seeley (1866) and on p. 36 to Seeley (1874), which is unsubstantiated in both cases.

Argillornis longipennis Owen

Argillornis longipennis Owen, 1878: 124 [Syntypes from Sheppey: proximal end of right humerus (BMNH A-5) and proximal end of left humerus (BMNH A-8). Figured by Owen 1878, pl. 6, fig. 1-3, 7-12, 16, Harrison & Walker 1976b, pl. 6, fig. d-f; and Harrison & Walker 1977a, pl. 4, fig. b-g.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Owen 1878, 1880, Lydekker 1891a, Lambrecht 1933, Harrison & Walker 1976b, 1977), and perhaps also middle Eocene (MP 11-13) of Etterbeek, Belgium (Dollo 1909: 111, Lambrecht 1933: 284).

Genus *Pelagornis* Lartet

Pelagornis Lartet, 1857: 740 [Type by monotypy: *Pelagornis miocaenus* Lartet, 1857. This is a senior homonym of *Pelagornis* Seeley, 1866.]

Remarks: Lambrecht (1933: 282, footnote) mentioned that a humerus labeled "*Pelagornis Delfortrii* 1869" was found in the Museum of Bordeaux. Brodkorb (1963c: 263) attributed this name to Lambrecht (1933) as a nomen nudum, listing it in the synonymy of *Pelagornis miocaenus* Lartet. This is incorrect, because *Pelagornis Delfortrii* is a label name without any standing in zoological nomenclature. It cannot be attributed to Lambrecht.

Pelagornis miocaenus Lartet

Pelagornis miocaenus Lartet, 1857: 740 [Holotype from Armagnac: left humerus; MNHN, uncatalogued. Figured by Milne-Edwards, 1867-1868, pl. 45, fig. 1-7, Harrison & Walker, 1976b, pl. 9, fig. d-e.]

Distribution: Early Miocene (MN 2-3) of Armagnac, France (Lartet 1857, Harrison & Walker 1976b). Harrison & Walker (1976b: 29) tentatively attributed to this species partial humerus from the middle or late Miocene of coastal cliffs near Waipara River mouth, North Canterbury, New Zealand, which was first described by Scarlett (1972).

Order Ciconiiformes Bonaparte

Ciconiae Bonaparte, 1854 [Modern order.]

Family Podicipedidae Bonaparte

Podicipedidae Bonaparte, 1831 [Modern family.]

Genus *Podiceps* Latham

Podiceps Latham, 1787 [Modern genus.]
Thiornis Navás, 1922: 59 [Type by monotypy: *Thiornis sociata* Navás, 1922.]
Miobaptus Švec, 1982: 244 [Type by original designation: *Miobaptus walteri* Švec, 1982.]

Podiceps walteri (Švec)

Miobaptus walteri Švec, 1982: 246 [Holotype from Dolnice: proximal part of right humerus; DP FNSP 4810. Figured by Švec 1982, pl. 1, fig. 2.]
Podiceps walteri (Švec): Mlíkovský 2000f: 97 [New combination.]

Distribution: Early Miocene (MN 3) of Skyřice, Czechia (Mlíkovský 2000f); and early Miocene (MN 4b) of Dolnice, Czechia (Švec 1982, 1984, Mlíkovský 2000f).

Remarks: The genus *Miobaptus* Švec was synonymized with the modern genus *Podiceps* Linnaeus by Mlíkovský (2000f: 97.).

Podiceps miocenicus Kessler

Podiceps miocenicus Kessler, 1984b: 523 [Holotype from Chişinău: right humerus in two parts; LPUI 61-MS. Figured by Kessler 1984b, fig. 13-14.]

Distribution: Late Miocene (MN 9) of Chişinău, Moldova (Kessler 1984b).

Podiceps sociatus (Navás)

Thiornis sociata Navás, 1922: 59 [Holotype from Libros: almost complete skeleton in a slab with feather impressions; MNHN 1930-1. Figured by Navás 1922, pl. 2, and Olson 1995a, fig. 1-4.]
Podiceps sociatus (Navás): Olson 1995: 132 [New combination.]

Distribution: Late Miocene (MN 9-10) of Libros, Spain (Navás 1922, Cracraft 1973: 40, Olson 1995a, Storer 2000).

Remarks: Lambrecht (1933, fig. 144) figured another specimen in slab from Libros (BMNH A-1620), which was later erroneously considered as the holotype of *Thiornis sociata* by Brodkorb (1967: 124) and Cracraft (1973: 40, fig. 40). The latter specimen is indeterminate, but does not belong to the Podicipedidae (Olson 1977: 373, 1995).

Thiornis sociata Navás was long believed to represent a fossil rail, family Rallidae (Lambrecht 1933: 475, Brodkorb 1967: 124, Cracraft 1973: 40), until Olson (1995a) rediscovered its type material and identified it as a grebe, synonymizing *Thiornis* Navás with the modern genus *Podiceps* Linnaeus.

Podiceps cristatus (Linnaeus) – Great Crested Grebe

Colymbus cristatus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub. *P.* cf. *cristatus*).

Podiceps grisegena (Boddaert) – Red-necked Grebe

Colymbus grisegena Boddaert, 1783 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *P.* aff. *grisegena*), Stránská skála – Čapek's site 5a, lower layer (Jánossy 1972), and Stránská skála – Musil's talus cone, layer 13 (Mlíkovský 1995b).

Podiceps auritus (Linnaeus) – Horned Grebe

Colymbus auritus Linnaeus, 1758 [Modern species.]

Fulica sp. (*pisana*) Portis, 1889: 13 [Holotype from Orciano Pisano: distal end of right humerus; IGF 14874. Figured by Portis 1889, pl. 1, fig. 24-25, and Regàlia 1902, pl. 27, fig. 21-22.]

Podicipes pisanus (Portis): Regàlia 1902: 233 [New combination, generic name misspelled.]

Distribution: Middle Pliocene (MN 15-16) of Orciano Pisano, Italy (Portis 1889, Regàlia 1902, 1907).

Remarks: *Fulica pisana* Portis was originally described as a coot, but Regàlia (1902) showed that it represents a grebe. After a restudy of a cast of the holotype and a biometrical study (Mlíkovský orig.) I concluded, that *Podiceps pisanus* (Portis) is synonymous with the modern Horned Grebe *Podiceps auritus* (Linnaeus).

Podiceps nigricollis Brehm – Black-necked Grebe

Podiceps nigricollis Brehm, 1831 [Modern species.]

Distribution: Late Miocene (MN 9-10) of Sokolov, Ukraine (Vojinstvens'kyj 1967 sub *Colymbus* cf. *nigricollis*); early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *P.* cf. *nigricollis*), and Nagyhársánhegy 1-4, Hungary (Jánossy 1980a sub *P.* aff. *nigricollis*, Jánossy 1980b sub *P.* cf. *nigricollis*).

Podiceps ruficollis Pallas – Little Grebe

Colymbus ruficollis Pallas, 1764 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Huéscar-1, Spain (Sánchez Marco 1989).

Family Pelecanidae Rafinesque

Pelecanidae Rafinesque, 1815 [Modern family.]

Genus *Miopelecanus* Cheneval

Miopelecanus Cheneval, 1984a: 68 [Type by original designation: *Pelecanus gracilis* Milne-Edwards, 1863.]

Miopelecanus gracilis (Milne-Edwards)

Pelecanus gracilis Milne-Edwards, 1863: 161 [Holotype from Saint-Gérand-le-Puy: proximal end of a tarsometatarsus; present location unknown, probably lost – Cheneval 1984a: 68, 74. Figured by Milne-Edwards 1867-1868, pl. 38, fig. 1-5.]

Miopelecanus gracilis (Milne-Edwards): Cheneval 1984a: 68 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1867-1868, Cheneval 1984a).

Miopelecanus intermedius (Fraas)

Pelecanus intermedius Fraas, 1870: 281 [Holotype from Hahnenberg: incomplete skull with posterior end of left mandible; SMNS, uncatalogued. Figured by Fraas 1870, pl. 13, fig. 3-4.]

Pelecanus fraasi Lydekker, 1891a: 44 [Holotype from Lierheim: slightly imperfect skull; BMNH 47862. Figured by Lydekker 1891a, fig. 10a; and Heizmann & Hesse 1995, fig. 2a.]

Miopelecanus intermedius (Fraas): Heizmann & Hesse 1995: 175 [New combination.]

Distribution: Middle Miocene (MN 6) of Hahnenberg, Germany (Fraas 1870, Lydekker 1891a), and Lierheim, Germany (Lydekker 1891a, Heizmann & Hesse 1995).

Remarks: *Pelecanus fraasi* Lydekker was synonymized with *Pelecanus intermedius* Fraas by Heizmann & Hesse (1995).

Genus *Pelecanus* Linnaeus

Pelecanus Linnaeus, 1758 [Modern genus.]

Pelecanus odessanus Vidgal'm

Pelecanus odessanus Vidgal'm, 1886: 6 [Lectotype from Novaja Slobodka (here selected): a tarsometatarsus; present location unknown. Figured by Vidgal'm 1886, fig. 1-3. Paralectotype from Novaja Slobodka: a coracoid lacking cranial end; present location unknown. Figured by Vidgal'm 1886, fig. 4.]

Distribution: Late Miocene (MN 11-13) of Novaja Slobodka, Ukraine (Vidgal'm 1886, Miller 1966: 184, Olson 1999c: 508).

Family Messelornithidae Hesse

Messelornithidae Hesse, 1988a: 84 [Type genus: *Messelornis* Hesse, 1988a.]

Distribution: Middle Eocene (MP 11) of Germany, and perhaps also late Eocene to middle Oligocene (MP 17-23) of France. Extralimital record is limited to the middle Eocene of Wyoming (Hesse 1992).

Genus *Messelornis* Hesse

Messelornis Hesse, 1988a: 90 [Type by original designation: *Messelornis cristata* Hesse, 1988a.]

Distribution: Middle Eocene (MP 11) of Germany, and middle Oligocene (MP 23) of France. Extralimital record includes *Messelornis nearctica* Hesse, 1992 from the middle Eocene (Green River Formation) of Wyoming (Hesse 1992).

Messelornis cristata Hesse

Messelornis cristata Hesse, 1988a: 90 [Holotype from Messel: skeleton in three plates; SMF ME-807a-c. Figured by Hesse 1988a, fig. 15-17, and Hesse 1990, pl. 1, fig. 1-3.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Hesse 1988a,b, 1990, 1991, Hesse & Habersetzer 1993).

Genus *Itardiornis* Mourer-Chauviré

Itardiornis Mourer-Chauviré, 1995a: 96 [Type by original designation: *Itardiornis hessae* Mourer-Chauviré, 1995a.]

Remarks: The taxonomic position of this genus is uncertain.

Itardiornis hessae Mourer-Chauviré

Itardiornis hessae Mourer-Chauviré, 1995a: 97 [Holotype from Itardiès: humeral end of left coracoid; USTL ITD-679. Figured by Mourer-Chauviré 1995a, pl. 1, fig. 6-7.]

Distribution: Late Eocene (MP 17) of Bouffie, France (Mourer-Chauviré 1995a); early Oligocene (MP 21) of Ravet-Lupovici, France (Mourer-Chauviré 1995a); and middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1995a).

Family Gruidae Vigors

Gruidae Vigors, 1825: 488 [Modern family.]

Genus *Palaeogrus* Portis

Palaeogrus Portis, 1884: 362 [Type by monotypy: *Palaeogrus princeps* Portis, 1884.]

Palaeogrus princeps Portis

Ornitocnemis [sic!] *robustus* Zigno in Portis, 1884: 362 [Nomen nudum; no description or indication.]

Palaeogrus princeps Portis, 1884: 362 [Holotype from Monte Zuello: distal end of left tibiotarsus; MPUP, uncatalogued. Figured by Portis 1884, pl. 1, fig. 1-4.]

Grus princeps (Portis): Lydekker 1891a: 165 [New combination.]

Distribution: Middle Eocene (MP 11-13) of Monte Zuello, Italy (Portis 1884, Cracraft 1973: 78).

Remarks: In describing *Palaeogrus princeps*, Portis (1884: 362) mentioned that the holotype was given to him by Achille de Zigno, and that Zigno provisionally named the fossil *Ornitocnemis robustus*. In the preceding paragraph, Portis (1884) referred to two Zigno's papers, where the latter author described other vertebrates from Monte Zuello. Lambrecht (1921: 63, 1933: 518) erroneously listed the first of the two papers (Zigno 1875) as the source of *Ornitocnemus* [sic!; misspelled] *robustus*, but included it in the synonymy of *Palaeogrus princeps*. Brodkorb (1967: 147) used *Ornitocnemus robustus* as the valid name for the bird, attributing it to Zigno ("1876"), and referring to his paper in vol. 20 of the *Memorie*, p. 445. This is apparently just an erroneous citation of Zigno (1875), because neither Cracraft (1973: 78) nor me were able to find any paper by Zigno, which would correspond to the citation in Brodkorb (1967). Moreover, Zigno (1884) described the bird in a special paper, where he compared it with *Ardea* Linnaeus, not mentioning any name for it. It is thus probable, that Zigno never published the name *Ornitocnemis robustus* in a manner required by the ICZN (1999).

Palaeogrus hordwelliensis (Lydekker)

Grus hordwelliensis Lydekker, 1891a: 165 [Holotype from Hordle: distal end of right tibiotarsus; BMNH 30333. Figured by Lydekker 1891a, fig. 36, Cracraft 1973, fig. 35a-d, Harrison & Walker 1976a, pl. 5, fig. f-j.]

Palaeogrus hordwelliensis (Lydekker): Lambrecht 1933: 519 [New combination.]

Ornitocnemus hordwelliensis (Lydekker): Brodkorb 1967: 148 [New combination.]

Distribution: Late Eocene (MP 17) of Hordle, England (Lydekker 1891a, Cracraft 1973, Harrison & Walker 1976a).

Genus *Geranopsis* Lydekker

Geranopsis Lydekker, 1891a: 166 [Type by original designation: *Geranopsis hastingsiae* Lydekker, 1891a. This is a senior homonym of *Geranopsis* Milne-Edwards, 1892.]

Geranopsis hastingsiae Lydekker

Geranopsis hastingsiae Lydekker, 1891a: 166 [Holotype from Hordle: left coracoid; BMNH 30331. Figured by Lydekker 1891a, fig. 37, Cracraft 1973, fig. 39a-b, Harrison & Walker 1976a, pl. 5, fig. k-n.]

Distribution: Late Eocene (MP 17) of Hordle, England (Lydekker 1891a, Cracraft 1973, Harrison & Walker 1976a).

Remarks: Generic distinction from *Palaeogrus* Portis has not been documented as yet.

Genus *Balearica* Brisson

Balearica Brisson, 1760 [Modern genus.]

Balearica excelsa (Milne-Edwards)

Grus excelsa Milne-Edwards, 1868: pl. 75 [Lectotype from Saint-Gérand-le-Puy (selected by Fischer & Stephan 1971: 577): distal end of right tibiotarsus; MNHN Av-8556. Figured by Milne-Edwards 1867-1869, pl. 75, fig. 5-6; and Cracraft 1973, fig. 36a-d. Being unaware of the action by Fischer & Stephan (1971), Cracraft (1973: 82) selected as a lectotype the same tibiotarsus. His action is invalid (ICZN 1999, Art. 74.1.1). "Paralectotypes" from Saint-Gérand-le-Puy (in MNHN, one in AMNH): right coracoid (Av-8547), shaft of right humerus (Av-8549a), distal end of left humerus (Av-8549), distal ends of two right humeri (Av-8548, Av-8550), right ulna (Av-8552), proximal end of left ulna (Av-8553), proximal end of right ulna (Av-8551), proximal end of right carpometacarpus (AMNH 10583, cast in FSL 443691), distal end of right carpometacarpus (Av-8554), distal end of left tibiotarsus (Av-8555), proximal end of left tarsometatarsus (Av-8558), proximal end of right tarsometatarsus (Av-8557), shaft of left tarsometatarsus (Av-8559), and two pedal phalanges (Av-8560, Av-8561). Figured by Milne-Edwards 1869-1871, pl. 75, fig. 1-4 (proximal end of left tarsometatarsus), 5-6 (right tibiotarsus), 7 (coracoid), 8-9 (distal end of right humerus), 10-11 (proximal end of ulna), 12-15 (pedal phalanx), 16 (another pedal phalanx), pl. 76, fig. 1-2 (carpometacarpus AMNH 10538); and Cracraft 1973, fig. 37a-b (humerus Av-8548), and 37c-d (tarsometatarsus Av-8557). The ulna Av-8553 seems to be too large for the species – Mlíkovský orig.]

Palaeogrus excelsa (Milne-Edwards): Lambrecht 1933: 519 [New combination.]

Ornitocnemus excelsus (Milne-Edwards): Brodkorb 1967: 148 [New combination.]

Balearica excelsa (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Cracraft 1973, Cheneval 2000, Mlíkovský orig.); early Miocene (MN 4) of Artenay, France (Mlíkovský orig., material in MNHN); and middle Miocene (MN 6) of Sansan, France (Cheneval 2000).

Remarks: The lectotypical tibiotarsus of *Grus excelsa* Milne-Edwards differs from the same element of *Grus* Pallas and agrees with that of *Balearica* Brisson in having external condyle slightly convex, not notched. The paralectotypical ulna of *Grus excelsa* Milne-Edwards differs from the same element of *Grus* Pallas and agrees with that of *Balearica* Brisson in having external cotyla broad and rounded in anconal view. In absence of the contrary evidence I transfer here *Grus excelsa* from the genus *Grus* Pallas to the genus *Balearica* Brisson as *Balearica excelsa* (Milne-Edwards), new combination.

Genus *Grus* Pallas

Grus Pallas, 1766 [Modern genus.]

Grus moldavica (Kuročkin & Ganea)

Probalearica moldavica Kuročkin & Ganea, 1972: 64 [Holotype from Golboçica: distal end of left tibiotarsus; GIKM 12173/6. Figured by Kuročkin & Ganea 1972, pl. 2, fig. 9, and text-fig. 11.]

Grus moldavica (Kuročkin & Ganea): Mlíkovský, this paper [New combination.].

Distribution: Late Miocene (MN 9) of Golboçica, Moldova (Kuročkin & Ganea 1972).

Remarks: The holotypical tibiotarsus of *Probalearica moldavica* Kuročkin & Ganea differs from the same element of *Balearica*, and agrees with that of *Grus* Pallas, in being anterioposteriorly less flattened, in having the internal condyle directed anteriorly, not outwardly, and especially in having external trochlea notched. In absence of contrary evidence, I transfer here *Probalearica moldavica* Kuročkin & Ganea to the modern genus *Grus* Pallas as *Grus moldavica* (Kuročkin & Ganea), new combination. Being smaller than the comparably old *Grus pentelici* Gaudry from the late Miocene (MN 12-13) of Greece and Afghanistan (see below), *Grus moldavica* Kuročkin & Ganea seems to be a valid species of cranes.

Grus pentelici Gaudry

Grus Pentelici Gaudry, 1862a: 634 [Lectotype from Pikermi (selected independently by Fischer & Stephan 1971: 576, and Cracraft 1973: 91): distal end of left tarsometatarsus; MNHN # 39. The lectotype was figured by Gaudry 1862a, pl. 16, fig. 12, Gaudry 1862b, pl. 59, fig. 11, and Cracraft 1973, fig. 41a-b. Paralectotypes from Pikermi: two vertebrae (# 28, 29), anterior end of left coracoid (# 30), right humerus (# 31), proximal end of right humerus (# 40), proximal end of left humerus (# 38), right ulna (# 32), fragmentary pelvis (# 34), distal end of right femur (# 35), proximal end of right tibiotarsus (# 36), proximal end of right tarsometatarsus (# 37), distal end of left tarsometatarsus (# 39), and anterior end of pedal digit 3 (# 33). The syntypes are deposited in MNHN, but are uncatalogued. The numbers given above correspond with numbers I attached to avian bones from Pikermi, when I studied them in 1992. Of the syntypes, the humerus # 40 is not from a crane, belonging instead to a flamingo, and the alleged pedal phalanx (# 33) is an unidentifiable scrap of bone. All other specimens are referable to *Grus pentelici* (the vertebrae # 28-29 tentatively). Paralectotypes were figured by Gaudry 1862a, pl. 16, fig. 8 (humerus), 9 (ulna), 10 (pelvis), and 11 (tarsometatarsus), Gaudry 1862b, pl. 59, fig. 1-2 (vertebrae), 23 (coracoid), 4 (humerus), 5 (ulna), 6 ("phalanx"), 7 (pelvis), 8 (femur), 9 (tibiotarsus), and 10 (tarsometatarsus); and Cracraft 1973, fig. 42b-c (tibiotarsus).]

Pliogrus Pentelici (Gaudry): Lambrecht, 1933: 523 [New combination.]

Grus afghana Mourer-Chauviré, Balouet, Jehenne & Heintz, 1985: 180 [Holotype from Molayan: distal end of left tarsometatarsus; MNHN MOL-428. Figured by Mourer-Chauviré et al. 1985, pl. 1, fig. 1-4.]

Distribution: Late Miocene (MN 11) of Csákvár, Hungary (Kretzoi 1957, see also Jánossy 1987a), and late Miocene (MN 12-13) of Pikermi, Greece (Gaudry 1862a,b, 1862-1867, Cracraft 1973, Mourer-Chauviré et al. 1985, Mlíkovský orig.). An extralimital record is from the late Miocene (MN 12) of Molayan, Afghanistan (Mourer-Chauviré et al. 1985). The tentative record from the middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Depéret 1887 sub ?*Grus pentelici*) should be reevaluated.

Remarks: According to Mourer-Chauviré et al. (1985), the holotypical tarsometatarsus of *Grus afghana* Mourer-Chauviré et al. differs from the same element (lectotype) of *Grus pentelici* Gaudry from similarly aged (MN 12) deposits of Pikermi in Greece in having (1) distal foramen closer to the external intertrochlear notch, (2) channel between distal foramen and external intertrochlear notch deep, and (3) in being smaller. None of these characters is valid. Mourer-Chauviré et al. (1985) apparently did not examine the lectotypical tarsometatarsus of *Grus pentelici* directly, probably deriving its description from fig. 41 in Cracraft (1973), which indeed shows the characters as listed by Mourer-Chauviré et al. (1985). Nevertheless, reflections of lights on the bone in that stereo-figure distort its shape and make exact observation of characters impossible. When the bone is examined directly, it shows exactly the same morphological details as listed by Mourer-Chauviré et al. (1985) for *Grus afghana* Mourer-Chauviré et al. (Mlíkovský, pers. observation in MNHN). The holotype of *Grus afghana* is smaller than the lectotype of *Grus pentelici* only by ca. 10 % (see Tab. 1 in Mourer-Chauviré et al. 1985), i.e. both species fall in the same size class. Hence, I synonymize here *Grus afghana* Mourer-Chauviré et al. with *Grus pentelici* Gaudry.

Grus primigenia Milne-Edwards

Grus primigenia Milne-Edwards, 1869: 33 [Holotype from Eyzies: distal end of right tibiotarsus; MNHN Av-Q.1. Figured by Milne-Edwards 1969-1871, pl. 76, fig. 8-11, Northcote & Mourer-Chauviré 1985, fig. 1/1-5 (right in all cases), and Northcote & Mourer-Chauviré 1988, fig. 3/4.]

Grus melitensis Lydekker, 1890: 408 [Lectotype from Zebbug (selected by Lydekker 1891a: 162, see also Fischer & Stephan 1971: 576): cranial end of right coracoid; BMNH 49365. Figured by Lydekker 1890, pl. 36, fig. 4. Paralectotypes (from Zebbug): distal end of left tibiotarsus (BMNH 49361), distal end of left tarsometatarsus (BMNH 49358). Figured by Lydekker 1890, pl. 36, fig. 2, 2a (tarsometatarsus), and 5, 5a-b (tibiotarsus), and Lydekker 1891a, fig. 35 (tibiotarsus). Lydekker (1891a: 162-163) attributed to *Grus melitensis* six bones or bone fragments, which were not mentioned in the original description of the species. In the same paper Lydekker (1891a: 162, footnote) declared that the partial coracoid (here termed lectotype) and left fragment of pelvis (BMNH 49322m) are types of the species (this being accepted by Brodkorb 1967: 151). Nevertheless, the pelvis fragment was not part of the syntypical series and cannot be included among the syntypes of *Grus melitensis*.]

Sarcogeranus bohatshevi Serebrovskij, 1940a: 767 [Holotype from Binagady: partial skull; MB R-2. Figured by Serebrovskij 1940a, fig. 1e-f.]

Leucogeranus bohatschevi Serebrovs'kyj, 1941a: 473 [New combination, and spelling of the species name emended. This is junior objective synonym of *Sarcogeranus bohatshevi* Serebrovskij, 1940a.]

Grus leucogeranus bogatshevi (Serebrovs'kyj): Dement'ev 1964: 678 [New combination, new rank, subspecies name misspelled.]

Distribution:); Late Pleistocene (MQ 2C) of Avenc de na Corna, Mallorca, Spain (Mourer-Chauviré et al. 1975 and 1977 sub *G. antigone* – see Northcote & Mourer-Chauviré 1988), and Ilford, England (Harrison & Cowles 1977), Zebbug, Malta (Lydekker 1890 and 1891a sub *G. melitensis*, Northcote 1982a, 1984 and 1992 sub *G. melitensis*), Gnien, Malta (Harrison & Cowles 1977 sub *G. melitensis*, Northcote 1984 and 1992 sub *G. melitensis*), and Mnajdra, Malta (Northcote 1982a, 1984 and 1992 sub *G. melitensis*); late Pleistocene (MQ 2C) of Figueira Brava, Portugal (Mourer-Chauviré & Antunes 2000); late Pleistocene (MQ 2D) of Eyzies, France (Milne-Edwards 1869-1871 and 1875a,b), Harpons – layer B-II, France (Saint-Périer 1920), Madelaine – unknown layer, France (Milne-Edwards 1875b), Morin, France (Delpech 1983), Duruthy – layer 3, France (Delpech 1968 and 1983 sub *G.* cf. *primigenia*), Gouërris, France (Saint-Périer 1927 sub *G.* cf. *primigenia*), Gourdan, France (Clot & Mourer-Chauviré 1986), Hohen Vielchen, Germany (Soergel 1961 sub *G. antigone*), Pouàs, Eivissa, Balearics (J. A. Alcover in Tyrberg 1998: 422), and Romanelli – unknown layer, Italy (Cassoli 1992 sub *G.* cf. *leucogeranus*);

Holocene (MQ 2E; Neolithic) of Ehrenstein, Germany (Soergel 1955 sub *G. antigone*); and Holocene (MQ 2E; Iron Age) of Strathclyde, Isle of Jura, Scotland (Harrison & Cowles 1977), and Somerset, England (Harrison & Cowles 1977).

Extralimital record is available from the late Pleistocene (MQ 2C-D) of Binagady, Azerbaijan (Serebrovs'kyj 1940a,b and 1948 sub *Sarcogeranus* cf. *leucogeranus*, and *Sarcogeranus bohatshevi* or *Leucoceranus bogatschevi*).

Remarks: Bones of *Grus* cranes, larger than the modern *Grus grus* (Linnaeus), were found in the late Pleistocene (MQ 2C-E) deposits of SW and W Europe. The taxonomic treatment of these bones is uncertain. Large cranes from Malta were traditionally separated at the species level as *Grus melitensis* Lydekker, 1890, while large continental cranes from Europe were referred either to the modern Sarus Crane *Grus antigone* (Linnaeus, 1758) or to the extinct *Grus primigenia* Milne-Edwars, 1869 (see above for references). In addition, similarly sized cranes from the late Pleistocene of Azerbaijan were referred to the extinct *Grus bohatshevi* (Serebrovs'kyj, 1940a) and to the modern Siberian Crane *Grus leucogeranus* Pallas, 1773 (Serebrovs'kyj 1940a,b, 1941a, 1948). Mourer-Chauviré et al. (1975, 1977) synonymized *Grus melitensis* with *Grus antigone*, but Northcote (1982a, 1984, 1985, 1992) resurrected the species. Large continental cranes were separated at the species level on zoogeographical grounds (Harrison & Cowles 1977) and morphologically (Northcote & Mourer-Chauviré 1985). Alcover et al. (1992) held it for possible that *Grus melitensis* and *Grus primigenia* are conspecific. For the time being, I prefer to treat all these cranes as a single extinct species, to which the name *Grus primigenia* Milne-Edwards, 1869 is applicable. Nevertheless, comparisons with similarly large modern *Grus leucogeranus* Pallas, 1773 from Siberia and *Grus carunculatus* (Gmelin, 1789) from Africa are needed (see Fischer & Stephan 1971 for skeletal measurements of the latter two species). It is also well possible, that different bones listed here under the name *Grus melitensis* Lydekker belong to different fossil and/or modern *Grus* species.

Grus grus **(Linnaeus) – Common Crane**

Ardea Grus Linnaeus, 1758 [Modern species.]

Grus turfa Portis, 1884: 372 [Syntypes from Peschiera: two vertebrae, left coracoid, left humerus, two ulnae, two radii, two carpometacarpi, two scapulae, partial pelvis, two femora, two tibiotarsi, two fibulae, left tarsometatarsus, all possibly from a single individual; present location unknown. Figured by Portis 1884, pl. 2, fig. 1 (tarsometatarsus), 2 (tibiotarsus), 3 (fibula), 4 (femur), 5 (pelvis), 6 (coracoid), 7 (scapula), 8 (humerus), 9 (ulna), 10 (radius), 11 (carpometacarpus), and 12-13 (vertebrae).]

Distribution: Late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a sub “array of *G. grus*”); early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965 sub *G.* cf. *grus*); and Holocene (MQ 2E) of Peschiera, Italy (Portis 1884 sub *G. turfa*).

Remarks: Lydekker (1891a: 161) and Paris (1912: 292) indicated, that *Grus turfa* Portis is identical with *Grus primigenia* Milne-Edwards, but Lambrecht (1933: 524) showed that *turfa* is inseparable from the modern *Grus grus* (Linnaeus).

Grus **sp.**

Distribution: Late Pliocene (MN 17) of Puebla de Valverde, Spain (Adrover et al. 1974).

Family Threskiornithidae Poche

Threskiornithidae Poche, 1904 [Modern family.]

Genus *Rhynchaeites* Wittich

Rhynchaeïtes Wittich, 1899: 103 [Type by monotypy: *Rhynchaeites messelensis* Wittich, 1899.]

Rhynchaeites Wittich: Lambrecht 1921: 52 [Spelling emended.]

Plumumida Hoch, 1980: 40 [Type by original designation: *Plumumida lutetialis* Hoch, 1980.]

Remarks: *Plumumida* Hoch was synonymized with *Rhynchaeites* Wittich by Peters (1983). The taxonomic position of *Rhynchaeites* within the family was not yet studied.

Rhynchaeites messelensis **Wittich**

Rhynchaeïtes messelensis Wittich, 1899: 103 [Holotype from Messel: incomplete skeleton in a slab; lost - Peters 1983: 1-2. Figured by Wittich 1899, pl. 2, fig. 1 (pelvis), 2 (sternum), 3 (tarsometatarsus and phalanges gigitorum pedis), 4 (bill), 5 (proximal end of carpometacarpus), 6a-b (distal end of carpometacarpus), 7 (phalanx proximalis digiti majoris), 8 (phalanx distalis digiti majoris), 9 (proximal end of humerus), 10a-b (distal end of humerus), 11 (phalanx distalis digiti minoris), 12 (ulnare), 13 (proximal end of radius), 14a-b (cranial end of coracoid), 15-16 (quadratum), 17 (caudal vertebra). Neotype (selected by Peters 1983: 4): incomplete skeleton in a slab from Messel; SMF ME-1045. Figured by Peters 1983, fig. 2.]

Plumumida lutetialis Hoch, 1980: 40 [Holotype from Messel: incomplete skeleton in a slab; GIH 2183. Figured by Hoch 1980, fig. 2-6.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Wittich 1899, Hoch 1980, Peters 1983, Mayr 1999b).

Remarks: Both *Rhynchaeites messelensis* Wittich and *Plumumida lutetialis* Hoch were described as charadriiform birds of uncertain taxonomic position. Peters (1983) observed that the latter species is synonymous with the former one, and recognized that *Rhynchaeites messelensis* Wittich was an ibis.

Genus *Plegadis* Kaup

Plegadis Kaup, 1829 [Modern genus.]

Milnea Lydekker, 1891a: 169 [Type by original designation: *Milnea gracilis* Lydekker, 1891a. This is a junior homonym of *Milnea* Reichenbach, 1866.]

Plegadis paganus (Milne-Edwards)

Ibis pagana Milne-Edwards, 1868: 450 [Lectotype from Saint-Gérand-le-Puy (selected by Cheneval 1984a: 82): right tarsometatarsus; MNHN Av-8693. Figured by Milne-Edwards 1867-1869, pl. 70, fig. 1-5, and Cheneval 1984a, pl. 6, fig. 6. "Paralectotypes" from Saint-Gérand-le-Puy (all in MNHN): incomplete skull (Av-8695), two fragmentary mandibles (Av-4849, 4850), fragmentary sternum (Av-8694), 25 coracoids (Av-2919-2921, 8561-8562), scapula (described by Milne-Edwards 1868: 455, but not mentioned by Cheneval 1983a, 1984a; probably lost), furcula (lost – Cheneval 1984a: 86), 22 humeri (Av-8583-8586, 8588-8604, 8640), 13 ulnae (8605-8616, 8642), four radii (Av-8617, 8618, 8620, 8641), 16 carpometacarpi (Av-8643), fragmentary pelvis (Av-8644), 24 femora (Av-8644-8666, 8691), 24 tibiotarsi (Av-8667-8690, 8692), and 38 tarsometatarsi (Av-2922-2926, 2926a, 8697-8727). Figured by Milne-Edwards 1867-1868, pl. 69 (reconstructed skeleton), pl. 70, fig. 1, 6-8 (tibiotarsus Av-8692), 1, 9-11 (femur Av-8691), 12-14 (pelvis Av-8644), 15-17 (sternum Av-8694), 18-20 (coracoid Av-2920), pl. 71, fig. 1-3 (humerus Av-8640), 1, 4-5 (ulna Av-8642), 1, 6-7 (carpometacarpus Av-8643), 8-9 (furcula), 10-12 (skull Av-8695); and Cheneval 1984a, pl. 6, fig. 1a-b (skull Av-8695), 2a-b (coracoid Av-2920), 3a-b (humerus Av-8640), 4a-b (carpometacarpus Av-8643), 5a-b (tibiotarsus Av-8692). The paralectotypical humerus Av-8691 belongs to *Anas* (= *Mionetta*) *blanchardi* (Milne-Edwards) – see Cheneval (1983b: 88, 1984a: 86). Cheneval (1983b: 88) incorrectly listed this specimen as a paralectotype of *Anas blanchardi* Milne-Edwards.

Milnea gracilis Lydekker, 1891a: 169 [Holotype from Saint-Gérand-le-Puy: left humerus; BMNH 47457. Figured by Lydekker 1891a, fig. 38.]

Eudocimus paganus (Milne-Edwards): Sharpe [New combination; fide Lambrecht 1933: 331.]

Plegadis paganus (Milne-Edwards): Olson 1981: 165 [New combination.]

Actiornis pagana (Milne-Edwards): Harrison 1976: 140 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1967-1869, Lydekker 1891a, Olson 1981, Cheneval 1984a).

Remarks: *Milnea gracilis* Lydekker was described in the Oedicnemidae (= Burhinidae). Cracraft (1972: 43) indicated that *Milnea gracilis* Lydekker is synonymous with *Ibis pagana* Milne-Edwards, but did not make the synonymization formally. The latter action was done by Cheneval (1984a: 82).

Genus *Geronticus* Wagler

Geronticus Wagler, 1832 [Modern genus.]

Geronticus perplexus (Milne-Edwards)

Ardea perplexa Milne-Edwards, 1869: 108 [Holotype from Sansan: distal end of right humerus; MNHN Sa-1212. Figured by Milne-Edwards 1869-1871, pl. 96, fig. 1-3; Cheneval 2000, fig. 1.]

Proardea perplexa (Milne-Edwards): Gaillard 1939: 79 [New combination.]

Geronticus perplexus (Milne-Edwards): Cheneval 2000: 324 [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869-1871, Cheneval 2000).

Geronticus eremita (Linnaeus) – Northern Bald Ibis

Upupa Eremita Linnaeus, 1758 [Modern species.]

Geronticus balcanicus Boev, 1998c: 49 [Holotype from Slivnica: worn proximal end of left carpometacarpus; NMNHS 14-1996. Figured by Boev 1998c, fig. 1a-d.]

Distribution: Late Pliocene (MN 18) of Slivnica, Bulgaria (Boev 1998c, 2000f sub *G. balcanicus*), and Almenara 1, Spain (Sánchez Marco 1996c); early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001); and middle Pleistocene (MQ 2A) of Spinagallo, Italy (Pavia 1999b).

Remarks: This is the only avian species extinct in Europe, but surviving elsewhere. In historical times, this species was known from Ancient Egypt (Kumerloeve 1983), Ancient Greece (DesFayes 1987), and from Central European Alps (Gesner 1555, see also Fatio 1906, Killermann 1911, Strohl 1917, Hescheler & Kuhn 1949, Geus 1959, Géroudet 1965, Schenker 1977, Kumerloeve 1978, 1984). The Northern Bald Ibis probably disappeared from Europe in the early 17th century, the last records being available from Switzerland (Bauer & Glutz von Blotzheim 1966, 1987, Smith 1970, Cramp & Simmons 1977, Kumerloeve 1984, Matheu & Del Hoyo 1992). The species is currently on the verge of extinction, with the last free population surviving in Morocco (Matheu & Del Hoyo 1992).

I consider arguments presented by Boev (1998c) for separating *G. balcanicus* Boev from the modern *Geronticus eremita* (Linnaeus) insufficient, and I synonymize here the former with the latter species.

Genus *Platalea* Linnaeus

Platalea Linnaeus, 1758 [Moden genus.]

Platalea leucorodia Linnaeus – Eurasian Spoonbill

Platalea leucorodia Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *P.* cf. *leucorodia*).

Family Gastornithidae Fürbringer

Gastornithidae Fürbringer, 1888: 1178 [Type genus: *Gastornis* Hébert, 1855a.]

Diatrymidae Matthew & Granger, 1917: 321 [Type genus: *Diatryma* Cope, 1876.]

Distribution: Late Paleocene to middle Eocene (MP 6-13) of England, Belgium, France and Germany. Extralimital record is available from the late Paleocene through early Eocene of Wyoming, Colorado and New Mexico (see Andors 1988, 1992), and putatively also from the early Eocene of China (Hou 1980, see also Buffetaut 1997a).

Eggshell fragments from the early Eocene (MP 7) of France, described in the genus *Ornitholithes* by Dughi & Sirugue (1962), were tentatively referred to the Gastornithidae (Michajlov 1991: 223, see also Dughi & Sirugue 1962, 1968).

Remarks: Diatrymidae Matthew & Granger is here synonymized with the Gastornithidae Fürbringer (see below under *Gastornis* Hébert).

Genus *Gastornis* Hébert

Gastornis Hébert, 1855a: 579 [Type by monotypy: *Gastornis parisiensis* Hébert, 1855a.]
Diatryma Cope, 1876: 11 [Type by monotypy: *Diatryma gigantea* Cope, 1876.]
Barornis Marsh, 1894: 344 [Type by monotypy: *Barornis regens* Marsh, 1894.]
Omorhamphus Sinclair, 1928: 51 [Type by monotypy: *Omorhamphus storchii* Sinclair, 1928.]

Distribution: Late Paleocene (MP 6) to early Eocene (MP 7-8) of England, Belgium, France and Germany.

Remarks: Coues (1884: 825) and Buffetaut (1997a) suggested that *Diatryma* Cope is synonymous with *Gastornis* Hébert. I concur with them, and formally synonymize here *Diatryma* Cope with *Gastornis* Hébert. Brodkorb (1967: 143-144) recognized two North American species of diatrymas, which should henceforth be known as *Gastornis ajax* (Shufeldt, 1913), new combination, and *Gastornis giganteus* (Cope, 1876), new combination.

For dietary habits of *Gastornis* (incl. *Diatryma*) see Andors (1988, 1991, 1992) and Witmer & Rose (1991).

Gastornis parisiensis Hébert

Gastornis parisiensis Hébert, 1855a: 579 [Holotype from Meudon: left tibiotarsus lacking proximal end; lost – Martin 1992: 98. Casts are in MNHN, uncatalogued, BMNH 32384 and KUVP 25681. Figured by Owen 1856a, pl. 3, fig. 1-1a, Milne-Edwards 1867-1868, pl. 28, fig. 1-4, and Martin 1992, fig. 2a-d.]

Gastornis Edwardsii Lemoine, 1878: 13 [Lectotype from Cernay-les-Reims (selected by Martin 1992: 98): partial left tibiotarsus; MNHN L-2457. Figured by Lemoine 1878, pl. 2, fig. 1-2. Paralectotypes from Cernay-les-Reims: a vertebra (MNHN L-2459), proximal end of right femur (MNHN L-2460), partial tarsometatarsus composed from at least 27 fragments (MNHN L-2458). Figured by Lemoine 1878, pl. 1, fig. 1 above, 2 below (proximal end of femur), fig. 1 below, 2 above (distal end of femur), and pl. 3, fig. 1-3 (tarsometatarsus), 4-6 (vertebra).]

Gastornis Klaasseni Newton, 1885a: 362 [Lectotype from Croydon: proximal end of left femur (IGS GSM-1231, figured by Newton 1886a, pl. 28, fig. 4-6, and Harrison & Walker 1977a, pl. 9, fig. f-h). Paralectotypes from Croydon: distal end of right tibiotarsus (IGS GSM-1228, cast BMNH A-86), distal end of left tibiotarsus (IGS GSM-1229, cast BMNH A-86a). Figured by Newton 1886a, pl. 28, fig. 1-3 (right tibiotarsus), 7-11 (left tibiotarsus), and Harrison & Walker 1977, pl. 9, fig. a-e (right tibiotarsus). The syntypical series included also remains of additional three tibiotarsi, now lost – Harrison & Walker 1977a: 38.]

Distribution: Late Paleocene (MP 6) of Walbeck, Germany (Weigelt 1939, 1942), Mesvin, Belgium (Dollo 1883, 1909, Martin 1992), and Cernay-les-Reims, France (Gervais 1873, 1877, Lemoine 1878, 1880, 1881a,b,c 1884, 1885, 1893, Meunier 1882, Repelin 1924, Andors 1992, Martin 1992, Buffetaut 1997a, see also Lydekker 1893a, Matthew & Granger 1917); early Eocene (MP 7) of Meudon, France (Prévost 1855a,b, Hébert 1855a,b,c,d, Lartet 1855, Valenciennes 1855, Duméril 1855, Owen 1856a,b, Milne-Edwards 1867a,b, 1872, Meunier 1882, Repelin 1924, Martin 1992, see also Bonaparte 1856a,b, Woodward 1886, Lavocat 1899, Russell et al. 1990), Passy, France (Milne-Edwards 1867a,b, 1872), and Croydon, England (Newton 1885a,b, 1886a,b, 1889, Harrison & Walker 1977a, Martin 1992); and early Eocene (MP 8-9) of Mutigny, France (Martin 1992). General reference: Buffetaut 1997b,c.

Remarks: *Gastornis edwardsii* Lemoine and *Gastornis klaasseni* Newton were synonymized with *Gastornis parisiensis* Hébert by Martin (1992).

Lemoine (1881c, pl. 11) reconstructed the skeleton of *Gastornis* using syntypes of *Gastornis parisiensis* and a number of referred material, some of which was later shown to belong to turtles and fishes (Martin 1992, fig. 12; see also Feduccia 1996: 236, Buffetaut 1997c, fig. 1). This reconstruction later entered general monographs (e.g. Meunier 1898, Lambrecht 1933, fig. 165, Piveteau 1955, fig. 59, Müller 1968, fig. 722), and markedly influenced taxonomic fate of the European *Gastornis* (see Martin 1992, Buffetaut 1997a,b,c).

Gastornis russeli Martin

Gastornis russeli Martin, 1992: 102 [Holotype from Berru: left tarsometatarsus; MNHN R-3560. Figured by Martin 1992, fig. 6a-d, 7a.]

Distribution: Late Paleocene (MP 6) of Berru, France (Martin 1992).

Gastornis sarasini (Schaub)

(?) Diatryma sarasini Schaub, 1929b: 588 [Lectotype from Monthelon (here selected): distal end of left tarsometatarsus; BaM TS-94. Figured by Schaub 1929b, fig. 1-3, 6, and Gaillard 1936, fig. 7, 7a. Paralectotype from Monthelon: phalanx I digiti II; NMB TS-8. Figured by Schaub 1929b, fig. 8.]

Diatryma geiselensis Fischer, 1978: 134 [Holotype from Geiseltal XIII: right scapulocoracoid; GM Av-G?/Dia.2. Figured by Fischer 1962, pl. 4, fig. 2.]

Gastornis sarasini (Schaub): Mlíkovský, this paper [New combination.]

Distribution: Early Eocene (MP 10) of Monthelon, France (Schaub 1929a,b, Gaillard 1936); middle Eocene (MP 11) of Messel, Germany (Berg 1965 sub *Diatryma* cf. *steini*), Geiseltal XIII, Germany (Fischer 1962, 1978), and Geiseltal XIV, Germany (Fischer 1962, 1978); and middle Eocene (MP 13) of Geiseltal XXXV, Germany (Fischer 1978), and Geiseltal XLI, Germany (Fischer 1978).

Remarks: There is no evidence that *Diatryma geiselensis* Fischer was different from *Diatryma sarasini* Schaub. They coincide in age, distribution and morphology, so that I synonymize here *Diatryma geiselensis* Fischer with *Diatryma sarasini* Schaub. The species should bear the name *Gastornis sarasini* (Schaub), new combination.

Fischer (1962: 27) hypothesized that *Diatryma sarasini* Schaub could be a subspecies of *Diatryma steini* Matthew & Granger, described from the early Eocene (Willwood Formation) of South Elk Creek, Wyoming (Matthew & Granger 1917), and Berg (1965) tentatively attributed an imprint of a femur from Messel, Germany, to the same species. Until compared directly, I consider the European Eocene gastornithids as separated from the North American ones at the species level.

Family Eogruidae Wetmore

Eogruidae Wetmore, 1934a: 3 [Type genus: *Eogrus* Wetmore, 1934.]

Ergilornithidae Kozlova, 1960: 329 [Type genus: *Ergilornis* Kozlova, 1960.]

Distribution: Late Miocene (MN 9-13) of Moldova, Ukraine and Greece. Rich extralimital record is limited to the Tertiary of Asia, incl. the middle/late Eocene of China (Wetmore 1934a, Kuročkin 1981), Mongolia (Kuročkin 1981), and Kazakhstan (Bendukidze 1971, 1972a, Kuročkin 1981), early Oligocene of Mongolia (Kozlova 1960, Cracraft 1973, Kuročkin 1981), early Miocene of Kazakhstan (Karchu 1997), late Miocene of Iran (Mecquenem 1908, 1925, Cracraft 1973, Kuročkin 1981), China (Brodkorb 1967) and Krasnodar Province in Russia (Bendukidze 1972b, Kuročkin 1981), and early/middle Pliocene of Kazakhstan (Kuročkin 1981) and Mongolia (Kuročkin 1981, 1985). In addition, Kuročkin (1985: 61) opened the possibility, that large phalanges digitorum pedis from Mioocene Siwalik faunas of Pakistan, described by Davies (1880), belong to this family. However, another alleged record from the Siwalik faunas in the neighboring Pakistan (Harrison & Walker 1982) was rejected by Karchu (1997), so that the former existence of the Eogruidae in the Indian sub-continent remains unproven. Avian footprints described by Lambrecht (1938) from the late Miocene of Hamrin Mountains in Iran as *Urmiornis abeli* do not belong to the Eogruidae (Vjalov 1989). General reference: Kuročkin (1982).

Genus *Amphipelargus* Lydekker

Amphipelargus Lydekker, 1891a: 68 [Type by original designation: *Amphipelargus majori* Lydekker, 1891a. Kuročkin's (1985: 60) statement, that the type of this genus is *Urmiornis maraghanus* Mecquenem, 1925, is erroneous.]

Urmiornis Mecquenem, 1908: 54 [Type by monotypy *Urmiornis maraghanus* Mecquenem, 1908.]

Urmiornis Mecquenem, 1925: 27 [Type by monotypy *Urmiornis maraghanus* Mecquenem, 1925. Again marked as "nov. gen." This is thus both junior homonym and junior objective synonym of *Urmiornis* Mecquenem, 1908.]

Distribution: Late Miocene (MN 9/10 to 11/13) of Moldova, Ukraine and Greece. Extralimital record is known from the early Miocene of Kazakhstan (Karchu 1997), late Miocene of Iran (Mecquenem 1908, 1925, Cracraft 1973, Kuročkin 1981), and early Pliocene of Kazakhstan (Kuročkin 1981) and Mongolia (Kuročkin 1985). The alleged record from the late Miocene of Pakistan (Harrison & Walker 1982) is invalid (Karchu 1997).

Remarks: Kuročkin (1985) and Olson (1985a) followed Harrison's (1981) conjecture and included *Urmiornis* Mecquenem in *Amphipelargus* Lydekker. Karchu (1997) separated the genera again, but his data only underscore the specific status of *majori*, being not sufficient for its separation at the generic level.

Amphipelargus ukrainus (Kuročkin)

Urmiornis ukrainus Kuročkin, 1981: 78 [Holotype from Hrebenyky: distal end of left tarsometatarsus; IZAN 25-2589. Figured by Burčak-Abramovič 1951, fig. 1/3-4, 2/5-8.]

Amphipelargus ukrainus (Kuročkin): Kuročkin, 1985: 60 [New combination.]

Distribution: Late Miocene (MN 9-10) of Kolkotova Balka, Moldova (Laskarev 1908 and 1912: 41 sub *Urmiornis* sp., Burčak-Abramovič 1951 sub *U. maraghanus*, Cracraft 1973 sub *U. maraghanus*, Kuročkin 1981); late Miocene (MN 11) of Hrebenyky, Ukraine (Burčak-Abramovič 1951 sub *U. maraghanus*, Kuročkin 1981); and late Miocene (MN 11-13) of Čebotarevka, Ukraine (Umans'ka 1973 sub *Urmiornis* sp., Kuročkin 1981). An extralimital record is available from the late Miocene of Armavir, Krasnodar Province, Russia (Bendukidze 1972b sub *U. maraghanus*, Kuročkin 1981).

Amphipelargus majori Lydekker

Amphipelargus majori Lydekker, 1891a: 69 [Holotype from Samos 1: distal end of left tibiotarsus; BMNH A-123. Figured by Lydekker 1891a, fig. 18, Harrison 1981, fig. 1a-d, 2a.]

Urmiornis Maraghanus Mecquenem, 1925: 27 [Lectotype from Maragha (selected by Cracraft 1973: 74): left tarsometatarsus; MNHN uncatalogued. Figured by Mecquenem 1908, fig. 16, Mecquenem 1925, fig. 16; and Cracraft 1973, fig. 33a-d. Paralectotype from Maragha: distal end of right (not left as stated by Mecquenem 1925: 27) tibiotarsus. Figured by Mecquenem 1908, fig. 16; Mecquenem 1925, fig. 16-17; Cracraft 1973, fig. 34a-d). Kuročkin (1981: 78) erroneously called the lectotypical tibiotarsus a holotype.

Amphipelargus maraghanus (Mecquenem): Kuročkin 1985: 60 [New combination.]

Distribution: Late Miocene (MN 11) of Samos 1, Greece (Lydekker 1891a, Harrison 1981, Karchu 1997). An extralimital record is available from the late Miocene of Maragha, Iran (Mecquenem 1908, 1925, Burčak-Abramovič 1951, Cracraft 1973, Harrison 1981, Kuročkin 1981, Karchu 1997). Bones from the late Miocene of Moldova, Ukraine and Krasnodar Province in Russia (Lambrecht 1933: 521, Burčak-Abramovič 1951: 83, Bendukidze 1972b, Cracraft 1973: 74) were later assigned to *Amphipelargus ukrainus* (Kuročkin) by Kuročkin (1981). The alleged extralimital record from the early Pliocene of Kalmakpai, Kazakhstan (Cracraft 1973) became the holotype of *Urmiornis orientalis* Kuročkin, 1981.

Remarks: *Amphipelargus majori* Lydekker was transferred from the Ciconiidae to the

Eogruidae by Harrison (1981). The paralectotypical tibiotarsus of *Urmiornis maraghanus* Mecquenem agrees in size and morphology with the holotype of *Amphipelargus majori* Lydekker. Considering the agreement in age and geographic distribution, I synonymize here the former with the latter species (see also Harrison 1981: 112; for an opposite view see Karchu 1997: 105).

Family Otididae Gray

Otididae Gray, 1840 [Modern family.]

Gryzajidae Brodkorb, 1967: 175 [Type genus: *Gryzaja* Zubareva, 1939.]

Remarks: The genus *Gryzaja* Zubareva was described in the Otididae, but Brodkorb (1967: 175) separated it at the family level. I return here the genus to the Otididae, synonymizing thus Gryzajidae Brodkorb with the Otididae Gray. All fossil and modern genera of the Otididae are in need of revision.

Genus *Miootis* Umans'ka

Miootis Umans'ka, 1979a: 40 [Type by original designation: *Miootis compactus* Umans'ka, 1979a.]

Miootis compactus Umans'ka

Miootis compactus Umans'ka, 1979a: 40 [Holotype from Nova Emetivka: left carpometacarpus; IZAN 25-2891. Figured by Umans'ka 1979a, fig. 1a,b,v.]

Distribution: Late Miocene (MN 13) of Nova Emetivka, Ukraine (Umans'ka 1979a).

Remarks: Taxonomic identity of this genus and species is in need of confirmation.

Genus *Chlamydotis* Lesson

Chlamydotis Lesson, 1839 [Modern genus.]

Chlamydotis mesetaria Sánchez Marco

Chlamydotis mesetaria Sánchez Marco, 1990a: 225 [Holotype from Layna: right tibiotarsus; MNCN, uncatalogued. Figured by Sánchez Marco 1990a, text-fig. 1/1-2, 2/1-4, pl. 1, fig. 1-2, pl. 2, fig. 1-4.]

Distribution: Early Pliocene (MN 15) of Layna, Spain (Sánchez Marco 1990a).

Chlamydotis undulata (Jacquin) – Houbara Bustard

Otis undulata Jacquin, 1784 [Modern species.]

Otis khosatzkii Bocheński & Kuročkin, 1987b: 175 [Holotype from Etulia: distal end of right tibiotarsus; PIN 2614-56. Figured by Bocheński & Kuročkin 1987b, pl. 1, fig. 1-3.]

Otis khosatzkii beremendensis Jánossy, 1991: 24 [Holotype from Beremend 15: a "very damaged" tarsometatarsus; NMB V-90-11. Not figured.]

Distribution: Late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1987b and 1990b sub *Tetrax* sp., Jánossy 1991, 1992), and Etulia, Moldova (Bocheński & Kuročkin 1987b); and late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 1999e: 70 and 2000a sub *Otis* aff. *khosatzkii*).

Remarks: The available material of *Otis khosatzkii* Bocheński & Kuročkin is not reasonably separable from the modern *Chlamydotis undulata* (Jacquin). Consequently, I synonymize here the former with the latter species. The taxonomic identity of *Otis khosatzkii beremendensis* Jánossy remains uncertain.

Genus *Otis* Linnaeus

Otis Linnaeus, 1758 [Modern genus.]

Otis affinis Lydekker

Otis affinis Lydekker, 1891a: 168 [Holotype from Schnaitheim (= misprint for Steinheim according to Ammon 1918: 55, see also Lambrecht 1933: 528, and Mlíkovský & Hesse 1996: 635): crushed postcranial skeleton in slab; BMNH 36745. Figured by Lambrecht 1933, fig. 157b.]

Chlamydotis affinis (Lydekker): Brodkorb 1967: 174 [New combination.]

Distribution: Middle Miocene (MN 7) of Steinheim, Germany (Lydekker 1891a, Lambrecht 1933, Sánchez Marco 1990a).

Remarks: Mlíkovský (1992b: 441) returned the species to the genus *Otis* Linnaeus.

Otis bessarabensis Kessler & Gál

Otis bessarabensis Kessler & Gál, 1996: 77 [Holotype from Chişinău: distal end of left ulna; LPUI 62-MS. Figured by Kessler & Gál 1996, fig. 3a-b.]

Distribution: Late Miocene (MN 9) of Chişinău, Moldova (Kessler & Gál 1996).

Remarks: Taxonomic identity of this species needs confirmation.

Otis tetrax Linnaeus – Little Bustard

Otis Tetrax Linnaeus, 1758 [Modern species.]

Otis (Tetrax) kalmani Jánossy, 1972: 50 [Holotype from Betfia 2: cranial end of left coracoid; GIB Ob-4845. Not figured.]

Otis paratetrax Bocheński & Kuročkin, 1987b: 179 [Holotype from Etulia: cranial end of left coracoid; PIN 2614-49. Figured by Bocheński & Kuročkin 1987b, pl. 1, fig. 6-7.]

Distribution: Late Pliocene (MN 16) of Etulia, Moldova (Bocheński & Kuročkin 1987b sub *O. paratetrax*); late Pliocene (MN 17) of Kryžanovka 1, Ukraine (Dubrovo & Kapelist 1979 sub *O.* cf. *tetrax*); early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992), Betfia 2, Romania (Čapek 1917, Jánossy 1972 and 1980); early Pleistocene (MQ 1a) of Nagyharsánhegy 1-4, Hungary (Jánossy 1980a sub *O. kalmani*); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5, Czechia (Jánossy 1972), and Stránská skála – Musil's talus cone, layer 13, Czechia (Mlíkovský 1995b).

Otis tarda Linnaeus – Great Bustard

Otis Tarda Linnaeus, 1758 [Modern species.]

Otis brevipes Giebel, 1847: 26 [Holotype from Seveckenberg: distal end of right tarsometatarsus; MNHN, uncatalogued. Not figured.]

Otis lambrechti Kretzoi, 1941: 253 [Holotype from Betfia 5: fragmentary distal end of a tarsometatarsus; GIB, uncatalogued. Not figured.]

Distribution: Early Pliocene (MN 14) of Vojničevo, Ukraine (Vojinstvens'kyj 1967 sub *O.* cf. *tarda*); late Pliocene (MN 16) of Çişmikioi, Moldova (Bocheński & Kuročkin 1987b sub *Otis* sp. - group of *O. tarda*); late Pliocene (MN 18) of Villány 3, Hungary (Jánossy 1980a);

early Pleistocene (MQ 1a) of Osztramos 2, Hungary (Jánossy 1980), Beremend 17, Hungary (Jánossy 1992 sub *O.* cf. *lambrechti*), Nagyharsánhegy 1-4, Hungary (Jánossy 1980), and Betfia 5, Romania (Jánossy 1980a sub *O. lambrechti*); middle Pleistocene (MQ 2A) of Hundsheim, Austria (Jánossy 1974b sub *O.* cf. *lambrechti*, Mlíkovský orig.); and late Pleistocene (MQ 2C) of Seveckenberg, Germany (Giebel 1847, Mlíkovský orig.).

Remarks: I restudied the holotype of *Otis brevipes* Giebel and the description of *Otis lambrechti* Kretzoi, and I synonymize here both of these species with the modern *Otis tarda* Linnaeus (Mlíkovský orig.).

Otis sp.

Distribution: Early Pliocene (MN 15) of Maluşteni-Bereşti, Romania (Kessler 1979).

Genus *Gryzaja* Zubareva

Gryzaja Zubareva, 1939: 607 [Type by monotypy: *Gryzaja odessana* Zubareva, 1939.]

Gryzaja odessana Zubareva

Gryzaja odessana Zubareva, 1939: 607 [Lectotype from Odesa – catacombs (here selected): distal end of right tibiotarsus; IZAN 6617. Figured by Zubareva 1939, 4 unnumbered figs. on p. 607; Zubareva 1948, fig. 7c, 8c; and Dement'ev 1964, fig. 690a,b. Paralectotype: distal end of left tibiotarsus from Odesa–catacombs; IZAN 6618. Not figured.]

Chlamydotis pliodeserti Serebrovs'kyj, 1941a: 474 [Syntypes from Odesa – catacombs: right coracoid and cranial end of left coracoid; present location unknown. Figured by Serebrovs'kyj 1941a; and Dement'ev 1964, fig. 685.]

Otis gryzaja Vojinstvens'kyj, 1967. [New name for *Gryzaja odessana* Zubareva, 1939, hence its junior objective synonym.]

Distribution: Early Pliocene (MN 15) of Odesa – catacombs, Ukraine (Zubareva 1939, 1948, Serebrovs'kyj 1941, Vojinstvens'kyj 1959a, 1967); and late Pliocene (MN 16) of Etulia, Moldova (Chozackij & Kuročin 1966, Kuročkin & Chozackij 1972, Bocheński & Kuročkin 1987b), and Kotlovina, Ukraine (Kuročkin & Chozackij 1972).

Remarks: *Chlamydotis pliodeserti* Serebrovs'kyj was synonymized with *Gryzaja odessana* Zubareva by Vojinstvens'kyj (1959a: 200).

Family Ciconiidae Sundevall

Ciconiidae Sundevall, 1836 [Modern family.]

Genus *Grallavis* Cheneval

Grallavis Cheneval 1984b: 44 [Type by original designation: *Propelargus edwardsi* Lydekker, 1891c.]

Grallavis edwardsi (Lydekker)

Propelargus (?) *Edwardsi* Lydekker, 1891c: 479 [Holotype from Saint-Gérand-le-Puy: right coracoid; BMNH A-427. Figured by Lydekker 1891c, fig. A.]

Grallavis edwardsi (Lydekker): Cheneval 1984b: 44 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Lydekker 1891a sub *Propelargus* (?) sp., Lydekker 1891c, Lambrecht 1933: 319-320, Cheneval 1984b).

Genus *Leptoptilos* Lesson

Leptoptilos Lesson, 1831 [Modern genus.]

Leptoptilos pliocenicus Zubareva

Leptoptilus [sic] *pliocenicus* Zubareva, 1948: 114 [Syntypes from Odesa – catacombs: fragment of right premaxilla (IZAN 8025), two fragments of left mandible from a single individual (IZAN 8026), fragment of right mandible (IZAN 7042), right quadratum (IZAN 7042), shaft of right humerus (IZAN 6939), left carpometacarpus (IZAN 8060), left tarsometatarsus lacking proximal end (IZAN 8024), and phalanx 1 digiti 3 (IZAN 6502). Figured by Zubareva 1948, fig. 1 (quadratum), fig. 2a-c (right mandible), fig. 3 (carpometacarpus), fig. 4a-b (tarsometatarsus), fig. 6a-b (phalanx); and Dement'ev 1964, fig. 695a (carpometacarpus), b,v (tarsometatarsus), g,d (phalanx).]

Distribution: Early Pliocene (MN 15) of Odesa – catacombs, Ukraine (Zubareva 1948).

Genus *Ciconia* Brisson

Ciconia Brisson, 1760 [Modern genus.]

Ciconia sarmatica Grigorescu & Kessler

Ciconia sarmatica Grigorescu & Kessler, 1977: 99 [Holotype from Credința: proximal end of right carpometacarpus; LPUB 259. Figured by Grigorescu & Kessler 1977, pl. 3, fig. 2a-b, 4a, pl. 5, fig. a.]

Distribution: Middle Miocene (MN 8) of Credința, Romania (Grigorescu & Kessler 1977).

Remarks: Taxonomic status of this species is in need of revision.

Ciconia gaudryi Lambrecht

Ciconia gaudryi Lambrecht, 1933: 323 [Holotype from Pikermi: humerus; perhaps in MNHN. I was not able to see the specimen during my visits to MNHN in 1992 and 1999, but other avian bones from the site collected by Gaudry were present there. Figured by Gaudry 1862-1867, pl. 59, fig. 12.]

Distribution: Late Miocene (MN 12-13) of Pikermi, Greece (Gaudry 1862a,b, 1862-1867 sub "Cicogne indeterminée", Lambrecht 1933).

Ciconia stehlini Jánossy

Ciconia stehlini Jánossy, 1992: 16 [Syntypes from Beremend 15: proximal end of tarsometatarsus and distal end of tarsometatarsus; NMB V-91.151. Figured by Jánossy 1992, fig. 4/1-3.]

Distribution: Late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1987b and 1990b sub *Ciconia* sp., Jánossy 1992); and early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992).

Remarks: Taxonomic status of this species is in need of revision.

Genus incertae sedis

"*Cygnus*" *bilinicus* Laube

Cygnus bilinicus Laube, 1909: 161 [Holotype from Břešťany: proximal (not distal as stated by Laube 1909) end of an ulna, proximal (not distal as stated by Laube 1909) end of an radius and a carpometacarpus, all apparently from a single individual; RMT 232. Figured by Laube 1909, pl. 1; and Mlíkovský & Švec 1989, pl. 2, fig. b. The bones are too flattened to reveal from which body side they originated.]

Aquilavus bilinicus (Laube): Brodkorb 1964: 264 [New combination; in *Aquilavus* Brodkorb, 1964.]

Distribution: Early Miocene (MN 3) of Břešťany, Czechia (Laube 1909, Mlíkovský & Švec 1989, Mlíkovský 1999c).

Remarks: Described as a swan, and later believed to represent an accipitrid raptor (Lambrecht 1933: 383, Brodkorb 1964: 264, 1978, Howard 1964). Mlíkovský & Švec (1989) showed that it is an indeterminate stork from the family Ciconiidae.

Family Cathartidae Lafresnaye

Cathartidae Lafresnaye, 1839 [Modern family.]

Remarks: In summarizing the evidence for the occurrence of the New World vultures (Cathartidae) in the Old World, Cracraft & Rich (1972) recognized four monotypic genera of Old World cathartids, all from the Paleogene of Europe. Of them, three genera were already removed from the family, incl. *Eocathartes* Lambrecht (P. Houde in Olson 1985a: 191), *Plesiocathartes* Gaillard (Jollie 1977c: 112), and *Amphiserpentarius* Milne-Edwards (Mourer-Chauviré & Cheneval 1983). The last genus, *Tapinopus* Milne-Edwards, is relegated to the category of Aves incertae sedis in this paper (see below).

The opinion of Cracraft & Rich (1972), that the Cathartidae originated in the Old World, was accepted by Alvarenga (1985) and Emslie (1988), but seems to have no support in the fossil record. There is currently no evidence, that the Cathartidae occurred in the Cenozoic of Europe or elsewhere in the Old World.

Order Anseriformes Wagler

Anseres Wagler, 1831 [Modern order.]

Family Phoenicopteridae Bonaparte

Phoenicopteridae Bonaparte, 1831 [Modern family.]

Palaeolontidae Stejneger, 1885: 154 [Type genus: *Palaelodus* Milne-Edwards, 1863. This is incorrect original spelling of Palaelodidae – see Mlíkovský 2000f.]

Palaelodidae Stejneger: Fürbringer 1888: 1565 [Spelling emended.]

Juncitarsinae Peters, 1987b: 141 [Type genus: *Juncitarsus* Olson & Feduccia, 1980a.]

Remarks: Palaelodidae Stejneger was synonymized with the Phoenicopteridae Bonaparte by Olson & Feduccia (1980a: 45).

Genus *Juncitarsus* Olson & Feduccia

Juncitarsus Olson & Feduccia, 1980a: 48 [Type by original designation: *Juncitarsus gracillimus* Olson & Feduccia, 1980a.]

Distribution: Middle Eocene (MP 11) of Germany. The extralimital record is limited to *Juncitarsus gracillimus* Olson & Feduccia, 1980a from the middle Eocene (early Bridgerian) of Wyoming (Olson & Feduccia 1980a). See also Ericson (1999).

Juncitarsus merkeli Peters

Juncitarsus merkeli Peters, 1987b: 141 [Holotype from Messel: incomplete skeleton in slab; coll. Kessler, uncatalogued. Cast in SMF, uncatalogued. Figured by Peters 1987b, fig. 1, 3-8.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Peters 1987b). Tentatively referred also from the middle Eocene (early Bridgerian) of Wyoming (Peters 1987b: 142).

Genus *Kashinia* Harrison & Walker

Tenuicrus Harrison & Walker, 1976a: 344 [Type by original designation: *Tenuicrus magnum* Harrison & Walker, 1976a.]

Kashinia Harrison & Walker, 1979c: 110 [New name for *Tenuicrus* Harrison & Walker, 1976a; preoccupied by *Tenuicrus* Womersley, 1940.]

Kashinia magna Harrison & Walker

Tenuicrus magnum Harrison & Walker, 1976a: 344 [Holotype from Hordle: incomplete right coracoid; BMNH 30327. Figured by Harrison & Walker 1976a, pl. 6, fig. h-k.]

Kashinia magna (Harrison & Walker): Harrison & Walker, 1979c: 110 [New combination.]

Distribution: Late Eocene (MP 17) of Hordle, England (Harrison & Walker 1976a).

Remarks: As judged from figures, the holotypical coracoid differs from the same element of the Recurvirostridae (where the species was placed by Harrison & Walker 1976a), and agrees with that of *Juncitarsus* Olson & Feduccia (see Ericson 1999, fig. 2) in having medial angle pointed, shaft shorter and more robust, and head less bent. It is thus possible, that *Kashinia magna* (Harrison & Walker) represents an ancestral flamingo. However, direct study of the specimens is necessary to confirm this conclusion.

Genus *Palaelodus* Milne-Edwards

Palaelodus Milne-Edwards, 1863: 158 [Type by subsequent designation (Milne-Edwards 1869: 59): *Palaeolodus ambiguus* Milne-Edwards, 1863. The generic name was often misspelled as *Paloelodus* (see Cheneval 1983c: 181), but I am not aware of any case, where this action could be unequivocally interpreted as a deliberate emendation of *Palaelodus*.]

Probalearica Lambrecht, 1933: 519 [Type by monotypy: *Grus problematica* Milne-Edwards, 1871.]

Megapaloelodus Miller, 1944: 86 [Type by monotypy: *Megapaloelodus connectens* Miller,

1944.]

Distribution: Late Oligocene (MP 25-30) of France and Germany, early Miocene (MN 1-4) of France, Germany and Czechia, and middle Miocene (MN 5-8) of Germany, Czechia and Romania. The genus has a rich extralimital record, which includes early Miocene of South Dakota (A.H. Miller 1944), middle Miocene of California (L.H. Miller 1950, 1952), late Miocene of Oregon (Brodkorb 1961), California (Howard 1971, tentatively), Texas (Becker 1987: 49), and Argentina (Noriega 1995), and late Oligocene through middle Miocene of Australia (Baird & Vickers-Rich 1998). A much younger record from the middle Pleistocene of Australia (Baird & Vickers-Rich 1998) is based on a single bone fragment and should be reevaluated.

Remarks: Olson & Feduccia (1980a: 45) indicated, that *Megapaloelodus* Miller "is very similar to, and may not be separable from *Palaelodus* [Milne-Edwards]". I agree and I synonymize here the former with the latter genus.

Palaelodus ambiguus Milne-Edwards

Palaelodus ambiguus Milne-Edwards, 1863: 159 [Lectotype from Saint-Gérand-le-Puy (selected by Cheneval 1983c: 181): left tarsometatarsus; MNHN Av-8914. Figured by Cheneval 1983c, pl. 1, fig. 1a-b. Not figured by Milne-Edwards 1869-1871, pl. 83, fig. 1-4, where a side-reversed right tarsometatarsus is shown (contra Cheneval 1983c: 181). "Paralectotypes" from Saint-Gérand-le-Puy (based on the list in Cheneval 1983a: 123-125; all in MNHN): mandible (Av-260 coracoids (Av-1-36, 38-48, 50-90, 92-259, 340-341, 9299, 9302), 287 scapulae (Av-342-628), 80 furculae (Av-260-339), 32 sterna (Av-2768-2805, 2947-2960), 299 humeri (Av-629-639, 641-643, 645-650, 652, 654-664, 666, 668-768, 770-804, 806-849, 851-857, 859-900, 902-945, 6529, 6531-6532), 412 ulnae (Av-1851, 1952-1978, 1981-2018, 2020-2041, 2043-2050, 2052-2069, 2071-2072, 2074-2081, 2083-2107, 2109-2114, 2231-2241, 2244-2294, 2296-2304, 2349-2365, 2367-2412, 2414-2428, 2430-2437), 235 radii (Av-1797, 1799-1800, 1803-1821, 1823-1827, 1829, 1831-1850, 1852-1879, 1881-1883, 2051, 2115-2130, 2132-2152, 2155-2181, 2183-2230, 2305-2316, 2318-2338, 2340-2349), 243 carpometacarpi (Av-1830, 2182, 2439-2440, 2442-2448, 2450-2456, 2458-2476, 2478-2486, 2488, 2490-2541, 2516-2518, 2520-2524, 2526-2538, 2540-2551, 2553-2558, 2560-2572, 2574-2578, 2580-2587, 2589-2615, 2617, 2619-2669, 2701), 185 femora (Av-2976-2989, 2991-3145, 3147, 6503-6510, 6512-6518), 377 tibiotarsi (Av-3221-3225, 3227-3253, 3255-3260, 3262-3361, 3363-3366, 3368-3379, 3414-3462, 3464-3490, 3500-3519, 3521-3539, 3560-3580, 3582-3593, 3595-3613, 3615-3650, 3652-3657, 3659-3661, 6479-6482, 6484, 6487, 6488, 6520-6523), and 281 tarsometatarsi (Av-3662-3757, 3759-3770, 3772-3776, 6528, 8761-8778, 8780-8835, 8837-8893, 8895-8913, 8915-8923, 9027-9254). Figured by Gervais 1859, pl. 51, fig. 9 (tarsometatarsus), Milne-Edwards 1869-1871, pl. 82 (reconstructed skeleton), pl. 83, fig. 1-4 (tarsometatarsus), 5-8 (tibiotarsus), 9-12 (femur), 13-15 (coracoid), pl. 84, fig. 4-5 (humerus), 9-11 (mandible), pl. 85, fig. 4-5 (ulna), 5 (radius), 6-9 (carpometacarpus); Lambrecht 1933, fig. 117b (tarsometatarsus), fig. 118 (reconstructed skeleton); Rothausen 1966, fig. 1 (skeletal reconstruction); and Cheneval 1983a, pl. 11, fig. 1a-b (coracoid), 2a-b (humerus), 3a-b (radius), 4a-b (ulna), 5a-b (carpometacarpus), pl. 12, fig. 1a-b (femur), 2a-b (tibiotarsus).]

Palaelodus gracilipes Milne-Edwards, 1863: 160 [Lectotype from Saint-Gérand-le-Puy (selected by Cheneval 1983c: 184): right tarsometatarsus; MNHN Av-9255. Figured by Milne-Edwards 1869-1871, pl. 85, fig. 12-16; and Cheneval 1983c, pl. 1, fig. 3a-b. "Paralecotypes" from Saint-Gérand-le-Puy (based on the list in Cheneval 1983a: 132-133; all in MNHN): coracoid (Av-9286), 10 humeri (Av-640, 644, 651, 667, 9282-9285, 9670-9671), 10 ulnae (Av-2019, 2042, 2070, 2073, 2082, 2243, 2295, 2366, 2413, 2429), two radii (Av-2317, 2339), 12 carpometacarpi (Av-2441, 2457, 2487, 2515, 2573, 2579, 2616, 2618, 9287-9290), nine femora (Av-9272-9280), 19 tibiotarsi (Av-3226, 3254, 3261, 3463, 3520, 3594, 3614, 3651, 3658, 6483, 6485-6486, 6489, 6536-6537, 9268-9271), 87 tarsometatarsi (Av-6490-6502, 8779, 8836, 9256-9627). Figured by Milne-Edwards 1869-1871, pl. 86, fig. 1-4 (femur), 5-7 (tibiotarsus), 8-11 (carpometacarpus), 12-14 (coracoid), 15-16 (humerus). Cheneval (1983c: 184) incorrectly listed among the paralectotypes of *Palaelodus gracilipes* also the holotype of *Palaelodus minutus* Milne-Edwards.]

Palaelodus crassipes Milne-Edwards, 1863: 160 [Lectotype from Saint-Gérand-le-Puy (selected by Cheneval 1983c: 185): proximal end of right tarsometatarsus; MNHN Av-9321. Figured by Cheneval 1983c, pl. 1, fig. 4a-b. Not figured by Milne-Edwards 1869-1871, pl. 88, fig. 4-7, which shows a side-reversed left tarsometatarsus (contra Cheneval 1983c: 185). "Paralectotypes" from Saint-Gérand-le-Puy (based on the list in Cheneval 1983a: 135-136): six coracoids (Av-37, 49, 9296-9298, 9303), eight humeri (Av-653, 665, 805, 850, 901, 6530, 9304-9305), three ulnae (Av-2108, 6533, 9306), eight radii (Av-1822, 1880, 2131, 6534-6535, 9307-9309), 16 carpometacarpi (Av-2438, 2449, 2477, 2489, 2519, 2525, 2539, 2552, 2559, 2588, 3758, 9313-9317), a femur (Av-2990), five tibiotarsi (Av-3367, 3581, 6468, 6519, 6557), and five tarsometatarsi (Av-3367, 3581, 6468, 6519, 6557). Figured by Milne-Edwards 1869-1871, pl. 88, fig. 4-7 (tarsometatarsus), 8-9 (tibiotarsus), 10 (ulna), 11 (radius); and Milne-Edwards 1969-1871, pl. 89, fig. 1-2 (coracoid), 5 (humerus).]

Paloelodus [sic!] *minutus* Milne-Edwards, 1868: pl. 86 [Holotype from Saint-Gérand-le-Puy: right tarsometatarsus; MNHN Av-6511. Figured by Milne-Edwards 1869-1871, pl. 86, fig. 17-20; Cheneval 1983a, pl. 10, fig. 2; and Cheneval 1983c, pl. 1, fig. 2a-b.]

Grus problematica Milne-Edwards, 1868: pl. 76 [Holotype from Saint-Gérand-le-Puy: imperfect premaxilla; MNHN Av-8728. Figured by Milne-Edwards 1869-1871, pl. 76, fig. 5-7; and Cracraft 1973, fig. 40a,d.]

Probalearica problematica (Milne-Edwards): Lambrecht 1933: 519 [New combination.]

Grus miocenicus Grigorescu & Kessler, 1977: 102 [Holotype from Credința: distal end of a tarsometatarsus; LPUB 263. Figured by Grigorescu & Kessler 1977.]

Distribution: Middle Oligocene (MP 25) of Chaptuzat, France (Milne-Edwards 1867-1868, 1869-1871); late Oligocene (MP 25-30) of Perignat, France (Lydekker 1891a: 89); late Oligocene (MP 28) of Cournon, France (Milne-Edwards 1869-1871); late Oligocene (MP 29) of Pont-du-Château, France (Milne-Edwards 1869-1871); late Oligocene (MP 30) of Gannat, France (Milne-Edwards 1869-1871);

early Miocene (MN 1) of Weisenau-AS, Germany (Lydekker 1891a: 90, Lambrecht 1933: 340); early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1869-1871, Cheneval 1983c, Cheneval & Escuillié 1992), Wiesbaden-Hessler, Germany (Lambrecht 1933: 340), Wiesbaden 1, Germany (Lambrecht 1933: 342), Budenheim, Germany (Lambrecht 1933: 340, 342); early Miocene (MN 2) of Monsheim, Germany (Lambrecht 1933: 341), Büchelberg, Germany (Kuss 1960), and Ravolzhausen, Germany (Martini 1974); early Miocene (MN 4b) of Dolnice, Czechia (Švec 1981, Mlíkovský orig);

middle Miocene (MN 5) of Františkovy Lázně, Czechia (Mlíkovský orig.); middle Miocene (MN 6) of Nördlinger Ries, Germany, incl. Steinberg and Hahnenberg (Lambrecht 1933: 339, Heizmann & Hesse 1995); middle Miocene (MN 7) of Lišov, Czechia (Mlíkovský orig. as *P.* cf. *ambiguus*); and middle Miocene (MN 8) of Credința, Romania (Grigorescu & Kessler 1977, Mlíkovský orig.).

The following record is invalid: early Miocene (MN 1) of Pyrimont-Challonges, France (Depéret & Douxami 1902 – see Cheneval 1983c: 184), and Oppenheim, Germany (Rothausen 1966 – see Olson & Feeduccia 1980a, Mlíkovský 1988, Cheneval & Escuillié 1992).

Remarks: *Palaelodus minutus* Milne-Edwards was synonymized with *Palaelodus gracilipes* Milne-Edwards by Cheneval (1983c: 184). The latter species was synonymized with *Palaelodus ambiguus* Milne-Edwards by Lambrecht (1933: 339), and Mlíkovský (orig.). *Grus problematica* Milne-Edwards was synonymized with *Palaelodus ambiguus* Milne-Edwards by Cheneval & Escuillié (1992: 211). The holotypical tarsometatarsus of *Grus miocenicus* Grigorescu & Kessler shows typical morphology of *Palaelodus* flamingos, and agrees in size with *Palaelodus ambiguus* Milne-Edwards. I synonymize it here with the latter species (Mlíkovský orig.).

The alleged morphological differences between *Palaelodus gracilipes, P. ambiguus*, and *P. crassipes* pointed out by Cheneval (1983c) and Heizmann & Hesse (1995) are clearly size-dependent, and can be interpreted as intraspecific variability. *P. gracilipes* is based on smallest individuals of *P. ambiguus*, while *P. crassipes* on its largest individuals.

Palaelodus goliath Milne-Edwards

Paloelodus [sic!] *goliath* Milne-Edwards, 1868: pl. 87 [Lectotype from Saint-Gérand-le-Puy (selected by Cheneval 1983c: 186): right tarsometatarsus; MNHN Av-6475. Figured by Milne-Edwards 1867-1869, pl. 87, fig. 1-4; and Cheneval 1983c, pl. 1, fig. 5a-b. Paralectotypes from Saint-Gérand-le-Puy (based on the list in Cheneval 1983a: 139-140): two coracoids (Av-6460-6461), sternum (Av-6459), four femora (Av-3146, 6462-6464), nine tibiotarsi (Av-6465-6467, 6469-6474), and five tarsometatarsi (Av-3771, 6476-6477, 8894, 9669). Figured by Milne-Edwards 1867-1868, pl. 87, fig. 5-8 (femur), 13-14 (coracoid); and Milne-Edwards 1867-1868, pl. 88, fig. 1-3 (tibiotarsus).]

Megapaloelodus goliath (Milne-Edwards): Cheneval 1983c: 186 [New combination.]

Distribution: Late Oligocene (MP 25-30) of Perignat, France (Lydekker 1891a: 82); early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1869-1871, Cheneval 1983c), Wiesbaden-Hessler, Germany (Lambrecht 1933: 342), Wiesbaden 1, Germany (Lambrecht 1933: 342), and Budenheim, Germany (Lambrecht 1933: 342); early Miocene (MN 2) of Ravolzhausen, Germany (Martini 1974); early Miocene (MN 4b) of Dolnice, Czechia (Švec 1981, Mlíkovský orig.); middle Miocene (MN 6) of Mátraszőlős 2, Hungary (Gál & Kessler in Gál et al. 2000); and middle Miocene (MN 7) of Steinheim, Germany (Heizmann & Hesse 1995).

Genus *Phoenicopterus* Linnaeus

Phoenicopterus Linnaeus, 1758 [Modern genus.]

Gervaisia Harrison & Walker, 1976d: 308 [Type by original designation: *Phoenicopterus croizeti* Gervais, 1852. This is a junior homonym of *Gervaisia* Bonaparte, 1854: 6, *Gervaisia* Waga, 1858: 829, and *Gervaisia* Robineau-Desvoidy, 1863: 36.]

Harrisonavis Kašin, 1978: 146 [New name for *Gervaisia* Harrison & Walker, 1976d; hence its junior objective synonym.]

Remarks: *Gervaisia* Harrison & Walker and *Harrisonavis* Kašin were synonymized with *Phoenicopterus* Linnaeus by Olson & Feduccia (1980a: 46).

Phoenicopterus croizeti Milne-Edwards

Phoenicopterus croizeti Gervais, 1852: 233 [Syntypes from Gergovie: skull and anterior portion of bill; formerly in coll. Croizet, present location unknown, casts in MNHN Av-6544 (skull; possibly lost – Cheneval 1983a: 146) and Av-6545 (bill). Figured by Gervais 1852, pl. 50, fig. 4 (skull) and 5 (bill). Miller (1963: 292) erroneously stated, that the species was based on a tibiotarsus.]

Gervaisia croiseti [sic!] (Gervais): Harrison & Walker 1976d: 308 [New combination; species name misspelled.]

Harrisonavis croizeti (Gervais): Kašin 1978: 146 [New combination.]

Distribution: Late Oligocene (MP 25) of Chaptuzat, France (Gervais 1848-1852, Lydekker 1891a: 78-79, Milne-Edwards 1867-1868, Cheneval 1984a), Sauvetat, France (Laizer 1828 sub unidentified eggs, Gervais 1848-1852: 234, Lydekker 1891a: 79); late Oligocene (MP 28) of Cournon, France (Gervais 1848-1852: 234, Milne-Edwards 1867-1868); late Oligocene (MP 29) of Pont-du-Château, France (Gervais 1848-1852: 234, eggs only); late Oligocene (MP 30) of Gergovie, France (Gervais 1848-1852, Cheneval 1984a) and Gannat, France (Milne-

Edwards 1867-1868, Cheneval 1984a); late Oligocene (MP 25-30) of Perignat, France (Milne-Edwards 1867-1868, Lydekker 1891a: 78-79), cf. Oligocene (MP 21-30) of Alliers, France (Milne-Edwards 1867-1868), and Aurillac, France (Gervais 1848-1852: 243);

early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1869-1871, Lydekker 1891a: 78-79, Lambrecht 1933: 344, Cheneval 1984a), and Budenheim, Germany (Lambrecht 1933: 345); early Miocene (MN 2) of Ravolzhausen, Germany (Martini 1974); early Miocene (MN 4b) of Dolnice, Czechia (Švec 1981, Mlíkovský orig.); middle Miocene (MN 5) of Františkovy Lázně, Czechia (Mlíkovský, orig.); and middle Miocene (MN 7) of Steinheim, Germany (Fraas 1870, Heizmann & Hesse 1995).

Remarks: After being separated at the generic level by Harrison & Walker (1976d), this species was returned to *Phoenicopterus* Linnaeus by Olson & Feduccia (1980a: 46).

Phoenicopterus sp.

Distribution: Late Miocene (MN 12-13) of Pikermi, Greece (Mlíkovský, orig., material in MNHN).

Family Recurvirostridae Bonaparte

Recurvirostridae Bonaparte, 1831: 59 [Modern family.]

Remarks: Three species from the Paleogene of Europe were assigned to this family, but I had to relegate *Fluviatilavis antunesi* Harrison to the category of Aves incertae sedis, *Tenuicrus magnum* Harrison & Walker may represent an ancient flamingo (see p. 103), and also the taxonomic fate of *Recurvirostra sanctaneboulae* Mourer-Chauviré is uncertain (see below). There is no clear evidence, that the Recurvirostridae existed in Europe before the Holocene.

Genus *Recurvirostra* Linnaeus

Recurvirostra Linnaeus, 1758 [Modern genus.]

Recurvirostra sanctaneboulae Mourer-Chauviré

Recurvirostra sanctaneboulae Mourer-Chauviré, 1978b: 221 [Holotype from Sainte-Néboule: left ulna; USTL SNB-705. Figured by Mourer-Chauviré 1978b, pl. 1, fig. 7-10.]

Distribution: Late Eocene (MP 18) of Sainte-Néboule, France (Mourer-Chauviré 1978).

Remarks: There is no evidence, that this species belongs to the family Recurvirostridae, or even to the genus *Recurvirostra* Linnaeus. Nevertheless, it seems to belong to one of the following closely related families: Phoenicopteridae, Recurvirostridae and Presbyornithidae. Characters distinguishing proximal end of ulna of these families are not known as yet (Ericson 1999: 248), so that *Recurvirostra sanctaneboulae* Mourer-Chauviré is in danger to become a nomen dubium until more material is found.

Family Anseranatidae Sclater

Anseranatidae Sclater, 1880 [Modern family.]

Anhimidae Stejneger, 1885 [Modern family.]

Romainvillinae Lambrecht, 1933: 351 [Type genus: *Romainvillia* Lebedinsky, 1927. Established as a subfamily of the Anatidae.]

Romainvilliinae Lambrecht: Brodkorb 1964: 208 [Spelling emended.]

Remarks: I synonymize here Anhimidae Stejneger and Romainvilliinae Lambrecht with the Anseranatidae Sclater (see below under *Romainvillia* Lambrecht for a discussion)

Genus *Nettapterornis* n. g.

Nettapterornis Mlíkovský, this paper [Type by original designation: *Anatalavis oxfordi* Olson,

1999.]

Diagnosis: An anhimid with a flat, duck-like rostrum, ending with an upwards oriented tip. For further details see Olson (1999a: 240-242).

Comparison: Differs from *Anatalavis* Olson & Parris in having brachial depression on the distal end of humerus located in the axis of shaft, external condyle oriented more ventrally (in *Anatalavis* it lays almost parallel with axis of the shaft, with the proximal tip facing the dorsal border of the shaft), internal condyle more protruding distally, and entepicondyle ending more proximally (in *Anatalavis* it almost forms a line with internal and external condyles). Other bones are known for *Anatalavis*.

Included species: Type species only.

Etymology: *Anatalavis* means "duck-winged bird" in Latin (Olson & Parris 1987: 11). *Nettapterornis* means the same in Greek, being formed from Greek words "νεττα" (duck), "πτερον" (wing), and "ορνις" (bird). The name is feminine in gender.

Nettapterornis oxfordi (Olson)

Anatalavis oxfordi Olson, 1999a: 233 [Holotype from Walton-on-the-Naze: associated skeleton lacking hind limbs; BMNH A-5922. Figured by Olson 1999a, fig. 1-2 (skull), 3 (pterygoid), 4 (mandible), 5 (furcula), 61-f (coracoid), 6g (scapula), 7 (sternum and pelvis), 8a-c (humerus), and 9 (ulnare, carpometacarpus and associated phalanges).]

Nettapterornis oxfordi (Olson): Mlíkovský, this paper [New combination.]

Distribution: Early Eocene (MP 8) of Walton-on-the-Naze, England (Olson 1999).

Genus *Headonornis* Harrison & Walker

Headonornis Harrison & Walker, 1976a: 335 [Type by original designation: *Agnopterus hantoniensis* Lydekker, 1891a.]

Headonornis hantoniensis (Lydekker)

Agnopterus (?) *hantoniensis* Lydekker, 1891a: 96 [Holotype from Hordle: right coracoid; BMNH 30325. Figured by Lydekker 1891a, fig. 25, Harrison & Walker 1976a, pl. 3, fig. j-o.]

Headonornis hantoniensis (Lydekker): Harrison & Walker, 1976a: 335 [New combination.]

Presbyornis hantoniensis (Lydekker): Bocheński, 1997: 303 [New combination.]

Distribution: Late Eocene (MP 17) of Hordle, England (Lydekker 1891a, Harrison & Walker 1976a).

Remarks: Originally not included in a family. Harrison & Walker (1976a) included the species in the Telmabatidae (= Presbyormithidae). I transfer here this species on the basis of the general morphology of the holotype coracoid.

Genus *Romainvillia* Lebedinsky

Romainvillia Lebedinsky, 1927: 1 [Type by monotypy *Romainvillia stehlini* Lebedinsky, 1927.]

Romainvillia stehlini Lebedinsky

Romainvillia Stehlini Lebedinsky, 1927: 1 [Syntypes from Romainville: furcula in slab (BaM 38), cranial end of left coracoid (BaM 38a), left carpometacarpus (BaM 53) proximal end of right carpometacarpus (BaM 55), and right tarsometatarsus (BaM 25.1); all perhaps from a single individual. Present location unknown: Boxes with respective labels were present in BaM, but bones were absent from them in 1996 (B. Engesser, in litt. 1996). Figured by Lebedinsky 1927, pl. 1, fig. 1-4 (left carpometacarpus), 5-7 (tarsometatarsus), 8-11 (coracoid), and 12 (furcula); and Howard 1964, pl. 1, fig. a-c (left carpometacarpus), d (tarsometatarsus), e-h (coracoid).]

Distribution: Late Eocene (MP 20) of Romainville, France (Lebedinsky 1927, Brunet 1970).

Remarks: The syntypical carpometacarpus of *Romainvillia* Lebedinsky differs from the same element of the proper Anatidae and agrees with that of *Anseranas* Lesson in having (1) carpal trochlea not notched, (2) processus extensorius rather small, (3) distal end of metacarpal II distorted caudally, which casuses that (4) the facet for digit II is relatively large. In addition, coracoidal fenestra is present as in *Anseranas*, while it is absent in all proper Anatidae. Similarly as Verheyen (1956) and Olson & Feduccia (1980b), I consider *Anseranas* Linnaeus to be closer to the Anhimidae than to the proper Anatidae. Consequently, I transfer here modern anhimids and *Romainvillia* Lebedinsky to the family Anseranatidae, which has nomenclatural priority (see above under the Anseranatidae).

Family Anatidae Leach

Anatidae Leach, 1820 [Modern family.]

Genus *Paracygnopterus* Harrison & Walker

Paracygnopterus Harrison & Walker, 1979b: 35 [Type by original designation: *Paracygnopterus scotti* Harrison & Walker, 1979b.]

Paracygnopterus scotti Harrison & Walker

Paracygnopterus scotti Harrison & Walker, 1979b: 35 [Holotype from Yarmouth: cranial end of right coracoid; BMNH A-4407. Figured by Harrison & Walker 1979b, pl. 2, row A, fig. 1-5.]

Distribution: Early/middle Oligocene (MP 21-23) of Yarmouth, England (Harrison & Walker 1979b).

Remarks: The taxonomic position of this species requires restudy.

Genus *Mionetta* Livezey & Martin

Mionetta Livezey & Martin, 1988: 208 [Type by original designation: *Anas blanchardi* Milne-Edwards, 1863.]

Distribution: Early Miocene (MN 1-4) of France, Germany and Czechia, and middle Miocene (MN 6-8) of France, Germany and Romania.

Mionetta blanchardi Milne-Edwards

Anas Blanchardi Milne-Edwards, 1863: 160 (not 155 as stated by Cheneval 1983b: 88) [Lectotype from Saint-Gérand-le-Puy (selected by Cheneval 1983b: 88): left tibiotarsus; MNHN Av-8231. Figured by Cheneval 1983a, pl. 14, fig. 1a-b, and Cheneval 1983b, pl. 1, fig. 1a-b. Not figured by Milne-Edwards (1867-1868, pl. 22, fig. 8-14), which shows side-reversed right tibiotarsus (contra Cheneval 1983b: 88). "Paralectotypes" from Saint-Gérand-le-Puy (based on the list in Cheneval 1983a: 157-158, but restricted to limb bones – see Milne-Edwards 1863: 160; all in MNHN): 388 humeri (Av-6966-7047, 7049-7082, 7084-7309, 7311-7317, 7319, 7320, 7322-7339, 7341-7358, 8587), 291 ulnae (Av-2154, 7359-7648), 182 radii (Av-7649-7663, 7665-7735, 7737-7831, 8618), 170 carpometacarpi (Av-7832-7932, 7934, 8029, 8031-8094, 8624, 8626, 8633), 93 femora (Av-8137-8166, 8168-8230), 160 tibiotarsi (Av-6451-6453, 8232-8388), and 156 tarsometatarsi (Av-6456, 6458, 8389-8542). Figured by Milne-Edwards 1867-1868, pl. 21 (reconstructed skeleton), pl. 22, fig. 1 (leg skeleton), 2-7 (tarsometatarsus), 8-14 (tibiotarsus), 17-23 (femur), pl. 23, fig. 1 (wing skeleton), pl. 24, fig. 7-9 (humerus), 10-11, 11a (ulna), 12-13 (radius), 14-17 (carpometacarpus), Howard 1964, pl. 8, fig. a-c (humerus), d-e (tarsometatarsus), f (tibiotarsus), and Cheneval 1983a, pl. 15, fig. 4a-b (humerus, Av-6966), 5a-b (ulna, Av-7359), and pl. 16, fig. 2a-b (tarsometatarsus, Av-8389).

Cheneval (1983b: 88) erroneously included among the paralectotypes also the tarsometatarsus MNHN Av-6457, upon which Milne-Edwards based *Anas consobrina*, and the femur MNHN Av-8691, attributed by Milne-Edwards to *Ibis pagana*. Howard (1964: 291) erroneously stated, that type of *Anas blanchardi* Milne-Edwards is a "complete skeleton in Paris Museum", possibly referring to the reconstructed skeleton figured by Milne-Edwards 1867-1868, pl. 22, fig. 1.]

Anas consobrina Milne-Edwards, 1867b: 145 [Lectotype from Saint-Gérand-le-Puy (selected by Cheneval 1983b: 91): left tibiotarsus; MNHN Av-6454 = SG-9006. Figured by Cheneval 1983a, pl. 14, fig. 2a-b, and Cheneval 1983b, pl. 1, fig. 2a-b. Not figured by Milne-Edwards 1867-1868, pl. 25, fig. 5-7, which shows a side-reversed right tibiotarsus (contra Cheneval 1983b: 91). "Paralectotypes" from Saint-Gérand-le-Puy (based on the list in Cheneval 1983a: 162-164, restricted to limb bones, as in the case of *Anas blanchardi*; all in MNHN): two carpometacarpi (Av-1055, SG-10054), two femora (Av-6449-6450), right tibiotarsus (Av-6455), and left tarsometatarsus (Av-6457). Figured by Milne-Edwards 1867-1868, pl. 25, fig. 1 (leg skeleton), 2-4 (tarsometatarsus), 5-7 (tibiotarsus), 8-10 (femur), and 11-13 (carpometacarpus).]

Palaeortyx? *phasianoides* Milne-Edwards, 1869: 237 [Lectotype from Saint-Gérand-le-Puy (here selected): shaft of right humerus; MNHN Av-2896. Figured by Milne-Edwards 1869-1871, pl. 130, fig. 26-27. Paralectotype: cranial end of right scapula from Saint-Gérand-le-Puy; MNHN Av-2895. Figured by Milne-Edwards 1869-1871, pl. 130, fig. 22-25.]

Anas macroptera Milne-Edwards, 1871: 573 [Nomen nudum; no description or indication. Cheneval 1983b: 91 located left humerus from Saint-Gérand-le-Puy (MNHN SG-10053) upon which the species was based, beacuse it was accompanied with Milne-Edwards's handwritten label bearing the name "*Anas macroptera*". *Anas macroptera* Milne-Edwards, 1871 remains nomen nudum, but can be listed in this place.]

Fuligula arvernensis Lydekker, 1891a: 122 [Holotype from Saint-Gérand-le-Puy: associated imperfect right humerus and partial shaft of an ulna in slab; BMNH A-159. Not figured.]

Aythya arvernensis (Lydekker): Brodkorb 1964: 228 [New combination.]

Taoperdix phasianoides (Milne-Edwards): Brodkorb 1964: 301 [New combination.]

Dendrochen blanchardi (Milne-Edwards): Cheneval 1983b: 88 [New combination.]

Dendrochen consobrina (Milne-Edwards): Cheneval 1983b: 91 [New combination.]

Mionetta blanchardi (Milne-Edwards): Livezey & Martin 1988: 208 [New combination.]

Mionetta consobrina (Milne-Edwards): Livezey & Martin 1988: 208 [New combination.]

Distribution: Early Miocene (MN 1) of Weisenau-AS, Germany (Milne-Edwards 1867-1868, Lydekker 1891a); early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1867-1868, Lydekker 1891a, Lambrecht 1933, Cheneval 1983b, Liverzey & Martin 1988, Mlíkovský orig.); early Miocene (MN 2) of Ravolzhausen (Martini 1974); early Miocene (MN 4b) of Dolnice, Czechia (Švec 1981, Mlíkovský orig.); middle Miocene (MN 6) of Mátraszőlős 2, Hungary (Gál & Kessler in Gál et al. 2000); middle Miocene (MN 7) of Steinheim, Germany (Fraas 1870, but see Heizmann & Hesse 1995); and middle Miocene (MN 8) of Credința, Romania (Kessler 1992). The record from the early Pliocene (MN 15) of Malușteni-Berești, Romania (Kessler 1992) is doubtful because of its age. The following record is invalid: early Miocene (MN 3) of Skyřice, Czechia (Laube 1910 sub *Anas blanchardi* – reidentified as *Mionetta natator* by Mlíkovský 2000f).

Remarks: Cheneval (1983b), Mlíkovský (1983c) and Livezey & Martin (1988) recognized the dendrocygnine affinities of *blanchardi*. Cheneval (1983b) included the species in the genus *Dendrochen*, created by A.H. Miller (1944) for *Dendrochen robusta* A.H. Miller, 1944 from the early Miocene of South Dakota. Livezey & Martin (1988) separated the species at the generic level, which agrees with my observations. *Anas consobrina* Milne-Edwards is based on large specimens of *Anas blanchardi* (Mlíkovský orig., see also Livezey & Martin 1988).

Palaeortyx phasianoides Milne-Edwards was synonymized with *Mionetta blanchardi* (Milne-Edwards) by Mlíkovský (2000e: 93).

Mionetta natator (Milne-Edwards)

Anas natator Milne-Edwards, 1867b: 148 [Lectotype from Saint-Gérand-le-Puy (selected by Storer 1956: 422): left ulna; MNHN Av-6428. Figured by Milne-Edwards 1867-1868, pl. 25, fig. 21-22; and Cheneval 1983a, pl. 14, fig. 4a-b. "Paralectotypes" from Saint-Gérand-le-Puy (with reference to the data in Cheneval 1983a: 165-166; all reportedly in MNHN): distal end of right humerus (perhaps one of the following: Av-6437-6438, SG-10064-10066), and right tibiotarsus lacking proximal end (perhaps Av-6622; certainly not Av-6436 listed by Cheneval 1983a: 165, 1983b: 93, and figured by Cheneval 1983a, pl. 14, fig. 3a-b, and Cheneval 1983b, pl. 1, fig. 3a-b). Figured by Milne-Edwards 1867-1868, pl. 25, fig. 14-18 (tibiotarsus), and 19-20 (humerus). All syntypes and other material studied by Cheneval (1983a,b) should be in MNHN, but may be lost, because I did not find them there in June 1999.]

Querquedula natator (Milne-Edwards): Brodkorb 1962: 157 [New combination.]

Dendrochen natator (Milne-Edwards): Cheneval 1983b: 93 [New combination.]

Mionetta natator (Milne-Edwards): Livezey & Martin 1988: 208 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1867-1868, Cheneval 1983b, Livezey & Martin 1988); early Miocene (MN 3) of Skyřice, Czechia (Laube 1910 sub *Anas blanchardi*, Mlíkovský 2000f); and early Miocene (MN 4b) of Dolnice, Czechia (Švec 1981, Mlíkovský orig.). The record from the late Miocene (MN ?9) of Chişinău, Moldova (Kessler 1992) is doubtful, because of its age.

Remarks: The taxonomic identity of both paralectotypes of *Mionetta natator* (Milne-Edwards) is doubtful, because both seem to entirely lack characteristic features of respective anatid bones (Mlíkovský orig.). The tibiotarsus perhaps belongs to *Colymboides minutus* Milne-Edwards (Storer 1956: 422).

Mionetta robusta (Milne-Edwards)

Anas robusta Milne-Edwards, 1868: 155 [Holotype from Sansan: distal end of left humerus; MNHN SA-1234. Figured by Milne-Edwards 1867-1868, pl. 25, fig. 23-25, Cheneval 1987, pl. 1, fig. a-b.]

Anserobranta (?) *robusta* (Milne-Edwards): Cheneval 1987: 141 [New combination.]

Mionetta robusta (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Cheneval 1983b sub *Dendrochen consobrina*, Mlíkovský orig.); early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský orig.); middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1867-1868, Cheneval 1987, 2000), and Lierheim, Germany (Lydekker 1891a sub *Anas robusta*); and middle Miocene (MN 7-8) of Dechbetten, Germany (Ammon 1918 sub *Anas* cf. *robusta*).

Remarks: The holotypical humerus of *Anas robusta* Milne-Edwards is characterized by a very narrow space between the external condyle and the facet for the anterior articular ligament, which is typical for the Dendrocygnini (see Woolfenden 1961: 6). In absence of the evidence to the contrary I include here the species in the dendrocygnine genus *Mionetta* Livezey & Martin, which was common in Europe in the older part of the Miocene. Within the latter genus, *Mionetta robusta* (Milne-Edwards), new combination, is larger than both other known species, incl. *Mionetta natator* (Milne-Edwards) and *Mionetta blanchardi* (Milne-Edwards). Cheneval (1983b) correctly recognized from Saint-Gérand-le-Puy a *Mionetta* (his *Dendrochen*) species larger than *blanchardi*, but erroneously applied the name *Anas consobrina* Milne-Edwards to it.

Genus *Cygnavus* Lambrecht

Cygnavus Lambrecht, 1931a: 4 [Type by monotypy: *Cygnavus senckenbergi* Lambrecht 1931a.]

Distribution: Early Miocene (MN 2) of France and Germany. Extralimital record includes *Cygnavus formosus* Kuročkin, 1968 from the middle Oligocene of Kazakhstan (Kuročkin 1968, Mlíkovský & Švec 1986).

Cygnavus senckenbergi Lambrecht

Cygnavus Senckenbergi Lambrecht, 1931a: 3 [Lectotype from Wiesbaden-Hessler (here selected): left femur with abraded ends; SMF Av-132, cast in USNM 215045. Figured by Lambrecht 1931a, pl. 1, fig. 3-4; Lambrecht 1933, fig. 128a-b; Howard 1964, pl. 2, fig. a-b. Paralectotypes from Wiesbaden-Hessler: distal end of left tibiotarsus (SMF Av-131, cast in USNM 215044), and a pedal phalanx (NFS Av-130, cast in USNM 215043). Figured by Lambrecht 1931a, pl. 2, fig. 9-10 (tibiotarsus) and 11-12 (phalanx), Lambrecht 1933, fig. 128c-d (tibiotarsus), and 128e-f (phalanx), and Howard 1964, pl. 2, fig. c-d (phalanx), and e-f (tibiotarsus).]

Cygnopterus alphonsi Cheneval, 1984a: 97 [Holotype from Saint-Gérand-le-Puy: right tarsometatarsus; FSL 91883. Figured by Cheneval 1984a, pl. 9, fig. 3a-c.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Cheneval 1984a), and Wiesbaden-Hessler, Germany (Lambrecht 1933).

Remarks: The described bones of *Cygnopterus alphonsi* Cheneval agree in size and morphology with the corresponding bones of *Cygnavus senckenbergi* Lambrecht (Mlíkovský orig., after examining casts of all syntypes of the latter species in USNM), both species are contemporaneous, and were described from geographically close localities. Hence, I synonymize here the former with the latter species. This is a large representative of the Dendrocygnini (Mlíkovský orig.).

Genus *Cygnopterus* Lambrecht

Cygnopterus Lambrecht, 1931a: 3 [Type by monotypy: *Sula affinis* Beneden, 1883.]

Distribution: Middle Oligocene (MP 23-24) of Belgium. No extralimital record of this genus is known, because *Cygnopterus lambrechti* Kuročkin, 1968 from the middle Oligocene of Kazakhstan was shown to be synonymous with the flamingo "*Agnopterus*" *turgaiensis* Tugarinov, 1940a, also described from the middle Oligocene of Kazakhstan (Mlíkovský & Švec 1986).

Remarks: Taxonomic position of this genus is uncertain.

Cygnopterus affinis (Beneden)

Sula affinis Beneden, 1883: 133 [Syntypes from Rupelmonde (said to come from a single individual): cranial end of right coracoid, left humerus, proximal end of right ulna, right femur, and proximal end of left tibiotarsus; IRScNB Ht-Av-2a (femur), Av-2b (tibiotarsus) and Av-2c (humerus). Figured by Lambrecht 1931a, pl. 1, fig. 1-2 (femur), 6-7 (tibiotarsus), pl. 2, fig. 1-2 (humerus), 3-4 (ulna), 5-6 (coracoid); Lambrecht 1933, fig. 127a-b (humerus), 127c-d (ulna), 127e-f (tibiotarsus), 127g-h (femur), 127j-k (coracoid); and Howard 1964, pl. 3, fig. a-b (femur), e-f (humerus), g-h (tibiotarsus), j-k (coracoid). Lambrecht (1931a) described also a scapula, but Beneden (1883) did not mention it, so it could be included among the types only if all the bones were treated as coming from a single individual (which is well possible, but not certain), which would then be termed holotype.

Cygnopterus affinis (Beneden): Lambrecht 1931a: 3 [New combination.]

Palaeopapia hamsteadiensis Harrison & Walker, 1979b: 34 [Holotype from Yarmouth: proximal end of right scapula; BMNH A-4412. Figured by Harrison & Walker 1979b, pl. 1, row E, fig. 5-8.]

Distribution: Early/middle Oligocene (MP 21-23) of Yarmouth, England (Harrison & Walker 1979b); and middle Oligocene (MP 23-24) of Rupelmonde, Belgium (Beneden 1883, Lambrecht 1931a, 1933, Cheneval 1984a).

Remarks: The holotypical scapula of *Palaeopapapia hamsteadiensis* Harrison & Walker closely resembles the same element of *Cygnopterus affinis* (Beneden). These species were described from stratigraphically and geographically close localities, so that I synonymize here the former with the latter species.

Genus *Cygnus* Bechstein

Cygnus Bechstein, 1802 [Modern genus]

Olor Wagler, 1832 [Modern genus.]

Palaeocycnus Stejneger, 1882: 180 [Type by original designation: *Cygnus falconeri* Parker, 1865.]

Palaeocygnus Oberholser, 1908. [Unsubstantiated emendation of *Palaeocycnus* Stejneger, 1882; hence an available name. This is a junior objective synonym of *Palaeocycnus* Stejneger, 1882.]

Cygnanser Kretzoi, 1957: 245 [Type by original designation: *Cygnus csakvarensis* Lambrecht, 1931a.]

Remarks: I formerly treated *Olor* Wagler as a separate genus (e.g. Mlíkovský & Švec 1986), but my further studies led me to change the opinion and to consider this genus as a subgenus of *Cygnus* Bechstein. The subgeneric allocation is not known for *Cygnus atavus* Fraas, while all the remaining species seem to belong to the subgenus *Olor* Wagler (but see under *Cygnus equitum* Bate).

Cygnus atavus (Fraas)

Anas atava Fraas, 1870: 275 [Holotype from Steinheim: proximal end of right femur; SMNS, uncatalogued. Figured by Fraas 1870, pl. 13, fig. 1a-c.]

Anas cygniformis Fraas, 1870: 276 [Lectotype from Steinheim (selected by Mlíkovský 1992b: 438): left coracoid; SMNS, uncatalogued. Figured by Fraas 1870, pl. 13, fig. 2a-b. Paralectotypes: proximal ends of two tarsometatarsi and three pedal phalanges; SMNS, uncatalogued. Figured by Fraas 1870, pl. 9, fig. 10-12 (phalanges).

Palaelodus steinheimensis Fraas, 1870: 285 [Holotype from Steinheim: distal end of left tibiotarsus; SMNS, uncatalogued. Figured by Fraas 1870, pl. 7, fig. 13.]

Anser atavus (Fraas): Lambrecht 1933: 369 [New combination.]

Anser cygniformis (Fraas): Lambrecht 1933: 369 [New combination.]

Cygnus atavus (Fraas): Mlíkovský 1992b: 439 [New combination.]

Distribution: Middle Miocene (MN 7) of Steinheim, Germany (Fraas 1870, Lambrecht 1933, Mlíkovský 1992b, Heizmann & Hesse 1995).

Remarks: *Palaelodus steinheimensis* Fraas and *Anas cygniformis* Fraas were synonymized with *Cygnus atavus* (Fraas) by Heizmann & Hesse (1995).

Cygnus (Olor) csakvarensis Lambrecht

Cygnus csákvárensis Lambrecht, 1931a: 4 [Nomen nudum; no description or indication.]

Cygnus csákvárensis Lambrecht, 1933: 283 [Lectotype from Csákvár (selected by Kretzoi 1957: 240): proximal end of left carpometacarpus; GIB, uncatalogued. Figured by Lambrecht 1933, fig. 128g-h; Kretzoi 1957, fig. 37-39; and Howard 1964, pl. 2, fig. g-h. Paralectotypes: distal end of a carpometacarpus (GIB, uncatalogued), and phalax I digiti majoris (GIB, uncatalogued). Figured by Lambrecht 1933, fig. 128j-k (phalanx); and Kretzoi 1957, fig. 40 (carpometacarpus), fig. 42-43 (phalanx).]

Cygnanser csákvárensis (Lambrecht): Kretzoi 1957: 240 [New combination.]

Cygnanser csakvarensis Lambrecht: Brodkorb 1964: 210 [Spelling emended.]

Olor csakvarensis (Lambrecht): Mlíkovský 1992b: 437 [New combination.]

Distribution: Late Miocene (MN 10) of Csákvár, Hungary (Lambrecht 1933: 283, Kretzoi 1957, Mlíkovský 1992b).

Cygnus verae Boev

Cygnus verae Boev, 2000a: 2 [Nomen nudum; no description or indication. This paper was published before 1 June, while the paper by Boev 2000b on 30 June.]

Cygnus verae Boev, 2000b: 186 [Holotype from Lozenec: proximal end of left humerus; MNHNS 1644. Figured by Boev 2000b, fig. 1a-c.]

Distribution: Early Pliocene (MN 14) of Lozenec, Bulgaria (Boev 1999a, 2000b).

Cygnus (*Olor*) *falconeri* Parker

Cygnus falconeri Parker, 1865: 752 [Syntypes from Zebbug (listed according to Parker 1869: 119): two fragmentary skulls, three fragments of ribs, shaft of an ulna, 12 femora, 20 tibiotarsi, 20 tarsometatarsi, and three pedal phalanges; present location unknown, probably lost (Lydekker 1890, 1891a see also Northcote 1982b, 1992). Figured by Parker 1869, pl. 30, fig. 4-5 (ulna), 6-9 (femur), 10-11 (another femur), 12-15 (tibiotarsus), 16-19 (tarsometatarsus), and 20-22 (pedal phalanx). Parker (1865) did not specify the type material of *Cygnus falconeri*, stating that the species was based on "the head and more than half of the long bones [he received from the collectors Falconer and Spratt]", and referring to his forthcoming full paper [= Parker 1869]. Accordingly, the list of syntypes is based on Parker (1869).]

Cygnus melitensis Falconer, 1868: 300 [Types from Zebbug; not specified, but either same as for *Cygnus falconeri* Parker, 1865, or only those collected by Falconer, not those collected by Spratt. Parker (1865, 1869) did not specify which bones he received from which collector. Not figured in the original paper.]

Palaeocycnus falconeri (Parker): Stejneger 1882: 180 [New combination.]

Palaeocygnus falconeri (Parker): Oberholser 1908. [New combination.]

Cygnus (*Olor*) *falconeri* Parker: Livezey 1997a: 473 [New combination.]

Distribution: Late Pleistocene (MQ 2C) of Zebbug, Malta (Parker 1865, 1869, Lydekker 1890, 1891a), Ghar Dalam, Malta (Bate 1916), Mnajdra, Malta (Northcote 1982b), and Gnien, Malta (Northcote 1992).

Remarks: Northcote (1982b, 1983) assembled evidence that *falconeri* is related to *Olor*, not to *Cygnus* swans (see also Livezey 1997a: 473). *Cygnus melitensis* Falconer was correctly synonymized with *Cygnus falconeri* Parker by Lambrecht (1933: 385).

Cygnus equitum Bate

Cygnus equitum Bate, 1916: 427 [Holotype from Ghar Dalam: right carpometacarpus; NMM 20 or21, casts BMNH A-1613 or A-1614 or A-1615 (fide Northcote 1992: 287). Figured by Bate 1916, fig. 1a, 2a-b.]

Anser equitum (Bate): Brodkorb 1964: 213 [New combination.]

Cygnus (Olor) equitum Bate: Northcote 1988a. [New combination.]

Cygnus (Cygnus) equitum Bate: Livezey 1997: 473 [New combination.]

Distribution: Late Pleistocene (MQ 2C) of Ghar Dalam, Malta (Bate 1916), Ta'Kandja, Malta (Lambrecht 1933: 386), Ghaqba, Malta (Lambrecht 1933: 386), Benghisa, Malta (Lambrecht 1933: 386), Kalafrana, Malta (Lambrecht 1933: 386), Gnien, Malta (Nothcote 1988, 1992), and Mnajdra, Malta (Northcote 1988, 1992).

Remarks: The taxonomic identity of this species is uncertain. Bate (1916) described it in the genus *Cygnus*, without specifying the subgenus. Brodkorb (1964) transferred it to the genus *Anser* Brisson, while Northcote (1988a, 1992) indicated, that it belongs to the swan subgenus *Olor* Wagler, and Livezey (1997a) placed it in the swan subgenus *Cygnus* Bechstein. The referred carpometacarpus (Lambrecht 1933, fig. 129d) resembles more the same element of *Alopochen* Stejneger than that of *Cygnus* Bechstein or *Anser* Brisson. The referred femur

(Lambrecht 1933, fig. 129e) is too small for an anatid with the referred humerus figured by Lambrecht (1933, fig. 129a) (Mlíkovský, orig.). Although all the bones referred to this species by Bate (1916), Lambrecht (1933) and Northcote (1988) seem to belong to the Anatidae, it is improbable that they belong to a single species.

Cygnus (Olor) bewickii Yarrell – Bewick's Swan

Cygnus Bewickii Yarrell, 1830 [Modern species.]

Anser liskunae Kuročkin, 1976: 59 [Holotype from Dzabchan: distal end of left humerus; PIN 2614-105. Figured by Kuročkin 1976, fig. 6a,b,v, Kuročkin 1985, fig. 12a,b,v.]

Olor liskunae (Kuročkin): Mlíkovský & Švec, 1986: 263 [New combination.]

Anser subanser Jánossy, 1982: 22 [Nomen nudum; no description or indication.]

Anser subanser Jánossy, 1983: 252 [Lectotype from Přezletice (here selected): distal end of right radius; coll. Fejfar, probably destroyed – O. Fejfar, pers. communication, 1999. Not figured. Paralectotype: proximal end of right radius from Přezletice; coll. Fejfar, probably destroyed – O. Fejfar, pers. communication, 1999. Not figured. Jánossy (1983: 252) believed that both these elements belonged to a single bone and termed both of them "holotype". However, there is no support for such an assumption.]

Distribution: Early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1982, 1983, Mlíkovský orig.), East Runton, England (Newton 1882b sub *Anser* sp., Harrison 1979d sub *C. bewickii*, Jánossy 1983: 252 sub *Anser subanser*), West Runton – Upper Freshwater Bed, England (Harrison 1979d: identification uncertain). Extralimital records are available from the middle Pliocene of Dzabchan and Chirgiz-Nur 2, Mongolia (Kuročkin 1976, 1985: 36, Mlíkovský & Švec 1986).

Remarks: Jánossy (1983) attributed to his *Anser subanser* all records he knew about, which were described as *Anser* and which originated from what he called "middle Pleistocene", even when he could not examine the bones. With one exception (retained in *Cygnus bewickii*), these records are listed under *Anser anser* (Linnaeus) in this paper (see below).

The holotypical humerus fragment of *Anser subanser* Jánossy (which I examined in the mid 1980s before it was lost) differs from the same element of *Olor* Wagler in the position of sulcus ligamentosus, shape of the facies articularis carpalis, and in the less pointed processus dorsalis (Mlíkovský orig.). *Anser liskunae* Kuročkin was identified as a small *Olor* swan, but left a valid species in belief that it is even smaller than the modern *Cygnus* (*Olor*) *bewickii* Yarrell (Mlíkovský & Švec 1986). The known bones of both of these species agree in morphology with the same elements of the modern *Cygnus bewickii* Yarrell, being comparable in size with the smallest specimens of the latter species. I synonymize here both *Anser subanser* Jánossy and *Anser liskunae* Kuročkin with the modern *Cygnus bewickii* Yarrell.

Cygnus cygnus (Linnaeus) – Whooper Swan

Anas Cygnus Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *C.* cf. *cygnus*); early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999). The alleged record from Přezletice, Czechia (Jánossy 1983) refers to *Cygnus bewickii* (Mlíkovský orig.).

Cygnus (Cygnus) olor (Gmelin) – Mute Swan

Anas Olor Gmelin, 1789 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Untermassfeld, Germany (Jánossy 1997 sub. *C.* cf. *olor*); early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *C.* aff. *cygnus* [partim] – Mlíkovský orig.).

Cygnus sp.

Distribution: Late Miocene (MN 9) of Chişinău, Moldova (Macarovici & Oescu 1942); late Miocene (MN 11) of Hrebenyky, Ukraine (Dubrovo & Kapelist 1979), late Miocene (MN 12) of Aljezar B, Spain (Cheneval & Adrover 1993), and early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965).

Genus *Anser* Brisson

Anser Brisson, 1760 [Modern genus]

Anser thraceiensis Burčak-Abramovič & Nikolov

Anser thraceiensis Burčak-Abramovič & Nikolov, 1984: 29 [Syntypes from Trojanovo: left coracoid, distal end of left humerus, and proximal end of right humerus, perhaps from a single individual; NMHNS 2–2/5. Figured by Burčak-Abramovič & Nikolov 1984, pl. 2, fig. 1-1a (right humerus), 3-3a (left humerus), and 5-5a (coracoid).]

Distribution: Late Miocene or early Pliocene (MN 11-15) of Trojanovo, Bulgaria (Burčak-Abramovič & Nikolov 1984).

Anser anser (Linnaeus) – Greylag Goose

Anas Anser Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Untermassfeld, Germany (Jánossy 1997 sub *A.* aff. *subanser*); early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999), West Runton – Upper Freshwater Bed, England (Harrison 1979d), Voigtstedt, Germany (Jánossy 1965 sub *Anser* sp., Jánossy 1983: 252 sub *A. subanser*), and Somssichhégy 2, Hungary (Toula 1910, Jánossy 1983: 252, and 1986: 55 sub *A. subanser*); and middle Pleistocene (MQ 2A) of Várhegy – Fortuna street 25, Hungary (Jánossy 1979: 19 sub *A.* aff. *anser*, Jánossy 1983: 252, and 1986: 87 sub *A. subanser*), and Ambrona, Spain (Jánossy 1983: 252 sub *A. subanser*, reidentified by Sánchez Marco 1990b as *A. anser*).

Anser sp.

Distribution: Early Miocene (MN 4a) of Dolnice, Czechia (Mlíkovský 1996e); middle Miocene (MN 6-7) of Minişu de Sus, Romania (Kessler & Codrea 1996); early Pliocene (MN 14) of Kamenskoe, Ukraine (Vojinstvens'kyj 1967); and early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layer 13, Czechia (Mlíkovský 1995b).

Genus *Branta* Scopoli

Branta Scopoli, 1769 [Modern genus.]

Branta ruficollis (Pallas) – Red-breasted Goose

Anas ruficollis Pallas, 1769 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965 sub *Branta* cf. *ruficollis*).

Remarks: This record is based on a fragmentary cranial end of a coracoid, and should be reevaluated.

Genus *Alopochen* Stejneger

Alopochen Stejneger, 1885 [Modern genus.]

Anserobranta Kuročkin & Ganea, 1972: 54 [Type by original designation: *Anserobranta tarabukini* Kuročkin & Ganea, 1972.]

Proanser Umans'ka, 1979a: 42 [Type by original designation: *Proanser major* Umans'ka, 1979a.]

Remarks: The holotypical carpometacarpi of both *Anserobranta tarabukini* Kuročkin & Ganea and *Proanser major* Umans'ka bear the characters typical for *Alopochen* Stejneger (see Woolfenden 1961). In absence of the contrary evidence I synonymize here the genera *Anserobranta* Kuročkin & Ganea and *Proanser* Umans'ka with *Alopochen* Stejneger.

Alopochen tarabukuni (Kuročkin & Ganea)

Anserobranta tarabukini Kuročkin & Ganea, 1972: 54 [Holotype from Chişinău: proximal end of left carpometacarpus; PIN 1713/1722. Figured by Kuročkin & Ganea 1972, text-fig. 4, pl. 1, fig. 5.]

Proanser major Umans'ka, 1979a: 42 [Holotype from Hrebenyky: proximal end of right carpometacarpus; IZAN 25–1682. Figured by Umans'ka 1979a, fig. 2a,b,v.]

Alopochen tarabukini (Kuročkin & Ganea): Mlíkovský, this paper [New combination.]

Distribution: Late Miocene (MN 9) of Chişinău, Moldova (Macarovici & Oescu 1941 sub *Cygnus* sp., Kuročkin & Ganea 1972, Kessler 1984b, 1992); and late Miocene (MN 11) of Hrebenyky, Ukraine (Umans'ka 1979a).

Remarks: The holotype of *Proanser major* Umans'ka agrees in size and morphology with the same element of *Anserobranta tarabukini* Kuročkin & Ganea. Both species were described from stratigraphically and geographically close localities, so that I synonymize here the former with the latter species.

Genus *Tadorna* Oken

Tadorna Oken, 1817 [Modern genus.]

Todarna Reichenbach, 1852: x [Type by monotypy: *Todarna wagneri* Reichenbach, 1852.]

Balcanas Boev, 1998d: 54 [Type by original designation: *Balcanas pliocaenica* Boev, 1998d.]

Tadorna tadorna (Linnaeus) – Common Shelduck

Anas tadorna Linnaeus, 1758 [Modern species.]

Todarna wagneri Reichenbach, 1852: x [Syntypes from Monte Reale: coracoid, phalanx I digiti majoris, femur, and proximal end of tibiotarsus; present location unknown. Figured by Wagner 1832, pl. 2, fig. 49 (femur), 50 (tibiotarsus), 51a-b (coracoid), 52a-b (phalanx).]

Anser anatoïdes Depéret, 1892: 691 [Holotype from Perpignan: left tibiotarsus; FSL 92881. Figured by Depéret 1897, pl. 13, fig. 1-1a.]

Anser anatoides Depéret: Paris 1912: 290 [Spelling emended.]

Nettapus anatoides (Depéret): Brodkorb 1964: 227 [New combination.]

Anas submajor Jánossy, 1979: 11 [Holotype from Villány 3: left ulna; NMB Vt-83. Figured by Jánossy 1979, pl. 4, fig. 2.]

Balcanas pliocaenica Boev, 1998d: 54 [Holotype from Dorkovo: distal end of left humerus; NHMNS 484. Figured by Boev 1998d, fig. 2a-b.]

Distribution: Early Pliocene (MN 14) of Dorkovo, Bulgaria (Boev 1998d); early Pliocene (MN 15) of Perpignan, France (Depéret 1892, 1897); late Pliocene (MN 17) of Chilhac 2b and Chilhac 3, France (Boeuf & Mourer-Chauviré 1992 sub *T.* cf. *tadorna*), and Villány 3, Hungary (Jánossy 1979, Mlíkovský 1982a); and early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *Tadorna* sp., Mlíkovský orig.), and Stránská skála – Čapek's site 9a, Absolon's 2nd cave, Czechia (Jánossy 1972, Mlíkovský orig.).

Remarks: *Anas submajor* Jánossy was synonymized with the modern *Tadorna tadorna* (Linnaeus) by Mlíkovský (1982a). *Todarna wagneri* Reichenbach, 1852 was identified with *Tadorna tadorna* (Linnaeus) or *Tadorna ferruginea* (Pallas) by Mlíkovský (1995a; see also C.L. Nitzsch in Wagner 1833). *Anser anatoides* Depéret was compared by its author particularly with *Anser* Brisson and *Nettapus* Brandt, which was probably the reason why

Brodkorb (1964) and Howard (1964) included the species in the latter genus. The holotypical bones of *Anser anatoides* Depéret and *Balcanas pliocaenica* Boev are similar to the same elements of the modern *Tadorna tadorna* (Linnaeus), with which they were not compared formerly. Accordingly, I synonymize here the former two species with the latter one (Mlíkovský, orig.).

Genus *Dendronessa* Wagler

Dendronessa Wagler, 1832 [Modern genus.]

Dendronessa galericulata (Linnaeus)

Anas galericulata Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979d sub *Aix galericulata*).

Dendronessa sp.

Distribution: Late Miocene (MN10) of Götzendorf, Austria (Mlíkovský 1992a).

Genus *Anas* Linnaeus

Anas Linnaeus, 1758 [Modern genus.]

Anas velox Milne-Edwards

Anas Meyerii Milne-Edwards, 1868: 129 [Holotype from Öhningen: crushed tarsometatarsus with associated phalanges in slab; BMNH 42805 (= Av-159). Figured by Meyer 1865, pl. 30, fig. 4, and Heer 1865, fig. 367.]

Anas velox Milne-Edwards, 1868: 150 [Lectotype from Sansan (selected by Cheneval 1987: 143, 144): right carpometacarpus; MNHN SA-1230. Figured by Milne-Edwards 1867-1868, pl. 26, fig. 17-18, and Cheneval 1987, pl. 1, fig. 2. Paralectotypes from Sansan: right coracoid (MNHN SA-1232), and proximal end of left ulna (MNHN SA-1231). Figured by Milne-Edwards 1867-1868, pl. 26, fig. 6-8 (coracoid) and 17-18 (ulna), and Cheneval 1987, pl. 1, fig. 3 (coracoid) and 4 (ulna). A tibiotarsus was listed among the syntypes of *Anas velox* Milne-Edwards by Howard (1964: 294) apparently in error.]

Nettion velox (Milne-Edwards): Brodkorb 1964: 224 [New combination.]

Aythya meyerii (Milne-Edwards): Brodkorb 1964: 228 [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1867-1868, Cheneval 1987); middle Miocene (MN 7) of Steinheim, Germany (Fraas 1870), Attenfeld, Germany (Schlosser 1916: 33 sub ?*Anas velox*), Öhningen, Germany (Heer 1865, Meyer 1865 sub "Vogelfuss von Oeningen", Milne-Edwards 1867-1868, Mlíkovský 1992b); middle Miocene (MN 8) of Credința, Romania (Grigorescu & Kessler 1977 sub *Anas* cf. *velox*, Kessler 1992); and doubtfully late Miocene (MN 9) of Rudabánya, Hungary (Jánossy 1993 sub *Anas* aff. *velox*). The alleged record from the early Miocene (MN 4b) of Dolnice, Czechia (Švec 1981 sub *Nettion* cf. *velox*) was re-identified as *Mionetta natator* (Milne-Edwards) by Mlíkovský (orig.).

Remarks: *Anas meyerii* Milne-Edwards was a tiny duck, even smaller than the modern Holarctic *Anas crecca* Linnaeus. It agrees in size with the better documented *Anas velox* Milne-Edwards, described from the almost contemporaneous deposits of France. I regard these two nominal taxa as conspecific, selecting for them – as the first reviser – the name *Anas velox* Milne-Edwards, 1868. The allocation of this species to the genus *Anas* Linnaeus is uncertain.

Anas sansaniensis Milne-Edwards

Anas sansaniensis Milne-Edwards, 1868: 153 [Lectotype from Sansan (selected by Cheneval

1987: 145): distal end of left tibiotarsus; MNHN SA-1223. Figured by Milne-Edwards 1867-1868, pl. 25, fig. 26-30, and Cheneval 1987, pl. 1, fig. 5a-b. Paralectotype from Sansan: distal end of right humerus; MNHN 1233. Figured by Milne-Edwards 1867-1868, pl. 26, fig. 19-22, and Cheneval 1987, pl. 1, fig. 6a-b.]

Dendrocygna sansaniensis (Milne-Edwards): Mlíkovský 1988: 57 [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1867-1868, Cheneval 1987); and middle Miocene (MN 7) of Grive-Saint-Alban, France (Cheneval 1987).

Remarks: Mlíkovský (1988) transferred *Anas sansaniensis* Milne-Edwards in the genus *Dendrocygna* Swainson on the basis of a referred skull from Sansan, but Cheneval (1987) restudied the lectotype and retained the species in *Anas* Linnaeus. I follow here Cheneval's decision, although I am not convinced, that the bird belongs to the genus *Anas* Linnaeus.

Anas penelope Linnaeus – Eurasian Wigeon

Anas Penelope Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1) of Betfia – Aven, Romania (Kessler 1978); and early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999), West Runton – Upper Freshwater Bed, England (Harrison 1979d), Voigtstedt, Germany (Jánossy 1965 sub *A.* cf. *penelope*), Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *A.* cf. *penelope*), and Nagyharsányhegy 1-4, Hungary (Jánossy 1979).

Anas strepera Linnaeus – Gadwall

Anas strepera Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1) of Betfia – Aven, Romania (Kessler 1978); early Pleistocene (MQ 1a) of Huéscar 1, Spain (Sánchez Marco 1989), Beremend 17, Hungary (Jánossy 1992 sub *Anas* cf. *strepera*), and Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *A.* aff. *strepera*); and early Pleistocene (MQ 1b) of Betfia 7, Romania (Kessler 1975), Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *A.* cf. *strepera*), and Stránská skála – Musil's talus cone, layers 4, 4a, 5, 6, 8, 13, 14a, 15e, and 16, Czechia (Mlíkovský 1995).

Anas crecca Linnaeus – Common Teal

Anas crecca Linnaeus, 1758 [Modern species]

Anas crecca percrecca Jánossy, 1992: 17 [Holotype from Beremend 16: right ulna; NMB V-91.150. Figured by Jánossy 1992, pl. 4, fig. 8.]

Distribution: Late Miocene (MN 9-10) of Sokolov, Ukraine (Vojinstvens'kyj 1967 sub *A.* cf. *crecca*); late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1987b and 1990b sub *Anas* cf. *querquedula*, Jánossy 1992 sub *Anas crecca percrecca*); early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992 sub *A. crecca percrecca*), and Betfia 2, Romania (Jánossy 1979 sub *A.* aff. *crecca*); and early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999), West Runton – Upper Freshwater Bed, England (Newton 1887 sub *Anas*?, Harrison 1979d), and Přezletice, Czechia (Jánossy 1983 sub *Aythya* cf. *nyroca* and *Oxyura* aff. *leucocephala*, Mlíkovský orig.).

Anas platyrhynchos Linnaeus – Mallard

Anas platyrhychos Linnaeus, 1758 [Modern species.]

Fuligula aretina Portis, 1887: 194 [Lectotype from Montecarlo (here selected): right tarsometatarsus; IGF 930. Figured by Portis 1889, pl. 1, fig. 1-2. Paralectotypes from Montecarlo: axis (IGF 925), 5th (?) cervical vertebra (IGF 929), furcula (IGF 934), shaft of left ulna (IGF 933), proximal end of left carpometacarpus (IGF 935), distal end of left femur (IGF 931), shaft of left femur (IGF 936), and right tarsometatarsus (IGF 932). Figured by Portis 1889, pl. 1, fig. 3 (femur), 4-5 (vertebrae), 6-7 (furcula), 8 (ulna), and 9-10 (carpometacarpus).]

Fuligula sepulta Portis, 1887: 194 [Lectotype from Montecarlo (here selected): left coracoid (IGF 924). Figured by Portis 1889, pl. 1, fig. 14-16. Paralectotypes from Montecarlo: atlas (IGF 922), furcula (IGF 919), proximal end of right rib (IGF 927), left ulna (IGF 920), right ulna (IGF 926), left radius (IGF 921), left carpometacarpus (IGF 928), and right carpometacarpus (IGF 923). Figured by Portis 1889, pl. 1, fig. 11 (vertebra), 12-13 (furcula), 17-19 (ulna), 20-21 (radius), and 22-23 (carpometacarpus).]

Aythya aretina (Portis): Brodkorb 1964: 228 [New combination.]

Aythya sepulta (Portis): Brodkorb 1964: 228 [New combination.]

Anas aretina (Portis): Cheneval 1987: 150 [New combination.]

Anas sepulta (Portis): Cheneval 1987: 150 [New combination.]

Distribution: Late Pliocene or early Pleistocene (MN 16 – MQ 1) of Montecarlo, Italy (Portis 1887 and 1889 sub *F. aretina* and *F. sepulta*), Strette, Italy (Portis 1889 sub *F. aretina*); and early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999), East Runton, England (Harrison 1979d, see also Newton 1882b sub *A. boschas*), West Runton – Upper Freshwater Bed, England (Harrison 1979d), Voigtstedt, Germany (Jánossy 1965 sub *A.* cf. *platyrhynchos*), Přezletice, Czechia (Jánossy 1983 *sub Anas* sp., Mlíkovský orig.), and Stránská skála – Čapek's sites 5a, 5b, and 9a, Czechia (Jánossy 1972 sub *A.* cf. *platyrhynchos*). Both Pliocene and Pleistocene strata occur at Montecarlo and exact place of excavation of syntypes of *Fuligula aretina* Portis is unknown (see Delle Cave 1996: 677).

Remarks: *Fuligula aretina* Portis was based mainly on forelimb elements, while *Fuligula sepulta* Portis on hindlimb elements. Portis (1887, 1889) believed that *Fuligula sepulta* is smaller than *Fuligula aretina*, but I found in his data no support for this statement. Cheneval (1987) transferred *Fuligula aretina* Portis and *Fuligula sepulta* Portis to the genus *Anas* Linnaeus, without discussing their taxonomic status within the latter genus. The syntypes of both these alleged species agree in size with the same elements of the modern *Anas platyrhynchos* Linnaeus, with which I synonymize here both of them.

Anas acuta Linnaeus – Northern Pintail

Anas acuta Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992 sub *Anas* cf. *acuta*), and Betfia 2, Romania (Jánossy 1979 sub *A.* aff. *acuta*); early Pleistocene (MQ 1a) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *A.* cf. *acuta*), and Nagyharsánygehy 1-4, Hungary (Jánossy 1979 sub *A.* aff. *acuta*).

Anas querquedula Linnaeus – Garganey

Anas Querquedula Linnaeus, 1758 [Modern species.]

Distribution: Late Miocene (MN 11-13) of Čebotarevka, Ukraine (Vojinstvens'kyj 1967); early Pleistocene (MQ 1) of Betfia – Aven, Romania (Kessler 1978); early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *A.* aff. *querquedula*); early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999 sub cf. *A. querquedula*), Stránská skála – Čapek's sites 1-3, 4c, 5a, 5b, 9a, Czechia (Jánossy 1972), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972), Stránská skála – Musil's talus cone, layers 4, 4a, 5, 6, 8, 9, 10, 10a, 11, 12, 13, 14a, 15a, 15c, 15e, and 16, Czechia (Mlíkovský 1995b), and Nagyharsányhegy 1-4, Hungary (Jánossy 1979 sub *A.* aff. *querquedula*).

Anas clypeata Linnaeus – Northern Shoveler

Anas clypeata Linnaeus, 1758 [Modern species.]

Distribution: Late Miocene (MN 11-13) of Čebotarevka, Ukraine (Vojinstvens'kyj 1967 sub *A.* cf. *clypeata*); early Pleistocene (MQ 1) of Betfia – Aven, Romania (Kessler 1978); early

Pleistocene (MQ 1a) of Huéscar 1, Spain (Sánchez Marco 1989), Beremend 16, Hungary (Jánossy 1992 sub cf. *Spatula clypeata*), Beremend 17, Hungary (Jánossy 1992 sub cf. *Spatula clypeata*), and Betfia 2, Romania (Čapek 1917); early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5a, and Absolon's 2nd cave, Czechia (Jánossy 1972 sub cf. *Spatula clypeata*), Stránská skála – Musil's talus cone, layers 4a, 5, 6, 7b, 8, 9, 10, 11, 12, 13, 14, 15c, 15e, 16 (Mlíkovský 1995), and Nagyharsányhegy 1-4, Hungary (Jánossy 1979 sub *A.* aff. *clypeata*). The record from the early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Newton 1887, 1891 sub *Spatula clypeata*) is invalid (Harrison 1979d).

Anas sp.

Distribution: Late Miocene (MN 9) of Chişinău, Moldova (Macarovici & Oescu 1942, Kessler 1984); late Pliocene (MN 18) of Slivnica, Bulgaria (Boev 2000a); and early Pleistocene (MQ 1b) of Sima del Elefante – unknown layer, Spain (Rosas et al. 2001).

Genus *Aythya* Boie

Aythya Boie, 1822 [Modern genus.]

Aythya chauvirae Cheneval

Aythya chauvirae Cheneval, 1987: 148 [Holotype from Sansan: left femur; MNHN SA-1457. Figured by Cheneval 1987, pl. 1, fig. 7a-b.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Cheneval 1987, 2000); and middle Miocene (MN 8) of Credinţa, Romania (Grigorescu & Kessler 1977 sub *Aythya* sp., Cheneval 1987, Kessler 1992).

Aythya ferina (Linnaeus) – Common Pochard

Anas ferina Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Huéscar 1, Spain (Sánchez Marco 1989); and early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Lydekker 1891a sub *Fuligula ferina*, Harrison 1979d). An invalid record is from the early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983, reidentified by Mlíkovský, orig., as *Bucephala clangula*).

Aythya nyroca (Güldenstädt) – Ferruginous Duck

Anas nyroca Güldenstädt, 1769 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Huéscar 1, Spain (Sánchez Marco 1989), Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *A.* cf. *nyroca*); and early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965 sub *A.* cf. *nyroca*), Přezletice, Czechia (Jánossy 1983, Mlíkovský orig.), and Stránská skála – Čapek's sites 5a, and 9a, Czechia (Jánossy 1972 sub cf. *A. nyroca*).

Aythya fuligula (Linnaeus) – Tufted Duck

Anas fuligula Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999), West Runton – Upper Freshwater Bed, England (Harrison 1979d), Voigtstedt, Germany (Jánossy 1965 sub *A.* cf. *fuligula*), and Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *A.* cf. *fuligula*). An invalid record is from the early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983, reidentified by Mlíkovský, orig., as *Aythya nyroca* and *Bucephala clangula*).

Genus *Netta* Kaup

Netta Kaup, 1829 [Modern genus.]

Netta rufina (Pallas) – Red-crested Pochard

Anas rufina Pallas, 1773 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Huéscar 1, Spain (Sánchez Marco 1989); and early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979d).

Genus *Somateria* Leach

Somateria Leach, 1819 [Modern genus.]

Somateria mollissima (Linnaeus) – Common Eider

Anas mollissima Linnaeus, 1758 [Modern species.]

Somateria gravipes Harrison, 1979: 280 [Holotype from West Runton – Upper Freshwater Bed: left tarsometatarsus; BMNH A-3396. Not figured.]

Distribution: Early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979 sub *S. gravipes*, Mlíkovský 1982c).

Remarks: Mlíkovský (1982c) believed, that the holotypical tarsometatarsus of *Somateria gravipes* Harrison is a pathological specimen, because it differed from the same element of *Somateria mollissima* (Linnaeus) in one dimension. Subsequent research showed, that Harrison (1979) understood this dimension in a different way than me, and that the holotype falls entirely in the size and shape range of the modern *Somateria mollissima* (Mlíkovský orig.).

Genus *Clangula* Leach

Clangula Leach, 1819 [Modern genus.]

Clangula sp.

Distribution: Middle Miocene (MN 6-8) of Mátraszőlős 1, Hungary (Gál & Kessler in Gál et al. 1999).

Remarks: This is a very improbable record, because of its age (Mlíkovský orig.).

Genus *Melanitta* Boie

Melanitta Boie, 1822 [Modern genus.]

Melanitta nigra (Linnaeus) – Common Scoter

Anas nigra Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Lydekker 1891a sub *Fuligula ferina*, Harrison 1979d).

Genus *Bucephala* Baird

Bucephala Baird, 1858 [Modern genus.]

Bucephala cereti Boeuf & Mourer-Chauviré

Bucephala cereti Boeuf & Mourer-Chauviré, 1992: 1093 [Holotype from Chilhac 3: left humerus; MPC CH-3.1971.265. Figured by Boeuf & Mourer-Chauviré 1992, fig. 5-6.]

Distribution: Late Pliocene (MN 17) of Chilhac 3, France (Boeuf & Mourer-Chauviré 1992).

Bucephala clangula (Linnaeus) – Common Goldeneye

Anas clangula Linnaeus, 1758 [Modern species.]

Bucephala angustipes Jánossy, 1965: 345 [Holotype from Voigtstedt: right tarsometatarsus; IQW 2795. Figured by Jánossy 1965, text-fig. 6, pl. 6, fig. 19.]

Distribution: Late Pliocene (MN 16) of Hajnáčka, Slovakia (P. Švec in Fejfar & Heinrich 1985 sub *Mergus* sp., Mlíkovský orig. – tentative identification); late Pliocene (MN 18) of S'Onix, Mallorca (Sondaar et al. 1995 sub *B.* cf. *clangula*); early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979d), Voigtstedt, Germany (Jánossy 1965 sub *Bucephala angustipes*, Mlíkovský 1982c), Přezletice, Czechia (Jánossy 1983 sub *B.* cf. *angustipes*, *Aythya* cf. *fuligula*, and *Aythya* cf. *nyroca*, Mlíkovský orig.), Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *Bucephala angustipes*, Mlíkovský, orig.), and Stránská skála – Musil's talus cone, layers 11, 13, 15c and 15e, Czechia (Mlíkovský 1995b).

Remarks: *Bucephala angustipes* Jánossy was synonymized with *Bucephala clangula* Linnaeus by Mlíkovský (1982c). Early Pleistocene populations of *Bucephala clangula* Linnaeus tend to be smaller than modern ones (Mlíkovský 1995). Pliocene records should be compared with *Bucephala cereti* Boeuf & Mourer-Chauviré.

Genus *Mergellus* Selby

Mergellus Selby, 1840 [Modern genus.]

Mergellus albellus (Linnaeus) – Smew

Mergus Albellus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979d).

Genus *Mergus* Linnaeus

Mergus Linnaeus, 1758 [Modern genus.]

Mergus connectens Jánossy

Mergus connectens Jánossy, 1972: 38 [Holotype from Stránská skála – Absolon's 2nd cave: right coracoid; MMB Abs-88. Figured by Jánossy 1972, pl. 1, fig. 5-6.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972, Mlíkovský orig.), Stránská skála – Musil's talus cone, layer 13, Czechia (Mlíkovský 1995b), and Betfia 5, Romania (Jánossy 1972: 42).

Mergus serrator Linnaeus – Red-breasted Merganser

Mergus Serrator Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979d), Stránská skála – Musil's talus cone, layers 13 and 15e, Czechia (Mlíkovský 1995b).

Mergus merganser Linnaeus – Goosander

Mergus Merganser Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layer 13 (Mlíkovský 1995b).

Mergus sp.

Distribution: Middle Miocene (MN 6-8) of Mátraszőlős 1, Hungary (Gál & Kessler in Gál et al. 1999).

Remarks: This is an improbable record, because of its age (Mlíkovský orig.).

Genus *Oxyura* Bonaparte

Oxyura Bonaparte, 1828 [Modern genus.]

Oxyura doksana n. sp.

Oxyura doksana Mlíkovský, this paper [Holotype from Dolnice: cranial end of left coracoid; DPFNSP 4828. Figured by Švec & Mlíkovský 1986, pl. 1, fig. a-c.]

Diagnosis: Coracoid of *Oxyura doksana* differs from the coracoids of other *Oxyura* species in having: (1) sulcus musculi procoracoidei deeper, (2) medioventral part of facies articularis less prominent over medioventral margin of canalis triosseus, and (3) in being generally larger and more robust.

Material: Holotype only. For measurements and detailed comparisons see Švec & Mlíkovský 1986.

Etymology: Lacustrine, latinized from *doksa*, Celtic word for a lake, the habitat of *Oxyura doksana*. Both Celts and *Oxyura doksana* were past inhabitants of Czechia, though in different times.

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Švec & Mlíkovský 1986, Mlíkovský orig.).

Oxyura leucocephala (Scopoli) – White-headed Duck

Anas leucocephala Scopoli, 1769 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983, Mlíkovský orig.).

Genus incertae sedis

Anas albae Jánossy

Anas albae Jánossy, 1979: 16 [Holotype from Polgárdi: left carpometacarpus; NMB Vt-84. Not figured.]

Distribution: Late Miocene (MN 13) of Polgárdi, Hungary (V. Čapek in Lambrecht 1912a,b sub *Mergus* sp., Jánossy 1979).

Anas eppelsheimensis Lambrecht

Anas eppelsheimensis Lambrecht, 1933: 362 [Holotype from Eppelsheim: fragmentary cranial end of right coracoid; present location unknown. Figured by Lambrecht 1933, fig. 124.]

Distribution: Late Miocene (MN 9) of Eppelsheim, Germany (Lambrecht 1933).

Remarks: The holotypical fragment probably cannot be identified within the family Anatidae (Mlíkovský 1992b).

Anas isarensis Lambrecht

Anas isarensis Lambrecht, 1933: 361 [Holotype: proximal end of right scapula from Aumeister; formerly in BSP 1926-v-12b, but apparently destroyed in the World War II. Figured in Lambrecht 1933, fig. 123a.]

Distribution: Late Miocene (MN 9) of Aumeister, Germany (Lambrecht 1933).

Remarks: Mlíkovský (1992b) transferred this species to the tribe Aythyini, where it was considered indeterminate at the generic level. Unfortunately, in a subsequent test with duck scapulae I tended to misidentify *Anas* scapulae for those of *Aythya*. Taking into account that my re-identification of *Anas isarensis* was based on the restudy of an illustration, I refer here the species to Anatidae incertae sedis. It cannot be regarded as a record of the Aythyini.

Anser brumeli Milne-Edwards

Anser Brumeli Milne-Edwards, 1871: 585 [Holotype from Orleanais: a tarsometatarsus; present location unknown. Not figured.]

Distribution: Middle Miocene (MN 4) of Orleanais, France (Milne-Edwards 1871).

Remarks: This is a valid name, although its description ("un Oie un peu plus petit que la barnache") is highly superficial. Lambrecht (1933: 368) and Brodkorb (1978: 222) erroneously listed the species as a nomen nudum (but see Lambrecht 1921: 12, Howard 1964: 266).

Anas oeningensis Meyer

Anas oeningensis Meyer, 1865: 126 [Holotype from Öhningen: incomplete skeleton in slab; BMNH 42804. Figured by Meyer 1865, pl. 30, fig. 2.]

Anser oeningensis (Meyer): Milne-Edwards 1867b: 127 [New combination.]

Distribution: Middle Miocene (MN 7) of Öhningen, Germany (Meyer 1865, Milne-Edwards 1867b: 127).

Remarks: Taxonomic position of this species is in need of restudy. Lambrecht (1921: 15) listed this species in the synonymy of *Anas meyerii* Milne-Edwards, but the two species markedly differ in size (Mlíkovský orig.). The relation between the lengths of humerus and ulna in *Anas oeningensis* Meyer seems to differ from that of *Anser* Brisson, and to agree with that of the Cairinini (Mlíkovský, orig.). The taxonomic evaluation of this observation requires further study.

Anas risgoviensis Ammon

Anas Risgoviensis Ammon, 1918: 41 [Syntypes from Lierheim: imperfect left coracoid (BMNH 48165) and sternal end of right coracoid (BMNH 48165a). Not figured.]

Distribution: Middle Miocene (MN 6) of Lierheim, Germany (Ammon 1918: 41), and Wallerstein, Germany (Ammon 1918: 7-8, feather imprints).

Remarks: There is no evidence that this species belonged to the genus *Anas* Linnaeus. Lydekker (1891a: 117) mentioned, that the syntypes are "slightly larger than the corresponding bones of *Anas blanchardi*".

Anser scaldii Lambrecht

Anser Scaldii Beneden, 1872: 288 [Nomen nudum; no description or indication.]

Anser Scaldii Beneden, 1873a: 372 [Nomen nudum; no description or indication]

Anser scaldii "Beneden" Lambrecht, 1933: 368 [Holotype from Antwerp: a humerus; IRScNB, uncatalogued. Not figured.]

Distribution: Middle Miocene (MN 7-8) of Antwerp, Belgium (Beneden 1872, 1873a, Shufeldt 1909: 336, Lambrecht 1933: 368).

Remarks: Lambrecht (1933: 368) erroneously stated that the fossil was described by Beneden (1872) as *Anas Scaldii*, and „transferred" it to the genus *Anser*. This incorrect information was repeated by Gaillard (1939: 78), Brodkorb (1964: 212) and Howard (1964: 267). *Anser Scaldii* is a pure nomen nudum in Beneden (1872, 1873a), but Lambrecht (1933: 368) restudied the holotype and presented a very brief description, thus validating the name.

Order Charadriiformes Huxley

Charadriomorphae Huxley, 1867 [Modern order.]

Family Jacanidae Chenu & des Murs

Jacanidae Chenu & des Murs, 1854 [Modern family.]

Genus *Nupharanassa* Rasmussen et al.

Nupharanassa Rasmussen, Olson & Simons, 1987: 7 [Type by original designation: *Nupharanassa bulotorum* Rasmussen et al., 1987.]

Distribution: Early Miocene (MN 4) of Czechia. Extralimital record is limited to the early Oligocene (MP ?) of Fayum in Egypt (Rasmussen et al. 1987), from where two species were described: *Nupharanassa bulotorum* Rasmussen et al., 1987, and *Nupharanassa tolutaria* Rasmussen et al., 1987.

Nupharanassa bohemica Mlíkovský

Nupharanassa bohemica Mlíkovský 1999a: 121 [Holotype from Dolnice: distal end of right tarsometatarsus; coll. Fejfar, uncatalogued. Figured by Mlíkovský 1999a, unnumbered fig.; and Mourer-Chauviré 1999a, fig. 1.]

Geranopterus bohemicus (Mlíkovský): Mourer-Chauviré 1999a: 151 [New combination.]

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský 1999a, Mourer-Chauviré 1999a).

Remarks: Mourer-Chauviré (1999a) transferred *Nupharanassa bohemica* Mlíkovský to the Coraciidae. She listed characters in which tarsometatarsus of the Jacanidae differ from that of the Coraciidae. Contrary to her opinion (she derived from the figures), the holotypical tarsometatarsus of *Nupharanassa bohemica* Mlíkovský agrees with the same element of the Jacanidae, and differs from that of the Coraciidae in all characters she listed. *Nupharanassa bohemica* Mlíkovský is certainly not a coraciid bird, and no points were presented for its exclusion from the Jacanidae.

Family Rostratulidae Mathews

Rostratulidae Mathews, 1914 [Modern family.]

Genus *Rostratula* Vieillot

Rostratula Vieillot, 1816 [Modern genus.]

Rostratula pulia Mlíkovský

Rostratula pulia Mlíkovský, 1999b: 99 [Holotype from Dolnice: distal part of right tarsometatarsus; DP FNSP 4819. Figured by Švec 1983, pl. 2, fig. a-c.]

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský 1999b).

Remarks: The holotypical tarsometatarsus of *Rostratula pulia* Mlíkovský was originally described by Švec (1983) as a paratype of *Microrallus fejfari* Švec.

Family Scolopacidae Vigors

Scolopacidae Vigors, 1825 [Modern family.]

Remarks: This is an osteologically rather uniform family, which opens considerable space for identification errors. Most of the Tertiary species were described inadequately, none were properly revised, and the taxonomic status of all of the Tertiary taxa should be reevaluated.

Calidris Merrem

Calidris Merrem, 1804 [Modern genus.]

Calidris sp.

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský orig.); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *Calidris* sp., aff. *alpina* Linnaeus), and Stránská skála – Musil's talus cone, layer 7, Czechia (Mlíkovský 1995b).

Genus *Philomachus* Merrem

Philomachus Merrem, 1804 [Modern genus.]

Philomachus pugnax (Linnaeus) – Ruff

Tringa Pugnax Linnaeus, 1758 [Modern species.]

Philomachus pugnax rhyphaeicus Potapova, 1990: 142 [Holotype from Medvež'ja cave – layer 3: right humerus; ZIN RO-4003. Figured by Potapova 1990, pl. 3, fig. 6.]

Distribution: Early Pleistocene (MQ 1a) of Tarchankut, Ukraine (Vojinstvens'kyj 1967 sub *P.* cf. *pugnax*); early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub aff. *P. pugnax*); Stránská skála – Musil's talus cone, layers 4, 5, 6, 8, and 11, Czechia (Mlíkovský 1995b); and late Pleistocene (MQ 2D) of Medvež'ja cave, Russia (Potapova 1990 sub *P. p. rhyphaeicus*).

Genus *Lymnocryptes* Kaup

Lymnocryptes Kaup, 1829 [Modern genus.]

Lymnocryptes minimus (Brünnich) – Jack Snipe

Scolopax minima Brünnich, 1764 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layers 7, 14, and 15e, Czechia (Mlíkovský 1995b).

Genus *Gallinago* Brisson

Gallinago Brisson, 1760 [Modern genus.]

Gallinago veterior Jánossy

Gallinago veterior Jánossy, 1979: 24 [Holotype from Csarnóta 2 – layer 2/B1: nearly complete right coracoid; NMB Vt-81. Figured by Jánossy 1979, fig. 4/9.]

Capella veterior Jánossy: Jánossy 1980b: 13 [New combination.]

Distribution: Early Pliocene (MN 15) of Csarnóta 2, Hungary (Jánossy 1979).

Gallinago gallinago (Linnaeus) – Common Snipe

Scolopax Gallinago Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *G.* cf. *gallinago*), Stránská skála – Čapek site 5a, Czechia (Jánossy 1972 sub *Capella* cf. *gallinago*), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *Capella* cf. *gallinago*), and Stránská skála – Musil's talus cone, layers 4, 4a, 5, 6, 13, and 14, Czechia (Mlíkovský 1995b).

Gallinago media (Latham) – Great Snipe

Scolopax media Latham, 1787 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Jánossy 1979 sub *G.* cf. *media*); and early Pleistocene (MQ 1b) of Stránská skála – Čapek site 5a, and Absolon's 2nd cave, Czechia (Jánossy 1972 sub *Capella* cf. *media*), and Stránská skála – Musil's talus cone, layers 5, 6, 13, 14, and 15c, Czechia (Mlíkovský 1995b).

Gallinago sp.

Distribution: Late Miocene (MN 13) of Polgárdi 4 – upper layer, Hungary (Jánossy 1991 sub *Capella* sp.).

Genus *Scolopax* Linnaeus

Scolopax Linnaeus, 1758 [Modern genus.]

Scolopax carmesinae Seguí

Scolopax carmesinae Seguí, 1999b. [Holotype: Humerus.]

Distribution: Late Pliocene (MN 17-18) of the island of Menorca, Spain (Seguí 1999b).

Remarks: Not seen.

Scolopax rusticola Linnaeus – Eurasian Woodcock

Scolopax rusticola Linnaeus, 1758 [Modern species.]

Scolopax rusticola magnus Potapova, 1990: 143 [Holotype from Medvež'ja cave – layer 3: left humerus; ZIN RO-4029. Figured by Potapova 1990, pl. 3, fig. 7.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 5a, and 9a, Czechia (Jánossy 1972 sub *S.* cf. *rusticola*), and Stránská skála – Musil's talus cone, layers 4a, 5, 6, 8, 10, 11, 13, and 15e, Czechia (Mlíkovský 1995); and late Pleistocene (MQ 2D) of Medvež'ja cave, Russia (Potapova 1990 sub *S. rusticola magnus*).

Genus *Limosa* Brisson

Limosa Brisson, 1760 [Modern genus.]

Limosa limosa (Linnaeus) – Black-tailed Godwit

Scolopax Limosa Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992 sub *L.* cf. *limosa*), Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *L.* cf. *limosa*); and early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *L.* aff. *limosa*), Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *L.* aff. *limosa*), and Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *L.* aff. *limosa*).

Limosa sp.

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layers 3b, 5, 6, 8, 10, 11, and 13, Czechia (Mlíkovský 1995b: sub *Limosa* spp. Two size classes were recognized, corresponding to *Limosa limosa* (Linnaeus) and *Limosa lapponica* (Linnaeus), respectively, but fragments were usually not identifiable to species).

Genus *Numenius* Brisson

Numenius Brisson, 1760 [Modern genus.]

Numenius phaeopus (Linnaeus) – Whimbrel

Scolopax Phaeopus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layers 5, 6, 8, 11, 13, and 15a, Czechia (Mlíkovský 1995).

Numenius arquata (Linnaeus) – Eurasian Curlew

Scolopax Arquata Linnaeus, 1758 [Modern species.]
Distribution: Late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1992 sub *N.* cf. *arquata*).

Genus *Tringa* Linnaeus

Tringa Linnaeus, 1758 [Modern genus.]

Tringa erythropus Linnaeus – Spotted Redshank

Tringa erythropus Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *T.* aff. *erythropus*).

Tringa totanus (Linnaeus) – Common Redshank

Scolopax totanus Linnaeus, 1758 [Modern species.]
Distribution: Late Pliocene (MN 18) of Betfia 13, Romania (Kessler 1975 sub *T.* aff. *totanus*); early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *T.* aff. *totanus*).

Tringa ochropus Linnaeus – Green Sandpiper

Tringa ocropus [sic!] Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1b) of West Runton – unspecified bed, England (Newton 1882b – bone figured, but not identified, Harrison 1979d), Voigtstedt, Germany (Jánossy 1965 sub *T.* cf. *ochropus*), and Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *T.* aff. *ochropus*).

Tringa glareola Linnaeus – Wood Sandpiper

Tringa glareola Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1) of Betfia – Aven, Romania (Kessler 1978).

Tringa sp.

Distribution: Early Miocene (MN 2) of Ravolzhausen, Germany (Martini 1974); late Miocene (MN 13) of Polgárdi 4 – upper layer, Hungary (Jánossy 1991); early Pleistocene (MQ 1) of Betfia 7, Romania (Kessler 1975 sub *T. glareola/ochropus*); early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992); and early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layers 4, 4a, 5, 6, 8, 9, 13, 14, and 14a, Czechia (Mlíkovský 1995b: three size classes distinguished), and Betfia 5, Romania (Kessler 1975).

Genus *Phalaropus* Brisson

Phalaropus Brisson, 1760 [Modern genus.]

Phalaropus fulicarius (Linnaeus) – Red Phalarope

Tringa fulicaria Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *P.* aff.

fulicarius).

Genus Incertae sedis

Actitis balcanica Boev

Actitis balcanica Boev, 1998a: 72 [Holotype from Vâršec: distal end of right tarsometatarsus; NMNHS 45. Figured by Boev 1998, fig. 1a-b.]

Distribution: Late Pliocene (MN 17) of Vâršec, Bulgaria (Boev 1997b sub *Actitis* sp., Boev 1998a).

Remarks: Relatively short inner trochlea of the holotypical tarsometatarsus resembles more the condition in the Charadriidae than in the Scolopacidae (Mlíkovský, orig.).

Elorius paludicola Milne-Edwards

Elorius paludicola Milne-Edwards, 1868: 407 [Holotype from Saint-Gérand-le-Puy: right tarsometatarsus; MNHN Av-9503. Figured by Milne-Edwards 1867-1868, pl. 63, fig. 23-26. Paralectotypes from Saint-Gérand-le-Puy (according to the material available at MNHN in June 1999 – Mlíkovský orig.): proximal end of right humerus (Av-9501), shaft of right humerus (Av-9495), distal ends of 2 left humeri (Av-9496, Av-9498), distal ends of 2 right humeri (Av-9499, Av-9500), proximal end of left tarsometatarsus (Av-9504), and distal end of right tarsometatarsus (Av-9505). Figured by Milne-Edwards 1967-1868, pl. 63, fig. 27-29 (coracoid), and 30-31 (proximal end of left humerus and distal end of left humerus). I did not find the figured coracoid and proximal end of left humerus and specimens Av-9497 and Av-9502 in MNHN in June 1999. They probably belonged to the syntypical series as well.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1867-1868).

Remarks: *Elorius paludicola* Milne-Edwards, 1868 is type by monotypy of the genus *Elorius* Milne-Edwards, 1868: 407.

Numenius antiquus Milne-Edwards

Numenius antiquus Milne-Edwards, 1868: 415 [Lectotype from Sansan (selected by Cheneval 2000: 361): proximal end of left tarsometatarsus; MNHN Sa-1227. Figured by Milne-Edwards 1867-1868, pl. 64, fig. 27-31; and Cheneval 2000, fig. 18. Paralectotype from Sansan: distal end of right tarsometatarsus; MNHN Sa-1228. Figured by Milne-Edwards 1867-1868, pl. 64, fig. 27; and Cheneval 2000, fig. 19.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1867-1868, Cheneval 2000).

Scolopax baranensis Jánossy

Scolopax baranensis Jánossy, 1979: 23 [Holotype from Csarnóta 2 (layer not given): proximal end of a carpometacarpus (body side not given); NMB Vt-82. Not figured.]

Distribution: Early Pliocene (MN 15) of Csarnóta 2, Hungary (Jánossy 1979).

Remarks: Due to its superficial and irrelevant description by Jánossy (1979) and the absence of any illustration, this species is almost a nomen nudum (see also Mlíkovský 1992b: 442).

Totanus edwardsi Gaillard

Totanus Edwardsi Gaillard, 1908: 128 [Holotype from Quercy: distal end of right humerus; BSP 124; apparently destroyed during the World War II (Mlíkovský, orig.). Figured by Gaillard 1908, fig. 37.]

Tringa edwardsi (Gaillard): Bocheński 1997: 315 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1908, Mayr 2000i:

635).

Totanus lartetianus Milne-Edwards

Totanus Lartetianus Milne-Edwards, 1863: 160 [Holotype from Saint-Gérand-le-Puy: right humerus; MNHN. Figured by Milne-Edwards 1867-1868, pl. 63, fig. 17-18. Milne-Edwards (1868: 402-406) descibed various skeletal elements of *Totanus lartetianus*, which Brodkorb (1967: 186) considered [syn]types of the species. However, Milne-Edwards (1863) described the species only on the basis of a humerus, which has therefore to be regarded as the holotype of the species.]

Tringa lartetiana (Milne-Edwards): Bocheński 1997: 316 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1867-1868).

Totanus grivensis Ennouchi

Totanus grivensis Ennouchi, 1930: 92 [Syntypes from Grive-Saint-Alban – early collections: proximal part of right humerus (ML Lgr-75), and distal part of left humerus (ML LGr-74). Figured by Ennouchi 1930, pl. 2, fig. 1-4 (proximal part) and fig. 5-8 (distal part).]

Tringa grivensis (Ennouchi): Bocheński 1997: 316 [New combination.]

Distribution: Middle Miocene (MN 7-8) of La Grive-Saint-Alban, France (Ennouchi 1930).

Totanus majori Lydekker

Totanus majori Lydekker, 1893: 521 [Holotype from Grive-Saint-Alban: left humerus; BMNH. Figured by Lydekker 1893, pl. 41, fig. 14.]

Tringa majori (Lydekker): Bocheński 1997: 316 [New combinaton.]

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban – early collections, France (Lydekker 1893b, Ennouchi 1930: 92); and middle Miocene (MN 8) of Grive-Saint-Alban – fissure M, France (Ballmann 1969a: 187).

Totanus minor Ennouchi

Totanus minor Ennouchi, 1930: 94 [Syntypes from Grive-Saint-Alban (all in ML): three left humeri (LGr-80, 81, 82), right humerus (LGr-84), and right humerus lacking proximal end (LGr-83). Figured by Ennouchi 1930, pl. 2, fig. 9-12 (one complete humerus); the remaining four syntypes remain not figured.]

Erolia ennouchii Brodkorb, 1967: 189 [New name for *Totanus minor* Ennouchi, 1930, believed to be junior secondary homonym of *Tringa cinclus minor* Schlegel, 1844 = *Erolia alpina* (Linnaeus, 1758) = *Calidris alpina* (Linnaeus, 1758). I was not able to find any paper, in which the species-group name *minor* Schlegel was published in combination with the genus *Totanus* Bechstein, 1803. It is thus probable, that *minor* Ennouchi is not a secondary homonym of *minor* Schlegel.]

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban – early collections, France (Ennouchi 1930, Gaillard 1939: 64); and middle Miocene (MN 8) of Grive-Saint-Alban – fisssure M, France (Ballmann 1969a: 187).

Totanus numenioides Serebrovs'kyj

Totanus numenioides Serebrovs'kyj, 1941b: 476 [Holotype from Odesa – catacombs: left humerus with damaged distal end; present location unknown. Figured by Serebrovs'kyj 1941b; and Dement'ev 1964, fig. 687a,b.]

Tringa numenioides (Serebrovs'kyj): Dement'ev 1964: 682 [New combination.]

Tringa numenioidea (Serebrovs'kyj): Bocheński 1997: 316 [Marked as a new combination; species name misspelled.]

Distribution: Early Pliocene (MN 15) of Odesa – catacombs, Ukraine (Serebrovs'kyj 1941b).

Totanus scarabellii Portis

Totanus Scarabellii Portis, 1887: 181 [Type from Senigallia: partial hind limb embedded in a slab (body side unknown), incl. distal end of tibiotarsus, tarsometatarsus, two anterior toes, and proximal phalanx of the hind toe; MCI, uncatalogued. Figured by Portis 1887, pl. 1, fig. 1.]

Tringa scarabellii (Portis): Bocheński 1997: 316 [New combination.]

Distribution: Late Miocene (MN 13) of Senigallia, Italy (Massalongo & Scarabelli-Gommi-Flamini 1859: 19 as an unidentified bird remain, Portis 1887).

Tringa gracilis Milne-Edwards

Tringa gracilis Milne-Edwards, 1868: 411 [Syntypes from Saint-Gérand-le-Puy (all in MNHN): large number of bones, incl. at least the following elements: a furcula, proximal end of a scapula, proximal end of a humerus, distal end of a humerus, an ulna, proximal end of a tibiotarsus, distal end of a tibiotarsus, and distal end of a tarsometatarsus. Figured by Milne-Edwards 1867-1868, pl. 58 (not pl. 64 as printed in Milne-Edwards 1867-1868: 411), fig. 2, and pl. 64, fig. 1-4 (tarsometatarsus), 5-10 (tibiotarsus), 11-13 (furcula), 14-16 (scapula), 17-19 (humerus), 20-21 (ulna).]

Erolia gracilis (Milne-Edwards): Brodkorb 1967: 188 [New combination.]

Distribution: Early Miocene (MN 1) of Weisenau–AS, Germany (Milne-Edwards 1867-1868: 413); and early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1867-1868).

Tringa grigorescui Kessler & Gál

Tringa grigorescui Kessler & Gál, 1996: 75 [Holotype from Ciobănița: proximal end of left carpometacarpus; LPUB 283. Figured by Kessler & Gál 1996, fig. 2a-b.]

Distribution: Middle Miocene (MN 8) of Ciobănița, Romania (Kessler & Gál 1996).

Family Glareolidae Brehm

Glareolidae Brehm, 1831 [Modern family.]

Genus *Mioglareola* Ballmann

Mioglareola Ballmann, 1979: 68 [Type by monotypy: *Mioglareola gregaria* Ballmann, 1979.]

Distribution: Early Miocene (MN 4) of Czechia, and middle Miocene (MN 6) of Germany.

Mioglareola dolnicensis (Švec)

Larus dolnicensis Švec, 1980: 380 [Holotype from Dolnice: distal end of left humerus; coll. Fejfar, uncatalogued. Figured by Švec 1980, pl. 1, fig. 2-3.]

Mioglareola dolnicensis (Švec): Mlíkovský 2000c: 94 [New combination.]

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Švec 1980, Mlíkovský 2000c).

Mioglareola gregaria Ballmann

Mioglareola gregaria Ballmann, 1979: 68 [Holotype from Steinberg: imperfect cranium; BSP 1970-XVIII-851. Figured by Ballmann 1979, pl. 1, fig. 3-5, text-fig. 3a-c, 4a-b.]

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský 2000c), and middle Miocene (MN 6) of Steinberg, Germany (Ballmann 1979).

Genus *Glareola* Brisson

Glareola Brisson, 1760 [Modern genus.]

Glareola neogena Ballmann

Glareola neogena Ballmann, 1979: 81 [Holotype from Steinberg: right humerus; BSP 1970-XVIII-852. Figured by Ballmann 1979, pl. 1, fig. 9, pl. 2, fig. 1.]

Distribution: Middle Miocene (MN 6) of Steinberg, Germany (Ballmann 1979), and Goldberg, Germany (Ballmann 1979).

Genus *Cursorius* Latham

Cursorius Latham, 1790 [Modern genus.]

Cursorius sp.

Distribution: Late Miocene (MN 13) of Polgárdi 4 – upper layer, Hungary (Jánossy 1991); and early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992 sub ?*Cursorius* sp.).

Family Thinocoridae Sundevall

Thinocoridae Sundevall, 1836 [Modern family.]

Pedionomidae Bonaparte, 1856 [Modern family.]

Turnipacidae Mayr, 2000i: 626 [Type genus: *Turnipax* Mayr, 2000i.]

Remarks: Olson & Steadman (1981) demonstrated, that *Pedionomus* Gould, 1841 is closely related to the Thinocoridae. The discovery of *Turnipax* (Mayr 2000i) allows to understand the Thinocoridae (which have nomenclatural priority) in the broader sense to encompass the presumably monophyletic group of quail-like birds related to the Scolopacidae (see Strauch 1978, Björklund 1994 and Chu 1995 for the latter relationship). Accordingly, I synonymize here Pedionomidae Bonaparte and Turnipacidae Mayr with the Thinocoridae Sundevall.

Mayr (2000i) listed small extremitas omalis of the coracoid as a distinguishing character of his family Turnipacidae. However, the configuration of this element is variable in the Thinocoridae s.l., ranging from open in *Pedionomus* Gould (see Olson & Steadman 1981) over medium small in *Thinocorus* Eschscholtz, 1829 (see Strauch 1976) to small in *Turnipax* Mayr (see Mayr 2000i).

Genus *Turnipax* Mayr

Turnipax Mayr, 2000i: 626 [Type by original designation: *Turnipax dissipata* Mayr, 2000i.]

Turnipax dissipata Mayr

Turnipax dissipata Mayr, 2000i: 627 [Holotype from Lubéron: partial, largely disarticulated skeleton in slab, incl. some vertebrae and ribs, both scapulae, both coracoids, furcula, both humeri, pelvis in two parts, both femora, left tibiotarsus with associated tarsometatarsus and phalanges digitorum pedis, right tibiotarsus with associated tarsometatarsus and phalanges digitorum pedis; SMF Av-427. Figured by Mayr 2000i, fig. 9/1 (left coracoid), fig. 9/2 (right coracoid), 9/3 (right scapula), 9/4 (left humerus), 9/5 (right humerus), 9/6 (one or two pelves, left femur and right femur), 9/7 (left leg), 9/8 (right leg), 9/9 (all syntypes).

Distribution: Early/middle Oligocene (MP 21-25) of Lupéron, France (Mayr 2000i). If Mayr (2000i) is correct in identifying Lupéron with Céreste, then the known distribution of *Turnipax dissipata* is limited to the middle Oligocene (MP 23) of Céreste, France.

Family Pterocletidae Bonaparte

Pteroclidae Bonaparte, 1831 [Modern family.]

Genus *Archaeoganga* Mourer-Chauviré

Archaeoganga Mourer-Chauviré, 1992a: 231 [Type by original designation: *Archaeoganga pinguis* Mourer-Chauviré, 1992a.]

Distribution: Eocene or Oligocene (MP 16-30) Quercy, France.

Archaeoganga pinguis Mourer-Chauviré

Archaeoganga pinguis Mourer-Chauviré, 1992a: 233 [Holotype from Quercy: right coracoid; MNHN QU-16960. Figured by Mourer-Chauviré 1992a, unnumbered pl., fig. a-b; and Mourer-Chauviré 1993, pl. 1, fig. a-b.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1992a, 1993a).

Archaeoganga larvatus (Milne-Edwards)

Pterocles larvatus Milne-Edwards, 1892: 71 [Holotype from Quercy: left coracoid; MNHN QU-15854. Figured by Mourer-Chauviré 1993, pl. 1, fig. e-f.]

Archaeoganga larvata (Milne-Edwards): Mourer-Chauviré 1992a: 231 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1993a).

Archaeoganga validus (Milne-Edwards)

Pterocles validus Milne-Edwards, 1892: 70 [Holotype from Quercy: left tarsometatarsus; MNHN QU-15853. Figured by Mourer-Chauviré 1993a, pl. 3, fig. c-d.]

Archaeoganga validus (Milne-Edwards): Mourer-Chauviré 1992a: 231 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1993a).

Genus *Leptoganga* Mourer-Chauviré

Leptoganga Mourer-Chauviré, 1993a: 87 [Type by original designation: *Pterocles sepultus* Milne-Edwards, 1869.]

Distribution: Late Oligocene (MP 28) of France, and early Miocene (MN 1-2) of France.

Leptoganga sepultus (Milne-Edwards)

Pterocles sepultus Milne-Edwards, 1869: 294 [Holotype from Saint-Gérand-le-Puy: left tarsometatarsus; MNHN Av-2844. Figured by Milne-Edwards 1869, pl. 141, fig. 1-9.]

Leptoganga sepultus (Milne-Edwards): Mourer-Chauviré 1993a: 88 [New combination.]

Distribution: Late Oligocene (MN 28) of Pech Desse, France (Mourer-Chauviré 1993a), and Pech du Fraysse, France (Mourer-Chauviré 1993a); early Miocene (MN 1) of Paulhiac, France (Mourer-Chauviré 1993); and early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869, Mourer-Chauviré 1993a).

Genus *Gerandia* Lambrecht

Gerandia Lambrecht, 1933: 602 [Type by monotypy: *Columba calcaria* Milne-Edwards, 1869.]

Gerandia calcaria (Milne-Edwards)

Columba calcaria Milne-Edwards, 1869: 292 [Holotype from Saint-Gérand-le-Puy: left humerus; MNHN Av-9672. Figured by Milne-Edwards, 1869-1871, pl. 141, fig. 10-14.]

Gerandia calcaria (Milne-Edwards): Lambrecht 1933: 602 [New combination.]

Distribution: Early Miocene (MN 2a) from Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Lambrecht 1933: 602).

Remarks: Described in the Columbidae (Milne-Edwards 1869). The holotypical humerus differs from the same element of the Columbidae, and agrees with that of the Pterocletidae in having: (1) deep muscular impression on the external side of the head, (2) ectepicondylar processus pointed and well separated from the shaft, and (3) distal end of the entepicondyle bent medially. The taxonomic position within the Pterocletidae has to be studied, but the taxon seems to be different from *Archaeoganga* Mourer-Chauviré, *Leptoganga* Mourer-Chauviré, and the modern *Pterocles* Temminck, 1815, with which I compared it.

Family Charadriidae Vigors

Charadriidae Leach, 1820 [Modern family.]

Distribution: Although the earliest identified Charadriidae are known from MN 16, there are two Miocene records of unidentified Charadriidae, incl. those from the early Miocene (MN4b) of Dolnice, Czechia (Mlíkovský 1996e), and the middle Miocene (MN 5) of Vieux-Collonges, France (Ballmann 1972).

Genus *Charadrius* Linnaeus

Charadrius Linnaeus, 1758 [Modern species.]

Charadrius morinellus Linnaeus – Eurasian Dotterel

Charadrius morinellus Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a sub array of *Charadrius morinellus*); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *C.* aff. *morinellus*).

Charadrius sp.

Distribution: Late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1987b and 1990b; not mentioned by Jánossy 1992); and early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layers 6 and 13, Czechia (Mlíkovský 1995b).

Genus *Pluvialis* Brisson

Pluvialis Brisson, 1760 [Modern genus.]

Pluvialis squatarola (Linnaeus) – Grey Plover

Tringa Squatarola Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub aff. *Squatarola squatarola*), and Stránská skála – Musil's talus cone, layers 3b, 5, 8, and 13, Czechia (Mlíkovský 1995b sub *P.* cf. *squatarola*).

Pluvialis sp.

Distribution: Early Pleistocene (MQ 1b) of Voigtstedt (Jánossy 1965 sub *Squatarola* sp.).

Genus *Vanellus* Brisson

Vanellus Brisson, 1760 [Modern genus.]

Vanellus vanellus (Linnaeus) – Northern Lapwing

Tringa Vanellus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992 sub *V.* cf. *vanellus*); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 1-3, 5a, and 9a, Czechia (Jánossy 1972 sub (Jánossy 1972 sub *V.* cf. *vanellus*), and Stránská skála – Musil's talus cone, layers 4, 4a, 5, 6, 7, 8, 10a, 11, and 13, Czechia (Mlíkovský 1995b).

Family Laridae Vigors

Laridae Vigors, 1825 [Modern family.]

Stercorariidae Gray, 1871 [Modern family.]

Remarks: I see no reason why to to separate Stercorariidae from the Laridae, because stercorariid genera fit well in the adaptive radiation of the Laridae. Hence, I include here Stercorariidae Gray in the Laridae Vigors.

Genus *Gaviota* Miller & Sibley

Gaviota Miller & Sibley, 1941: 563 [Type by original designation: *Gaviota niobrara* Miller & Sibley, 1941.]

Distribution: The extralimital record is limited to the late Miocene (Clarendonian) of Nebraska, USA (Miller & Sibley 1941, Olson 1985a: 182), from where *Gaviota niobrara* Miller & Sibley, 1941 was described.

Gaviota lipsiensis Fischer

Gaviota lipsiensis Fischer, 1983a: 152 [Holotype from Espenhain: distal end of right humerus; NKMB Av-732. Figured by Fischer 1983a, pl. 12, fig. 1-4.]

Distribution: Middle Oligocene (MP 23-24) of Espenhain, Germany (Fischer 1983a).

Remarks: The taxonomic position of this species needs confirmation.

Genus *Laricola* n. g.

Laricola Mlíkovský, this paper [Type by original designation: *Larus elegans* Milne-Edwards, 1868.]

Diagnosis: A gull with relatively long hindlimbs and short forelimbs (in comparison with the modern *Larus* Linnaeus).

Species included: *Laricola elegans* (Milne-Edwards), and *Laricola totanoides* (Milne-Edwards).

Etymology: “Walking gull”, coined from *Larus*, modern genus of gulls, and *kola*, Greek expression for a runner (Latinized). The name is masculine in gender.

Distribution: Late Oligocene (MP 25-30) of France, and early Miocene (MN 2-4) of France and Czechia.

Laricola elegans (Milne-Edwards)

Larus elegans Milne-Edwards, 1868: 350 [Syntypes from Saint-Gérand-le-Puy: large amount of bones, incl. at least one each of the following elements: skull, coracoid, furcula, scapula, humerus, ulna, radius, carpometacarpus, femur, tibiotarsus, and tarsometatarsus; MNHN. Figured by Milne-Edwards 1867-1868, pl. 56, fig. 11-15 (tarsometatarsus), 16-18 (tibiotarsus), 19-21 (femur), 22 (synsacrum), 23 (sternum), 24-26 (coracoid), 27-29 (scapula), pl. 57, fig. 1 (skull), 2-3 (humerus), 4-5 (ulna), 6-9 (carpometacarpus), 10-11 (furcula), and pl. 58, fig. 1 (reconstructed skeleton).]

Laricola elegans (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Late Oligocene (MP 25) of Antoingt, France (Lydekker 1891a: 178); late Oligocene (MP 30) of Gannat, France (Milne-Edwards 1867b: 350); early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1867-1868); early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský orig.); and middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Shufeldt 1896: 515). The latter record is uncertain (Brodkorb 1967: 206).

Laricola totanoides (Milne-Edwards)

Larus totanoides Milne-Edwards, 1868: 358 [Syntypes from Saint-Gérand-le-Puy: large amount of bones, incl. at least one each of the following elements: coracoid, humerus, ulna, radius, carpometacarpus, femur, tibiotarsus, tarsometatarsus; MNHN. Figured by Milne-Edwards 1867-1868, pl. 57, fig. 12-15 (tarsometatarsus), and 16-17 (humerus).

Laricola totanoides (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1867-1868). The record from the middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Shufeldt 1896: 515) is uncertain.

Genus *Larus* Linnaeus

Larus Linnaeus 1758 [Modern genus.]

Rissa Stephen, 1826 [Modern genus.]

Larus teruelensis (Villalta)

Totanus teruelensis Villalta, 1963: 268 [Lectotype from Mansuetos (selected by Olson 1985a: 175): distal end of right humerus; present location unknown – A. Sánchez Marco, in litt. 1995. Figured by Villalta 1963, pl. 3, fig. 1, 1a-b. Paralectotype: distal end of right ulna from Mansuetos; present location unknown – A. Sánchez Marco, in litt. 1995. Figured by Villalta 1963, pl. 2, fig. 5, 5a-b. Note that Villalta (1963: 268) based this species on both listed fragments, which he believed to come probably from a single individual. Olson (1985a: 175) erroneously stated that the species was based solely on the humerus fragment. Nevertheless, the latter action can be interpreted as a selection of the lectotype.]

Tringa teruelensis (Villalta): Bocheński 1997: 316 [New combination.]

Larus teruelensis (Villalta): Mlíkovský, this paper [New combination.]

Distribution: Late Miocene (MN 12) of Mansuetos, Spain (Villalta 1963).

Remarks: Deep longitudinal impression of musculus brachialis antiquus allows to assign the fossil to the Laridae (see also Olson 1985: 175). Within the family the fossil distal end of humerus agrees with the same element of *Larus* Linnaeus and differs from that of *Sterna* Linnaeus and *Chlidonias* Rafinesque especially in being relatively broad. Accordingly, I transfer here *Totanus teruelensis* Villalta to the modern genus *Larus* Linnaeus.

Larus ridibundus Linnaeus – Black-headed Gull

Larus ridibundus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992 sub *Larus* (?) cf. *ridibundus*); and early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999), Přezletice, Czechia (Jánossy 1983 sub *L.* cf. *ridibundus*), and Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *L.* cf. *ridibundus*).

Larus canus Linnaeus – Mew Gull

Larus canus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *L.* aff. *canus*), and Stránská skála – Musil's talus cone, layer 5, Czechia (Mlíkovský 1995b).

Larus tridactylus Linnaeus – Black-legged Kittiwake

Larus tridactylus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999 sub cf. *Rissa tridactyla*).

Larus sp.

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský 1996e sub ?*Larus*); middle Miocene (MN 8) of Credința, Romania (Grigorescu & Kessler 1977); and late Miocene (MN 9) of Chişinău, Moldova (Kessler 1984). The alleged record of *Larus* sp. from the late Miocene (MN 9) of Kalfa, Moldova (Ganea 1965) refers to an unidentified member of the Anatidae (Kuročkin & Ganea 1972).

Genus *Sterna* Linnaeus

Sterna Linnaeus, 1758 [Modern species.]

Sterna sp.

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský 1996e sub ?*Sterna*); and early Pleistocene (MQ 1a) of Primorsk, Ukraine (Vojistvens'kyj 1967).

Genus *Chlidonias* Rafinesque

Chlidonias Rafinesque, 1822 [Modern genus.]

Chlidonias sp.

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub aff. *C. nigra*?).

Genus *Stercorarius* Brisson

Stercorarius Brisson, 1760 [Modern genus.]

Stercorarius pomarinus (Temminck) – Pomarine Jaeger

Lestris pomarinus Temminck, 1815 [Modern species.]

Stercorarius pomarinus philippi Mourer-Chauviré, 1975a: 137 [Holotype from Fage – layer 35: left tarsometatarsus; FSL 41657. Figured by Mourer-Chauviré 1975a, pl. 13, fig. 14.]

Distribution: Middle Pleistocene (MQ 2B) of Fage – layer 35, France (Mourer-Chauviré 1975a sub *S. pomarinus philippi*).

Genus incertae sedis

Larus desnoyersii Milne-Edwards

Larus Desnoyersii Milne-Edwards, 1863: 161 [Holotype from Saint-Gérand-le-Puy: distal end of a humerus; MNHN. Not figured.]

Larus Desnoyersii Milne-Edwards, 1868: 344 [Lectotype from Saint-Gérand-le-Puy: distal end of a humerus; MNHN (same specimen is the holotype of *L. Desnoyersii* Milne-Edwards, 1863); MNHN. Not figured. Paralectotypes (all in MNHN): unknown number of bones, incl. cervical vertebrae, scapula, coracoid, humerus, ulna, radius, phalanx I digiti majoris, fragmentary pelvis, femur, tibiotarsus, and tarsometatarsus. Figured by Milne-Edwards 1867-1868, pl. 54, fig. 15 partim (tibiotarsus), 15-18 (tarsometatarsus), 15, 19-20 (femur), 21-23 (coracoid), 24-26 (humerus), pl. 55 (reconstruction), and pl. 56, fig. 1-2 (pelvis), 3-4 (ulna), 5-7 (carpometacarpus), 8 (phalanx I digiti majoris), 9-10 (scapula). This both junior objective synonym and junior homonym of *Larus Desnoyersii* Milne-Edwards, 1863.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1867-1868, Miller & Sibley 1941, Olson 1985a: 180).

Remarks: Olson (1985a: 180) pointed out that this species possibly should be transferred to the Stercorariidae (see also Miller & Sibley 1941: 566). I agree that it does not belong to the genus *Larus* Linnaeus.

Family Alcidae Vigors

Alcidae Vigors, 1825 [Modern family.]
Petralcinae Mlíkovský, 1987: 136 [Type genus: *Petralca* Mlíkovský, 1987a.]

Genus *Petralca* Mlíkovský

Petralca Mlíkovský, 1987: 136 [Type by original designation: *Petralca austriaca* Mlíkovský, 1987a.]

Petralca austriaca Mlíkovský

Petralca austriaca Mlíkovský, 1987a: 136 [Holotype from Traun-Pucking: incomplete skeleton in slab and counter-slab; NHMW 1980/25. Figured by Mlíkovský 1987a, text-fig. 4-5, pl. 1-2.]

Distribution: Late Oligocene (MP 30) of Traun-Pucking, Austria (Mlíkovský 1987).

Genus *Uria* Brisson

Uria Brisson, 1760 [Modern genus.]

Uria aalge (Pontoppidan) – Common Murre

Colymbus aalge Pontoppidan, 1763 [Modern species.]

Distribution: Late Pliocene (MN 18) of Aldeby, England (Newton 1882b, Harrison 1979d), and Chillesford, England (Harrison 1979d).

Genus *Alca* Linnaeus

Alca Linnaeus, 1758 [Modern genus.]
Plautus Brünnich, 1772 [Modern genus.]
Pinguinus Bonnaterre, 1791 [Modern genus.]

Alca impennis Linnaeus – Great Auk

Alca impennis Linnaeus, 1758: 130 [Modern species.]
Alca major Brisson, 1760: 85 [Unavailable name; book not strictly binomial – ICZN 1955.]
Plautus impennis (Linnaeus): Brünnich, 1772: 78 [New combination.]
Pinguinus impennis (Linnaeus): Bonnaterre, 1791: 29 [New combination.]

Distribution: Early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999); late Pleistocene (MQ 2C) of Devil's Tower, Gibraltar (Bate 1928), Gorham's Cave, Gibraltar (Eastham 1968), Figueira Brava – layer 2, Portugal (Mourer-Chauviré & Antunes 1991, 2000), Archi, Italy (Ascenzi & Segre 1971, Cassoli & Segre 1985); and late Pleistocene (MQ 2D) of Blomvåg, Norway (Lie 1986), Cosquer, France (Clottes et al. 1992, Clottes & Courtin 1993, d'Errico 1994a,b,c, McDonald 1994; see also Cleere 1992), Nerja, Spain (Eastham 1986), Urtiaga, Spain (Eastham 1985, 1989), Pendo, Spain (wall engraving, H. Breuil in Alcalde del Río et al. 1912, Eastham 1968, Gonzales Morales 1980, d'Errico 1994a,b,c; but see McDonald 1994), Paglicci, Italy (Mezzena & Palma di Cesnola 1992 sub *A. tordus* or *A. impennis*), Romanelli – layer B, Italy (Regàlia 1904 sub *Uria* sp., Blanc 1927, 1928, Cassoli et al. 1979, Cassoli & Segre 1985), and Arene Candide, Italy (Cassoli 1980: 183). Extralimital records are limited to the late Pleistocene of Porto Santo, Madeira (Pieper 1985), and Norfolk, Virginia (Ray et al. 1968).

The following late Pleistocene records are invalid: Gargas, Jersey, England (Andrews 1920 – see Breuil & Bégouën 1936, d'Errico 1994a,c, McDonald 1994), Raymonden, France (sculpture, Hardy 1891 – see Breuil et al. 1909, H. Breuil in Alcalde del Río et al. 1912: 38, Lambrecht 1933: 790-791, d'Errico 1994a,c, McDonald 1994), and Hermanstorp, Sweden (egg, Munthe 1914, reidentified as that of *Cygnus cygnus* Linnaeus by Löppenthin 1952).

The Holocene record is more abundant, being limited to the northern part of the Atlantic

Ocean. In Europe it includes sites in Iceland (Blasius 1884, Grieve 1885, Bardharson 1911, Petersen 1995), the Hebrides (Mellars 1978, 1987), Scotland (Blasius 1884, Bell 1915, Serjeantson 1993), Ireland (Ussher 1897, 1899a,b, 1902, Knowles 1895, Lambrecht 1933, Woodman 1978), England (Blasius 1884, Grieve 1885, Bell 1915, Fisher 1997, Stewart 1997), Norway (Lambrecht 1933, Olsen 1967, Hufthammer 1982, Montevecchi & Hufthammer 1990), Sweden (Lambrecht 1933, Lageraes 1989), Denmark (Blasius 1884, Winge 1903, Grigson 1989), Holland (Wijngarden-Bakker 1978, Kompanje & Kerkhoff 1991), Baltic Russia (Potapova 1994), Atlantic France (Péquart & Péquart 1926, Péquart et al. 1937), Atlantic Spain (Elorza & Sánchez Marco 1993, Hernández Carrasquilla 1994), and Mediterranean Spain (Hernández Carrasquilla 1994). For the occurrence in Greenland see Meldgaard (1988). In North America, the record is available from the Atlantic coast from Quebec in the north (Bisseling 1938, Jordan & Olson 1982) to Florida in the south (Hay 1902, Bullen & Sleight 1950, Brodkorb 1960b, 1967, Weigel 1988). For maps see Cassoli & Segre (1985), Mourer-Chauviré & Antunes (1991, 1999d), and especially Tyrberg (1999, fig. 1).

The disappearance of the Great Auk from Europe is not mapped as yet. It seems to have disappeared from the Mediterranean Sea at the close of the Pleistocene (being still recorded in Dryas III, but not later – excepting a Holocene record from Nerja in Spain near Gibraltar, Hernández Carrasquilla 1994), and from Norway ca. 1500 years ago (Hufthammer 1982). Its breeding distribution was probably limited to the islands in the northwestern Atlantic Ocean in historical times (see Bengtson 1984), but 18th-century records, probably attributable to vagrants, are available from the British Islands (Grieve 1885) and northwestern France (Scherdlin 1926).

Great Auk became extinct in the mid 19th century. The last generally accepted record dates back to June 1844, when two individuals were killed on the Eldey islet off Iceland (Greenway 1967, Bengtson 1984, Luther 1966, 1986), but an uncertain record is also from 1852 (Newton 1861, Vinokurov 1992). Data on the natural history of the Great Auk were summarized by Steenstrup (1855), Preyer (1862), Blasius (1884, 1903) and Grieve (1885, 1888); see also Violani (1974), Olson et al. 1979, Bengtson (1984), Nettleship & Evans (1985), Livezey (1988), Hobson & Montevecchi (1991), Fuller (1999), and Mourer-Chauviré (1999d). See also Burness & Montevecchi (1992) and Serjeantson (2001)

Alca torda Linnaeus – Razorbill

Alca Torda Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Bacton, England (Harrison 1979d).

Genus *Cepphus* Pallas

Cepphus Pallas, 1769 [Modern genus.]

Cepphus storeri Harrison

Cepphus storeri Harrison, 1977: 238 [Holotype from “Red Crag of Suffolk”: left carpometacarpus; BMNH A-4986. Not figured.]

Distribution: Late Pliocene (MN 16-17) of an unknown locality within the Red Crag in Suffolk, England (Harrison 1977).

Genus incertae sedis

Uria ausonia Portis

Uria ausonia Portis, 1887: 195 [Nomen nudum; no description or indication.]

Uria ausonia Portis, 1889: 15 [Holotype from Orciano Pisano: distal end of left humerus; IGF 14875. Figured by Portis 1889, pl. 1, fig. 28-30.]

Distribution: Middle Pliocene (MN 15-16) of Orciano Pisano, Italy (Portis 1887, 1889).

Remarks: This species does not belong to the genus *Uria* Brisson, 1760 (S.L. Olson, pers. communication, 1997).

Order Piciformes Meyer & Wolf

Pici Meyer & Wolf, 1810 [Modern order.]
Sandcoleiformes Houde & Olson, 1992 [Type genus: *Sandcoleus* Houde & Olson, 1992.]

Family Zygodactylidae Brodkorb

Zygodactylidae Brodkorb, 1971b: 257 [Type genus: *Zygodactylus* Ballmann, 1969b.]
Primoscenidae Harrison & Walker 1977a: 47 [Type genus: *Primoscens* Harrison & Walker, 1977a.]
Sandcoleidae Houde & Olson, 1992: 139 [Type genus: *Sandcoleus* Houde & Olson, 1992.]
Quercypsittidae Mourer-Chauviré, 1992c: 170 [Type genus: *Quercypsitta* Mourer-Chauviré, 1992c.]
Miopiconidae Mayr 1998c: 50 [Type genus: *Miopico* Mayr, 1998c.]
Pseudasturidae Mayr, 1998b: 200 [Type genus: *Pseudastur* Mayr, 1998b.]
Primoscinidae Harrison & Walker: Mlíkovský 2000d: 81 [Spelling emended.]

Distribution: Early Eocene (MP 7) of Denmark (based on an unnamed form from Fur, figured by Hoch 1975, fig. 6 – see Houde & Olson 1992: 157), early Eocene (MP 8-13) of England (see also Dyke 2001a) and Germany, late Eocene (MP 16-19) of France, early Miocene (MN 3-4) of Germany and Czechia, and middle Miocene (MN 8) of France. Extralimital record includes a number of genera and species from the early to middle Eocene of Wyoming (Houde & Olson 1989, 1992), and *Miopico benimellalensis* Mayr, 1998c from the middle Miocene (MN 6) of Beni Mellal in Morocco (Brunet 1971 sub *Jynx* cf. *torquilla*, Mayr 1998c).

Remarks: I include in this family all ancestral Eocene piciforms, plus their direct Miocene offshoots (*Zygodactylus* Ballmann 1969b, and *Miopico* Mayr, 1998c). Hence, I synonymize here Primoscenidae Harrison & Walker, Sandcoleidae Houde & olson, Quercypsittidae Mourer-Chauviré, Miopiconidae Mayr, and Pseudasturidae Mayr with the Zygodactylidae Brodkorb. Subsequent research may show, that some of these forms should be assigned to the derived families as representatives of respective ancestral radiations. A comprehensive review of the Zygodactylidae will probably result in a reduction of the number of recognized genera.

Genus *Primoscens* Harrison & Walker

Primoscens Harrison & Walker, 1977a: 47 [Type by original designation: *Primoscens minutus* Harrison & Walker, 1977a.]

Primoscens minutus Harrison & Walker

Primoscens minutus Harrison & Walker, 1977a: 48 [Holotype from Bognor Regis: right carpometacarpus; BMNH A-4681. Figured by Harrison & Walker 1977a, pl. 11, fig. e-j.]

Distribution: Early Eocene (MP 8-9) of Bognor Regis, England (Harrison & Walker 1977a, Olson & Feduccia 1979, Mayr 1998c).

Genus *Primozydactylus* Mayr

Primozydactylus Mayr, 1998c: 39 [Type by original designation: *Primozygodactylus danielsi* Mayr, 1998b.]

Distribution: Early Eocene (MP 8-8/9) of England, and middle Eocene (MN 11) of Germany.

Primozygodactylus danielsi Mayr

Primozygodactylus danielsi Mayr, 1998c: 47 [Holotype from Messel: partial skeleton in plate and counter-plate; SMF ME-2522a,b. Figured by Mayr 1998c, pl. 12, 14 (left).]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1998c).

***Primozygodactylus major* Mayr**

Primozygodactylus major Mayr, 1998c: 50 [Holotype from Messel: skeleton in plate and counter-plate; SMF ME-1758a,b. Figured by Mayr 1998c, pl. 16 (below).]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1998c).

***Primozygodactylus ballmanni* Mayr**

?*Primozygodactylus ballmanni* Mayr, 1998c: 50 [Holotype from Messel: incomplete skeleton in plate and counter-plate; SMF ME-2108a,b. Figured by Mayr 1998c, pl. 15 (left).]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1998c).

***Primozygodactylus* sp.**

Distribution: Early Eocene (MP 8) of Walton-on-the-Naze, England (Mayr 1998c: 51); and early Eocene (MP 8-9) of Bognor Regis, England (Mayr 1998c: 52).

Genus *Psittacopes* Mayr & Daniels

Psittacopes Mayr & Daniels, 1998: 158 [Type by original designation: *Psittacopes lepidus* Mayr & Daniels, 1998.]

***Psittacopes lepidus* Mayr & Daniels**

Psittacopes lepidus Mayr & Daniels, 1998: 159 [Holotype from Messel: skeleton lacking right leg; SMF ME-1279. Figured by Mayr & Daniels 1998, pl. 1a-b; and Mayr 2000g, fig. 6.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr & Daniels 1998).

Genus *Pseudastur* Mayr

Pseudastur Mayr, 1998b: 201 [Type by original designation: *Pseudastur macrocephalus* Mayr, 1998b.]

***Pseudastur macrocephalus* Mayr**

Pseudastur macrocephalus Mayr, 1998b: 202 [Holotype from Messel: complete skeleton in slab; WDC C-MG-94. Figured by Mayr 1998b, fig. 1.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Hoch 1988 sub unidentified bird, Mayr 1998b).

Genus *Selmes* Peters

Selmes "Peters" Mayr, 1998c: 64 [Nomen nudum; no definition.]

Selmes "Peters" Mayr & Peters, 1998: 189 [Nomen nudum; no definition.]

Selmes Peters, 1999: 217 [Type by original designation: *Selmes absurdipes* Peters, 1999.]

***Selmes absurdipes* Peters**

Selmes absurdipes "Peters" Mayr, 1998c: 64 [Nomen nudum; no description or indication.]

Selmes absurdipes "Peters" Mayr & Peters, 1998: 189 [Nomen nudum; no description or indication.]

Selmes absurdipes Peters, 1999: 218 [Holotype from Messel: Incomplete skeleton in a slab; SMF ME-2375. Figured by Peters 1999, fig. 1-2; Mayr 2001e, fig. 1.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Peters 1999, Mayr 2001e); and middle Eocene (MP 13) of Geiseltal XXXVI, Germany (Fischer 1987 sub *Eoglaucidium pallas*, Mayr 2001e).

Genus *Masillacolius* Mayr & Peters

Masillacolius Mayr & Peters, 1998: 184 [Type by original designation: *Masillacolius brevidactylus* Mayr & Peters, 1988.]

Masillacolius brevidactylus Mayr & Peters

Masillacolius brevidactylus Mayr & Peters, 1998: 185 [Holotype from Messel: skeleton lacking skull and right wing; SMF ME-10472. Figured by Mayr & Peters 1998, pl. 4, fig. 8; and Mayr 2000g, fig. 4.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr & Peters 1998).

Genus *Messelastur* Peters

Messelastur Peters, 1994: 4 [Type by original designation: *Messelastur gratulator* Peters, 1994.]

Messelastur gratulator Peters

Messelastur gratulator Peters, 1994: 4 [Holotype from Messel: skull and 15 associated cervical vertebrae; SMF ME-2024. Figured by Peters 1994, fig. 1-3 + erratum, fig. 1.]

Distribution: Middle Eocene (MN 11) of Messel, Germany (Peters 1994, Mayr 1998b).

Remarks: Here transferred from the Accipitridae.

Genus *Serudaptus* Mayr

Serudaptus Mayr, 2000h: 208 [Type by original designation: *Serudaptus pohli* Mayr, 2000h.]

Serudaptus pohli Mayr

Serudaptus pohli Mayr, 2000h: 208 [Holotype from Messel: skeleton in slab; WDC C-MG-201a,b. Figured by Mayr 2000h, fig. 1-2.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 2000h).

Remarks: Described in the Pseudasturidae Mayr (Mayr 2000h).

Genus *Eoglaucidium* Fischer

Eoglaucidium Fischer, 1987: 138 [Type by original designation: *Eoglaucidium pallas* Fischer, 1987.]

Eoglaucidium pallas Fischer

Eoglaucidium pallas Fischer, 1987: 138 [Holotype from Geiseltal XX: right humerus; GM XXII/761. Figured by Fischer 1987, fig. 1, 4.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr & Peters 1998) and Geiseltal IL, Germany (Mlíkovský, orig.); and middle Eocene (MP 13) of Geiseltal XX, XXII, XXXV, XXXVII, and XLI, Germany (Fischer 1987, Mlíkovský, orig.). General reference: Mayr & Peters (1998).

Genus *Primocolius* Mourer-Chauviré

Primocolius Mourer-Chauviré, 1988a: 37 [Type by original designation: *Primocolius sigei* Mourer-Chauviré, 1988.]

Primocolius sigei Mourer-Chauviré

Primocolius sigei Mourer-Chauviré, 1988a: 39 [Holotype from Quercy: left humerus; MNHN QU-17092. Figured by Mourer-Chauviré 1988a, pl. 1, fig. 7-8.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1988a); and late Eocene (MP 16) of Bretou, France (Mourer-Chauviré 1988a).

Primocolius minor Mourer-Chauviré

Primocolius minor Mourer-Chauviré, 1988a: 39 [Holotype from Quercy: right tarsometatarsus; MNHN QU-15860. Figured by Mourer-Chauviré 1988a, pl. 2, fig. 9, and text-fig. 2c.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1988a); late Eocene (MP 17) of Perrière, France (Mourer-Chauviré 1988a); and late Eocene (MP 19) of Escamps A, France (Mourer-Chauviré 1988a).

Primocolius sp.

Distribution: Late Eocene (MP 19) of Montmartre, France (Mayr 1998c: 205, 2000: 91; tentatively referred).

Genus *Quercypsitta* Mourer-Chauviré

Quercypsitta Mourer-Chauviré, 1992: 170 [Type by original designation: *Quercypsitta sudrei* Mourer-Chauviré, 1992.]

Distribution: Late Eocene (MP 17) of France.

Quercypsitta sudrei Mourer-Chauviré

Quercypsitta sudrei Mourer-Chauviré, 1992: 172 [Holotype from Bouffie: left tarsometatarsus; USTL BFI-1903. Figured by Mourer-Chauviré 1992, pl. 1, fig. 1.]

Distribution: Late Eocene (MP 17) of Bouffie, France (Mourer-Chauviré 1992).

Quercypsitta ivani Mourer-Chauviré

Quercypsitta ivani Mourer-Chauviré, 1992: 174 [Holotype from Bouffie: left coracoid; USTL BFI-1927. Figured by Mourer-Chauviré 1992, pl. 2, fig. 1-2.]

Distribution: Late Eocene (MP 17) of Bouffie, France (Mourer-Chauviré 1992).

Genus *Zygodactylus* Ballmann

Zygodactylus Ballmann, 1969a: 196 [Nomen nudum; no definition – see below.]

Zygodactylus Ballmann, 1969b: 52 [Type by monotypy: *Zygodactylus ignotus* Ballmann, 1969b.]

Distribution: Early Miocene (MN 3-4) of Germany and Czechia, and middle Miocene (MN 8) of France.

Remarks: Ballmann's 1969a paper appeared in June, while his 1969b paper was published only on 1 September. In the earlier paper, Ballmann (1969a) cited *Zygodactylus* as originating from Ballmann (1966), which is an unpublished thesis, stating that its type species is *Zygodactylus ignotus*, which was nomen nudum at that point. Hence, *Zygodactylus* Ballmann, 1969a is nomen nudum, and the name must be attributed to Ballmann, 1969b.

Zygodactylus ignotus Ballmann

Zygodactylus ignotus Ballmann, 1969a: 196, 197 [Nomen nudum; no description or indication.]

Zygodactylus ignotus Ballmann, 1969b: 52 [Holotype from Wintershof-West: distal end of right tarsometatarsus; BSP Wi-We-1937-II-18164. Figured by Ballmann 1969b, pl. 2, fig. 13a-b.]

Distribution: Early Miocene (MN 3a) of Wintershof-West, Germany (Ballmann 1969b); and early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský orig.; record uncertain).

Zygodactylus grivensis Ballmann

Zygodactylus grivensis Ballmann, 1969a: 197 [Holotype from Grive-Saint-Alban – fissure L-7: distal end of right tarsometatarsus; FLS, coll. Mein 151. Figured by Ballmann 1969a, pl. 14, fig. 7-9. Note, that the generic name was nomen nudum at this point.]

Distribution: Middle Miocene (MN 8) of Grive-Saint-Alban – fissure L-7, France (Ballmann 1969a).

Family Coliidae Swainson

Coliidae Swainson, 1837 [Modern family.]

Genus *Oligocolius* Mayr

Oligocolius Mayr, 2000a: 86 [Type by original designation: *Oligocolius brevitarsus* Mayr, 2000.]

Oligocolius brevitarsus Mayr

Oligocolius brevitarsus Mayr, 2000a: 87 [Holotype from Frauenweiler: incomplete skeleton in slab; SMNS 80529/2. Figured by Mayr 2000a, fig. 1-2, 3c, 4a, and 4f.]

Distribution: Middle Oligocene (MP 23-24) of Frauenweiler, Germany (Mayr 2000a).

Genus *Urocolius* Bonaparte

Urocolius Bonaparte, 1854 [Modern genus.]

Limnatornis Milne-Edwards, 1871: 392 [Type by monotypy: *Limnatornis paludicola* Milne-Edwards, 1871.]

Palaeopicus Lambrecht, 1933: 629 [Nomen nudum; type not fixed after 1930.]

Palaeopicus Brodkorb, 1952: 175 [Type by original designation: *Picus archiaci* Milne-Edwards, 1871.]

Urocolius archiaci (Milne-Edwards)

Limnatornis paludicola Milne-Edwards, 1871: 392 [Holotype from Saint-Gérand-le-Puy: right humerus; MNHN Av-2858. Figured by Milne-Edwards 1869-1871, pl. 176, fig. 14-18 (not pl. 176, fig. 8-13 as stated by Milne-Edwards 1871: 392). Brodkorb (1971b: 244) erroneously stated that the species was based on three syntypical humeri, NMNH Av-2858, 2859, and 2860.]

Picus archiaci Milne-Edwards, 1871: 396 [Holotype from Saint-Gérand-le-Puy: right tibiotarsus (not left as stated by Brodkorb 1971b: 244), MNHN Av-2852. Figured by Milne-Edwards 1871, pl. 178, fig. 1-5.]

Picus consobrinus Milne-Edwards, 1871: 397 [Holotype from Saint-Gérand-le-Puy: left tibiotarsus; MNHN Av-2854. Figured by Milne-Edwards 1869-1871, pl. 176, fig. 1-7.]

Palaeopicus consobrinus (Milne-Edwards): Lambrecht 1933: 629 [New combination, but the generic name was nomen nudum at this point.]

Colius archiaci (Milne-Edwards): Ballmann 1969a: 195 [New combination.]

Colius paludicola (Milne-Edwards): Ballmann 1969a: 195 [New combination.]

Urocolius archiaci (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Ballmann 1969a, Mlíkovský orig.).

Remarks: *Picus consobrinus* Milne-Edwards was synonymized with *Limnatornis paludicola* Milne-Edwards by Brodkorb (1971b: 244). The holotypical tibiotarsus of *Picus consobrinus* Milne-Edwards is similar in size and morphology with the same element of *Picus archiaci* Milne-Edwards (Mlíkovský orig.). There is no evidence, that more than one coliid species was found in Saint-Gérand-le-Puy. The configuration of humeral head of *Limnatornis paludicola* Milne-Edwards agrees with that of *Urocolius* Bonaparte, and differs from that of *Colius* Brisson (see also Rich & Haarhoff 1985), so that I synonymize here the genus *Limnatornis* Milne-Edwards, 1871 with *Urocolius* Bonaparte, 1854.

Urocolius sp.

Distribution: Late Miocene (MN 10) of Kohfidisch, Austria (Mlíkovský orig.).

Genus *Colius* Brisson

Colius Brisson, 1760 [Modern genus.]

Necrornis Milne-Edwards, 1871: 388 [Type by monotypy: *Necrornis palustris* Milne-Edwards, 1871.]

Colius palustris (Milne-Edwards)

Necrornis palustris Milne-Edwards, 1871: 388 [Holotype from Sansan: distal end of right tarsometatarsus; MNHN Sa-1243. Figured by Milne-Edwards 1869-1871, pl. 178, fig. 6-10; and Cheneval 2000, fig. 24. Cheneval (2000: 369) incorrectly stated, that the holotype of this species is a lectotype, adding two irrelevant bones as "paralectotypes".]

Colius palustris (Milne-Edwards): Ballmann 1969a: 195 [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869-1871, Ballmann 1969a, Rich & Haarhoff 1985, Cheneval 2000); and middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Ballmann 1969a).

Family Psittacidae Illiger

Psittacidae Illiger, 1811 [Modern family.]

Genus *Archaeopsittacus* Lambrecht

Archaeopsittacus Lambrecht, 1933: 609 [Type by monotypy: *Psittacus verreauxi* Milne-Edwards, 1871]

Remarks: This genus belongs to the modern tribe Psittaculini sensu Smith (1975), within which its taxonomic identity has not been evaluated yet (Mlíkovský 1998e). During a preliminary study I found the holotypical tarsometatarsus of *Psittacus verreauxii* Milne-Edwards very similar to the same element of SE Asian parrots of the genera *Alisterus* Mathews, 1911 and *Aprosmictus* Gould, 1843. Both these genera are closely allied, and a further study may well show, that both *Alisterus* Mathews and *Archaeopsittacus* Lambrecht will fall to the synonymy of *Aprosmictus* Gould.

Archaeopsittacus verreauxi (Milne-Edwards)

Psittacus Verreauxii Milne-Edwards, 1870: 558 [Nomen nudum; no description or indication – see Mlíkovský 1998e: 336-337.]

Psittacus Verreauxi Milne-Edwards, 1871: 525 [Holotype from Saint-Gérand-le-Puy: left tarsometatarsus; MNHN Av-2843. Figured by Milne-Edwards 1869-1871, pl. 200, fig. 1-6.]

Archaeopsittacus verreauxi (Milne-Edwards): Lambrecht 1933: 609 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1871, Mlíkovský 1998e).

Genus *Xenopsitta* Mlíkovský

Xenopsitta Mlíkovský, 1998e: 335 [Type by original designation: *Xenopsitta fejfari* Mlíkovský, 1998e.]

Xenopsitta fejfari Mlíkovský

Xenopsitta fejfari Mlíkovský, 1998e: 336 [Holotype from Merkur: distal part of left humerus; coll. Fejfar, uncatalogued. Figured by Mlíkovský 1998, fig. 1a-c.]

Distribution: Early Miocene (MN 3) of Merkur, Czechia (Mlíkovský 1998e).

Remarks: *Xenopsitta fejfari* Mlíkovský belongs to the Psittacini sensu Smith 1975 (Mlíkovský 1998e).

Genus incertae sedis

Psittacus lartetianus Milne-Edwards

Psittacus Lartetianus Milne-Edwards, 1872: 6. [Lectotype from Sansan (here selected): right tarsometatarsus lacking distal end; MNHN Sa-1668. Figured by Cheneval 2000, fig. 22. Paralectotypes from Sansan (in MNHN): left humerus (Sa-1216), two right humeri (Sa-1274, Sa-1492), distal end of left humerus (Sa-1490), left ulna (Sa-1464), distal ends of two left ulnae (Sa-1312, Sa-1314), distal end of left tibiotarsus (Sa-1606), proximal end of left tarsometatarsus (Sa-1669). Figured by Cheneval 2000, fig. 21 (tibiotarsus). Milne-Edwards (1972) did not state upon which material he created this species, but the catalogue numbers indicate, that it is the bones listed above.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1972, Cracraft 1973, Mlíkovský 998e).

Remarks: Cheneval (2000: 363) believed, that *Psittacus lartetianus* Milne-Edwards is nomen nudum, but Milne-Edwards (1872: 6) presented a very brief and superficial description of the taxon, which is valid. See also under *Palaeoaramides beaumonti* Milne-Edwards.

Family Ramphastidae Vigors

Ramphastidae Vigors, 1825 [Modern family.]

Capitonidae Bonaparte, 1838 [Modern family.]

Capitonididae Prum, 1988: 340 [Type genus: *Capitonides* Ballmann, 1969b.]

Remarks: The family Capitonidae Bonaparte was included in the Ramphastidae Vigors by Prum (1988), and the family Capitonididae Prum was synonymized with the Ramphastidae Vigors by Olson (1991: 224).

Genus *Trachyphonus* Ranzani

Trachyphonus Ranzani, 1821 [Modern genus.]

Capitonides Ballmann, 1969a: 196 [Nomen nudum; no definition.]

Capitonides Ballmann, 1969b: 43 [Type by monotypy: *Capitonides europeus* Ballmann, 1969b.]

Remarks: Ballmann (1983) showed, that *Capitonides* Ballmann is similar to *Trachyphonus* Ranzani (see also Olson 1991). Hence, I synonymize here the former with the latter genus.

Trachyphonus europeus (Ballmann)

Capitonides europeus Ballmann, 1969a: 196 [Nomen nudum; no description or indication.]

Capitonides europeus Ballmann, 1969b: 44 [Holotype from Wintershof-West: right carpometacarpus; BSP Wi-We-1937-II-18162. Figured by Ballmann 1969b, pl. 2, fig. 1a-b.]

Trachyphonus europeus (Ballmann): Mlíkovský, this paper [New combination.]

Distribution: Early Miocene (MN 3) of Wintershof-West, Germany (Ballmann 1969b, Olson 1991).

Trachyphonus protractus (Ballmann)

Capitonides protractus Ballmann, 1983: 46 [Holotype from Steinberg: right tarsometatarsus;

BSP 1970-XVIII. Figured by Ballmann 1983, fig. 2: 5-7, 3: a-d.]
Trachyphonus protractus (Ballmann): Olson 1991: 224 [New combination.]
Distribution: Middle Miocene (MN 6) of Steinberg, Germany (Ballmann 1983, Olson 1991).

Trachyphonus sp.

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Ballmann 1969a sub cf. *Capitonides* sp.).

Genus *Pogoniulus* Lafresnaye

Pogoniulus Lafresnaye, 1844 [Modern genus.]

Pogoniulus sp.

Distribution: Late Miocene (MN 10) of Kohfidisch, Austria (Mlíkovský orig.).

Family Picidae Vigors

Picidae Vigors, 1825: 452 [Modern family.]

Genus *Jynx* Linnaeus

Jynx Linnaeus, 1758 [Modern genus.]

Jynx torquilla Linnaeus – Eurasian Wryneck

Jynx Torquilla Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1980a sub *J.* cf. *torquilla*).

Genus *Picus* Linnaeus

Picus Linnaeus, 1758 [Modern genus.]

Picus peregrinabundus Umans'ka

Picus peregrinabundus Umans'ka, 1981: 20 [Holotype from Novoelisavetovka: distal end of left tarsometatarsus; IZAN 43-602. Figured by Umans'ka 1981, fig. 3a,b,v,g.]
Distribution: Late Miocene (MN 11-12) of Novoelisavetovka, Ukraine (Umans'ka 1981).
Remarks: The generic position of this species should be rechecked.

Picus canus Gmelin – Grey-headed Woodpecker

Picus canus Gmelin, 1788 [Modern species.]
Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *P.* cf. *canus*), and Stránská skála – Musil's talus cone, layer 13, Czechia (Mlíkovský 1995b).

Picus viridis Linnaeus – European Green Woodpecker

Picus viridis Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1b) of Somssichhegy 2, Hungary (Jánossy 1980a sub. *P.* aff. *viridis*). The record from the late Oligocene (MP 30) of Aix-en-Provence, France (Bayan 1873, based on a feather imprint) is doubtful because of its age (Mlíkovský, orig.).

Genus *Picoides* Lacépède

Picoides Lacépède, 1799 [Modern genus.]
Dendrocopos Koch, 1816 [Modern genus.]

Picoides major (Linnaeus) – Great Spotted Woodpecker

Picus major Linnaeus, 1758 [Modern species]

Dendrocopos major submajor Jánossy, 1974b: 234 [Lectotype from Hundsheim (here selected); UWPI 1899/66 (partim). Not figured. Paralectotypes: distal end of left tarsometatarsus from Hundsheim (UWPI 1899/66 – partim), and a tarsometatarsus from Tarkő (NMB ?). Not figured.]

Dendrocopos submajor Jánossy: Jánossy 1980a: 24 [New rank.]

Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917); early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 5a, 9a, and 9b, Czechia (Jánossy 1972 sub *Dendrocopos* cf. *major*), and Stránská skála – Musil's talus cone, layers 13 and 15e, Czechia (Mlíkovský 1995b); and middle Pleistocene (MQ 2A) of Hundsheim, Austria (Jánossy 1974b sub *D. major submajor*), and Tarkő – layers 4 and 11, Hungary (Jánossy 1974b and 1976c sub *D. major submajor*, Jánossy 1980a sub *D. submajor*).

Remarks: I restudied the syntypes of *Dendrocopos submajor* Jánossy from Hundsheim (incl. the lectotype), finding no differences between these bones and the same elements of *Picoides major* (Linnaeus). Hence, I synonymize here the former with the latter species.

Picoides medius (Linnaeus) – Middle Spotted Woodpecker

Picus medius Linnaeus, 1758 [Modern species.]

Dendrocopos praemedius Jánossy, 1974b: 237 [Holotype from Villány 3: right carpometacarpus; GIB uncatalogued. Not figured.]

Distribution: Late Pliocene (MN 17) of Obitočnoe, Ukraine (Vojinstvens'kyj 1967 sub *Dendrocopos* cf. *medius*); late Pliocene (MN 18) of Villány 3, Hungary (Jánossy 1974b sub *Dendrocopos praemedius*); and early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1980a sub *Dendrocopos* cf. *medius*), Primorsk, Ukraine (Vojinstvens'kyj 1967 sub *Dendrocopos* cf. *medius*), and Tarchankut, Ukraine (Vojinstvens'kyj 1967 sub *Dendrocopos* aff. *medius*); and middle Pleistocene (MQ 2A) of Tarkő – layers 4 and 11, Hungary (Jánossy 1974b sub *Dendrocopos praemedius*; reidentified by Mlíkovský orig.).

Remarks: Jánossy (1974b) did not present convincing evidence that *Dendrocopos praemedius* Jánossy, 1974b is different from the modern *Picoides medius* (Linnaeus). Hence, I synonymize here the former with the latter species.

Order Galliformes Temminck

Gallinae Temminck, 1820 [Modern order.]

Family Megapodiidae Swainson

Megapodiidae Swainson, 1837 [Modern family.]

Quercymegapodiidae Mourer-Chauviré, 1992b: 77 [Type genus: *Quercymegapodius* Mourer-Chauviré, 1992.]

Quercymegapodiinae Mourer-Chauviré: Mlíkovský, this paper [New rank.]

Remarks: The Quercymegapodiinae are known also from the late Oligocene or early Miocene (Tremembé Formation) of Brazil, incl. *Ameripodius* Alvarenga, 1995 and *Taubacrex* Alvarenga, 1988 (Mourer-Chauviré (1999b, 2000).

Genus *Quercymegapodius* Mourer-Chauviré

Quercymegapodius Mourer-Chauviré, 1992b: 77 [Type by original designation: *Palaeocryptonyx depereti* Gaillard, 1908.]

Quercymegapodius depereti (Gaillard)

Palaeocryptonyx Depereti Gaillard, 1908: 96 [Holotype from Quercy: left humerus; BSP 127, apparently destroyed in the World War II – Mlíkovský, orig. Cast in FSL PQ-1065. Figured by Gaillard 1908, text-fig. 26, pl. 5, fig. 9-12]

Pirortyx depereti (Gaillard): Brodkorb 1964: 300 [New combination.]

Quercymegapodius depereti (Gaillard): Mourer-Chauviré 1992b: 81 [New combination.]

Quercymegapodius brodkorbi Mourer-Chauviré, 1992b: 82 [Holotype from Rosières 1: left carpometacarpus; USTL ROS-1-202. Figured by Mourer-Chauviré 1992b, fig. 1n-p.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1908, Mourer-Chauviré 1992b); late Eocene (MP 16) of Lavergne, France (Mourer-Chauviré 1992b); late Eocene (MP 17) of Bouffie, France (Mourer-Chauviré 1992b); late Eocene (MP 18) of Sainte-Néboule, France (Mourer-Chauviré 1992b); and late Eocene (MP 19) of Escamps, France (Mourer-Chauviré 1992b), Rosières 1, and Rosières 2, France (Mourer-Chauviré 1992b).

Remarks: The holotypical carpometacarpus of *Quercymegapodius brodkorbi* was said to be morphologically identical, but slightly smaller that the same element of *Quercymegapodius depereti* (Mourer-Chauviré 1992b: 82-83). The available measurements (Tab. 2 in Mourer-Chauviré 1992b) show that the difference can be attributed to intraspecific variability. Accordingly, I synonymize here *Quercymegapodius brodkorbi* Mourer-Chauviré, 1992 with *Quercymegapodius depereti* (Gaillard, 1908).

Genus *Ameripodius* Alvarenga

Ameripodius Alvarenga, 1995. [Type by original designation: *Ameripodius silvasantosi* Alvarenga, 1995.]

Distribution: The extralimital record includes *Ameripodius silvasantosi* Alvarenga, 1995 from the late Oligocene or early Miocene (Tremembé Formation) of Taubaté, Brazil (Alvarenga 1995, Mourer-Chauviré 1999b, 2000).

Ameripodius alexis Mourer-Chauviré

Ameripodius alexis Mourer-Chauviré, 2000: 482 [Holotype from Saint-Gérand-le-Puy: left humerus, MNHN SG-9333. Figured by Mourer-Chauviré 2000, pl. 1, fig. 1-3.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Mourer-Chauviré 2000).

Family Cracidae Vigors

Cracidae Vigors, 1825 [Modern family.]
Gallinuloididae Lucas, 1900: 84 [Type genus: *Gallinuloides* Eastman, 1900.]
Gallinuloidinae Lucas: Tordoff & Macdonald 1957: 182 [New rank.]

Genus *Taoperdix* Milne-Edwards

Taoperdix Milne-Edwards, 1869: 225 [Type by monotypy: *Tetrao pessieti* Gervais, 1862.]

Distribution: Late Eocene (MP 16) of France (tentative record), middle Oligocene (MP 25) of France, and early Miocene (MN 3-4) of Germany and Czechia.

Taoperdix pessieti (Gervais)

Tetrao? *Pessieti* Gervais, 1862: 896 [Holotype from Armissan: incomplete skeleton in slab; MNHN 1903-16. Figured by Gervais 1859, pl. 39 (excepting figs. 7*bis*, and 12*bis*), Milne-Edwards, 1869-1871, pl. 127, and Eastman 1905, pl. 15-16. Note that the catalogue number in MNHN is the same as for *Sula arvernensis* Milne-Edwards.]

Taoperdix Pessieti (Gervais): Milne-Edwards, 1869: 225 [New combination.]

Distribution: Middle Oligocene (MP 25) of Armissan, France (Gervais 1862, Milne-Edwards 1867-1868, 1869-1871, Eastman 1905).

Taoperdix miocaena Ballmann

Taoperdix miocaena Ballmann, 1969b: 29 [Holotype from Wintershof-West: proximal end of left carpometacarpus; BSP 1937-II-18111. Figured by Ballmann 1969b, pl. 2, fig. 14a-b.]

Distribution: Early Miocene (MN 3) of Wintershof-West, Germany (Ballmann 1969b); and early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský orig.).

Taoperdix sp.

Distribution: Late Eocene (MP 16) of Bretou, France (Mourer-Chauviré 1988a, 1992b, tentatively).

Family Phasianidae Vigors

Phasianidae Vigors, 1825 [Modern family.]

Paraortygidae C. Mourer-Chauviré in Fischer, 1990: 133 [Nomen nudum; no definition. Mlíkovský (2000d: 80) erroneously considered this name valid, overlooking Art. 13.6.1. of the ICZN 1999, which invalidated Art. 12.2.4. for names published after 1930.]

Paraortygidae Mourer-Chauviré, 1992b: 70 [Type genus: *Paraortyx* Gaillard, 1908.]

Genus *Paraortyx* Gaillard

Paraortyx Gaillard, 1908: 105 [Type by subsequent designation (Richmond 1917: 612): *Paraortyx lorteti* Gaillard, 1908.]

Paraortyx lorteti Gaillard

Palaeortyx cayluxensis Milne-Edwards, 1892 [Holotype from Quercy: proximal end of right humerus; MNHN 15581. Figured by Gaillard 1908, pl. 6, fig. 1-4. This is a junior primary homonym of *Palaeortyx cayluxensis* Lydekker, 1891a.]

Paraortyx Lorteti Gaillard, 1908: 105 [Holotype from Quercy: left humerus; BSP 65, apparently destroyed during World War II – Mlíkovský, orig. Cast in MGHN PQ-1083. Figured by Gaillard 1908, text-fig. 30, pl. 6, fig. 5-8.]

Palaeortyx gaillardi Lambrecht, 1933: 451 [New name for *Palaeortyx cayluxensis* Milne-

Edwards, 1892.]

Ludiortyx gaillardi (Lambrecht): Brodkorb 1964: 299 [New combination.]

Paraortyx cayluxensis (Milne-Edwards): Cracraft 1973: 19 [New combination.]

Paraortyx gaillardi (Lambrecht): Cracraft 1973: 19 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908, Mourer-Chauviré 1992b); late Eocene (MP 17) of Bouffie, France (Mourer-Chauviré 1992b) and Perrière, France (Mourer-Chauviré 1992b); late Eocene (MP 19) of Escamps, France (Mourer-Chauviré 1992b), Rosières 1, and Rosières 2, France (Mourer-Chauviré 1992b); early Oligocene (MP 21) of Ravet-Lupovici, France (Mourer-Chauviré 1992b); early Oligocene (MP 22) of Mas de Got B, France (Mourer-Chauviré 1992b); and middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1992b), and Roqueprune 2, France (Mourer-Chauviré 1992b).

Remarks: *Palaeortyx cayluxensis* Milne-Edwards was synonymized with *Paraortyx lorteti* Gaillard by Mourer-Chauviré (1992b).

Paraortyx brancoi Gaillard

Paraortyx Brancoi Gaillard, 1908: 107 [Lectotype from Quercy (selected by Mourer-Chauviré 1992: 76): left humerus; NKMB, uncatalogued. Cast in MGNH PQ-1078. Figured by Gaillard 1908, text-fig. 31, pl. 6, fig. 9-12. Paralectotype from Quercy: left tarsometatarsus with damaged distal end; BSP 119, apparently destroyed during the World War II – Mlíkovský, orig. Cast in ML PQ-1078. Figured by Gaillard 1908, pl. 6, fig. 13-16. Gaillard (1908) based this species on two syntypes, one of which was erroneously called by Mourer-Chauviré (1992b: 76) holotype. Nevertheless, her action can be interpreted as a selection of the lectotype.]

Distribution: Eocene or Oligocne (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908, Mourer-Chauviré 1992b); late Eocene (MP 18) of Sainte-Néboule, France (Mourer-Chauviré 1992b); and late Eocene (MP 19) of Escamps, France (Mourer-Chauviré 1992b), and Rosières 2, France (Mourer-Chauviré 1992b).

Genus *Pirortyx* Brodkorb

Pirortyx Brodkorb, 1964: 300 [Type by original designation: *Palaeortyx major* Gaillard, 1939.]

Pirortyx major (Gaillard)

Palaeortyx major Gaillard, 1939: 22 [Holotype from Quercy: right humerus; MNHN QU-16297. Figured by Gaillard 1939, fig. 10, Mourer-Chauviré 1992b, fig. 5e-f.]

Pirortyx major (Gaillard): Brodkorb 1964: 300 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1939, Mourer-Chauviré 1992b); middle Oligocene (MP 23-24) of Espenhain, Germany (Fischer 1990); and late Oligocene (MP 28) of Fraysse (Mourer-Chauviré 1992b).

Genus *Coturnix* Bonnaterre

Coturnix Bonnaterre, 1791 [Modern genus.]

Palaeortyx Milne-Edwards, 1869: 217 [Type by original designation (Milne-Edwards 1869: 230): *Palaeortyx gallica* Milne-Edwards, 1869. Gaillard (1939: 73) and Brodkorb (1964: 298) overlooked the original designation and independently selected *Tringa*? *hoffmanni* Gervais, 1852 as the type species of *Palaeortyx* Milne-Edwards. Their action is invalid.]

Palaeoperdix Milne-Edwards, 1869: 245 [Type by original designation: *Palaeoperdix longipes* Milne-Edwards, 1869.]

Schaubortyx Brodkorb, 1964: 313 [Type by original designation: *Taoperdix keltica* Eastman, 1905.]

Remarks: The genera *Palaeortyx* Milne-Edwards, *Palaeoperdix* Milne-Edwards, and

Schaubortyx Brodkorb cannot be morphologically separated from the modern quails of the genus *Coturnix* Bonnaterre, with which they were not properly compared formerly.

Within the genus *Coturnix* Bonnaterre I recognize only two size classes and I identify them here with species. The size of both seems to have decreased from the early to the middle Miocene to a similar degree. The larger-bodied lineage (*Coturnix longipes*) became extinct in the middle Miocene, while the smaller-bodied lineage appears to have survived with the modern *Coturnix coturnix* (Linnaeus). Although I would be inclined to name all the forms from this lineage under the latter name, the record from the late Miocene is insufficient and inadequately documented, which opens the possibility, that the lineage was interrupted in that period. Until this problem is solved, I list here deliberately the Oligo-Miocene forms as *Coturnix gallica* Milne-Edwards, and the Plio-Pleistocene forms as *Coturnix coturnix* (Linnaeus).

Coturnix gallica (Milne-Edwards)

Palaeortyx gallica Milne-Edwards, 1869: 230 [Lectotype from Saint-Gérand-le-Puy (selected by Mlíkovský 2000e: 92): right humerus; MNHN Av-2875. Figured by Milne-Edwards 1869-1871, pl. 129, fig. 25-29. Paralectotypes from Saint-Gérand-le-Puy (all in MNHN): left coracoid (Av-2873), proximal end of left humerus (Av-2876), distal end of left humerus (Av-2874), 2 right ulnae (Av-2878, Av-2879), left femur (Av-2886), right femur (Av-2887), right femur (Av-2888), right tibiotarsus (Av-2890), proximal end of right tibiotarsus (Av-2893), distal ends of 3 left tibiotarsi (Av-2889, Av-2891, Av-2892), and right tarsometatarsus (Av-2894). Figured by Milne-Edwards 1869-1871, pl. 128 (reconstructed skeleton), pl. 129, fig. 1-7 (tarsometatarsus Av-2984), 1, 8-11 (tibiotarsus Av-2890), 12-17 (femur Av-2886), 18-22 (femur Av-2888), 23-24 (ulna Av-2878), 25-29 (humerus Av-2875). The syntypical series included also at least one incomplete furcula, one scapula and one radius (see Milne-Edwards 1869-1871, pl. 128). These specimens were absent from the MNHN collections during my study of the remains in June 1999. Assuming consecutive numbering of the bones, the following seven specimens are missing from the collection: Av-2877 and 2880-2885. Of the syntypes, both preserved ulnae and the proximal end of tibiotarsus Av-2893 do not originate from a phasianid (Mlíkovský 2000e).]

Palaeortyx brevipes Milne-Edwards, 1869: 235 [Lectotype from Saint-Gérand-le-Puy (selected by Mlíkovský 2000e: 92): right humerus; MNHN Av-2898. Figured by Milne-Edwards 1869-1871, pl. 130, fig. 12-13. Paralectotypes from Saint-Gérand-le-Puy (all in MNHN): left coracoid (Av-2897), right humerus (Av-2901), proximal end of right humerus (Av-2899), shaft of right humerus (Av-2900), right ulna (Av-2902), another ulna (Av-2903 – absent from the collections in June 1999 – Mlíkovský 2000e), left femur (Av-2908), two right femora (Av-2906, Av-2907), proximal end of right femur (Av-2905), right tibiotarsus (Av-2909), another tibiotarsus (Av-2910 – absent from collections in June 1999 – Mlíkovský 2000e), and right tarsometatarsus (Av-2911). Figured by Milne-Edwards 1869-1871, pl. 130, fig. 1-7 (tarsometatarsus), 7a, 8-11 (femur Av-2906), 13a-b, 14-16 (ulna Av-2902), 17-21 (coracoid), 21a-b (tibiotarsus Av-2911). Assuming consecutive numbering of the bones, specimen Av-2904 was missing from the MNHN collections in June 1999 – Mlíkovský 2000e.]

Palaeortyx ocyptera Milne-Edwards, 1892: 71 [Holotype from Quercy: left humerus; MNHN QU-15592. Figured by Mourer-Chauviré 1992b, fig. 5l-m.]

Rallus dasypus Milne-Edwards, 1892: 73 [Lectotype from Quercy (selected by Cracraft 1973: 24): right femur; MNHN QU-15568. Figured by Cracraft 1973, fig. 10d-e, Mourer-Chauviré 1992b, fig. 10o, 11b. Paralectotype: distal end of right humerus from Quercy, MNHN QU-3071, Figured by Cracraft 1973, fig. 10b-c.]

Palaeortyx grivensis Lydekker, 1893b: 521 [Holotype from Grive-Saint-Alban: right humerus; BMNH. Figured by Lydekker 1893, pl. 41, fig. 12.]

Quercyrallus dasypus (Milne-Edwards): Lambrecht 1933: 461 [New combination.]

Taoperdix keltica Eastman, 1905: 134 [Holotype from Armissan: incomplete skeleton in slab and counter-slab; CMP 2023 (slab) and MHNB TF-104 (counter-slab). Figured by Eastman 1905, pl. 13 (slab), and 14 (reconstruction of the skeleton), and Schaub 1945, pl. 23 (counter-slab).]

Palaeortyx Depereti Ennouchi, 1930: 72 [Lectotype from Grive-Saint-Alban (here selected): left humerus; ML LGr-50. Figured by Ennouchi 1930, pl. 3, fig 1-4. Paralectotype from Saint-Gérand-le-Puy: left tarsometatarsus; ML LGr-51. Figured by Ennouchi 1930, pl. 3, fig. 5-8.]

Palaeortyx Joleaudi Ennouchi, 1930: 76 [Holotype from Grive-Saint-Alban: right humerus; ML LGr-71. Figured by Ennouchi 1930, pl. 3, fig. 9-12.]

Coturnix (?) *miocenica* Villalta, 1963: 271 [Holotype from Mansuetos: proximal end of right carpometacarpus; coll. Villalta 4248. Figured by Villalta 1963, pl. 4, fig. 1, 1a-b.]

Taoperdix gallica (Milne-Edwards): Brodkorb 1964: 301 [New combination.]

Taoperdix brevipes (Milne-Edwards): Brodkorb 1964: 301 [New combination.]

Schaubortyx keltica (Eastman): Brodkorb 1964: 313 [New combination.]

Plioperdix grivensis (Lydekker): Brodkorb 1964: 317 [New combination.]

Plioperdix depereti (Ennouchi): Brodkorb 1964: 317 [New combination.]

Plioperdix joleaudi (Ennouchi): Brodkorb 1964: 317 [New combination.]

Coturnix gallica (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908 and 1939 sub *Palaeortyx* aff. *cayluxensis* Lydekker, Cracraft 1973: 24, Olson 1977: 344, Mourer-Chauviré 1992b); early Oligocene (MP 25) of Armissan, France (Eastman 1905, Schaub 1945, Brodkorb 1964: 313), and Belgarric, France (Mourer-Chauviré 1992b); late Oligocene (MP 28) of Desse, France (Mourer-Chauviré 1992b), and Fraysse, France (Mourer-Chauviré 1992b); early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Mourer-Chauviré 1992b, Mlíkovský 2000e); early Miocene (MN 3) of Wintershof-West, Germany (Ballmann 1969b), and Merkur, Czechia (Mlíkovský, orig.); early Miocene (MN 4b) of Dolnice, Czechia (Švec 1980 sub *Palaeortyx* sp., Mlíkovský orig.); middle Miocene (MN 5) of Vieux-Collonges, France (Ballmann 1972); middle Miocene (MN 6) of Petersbuch 39, Germany (Mlíkovský orig.); middle Miocene (MN 7-8) of Grive-Saint-Alban – early collections, France (Lydekker 1893, Shufeldt 1896, Ennouchi 1930); middle Miocene (MN 8) of Grive-Saint-Alban – fissures L7 and M, France (Ballmann 1969a); late Miocene (MN 9) of Rudabánya, Hungary (Jánossy 1976b and 1993 sub *Palaeortyx.* aff. *grivensis*); late Miocene (MN 11-12) of Sümeg, Hungary (Jánossy 1976b sub *P.* aff. *grivensis*); and late Miocene (MN 12) of Mansuetos, Spain (Villalta 1963), Aljezar B, Spain (Cheneval & Adrover 1993), and Tardosbánya, Hungary (Jánossy 1976b sub *Palaerotyx* aff. *grivensis*).

Remarks: *Rallus dasypus* Milne-Edwards (described in the Rallidae) and *Palaeortyx ocyptera* Milne-Edwards were synonymized with *Palaeortyx gallica* Milne-Edwards by Mourer-Chauviré (1992b: 83). *Palaeortyx brevipes* Milne-Edwards was synonymized with *Palaeortyx gallica* Milne-Edwards by Mlíkovský (2000e). *Taoperdix keltica* Eastman was separated at the genus level by Brodkorb (1964: 313), who compared it with *Palaeortyx hoffmanni* Milne-Edwards, which later turned out to be a rail (Brunet 1970). Judging from the figures and descriptions I see no difference in size or morphology of the types of *Taoperdix keltica* Eastman, *Palaeortyx grivensis* Lydekker, *Palaeortyx depereti* Ennouchi, *Palaeortyx joleaudi* Ennouchi, *Coturnix miocenica* Villalta, and the corresponding elements of *Coturnix gallica* (Milne-Edwards). Hence, I synonymize here the former five species with the latter one.

Coturnix longipes (Milne-Edwards)

Palaeoperdix longipes Milne-Edwards, 1869: 245 [Holotype from Sansan: proximal end of right tarsometatarsus; MNHN Sa-1224. Figured by Milne-Edwards 1869-1871, pl. 130, fig. 28-31; and Cheneval 2000, fig. 7.]

Palaeocryptonyx Gaillardi Ennouchi, 1930: 78 [Holotype from Grive-Saint-Alban: left (not right as stated by Ennouchi 1930: 78) humerus; ML LGr-46. Figured by Ennouchi 1930, pl. 4, fig. 1-4 (not 1-5 as stated by Ennouchi 1930 in captions to pl. 4.).

Proalector gaillardi (Ennouchi): Brodkorb 1964: 316 [New combination.]

Palaeortyx phasianoides grivensis Ballmann, 1969a: 178 [Holotype from Grive-Saint-Alban: left humerus, fissure L7; FSL coll. Mein 29. Figured by Ballmann 1969a, pl. 15, fig. 7. This is a junior primary homonym of *Palaeortyx grivensis* Lydekker, 1893b.]

Palaeortyx? *intermedia* Ballmann, 1969b: 33 [Holotype from Wintershof-West: left coracoid; BSP 1937-II-18103. Figured by Ballmann 1969b, pl. 1, fig. 1-2.]

Palaeortyx longipes (Milne-Edwards): Mlíkovský 2000e. [New combination.]

Coturnix longipes (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Late Oligocene (MP 28) of Desse, France (Mourer-Chauviré 1992b), and Fraysse, France (Mourer-Chauviré 1992b); early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Mourer-Chauviré 1992b, Mlíkovský 2000e); early Miocene (MN 3a) of Wintershof-West, Germany (Ballmann 1969b sub *Palaeortyx phasianoides*); early Miocene (MN 3) of Skyřice, Czechia (Mlíkovský 2000f); early Miocene (MN 4b) of Dolnice, Czechia (Švec 1980 sub *Palaeortyx* cf. *phasianoides*, Mlíkovský orig.); middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869-1871, Cheneval 2000); middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Lydekker 1893b sub *Palaeortyx depereti*, Ennouchi 1930, Gaillard 1939, Mlíkovský orig.); middle/late Miocene (MN 8-9) of Hostalets de Pierola, Spain (Villalta & Crusafont Pairó 1950, Villalta 1963); and tentatively late Miocene (MN 9) of Rudabánya, Hungary (Jánossy 1993 sub *Palaeortyx phasianoides-intermedia*-group).

Remarks: *Palaeortyx intermedia* Ballmann was synonymized with *Palaeortyx longipes* (Milne-Edwards) by Mlíkovský (2000e). Ballmann (1969a: 182) listed *Palaeortyx longipes* Milne-Edwards in the synonymy of *Palaeortyx phasianoides* Milne-Edwards. The lectotype of the latter species belongs to the duck *Mionetta blanchardi* (Milne-Edwards) (Mlíkovský 2000e), but I agree with Ballmann, that early Miocene *Palaeortyx* quails, often reported under the name of *Palaeortyx phasianoides* Milne-Edwards, belong to the same species as those described as *Palaeortyx longipes* Milne-Edwards. Hence, I synonymize here *Palaeortyx phasianoides grivensis* Ballmann with *Coturnix longipes* (Milne-Edwards).

Coturnix coturnix (Linnaeus) – Common Quail

Tetrao Coturnix Linnaeus, 1758 [Modern species.]

Scolopax ghardalamensis Fischer & Stephan, 1974: 516 [Holotype from Ghar Dalam – deer layer: right tarsometatarsus; NMM, uncatalogued. Figured by Fischer & Stephan 1974, fig. 1-2.]

Distribution: Early Pliocene (MN 14-15) of Gargano, Italy, incl. the sites of Biancone 1, Cantatore 3A, Chirò 3, 5A, 6, 11B, 14A, 20A, 24, 27, Fina D, Gervasio 2, Pirro 11A, Rinascita 1, and San Giovannino (Ballmann 1976a,b sub *Palaeortyx grivensis* and *Palaeortyx depereti*); late Pliocene (MN 18) of S'Onix, Mallorca, Spain (Sondaar et al. 1995 sub *C.* cf. *coturnix*);

early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001), and Beremend 17, Hungary (Jánossy 1992); early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 5a, 9a, and 9b, Czechia (Jánossy 1972), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972), Stránská skála – Musil's talus cone, layers 4a, 6, 8, 9, 10a, 11, 13, 14c, 15a, 16e, and 16 (Mlíkovský 1995b), Včeláre 4E, Slovakia (Mlíkovský orig.), and Somssichhegy 2, Hungary (Jánossy 1986 sub *C.* cf. *coturnix*); and late Pleistocene (MQ 2C) of Ghar Dalam - deer layer, Malta (Fischer & Stephan 1974 sub *Scolopax ghardalamensis*; Olson 1976b).

Remarks: *Scolopax ghardalamensis* Fischer & Stephan was synonymized with *Coturnix coturnix* (Linnaeus) by Olson (1976b: 273).

Genus *Miogallus* Lambrecht

Miophasianus Lambrecht, 1933: 439 [Nomen nudum; type species not fixed after 1930.]
Miogallus Lambrecht, 1933: 442 [Type by monotypy: *Gallus longaevus* Ammon, 1918.]
Miophasianus Brodkorb 1952: 175 [Type by original designation: *Phasianus altus* Milne-Edwards, 1869.]

Miogallus altus (Milne-Edwards)

Phasianus altus Milne-Edwards, 1869: 239 [Lectotype from Sansan (selected by Cheneval 2000: 351): proximal end of right tarsometatarsus; MNHN Sa-1221. Figured by Milne-Edwards 1869-1871, pl. 131, fig. 27-29; and Cheneval 2000, fig. 9. Paralectotypes from Sansan: distal end of left tibiotarsus (MNHN Sa-1222), and phalanx II digiti majoris (MNHN Sa-1225). Figured by Milne-Edwards 1869-1871, pl. 131, fig. 30-33 (tibiotarsus), 34-36 (phalanx); and Cheneval 2000, fig. 10 (phalanx) and 11 (tibiotarsus).]
Phasianus medius Milne-Edwards, 1869: 242 [Holotype from Sansan: distal end of left tarsometatarsus; MNHN Sa-1226. Figured by Milne-Edwards 1869-1871, pl. 131, fig. 24-26; and Cheneval 2000, fig. 8.]
Phasianus Desnoyersii Milne-Edwards, 1869: 243 [Holotype from Touraine: left carpometacarpus; MNHN 1906-17. Figured by Milne-Edwards 1869-1871, pl. 131, fig. 37-39.]
Ardea similis Fraas, 1870: 49 [Holotype from Steinheim: distal end of a tibiotarsus; SMNS, uncatalogued. Figured by Fraas 1870, pl. 4, fig. 14a-c.]
Palaeortyx maxima Lydekker, 1893: 520 [Holotype from Grive-Saint-Alban: right coracoid; BMNH. Figured by Lydekker 1893, pl. 41, fig. 11.]
Tantalus milne-edwardsii Shufeldt, 1896: 513 [Holotype from Grive-Saint-Alban: proximal end of right tibiotarsus; USNM 2168. Figured by Shufeldt 1896, fig. 1.]
Pseudotantalus Milne-Edwardsi (Shufeldt): Sharpe. [New combination; fide Lambrecht 1921: 25.]
Gallus longaevus Ammon, 1918: 41 [Holotype from Dechbetten: cranial end of left coracoid; SMF, uncatalogued. Figured by Ammon 1918, fig. 8.]
Phasianus augustus Ammon, 1918: 45 [Holotype from Dechbetten: left femur; SMF, uncatalogued. Figured by Ammon 1918, fig. 9-10.]
Botaurites similis (Fraas): Lambrecht 1933: 315 [New combination.]
Miophasianus altus (Milne-Edwards): Lambrecht 1933: 439 [New combination.]
Miophasianus medius (Milne-Edwards): Lambrecht 1933: 440 [New combination, but the genus name was nomen nudum at this point.]
Miophasianus augustus (Ammon): Lambrecht 1933: 440 [New combination, but the genus name was nomen nudum at this point.]
Miophasianus Desnoyersii (Milne-Edwards): Lambrecht 1933: 440 [New combination, but the genus name was nomen nudum at this point.]
Miogallus longaevus (Ammon): Lambrecht 1933: 442 [New combination.]
Proardea similis (Ammon): Gaillard 1939: 79 [New combination.]
Ibis milne-edwardsi (Shufeldt): Brodkorb 1963c: 292 [New combination.]
Miophasianus maximus (Lydekker): Brodkorb 1964: 315 [New combination.]
Tantalus milneedwardsii Shufeldt: Olson 1974: 110 [Spelling emended.]
Palaeoperdix medius (Milne-Edwards): Cheneval 2000: 349 [New combination.]
Miogallus altus (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Early Miocene (MN 3) of Can Mas, Spain (Villalta 1963); early/middle Miocene (MN 2-5) of Touraine, France (Milne-Edwards 1869); early Miocene (MN 4) of Córcoles, Spain (Alférez et al. 1982 sub *Miophasianus* sp.); middle Miocene (MN 5) of Vieux-Collonges, France (Ballmann 1972 sub *Miophasianus* sp.); middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869, Gaillard 1939, Cheneval 2000), and Devínská Nová Ves, Slovakia (Švec 1986, Mlíkovský orig.); middle Miocene (MN 7) of Öhningen, Germany

(Lydekker 1891a: 141), Steinheim, Germany (Fraas 1870, Bocheński 1987), and Przeworno 2, Poland (Bocheński 1987); middle Miocene (MN 7-8) of Grive-Saint-Alban – early collections, France (Depéret 1887, Lydekker 1893b, Shufeldt 1896, Regàlia 1896, Ennouchi 1930, Gaillard 1939, Olson 1974a, Bocheński 1987), and Dechbetten, Germany (Ammon 1918); middle Miocene (MN 8) of Grive-Saint-Alban – fissures L7 and M, France (Ballmann 1969a); middle/late Miocene (MN 8-9) of Hostalets de Pierola, Spain (Villalta & Crusafont Pairó 1950); and doubtfully late Miocene (MN 9) of Rudabanya, Hungary (Jánossy 1993 sub *Miophasianus* sp.). An uncertain extralimital record is from the middle Miocene (MN 5-8) of Perala, Turkey (Harrison 1985c, but see Cheneval 2000: 349).

Remarks: *Tantalus milneedwardsi* Shufeldt was synonymized with *Miogallus altus* (Milne-Edwards) by Olson (1974a: 112), *Ardea similis* Ammon by Olson (1985a: 166, tentatively), *Phasianus desnoyersi* Milne-Edwards by Švec (1986: 87), and *Phasianus augustus* Ammon by Bocheński (1987: 78, see also Švec 1986: 87). As judged from the figures and descriptions, the holotypes of *Phasianus medius* Milne-Edwards, *Palaeortyx maxima* Lydekker, and *Gallus longaevus* Ammon agree in size and morphology with the corresponding elements of *Miogallus gallus* (Milne-Edwards) (Mlíkovský orig.), and originated from localities similar in age and geographic location. In absence of the evidence to the contrary I synonymize here the former three species with the latter one.

This species seems to be common in the middle Miocene (MN 5-8) of western and central Europe, being most often found in lacustrine deposits. The alleged records from Can Mas and Córcoles are earlier, and need confirmation.

Genus *Alectoris* Kaup

Alectoris Kaup, 1829 [Modern genus.]

Tetraogallus Gray, 1832 [Modern genus.]

Ammoperdix Gould, 1851 [Modern genus.]

Palaeocryptonyx Depéret, 1892: 692 [Type by monotypy: *Palaeocryptonyx donnezani* Depéret, 1892.]

Palaeocryptonyx Depéret, 1897: 131 [Type by monotypy: *Palaeocryptonyx donnezani* Depéret, 1892; again marked as "nov. gen". This is both junior homonym and junior objective synonym of *Palaeocryptonyx* Depéret, 1892.]

Pliogallus Tugarinov, 1940b: 312 [Type by original designation: *Pliogallus coturnoides* Tugarinov, 1940b. This is a junior homonym of *Pliogallus* Gaillard, 1939.]

Plioperdix Kretzoi, 1955b: 367 [New name for *Pliogallus* Tugarinov, 1940b; hence its junior objective synonym.]

Proalector Brodkorb, 1964: 316 [Type by original designation: *Palaeortyx miocaena* Gaillard, 1939.]

Lambrechtia Jánossy, 1974a: 540 [Nomen nudum; type species not fixed after 1930 – see Mlíkovský 1992b: 458.]

Chauvireria Boev, 1997a: 141, 144 [Nomen nudum; not published in combination with an available species-group name after 1930.]

Chauvireria Boev, 1997b: 71 [Type by original designation: *Chauvireria balcanica* Boev, 1997b.]

Remarks: Pliocene and early Pleistocene deposits of Europe are rich in remains of a small phasianid, different from *Perdix* Brisson, which was assigned in SW Europe to the genus *Palaeocryptonyx* Depéret, in Central Europe to *Francolinus* Stephen, in eastern Europe to *Alectoris* Kaup, *Ammoperdix* Gould, and *Pliogallus* Tugarinov (= *Plioperdix* Kretzoi), and in Bulgaria to *Chauvireria* Boev. All these genus-group names (see below for the species-group names) seem to apply to a single taxon, for which the name *Palaeocryptonyx* Depéret is applicable. During a recent osteological revision of the modern Phasianidae I found that three of the extant genera, incl. *Alectoris* Kaup, *Ammoperdix* Gould, and *Tetraogallus* Gray, form a group of closely related taxa, and that this group is well defined osteologically (Mlíkovský orig.). Taking into account external morphology, habits and distribution of these birds, I believe that all these genera should be united under the name *Alectoris* Kaup, which takes precedence. Understanding *Alectoris* Kaup in this broader sense, there is no reason to separate *Palaeocryptonyx* Depéret at the genus level as well. Accordingly, I synonymize here *Palaeocryptonyx* Depéret, *Pliogallus* Tugarinov, *Plioperdix* Kretzoi, and *Chauvireria* Boev with *Alectoris* Kaup.

Within the genus, the Plio-Pleistocene remains of these partridges from central and eastern Europe seemed to fall into three size classed, which I recognized as species (Mlíkovský 1995b, see also Kuročkin 1985, and Bocheński & Kuročkin 1987a for taxonomic comments). However, my subsequent research convinced me, that the observed range of variability is not sufficient for the recognition of three species-group taxa, and that there is no evidence that more than a single *Alectoris* species inhabited Europe during the Pliocene and early Pleistocene (but see below for a few records of this age attributed to the modern *Alectoris graeca* Meisner).

Alectoris bavarica Ballmann

Alectoris bavarica Ballmann, 1969b: 36 [Holotype from Wintershof-West: left tarsometatarsus; BSP Wi-We-1937-II-18110. Figured by Ballmann 1969b, pl. 1, fig. 4a-b.]

Distribution: Early Miocene (MN 3) of Wintershof-West, Germany (Ballmann 1969b).

Remarks: The taxonomic position of this species requires reexamination, but my brief restudy of its holotype confirmed Ballmann's (1969b) opinion, that the bone is different from the same element of *Palaeortyx* Milne-Edwards (= *Coturnix* Bonnaterre).

Alectoris prisca (Milne-Edwards)

Palaeoperdix prisca Milne-Edwards, 1869: 246 [Lectotype Sansan (selected by Cheneval 2000: 345): proximal end of right tarsometatarsus; MNHN Sa-1236. Figured by Milne-Edwards 1869-1871, pl. 131, fig. 1-4; and Cheneval 2000, fig. 4. "Paralectotypes" from Sansan (all in MNHN): furcula (probably lost – Cheneval 2000: 347), two right coracoids (Sa-1239, Sa-1416), right humerus (Sa-1238), proximal end of right humerus (Sa-1297), distal end of left tibiotarsus (Sa-1237). Figured by Milne-Edwards 1869-1871, pl. 131, fig. 5-8 (tibiotarsus), 9-10 (furcula), 11-14 (humerus), 15-17 (coracoid); and Cheneval 2000, fig. 5 (coracoid Sa-1239) and 6 (tibiotarsus). The paralectotypical humerus belongs to the rail *Palaeoaramides beaumonti* (Milne-Edwards) according to Cheneval 2000: 345.]

Palaeoperdix? *Sansaniensis* Milne-Edwards, 1869: 249 [Holotype from Sansan: distal end of right tibiotarsus; MNHN Sa-1235. Figured by Milne-Edwards 1869-1871, pl. 131, fig. 18-23; and Cheneval 2000, fig. 6.]

Palaeocryptonyx grivensis Ennouchi, 1930: 81 [Holotype from Grive-Saint-Alban: left humerus; ML LGr-55. Figured by Ennouchi 1930, pl. 4, fig. 5-8.]

Alectoris prisca (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869-1871); and middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Ennouchi 1930).

Remarks: The holotypes of both these species agree in morphology with the corresponding elements of *Alectoris* Kaup, they were found in both geographically and stratigraphically close deposits, and belong to the same size class. Hence, I synonymize here *Palaeocryptonyx grivensis* Ennouchi with *Palaeoperdix prisca* Milne-Edwards. *Palaeoperdix sansaniensis* Milne-Edwards was synonymized with *Alectoris prisca* (Milne-Edwards) by Cheneval (2000: 345).

Alectoris edwardsi (Depéret)

Palaeortyx Edwardsi Depéret, 1887: 285 [Syntypes from Grive-Saint-Alban – early collections (all in ML): proximal end of right humerus (LGr-42), three distal ends of right humeri (uncatalogued), distal end of left ulna (LGr-44), proximal end of right femur (uncatalogued), proximal end of left tibiotarsus (LGr-43), distal end of left tarsometatarsus (uncatalogued). Figured by Depéret 1887, pl. 13, fig. 51 (distal end of humerus), and 52 (proximal end of humerus). The syntypical tarsometatarsus belongs to *Palaeortyx longipes* Lydekker (see also Ballmann 1969a: 182).]

Palaeortyx miocaena Gaillard, 1939: 50 [Lectotype from Grive-Saint-Alban – early collections (here selected): left humerus; ML LGr-6035a. Figured by Gaillard 1939, fig. 26 (left). Paralectotypes from Grive-Saint-Alban – early collections: right humerus (ML LGr-6035b), and left tarsometatarsus (ML LGr-6035c). Figured by Gaillard 1939, fig. 26 (right humerus), and 27 (tarsometatarsus).]

Palaeoperdix edwardsi (Depéret): Brodkorb 1964: 314 [New combination.]

Palaeocryptonyx edwardsi (Depéret): Ballmann 1969a: 182 [New combination.]

Alectoris edwardsi (Depéret): Mlíkovský, this paper [New combination.]

Distribution: Early Miocene (MN 3) of Can Mas, Spain (Villalta 1963); middle Miocene (MN 7-8) of Grive-Saint-Alban – early collections, France (Depéret 1887, Lydekker 1893, Ennouchi 1930, Gaillard 1939); middle Miocene (MN 8) of Grive-Saint-Alban, fissure L-7, France (Ballmann 1969a); and middle/late Miocene (MN 8-9) of Hostalets de Pierola, Spain (Villalta & Crusafont Pairó 1950).

Remarks: Ballmann (1969a: 182) assigned both syntypical humeri of *Palaeortyx miocaena* Gaillard to *Palaeortyx edwardsii* Ennouchi. I agree, and I synonymize here *Palaeortyx miocaena* Gaillard with *Alectoris edwardsi* (Depéret).

Alectoris donnezani (Depéret)

Palaeocryptonyx Donnezani Depéret, 1892: 131 [Syntypes from Perpignan (all in FSL): "scapula" (= amphibian ilium – Mourer-Chauviré, in litt.), right coracoid (92890), left humerus (92891-1), distal end of left ulna (92891-2), proximal end of left carpometacarpus (92891-5), right femur (92889), proximal end of left tibiotarsus (92891-4), distal end of left tibiotarsus (92892-8), and right tarsometatarsus (92888). Figured by Depéret 1997, pl. 13, fig. 2-2a (tarsometatarsus), 3-3a and 4-4a (tibiotarsus), 5-5a (femur), 6-6a (coracoid), 7-7a (scapula), 8-8a (humerus), 9-9a (ulna), 10-10a (carpometacarpus). The syntypical "scapula" is an amphibian ilium, and the carpometacarpus belongs to the Columbidae (Mourer-Chauviré in litt.).]

Francolinus Čapeki Lambrecht, 1933: 433 [Lectotype from Betfia 2 (here selected): right humerus; GIB uncatalogued. Figured by Lambrecht 1933, fig. 136a, Jurcsák & Kessler 1973, fig. 23a, and Jánossy 1976b, pl. 8, fig. 1. Paralectotypes from Betfia 2: proximal end of left scapula, four left and six right coracoids, incl. two complete ones, fragments of two furculae, fragments of three sterna, nine humeri (one of them complete), incl. three left, two right (one of them juvenile) and four abraded ones, proximal end of ulna, distal ends of three ulnae (incl. a left one), left carpometacarpus, five partial carpometacarpi, three phalanges I digiti 2 alae, and a sacrum. Figured by Lambrecht 1933, fig. 136b (right juvenile humerus, erroneously said by Lambrecht 1933: 434 to be the same bone as in his fig. 136a), 136c-d (coracoid), 136e-f (carpometacarpus), 136g (phalanx I digiti 2 alae), 136h (scapula), 136i (ulna) and 136j (furcula). All syntypes were collected by Tivadar Kormos between 1904 and 1912. The material was studied by Čapek (1917: 27, 68), Lambrecht (1933: 433-436) and Jánossy (1976b: 35-36), each of whom produced a different list of the bones. The above list includes syntypes said to be studied by Lambrecht (1933: 435). Lambrecht (1933: 433) listed among the material of *Francolinus Čapeki* also a humerus from Beremend, but it follows from a comment on p. 691 in the same book, that he did not consider it as a syntype of the species.

Ammoperdix ponticus Tugarinov, 1940b: 311 [Holotype from Odesa – catacombs: right tarsometatarsus with damaged proximal end; IZAN 6489. Figured by Tugarinov 1940b, fig.

2; and Bocheński & Kuročkin 1987a, pl. 18, fig. 1-2.]

Pliogallus coturnoides Tugarinov, 1940b: 312 [Syntypes from Odesa – catacombs: right coracoid (IZAN 6478), left and right ulna (IZAN 6483 and 6485), right radius (IZAN 6488), and two left carpometacarpi (IZAN 6479 and 6481). Figured by Tugarinov 1940b, fig. 1 (a carpometacarpus); and Dement'ev 1964, fig. 675 (same carpometacarpus).]

Plioperdix coturnoides (Tugarinov): Kretzoi 1955b: 305 [New combination.]

Francolinus capeki Lambrecht: Brodkorb 1964: 320 [Spelling emended.]

Francolinus capeki wenzensis Jánossy, 1974a: 540 [Syntypes from Węże 1: two fragments of premaxillae, two cranial ends of coracoids (1 left, 1 right), four distal ends of humeri (2 left, 2 right), two proximal ends of left ulnae, distal end of left ulna, proximal end of left radius, two proximal ends of carpometacarpi (1 left, 1 right), proximal end of right femur, two distal ends of right femora, proximal end of left tibiotarsus, distal end of right tibiotarsus, three proximal ends of left tarsometatarsi, five distal ends of tarsometatarsi (3 right, 2 left), four phalanges I digiti II alae; ISEZ, uncatalogued. Figured by Jánossy 1974a, pl. 23, fig. 7-8 (premaxilla), and Jánossy 1981, fig. 1-b (premaxilla).]

Francolinus capeki villányiensis Jánossy, 1974a: 540 [Syntypes (from Rębielice Królewskie 1): fragment of premaxilla, fragment of mandibula, anterior fragment of two sterna, cranial ends of 14 coracoids (6 left, 8 right), sternal ends of two right coracoids, proximal ends of 12 scapulae (11 left, 1 right), left humerus, proximal ends of nine humeri (5 left, 4 right), distal ends of 15 humeri (10 left, 5 right), diaphyses of two humeri (1 left, 1 right), two left ulnae, proximal ends of eight ulnae (4 left, 4 right), distal ends of four ulnae (3 left, 1 right), proximal ends of right radius, distal ends of eight radii (5 left, 3 three), an ulnare, left carpometacarpus, proximal ends of eight carpometacarpi (4 left, 4 right), distal ends of 7 carpometacarpi (3 left, 4 right), 12 phalanges I digiti 2 alae, two phalanges II digiti 2 alae, proximal end of left femur, distal ends of two femora (1 left, 1 right), proximal end of right tibiotarsus, distal ends of 15 tibiotarsi (7 left, 7 right, and 1 juvenile), diaphyses of three tibiotarsi (2 left, 1 right), right tarsometatarsus, proximal ends of 14 tarsometatarsi (10 left, 4 right), distal ends of 13 tarsometatarsi (7 left, 6 right), diaphyses of 4 tarsometatarsi (side of body not stated), seven phalanges I digiti 1 pedis, nine phalanges I digiti 2 pedis, two phalanges II digiti 2 pedis, three phalanges I digiti 3 pedis, 10 phalanges I digiti 4 pedis, and 18 phalanges unguis; (from Beremend 1-3): left humerus (said to be from the right side of the body by Jánossy 1976b: 35, but fig. 4 in Lambrecht 1916a shows a left humerus); (from Osztramos 7): cranial ends of three left coracoids, middle trochlea of a tarsometatarsus, phalanx II digiti 2 pedis, and fragmentary phalanx I digiti 3 pedis; (from Villány 3): distal ends of 2 left humeri. Deposited in ISEZ, uncatalogued (syntypes from Rębielice Królewskie 1) and GIB, uncatalogued (other syntypes). The syntypes from Rębielice Królewskie 1 are figured in Jánossy 1974a, pl. 23, fig. 1 (sternum), 2 (carpometacarpus), 3 (tarsometatarsus), 4 (humerus), 5 (ulna), and 6 (premaxilla), and Jánossy 1981, fig. 3 (premaxilla). The syntypical humerus from Beremend was figured by Lambrecht 1916b, fig. 4. Jánossy (1974a) based this subspecies on a number of bones from four different localities (see Jánossy 1974a: 547), without even providing list of the material from three of them (Beremend 1-3, Osztramos 7, and Villány 3). Lists of syntypes from the latter three localities were derived from Jánossy (1976b: 35).

Francolinus (*Lambrechtia*) *capeki* Lambrecht: Jánossy 1974a: 540 [New combination.]

Francolinus (*Lambrechtia*) *minor* Jánossy, 1974a: 547 [Holotype from Rębielice Królewskie 1: left carpometacarpus; ISEZ, uncatalogued. Not figured.]

Francolinus subfrancolinus Jánossy, 1976b: 36 [Holotype from Villány 3: left carpometacarpus; GIB uncatalogued. Figured by Jánossy 1976b, pl. 8, fig. 3.]

Alectoris baryosefi Tchernov, 1980: 25 [Holotype from 'Ubeidyia, layer II-23: left carpometacarpus; HUJ 'U-4.5b. Figured by Tchernov 1980, pl. 1, fig. 3.]

Francolinus wezensis Jánossy: Jánossy 1981: 380 [New rank; species name misspelled.]

Plioperdix ponticus (Tugarinov): Kuročkin 1985: 100 [New combination.]

Plioperdix capeki (Lambrecht): Mlíkovský 1995b: 116 [New combination.]
Plioperdix subfrancolinus (Jánossy): Mlíkovský 1995b: 116 [New combination.]
Chauvireria balcanica Boev, 1997a: 144 [Nomen nudum; no description or indication.]
Chauvireria balcanica Boev, 1997b: 71 [Holotype from Văršec: right carpometacarpus; NMNHS F-47-1996. Figured by Boev 1997b, pl. 1, fig. f.]
Alectoris donnezani (Depéret): Mlíkovský, this paper [New combination.]

Distribution: Early Pliocene (MN 14) of Vojničevo, Ukraine (Vojinstens'kyj 1967 sub *Plioperdix,* Bocheński & Kuročkin 1987a); early Pliocene (MN 15) of Perpignan, France (Depéret 1892, 1897), Węże 1, Poland (Jánossy 1974a, 1981), Ivanovce 1, Slovakia (Mlíkovský orig.), Csarnóta 2 – layers O, B/1, B/2, 2, 3, 5, 10, 15, and 20, Hungary (Jánossy 1976b), and Odesa – catacombs, Ukraine (Tugarinov 1940, Bocheński & Kuročkin 1987a); late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a), Rębielice Królewskie 2, Poland (Jánossy 1974a), Osztramos 7, Hungary (Jánossy 1976b), Beremend 15, Hungary (Jánossy 1987b, 1990b, 1992), Etulia, Moldova (Bocheński & Kuročkin 1987a), Çişmikioi, Moldova (Bocheński & Kuročkin 1987a), Kotlovina, Ukraine (Bocheński & Kuročkin 1987a); late Pliocene (MN 16-17) of Tourkobounia 1, Greece (Mourer-Chauviré 1980b, 1993b sub *Palaeo-cryptonyx* sp.); late Pliocene (MN 17) of Šandalja I – layer 6, Croatia (Malez-Bačić 1979 sub *Francolinus* sp.), Koliňany 2, Slovakia (Mlíkovský orig.), Beremend 11, Hungary (Jánossy 1986: 30), and Kryžanovka 1, Ukraine (Dubrovo & Kapelist 1979), and Văršec, Bulgaria (Boev 1997b); late Pliocene (MN 18) of Montoussé 5, France (Clot et al. 1976a,b), Ca Na Reia, Eivissa, Balearics (Alcover 1989 sub *Palaeocryptonyx* sp.), Kadzielnia 1, Poland (Jánossy 1974a sub *Francolinus* sp.), Villány 3, Hungary (Jánossy 1976b), Betfia 13, Romania (Kessler 1975), and Slivnica, Bulgaria (Boev 2000a); late Pliocene or early Pleistocene of Beremend 1-3, Hungary (Lambrecht 1916b sub "tyúkfél" and "Hühnervogel", Lambrecht 1933, Jánossy 1976b);

early Pleistocene (MQ 1a) of Untermassfeld, Germany (Jánossy 1997), Deutsch-Altenburg 2C, Austria (Jánossy 1981, Mlíkovský 1998d), Deutsch-Altenburg 4B, Austria (Jánossy 1981, Mlíkovský 1998d), Osztramos 2, Hungary (Jánossy 1976b), Osztramos 8, Hungary (Jánossy 1976b), Beremend 16, Hungary (Jánossy 1992), Beremend 17, Hungary (Jánossy 1992), and Betfia 2, Romania (Čapek 1917 sub "egy kihalt *Perdix*-nem" and "eine ausgestorbene *Perdix*-Gattung", Lambrecht 1933, Jánossy 1974b); early Pleistocene (MQ 1b) of Sackdilling, Germany (Heller 1930 sub "ein Hühnerartiger", Lambrecht 1933*,* K. Lambrecht in Brunner 1933), Chlum 6, Czechia (Mlíkovský 1996t), Koněprusy C-718, Czechia (Mlíkovský 1996t), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972, Mlíkovský orig.), Stránská skála – Musil's talus cone, layers 6, 8, 10, 11, 13 and 16, Czechia (Mlíkovský 1995b), Včeláre 4E, Slovakia (Mlíkovský orig.), Nagyharsányhegy 2, Hungary (Jánossy 1976b), Soave, Italy (Mourer-Chauviré 1980b, 1993b: 54 sub *Palaeocryptonyx* sp.), Podumci, Croatia (Malez 1973, 1986), and Razvode, Croatia (Malez 1973, 1986).

Extralimital record is available from the late Pliocene (MN 16) of Beregovaja, Buryatia (Kuročkin 1985), and early Pleistocene (MQ 1a) of 'Ubeidyia, layers II-23, and II-24, Israel (Tchernov 1980).

Remarks: I deliberately included in this list all relevant records, originally described from the Pliocene and early Pleistocene of Europe and adjacent parts of Asia as belonging to *Palaeocryptonyx* Depéret, *Francolinus* Stephen, and *Plioperdix* Kretzoi. It is possible that some of these bones belong to the modern *Perdix perdix* (Linnaeus), which was recorded from the same time-space unit (see below). No record of *Alectoris donnezani* (Depéret) is known from MQ 2. The record from the late Miocene (MN 9-10) of Sokolov, Ukraine (Vojinstvens'kyj 1967) is doubtful.

Alectoris graeca (Meisner) – Rock Partridge

Perdix graeca Meisner, 1804 [Modern species.]
Alectoris graeca mediterranea Mourer-Chauviré, 1975a: 98 [Holotype from Saint-Estève-

Janson – layer B: left tarsometatarsus; coll. Bonifay CD66-B-4019. Figured by Mourer-Chauviré 1975a, pl. 10, fig. 6.]

Alecoris graeca martelensis Mourer-Chauviré, 1975a: 99 [Holotype from Fage – layer 5: right tarsometatarsus; FSL 41631. Figured by Mourer-Chauviré 1975a, pl. 10, fig. 8.]

Gallus karabachensis Burčak-Abramovič & Aliev, 1989. [Holotype from Azych – layer 5: left tarsometatarsus.]

Alectoris (*graeca*) *mediterranea* Mourer-Chauviré: Potapova 2000: 25 [New rank.]

Distribution: Early Pleistocene (MQ 1) of Monte Argentario, Italy (Cassoli 1980: 173 sub *A. g. mediterranea* and *A. g. martelensis*);

middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layers B, C, D and H, France (Mourer-Chauviré 1975a sub *A. g. mediterranea*), and Petralona – layers 2 and 8, Greece (Kretzoi 1977 and Kretzoi & Poulianos 1981 sub *A. g. mediterranea*); middle Pleistocene (MQ 2B) of Lunel-Viel – layers 1-11, France (Mourer-Chauviré 1975a sub *A. g. mediterranea*), Orgnac 3 – layers h, i, j, France (Mourer-Chauviré 1975a sub *A. g. mediterranea*), Lazaret – layers V, V1, V2, 8, 9, 11, 12, 13 and 15, France (Mourer-Chauviré 1975a sub *A. g. mediterranea*), and Fage – layers 2/3, CO, 32, 33 and 36, France (Mourer-Chauviré 1975a sub *A. g. martelensis*).

The extralimital record includes early Pleistocene (MQ 1b) of Treugolnaja Cave, Karachaevo-Cherkessia, Russia (Potapova & Baryšnikov 1993 and Baryšnikov & Potapova 1995 sub *A. g. mediterranea*), and late Pleistocene (MQ 2C) of Azych, Azerbaijan (Burčak-Abramovič & Aliev 1989 sub *Gallus karabachensis*, Baryšnikov & Potapova 1995, Potapova 2000 sub *A. mediterranea*).

Remarks: The early Pleistocene records possibly belong to *Alectoris donnezani* (Depéret). *Gallus karabachensis* Burčak-Abramovič & Aliev was synonymized with the modern *Alectoris graeca* (Meisner) by Baryšnikov & Potapova (1995: 245, see also Potapova 2000: 25).

Genus *Pavo* Linnaeus

Pavo Linnaeus, 1758 [Modern genus.]

Pavo archiaci (Gaudry)

Phasianus Archiaci Gaudry, 1862a: 631 [Syntypes from Pikermi: partial skull with attached posterior part of mandibles (lost, cast # 1), cranial end of right coracoid (# 11), left humerus (lost, cast # 3), right humerus (lost, cast # 2), right ulna (only proximal end preserved; cast of the whole bone available, # 7), proximal end of right ulna (# 8), right radius (only proximal end preserved, # 12), carpometacarpus (lost), right femur with damaged proximal end (#14), proximal end of left femur (# 16), distal end of left tibiotarsus (# 17), distal end of right tibiotarsus (# 26), and a phalanx digiti pedis (# 27); MNHN uncatalogued (the numbers correspond to the labels I left with the bones in 1992). Figured by Gaudry 1862a, pl. 16, fig. 1 (skull), 2+4 (humerus), 3+5 (ulna), and Gaudry 1862-1867, pl. 58, fig. 1-3 (skull), 4-5 (humerus), 6-7 (ulna), 8 (radius), 10 (femur), 11 (tibiotarsus), and 12 (phalanx digiti pedis).]

Gallus Aesculapii Gaudry, 1862a: 632 [Syntypes from Pikermi: associated distal end of right tibiotarsus, right tarsometatarsus and 2 partial phalanges digitorum pedis (only distal end of tibiotarsus and proximal end of tarsometatarsus preserved, cast whole, but damaged toward the distal end, # 18), distal end of right tarsometatarsus (# 19); MNHN uncatalogued (the numbers correspond to the etiquettes I left with the bones in MNHN in 1992). Figured by Gaudry 1862a, pl. 16, fig. 6-7, and Gaudry 1862-1867, pl. 58, fig. 14-15.]

Pavo aesculapi (Gaudry): Jánossy 1991: 17 [New combination.]

Pavo aesculapi phasianoides Jánossy, 1991: 17 [Holotype from Polgárdi 4: right coracoid; GIB Vt-145—V-18.094. Figured by Jánossy 1991, pl. 2, fig. 8.]

Pavo archiaci (Gaudry): Mlíkovský, this paper [New combination.]

Distribution: Late Miocene (MN 9-10) of Kolkotova Balka, Moldova (Laskarev 1908, 1912, Vojinstvens'kyj 1967, Burčak-Abramovič & Bendukidze 1971); late Miocene (MN 11-12) of Novoelisavetovka, Ukraine (Alekseev 1916 and Vojinstvens'kyj 1967 sub *Gallus* aff. *aesculapi*); late Miocene (MN 11-13) of Belka, Ukraine (Vojinstves'kyj 1967 sub *Gallus aesculapi*), Žovten', Ukraine (Ganea & Kuročkin 1967); late Miocene (MN 12) of Pikermi, Greece (Gaudry 1862a,b, 1862-1867, Weithofer 1888 sub ?*Gallus Aesculapii*, Jánossy 1976b, Mlíkovský orig.); and late Miocene (MN 13) of Polgárdi 4, Hungary (Jánossy 1976b, 1991).

Remarks: I restudied the syntypes of *Phasianus archaici* Gaudry and *Gallus aesculapii* Gaudry, finding that both belong to a single species, and that the species is referable to the genus *Pavo* Linnaeus (Mlíkovský orig., see also Jánossy 1991).

Pavo bravardi (Gervais)

Gallus Bravardi Gervais, 1849: 220 [Holotype from Ardé: spurred shaft of left tarsometatarsus; MNHN, probably lost – Mourer-Chauviré 1989b, 1990. Figured by Gervais 1848-1852, pl. 51, fig. 1-1a, Gervais 1859, pl. 51, fig. 1-1a, and Mourer-Chauviré 1989b, fig. 1-1a.]

Pavo moldavicus Bocheński & Kuročkin, 1987b: 89 [Holotype from Luçeşti: sternal end of left coracoid; PIN 2614-53. Figured by Bocheński & Kuročkin 1987b, pl. 18, fig. 13-14.]

Phasianus etuliensis Bocheński & Kuročkin, 1987b: 91 [Holotype from Etulia: cranial end of right coracoid; PIN 2614-48. Figured by Bocheński & Kuročkin 1987b, pl. 18, fig. 15-16.]

Pavo bravardi (Gervais): Mourer-Chauviré 1989b: 439 [New combination.]

Distribution: Early Pliocene (MN 14) of Osztramos 1, Hungary (Jánossy 1976b sub *Gallus aesculapi*, Mlíkovský orig.), Vojničevo, Ukraine (Vojinstevs'kyj 1967 sub *Gallus aesculapi*), and Kamenskoe, Ukraine (Vojinstvens'kyj 1967 sub *Gallus* sp.); early Pliocene (MN 15) of Perpignan, France (Depéret 1892, 1897, Mourer-Chauviré 1989b, 1990), Odesa – catacombs, Ukraine (Tugarinov 1940b and Vojinstvens'kyj 1967 sub *Gallus aesculapi*), Muselievo, Bulgaria (Boev 1998e, 1999a), and Megalo Emvolon, Greece (Boev & Koufos 2000); late Pliocene (MN 16) of Ardé, France (Gervais 1844a sub "Gallinacé", Gervais 1849, 1848-1852, 1859, Mourer-Chauviré 1989b, 1990), Etulia, Moldova (Bocheński & Kuročkin 1987b), and Luçeşti, Moldova (Bocheński & Kuročkin 1987b, Mourer-Chauviré 1989b, 1990); and late Pliocene (MN 17) of Saint-Vallier, France (Viret 1954 sub ?*Gallus Bravardi*, Mourer-Chauviré 1989b, 1990); and late Pliocene (MN 18) of Senèze, France (Stehlin 1923 sub ?*Gallus Bravardi*, Mourer-Chauviré 1989b, 1990).

Remarks: *Pavo moldavicus* Bocheński & Kuročkin was synonymized with *Pavo bravardi* (Gervais) by Mourer-Chauviré (1989b: 445). The holotypical coracoid of *Phasianus etuliensis* Bocheński & Kuročkin differs from the same element of the modern *Phasianus* Linnaeus in characters listed by Bocheński & Kuročkin (1987b), agreeing in them with the coracoids of *Pavo* Linnaeus, with which it was not compared formerly. It belonged to a bird of the same size class as *Pavo bravardi* (Gervais). Accordingly, I synonymize here *Phasianus etuliensis* Bocheński & Kuročkin with *Pavo bravardi* (Gervais).

Genus *Gallus* Brisson

Gallus Brisson, 1760 [Modern genus.]

Pliogallus Gaillard, 1939: 59 [Type by original designation (Gaillard 1939: 81, 93): *Pliogallus crassipes* Gaillard, 1939. This is an senior homonym of *Pliogallus* Tugarinov, 1940b.]

Gallus gallus f. *domestica* – Domestic Chicken

Gallus domesticus fossilis Giebel, 1847: 23 [Nomen nudum; no description or indication.]

Pliogallus crassipes Gaillard, 1939: 59 [Holotype from "Csarnóta": right tarsometatarsus; FSL. Figured by Gaillard 1939, fig. 31.]

Pliogallus kormosi Gaillard, 1939: 61 [Holotype from "Csarnóta": left tarsometatarsus; FSL.

Figured by Gaillard 1939, fig. 32.]

Gallus gallus levantinus Pichon & Tchernov, 1987: 202 [Holotype from Kebara: left tarsometatarsus; HUJ, uncatalogued. Figured by Tchernov 1962, pl. 4, fig. 24, pl. 5, fig. 6-7; Pichon & Tchernov 1987, text-fig. 2, pl. 1, fig. a-b.]

Distribution: Middle Pleistocene (MQ 2B) of Suard, France (Mourer-Chauviré 1975a sub *G. gallus*); late Pleistocene (MQ 2C) of Crayford, England (Harrison & Walker 1977b sub *G. gallus*), Fontéchevade, France (Mourer-Chauviré 1975a), Grappin, France (Mourer-Chauviré 1975a), Trinka 1 – middle Paleolithic layer, Moldova (Ganea 1972 sub *Gallus* sp.), and Nižnekryvčansk, Ukraine (Marisova & Tatarinov 1962, Marisova 1968 and Tatarinov & Bačinskij 1968 sub *G. gallus*);

late Pleistocene (MQ 2C, pre-Magdalenian 'Würm') of Balauzière – layer III, France (Mourer-Chauviré 1975a sub *G. gallus*, probably mixed – Mourer-Chauviré 1975a: 401), Gonvillard – layer XIV, France (Mourer-Chauviré 1975a sub *G. gallus*), Petit Puymoyen, France (Mourer-Chauviré 1975a), Soulabé – layers C1-C2, France (Mourer-Chauviré 1975a), Dürrloch, Germany (Schlosser 1900 sub *G. gallus*), Zwergloch, Germany (Ranke 1879 sub *G. gallus*), Schusterlucke, Austria (Woldřich 1893 sub *Gallus* [three unnamed forms], Mlíkovský 1997d sub *Gallus* sp.), Vindija – layers D-E, Croatia (Malez 1988 sub *G. gallus*), Sungir, Russia (Gromov 1966 sub *Gallus* sp., Burčak-Abramovič 1972 and 1975 sub *Gallus* sp., see also Sukačev et al. 1966), Bordu Mare, Romania (Jurcsák & Kessler 1988 sub *G. gallus*), Starye Duruitory – upper cultural layers, Moldova (Ganea & Ketraru 1964, Ganea 1972), and Kiik-Koba Cave, Ukraine (Tugarinov 1937 sub *Gallus* sp., Vojinstvens'kyj 1967 sub *Gallus* sp., Baryšnikov & Potapova 1992 sub *Gallus* sp.);

late Pleistocene (MQ 2D; Magdalenian) of Lafaye, France (Mourer-Chauviré 1975a sub *G. gallus*), Mège, France (Capitan et al. 1906), Gourdan, France (Clot & Mourer-Chauviré 1986), Veyrier, France (Rütimeyer 1873 sub *G. gallus*?), Colombière, France (Mourer-Chauviré 1975a sub *G. gallus*), Grand Baille, France (Mourer-Chauviré 1975a), Trois Frères, France (Mourer-Chauviré 1975a), and Happurg, Germany (Hörmann 1913 sub *G. gallus*).

Extralimital records are known from the late Pleistocene (MQ 2C; late Mousterian) of Kebara – layer 345-410 cm, Israel (Tchernov 1962 sub *Phasianus hermonis*, Pichon & Tchernov 1987 sub *G. g. levantinus*); and from the late Pleistocene (MQ 2D; late Paleolithic) of Gvardžilas-Kldė, Georgia (Burčak-Abramovič 1966), Kudaro 1, Georgia (Burčak-Abramovič 1980), Mgvimevi, Georgia (Ganea & Burčak-Abramovič 1992), and Bavra, Georgia (Ganea & Burčak-Abramovič 1992); see also Burčak-Abramovič & Lakerbaj (1989), and Burčak-Abramovič (1996).

Remarks: The evidence presented above indicates, that chickens of the genus *Gallus* Brisson were present in Europe during the Riss/Würm interglacial (MQ 2C – lower part) and the lower part of the Würm glacial (MQ 2C – upper part). Nevertheless, the data do not allow to map the distribution of these chickens in that period, because some of the records are based on the material excavated and/or determined long ago, which increases the probability that the bones were assigned to incorrect strata, and/or that the relevant strata were mixed with younger ones, and/or that the bones were incorrectly identified.

On the other hand, there is no clear evidence, that *Gallus* chickens were present in Europe during the last glaciation (i.e. Würm III, which approximately corresponds to the Magdalenian), and subsequent parts of the Holocene. All the data cited above for the Magdalenian were based on the material from early excavations, while more recent excavations did not yield *Gallus* bones from this period. There are also no trustworthy records from the early Holocene (Mesolithic and Neolithic), although some were reported from Ukraine (Liberov 1959, Umans'ka 1972), Romania (Kessler 1975, 1978, 1985, Jurcsák & Kessler 1986), and Greece (see Thesing 1977, Mourer-Chauviré 1981b). It is thus probable, that *Gallus* chickens were absent from Europe during the period of latest Pleistocene (Würm III, i.e. Magdalenian), early Holocene (Preboreal and Boreal, i.e. Mesolithic), and middle Holocene (Atlantic, i.e. Neolithic).

Summarizing this evidence, it seems probable that *Gallus* chickens were present in Europe in the Riss/Würm interglacial and subsequent parts of the Würm glaciations. They probably became extinct with the onset of the last glaciation (Würm III), and were absent from Europe until the Subboreal (i.e. ca. Bronze Age), when they were recorded from sites in Czechia (Benecke 1994), Russia (near Moskva – Karchu 1990), Greece (see West & Zhou 1988), Moldova (Ganea 1972), Ukraine (Liberov 1959, Umans'ka 1972), and Romania (Jurcsák & Kessler 1973, Kessler 1993), and also in adjacent parts of Asia, incl. Armenia (Burčak-Abramovič & Mežlumjan 1986), Turkey (see West & Zhou 1988), and Syria (see West & Zhou 1988).

There is no doubt, that late Holocene chickens of Europe represent domestic forms (see e.g. Petrov 1951, Schweizer 1961, Nogalski 1975, Thesing 1977, Krupska 1978, and Mlíkovský 2002b for their osteology), but the taxonomic status of the late Pleistocene (MQ 2C) form remains unclear. Boule & Villeneuve (1927), Ganea (1965), Burčak-Abramovič & Bendukidze (1971), Burčak-Abramovič 1972 and Ganea & Burčak-Abramovič (1992) argued, that these chickens belonged to a wild, now extinct species of the genus *Gallus* Brisson. If so, the oldest available name for this taxon would be *Gallus gallus levantinus* Pichon & Tchernov. However, the holotypical tarsometatarsus of the latter subspecies differs from the same element of wild *Gallus* spp., and agrees with that of the domestic chicken – as judged from the figures – in having shaft broad and flat, and in being larger (Mlíkovský orig.; see Kuročkin & Anorova 1972 for respective characters).

The existence of a wild *Gallus* species in SE Europe was supported also by Vojinstvens'kyj (1959b), Vojinstvens'kyj & Uman'ska (1959), Marisova & Tatarinov (1965) and Ganea (1965, 1972), who believed that the species survived in this region to the late Holocene, and that it was domesticated here (see also Burčak-Abramovič & Bendukidze 1971, Burčak-Abramovič 1972, Ganea & Burčak-Abramovič 1992). This hypothesis is contradicted by the data presented above (see also Potapova 2000).

Pliogallus crassipes Gaillard and *Pliogallus kormosi* Gaillard were based on the material supposedly originating from the early Pliocene (MN 15) of Csarnóta, Hungary (Gaillard 1939). Jánossy (1976a: 13, 1976b: 38-39) observed that they were based on the remains of modern domestic chicken, and that they were apparently sent to Gaillard as a fake.

Genus *Phasianus* Linnaeus

Phasianus Linnaeus, 1758 [Modern genus.]

Phasianus sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a).

Genus *Perdix* Brisson

Perdix Brisson, 1760 [Modern genus.]

Perdix perdix (Linnaeus) – Grey Partridge

Tetrao Perdix Linnaeus, 1758 [Modern species.]

Perdix jurcsáki Kretzoi, 1962: 171 [Holotype from Betfia 5: right tarsometatarsus; RMO 1899a/3. Figured by Jurcsák & Kessler 1973, fig. 30 below.]

Perdix jurcsaki Kretzoi: Brodkorb 1964: 320 [Spelling emended.]

Perdix palaeoperdix Mourer-Chauviré, 1975a: 106 [Holotype from Fage – layer 5: right tarsometatarsus; FSL 41639. Figured by Mourer-Chauviré 1975a, pl. 10, fig. 12.]

Perdix perdix jurcsaki Kretzoi: Jánossy 1976b: 37 [New rank.]

Alectoris sutcliffei Harrison, 1980b: 96 [Holotype from Tornewton – glutton stratum: distal end of left tibiotarsus; BMNH A-4165. Figured by Harrison 1980b, fig. 1.]

Distribution: Late Pliocene (MN 17) of Kryžanovka 1, Ukraine (Dubrovo & Kapelist 1979 sub *P.* cf. *perdix*), and Obitočnoe, Ukraine (Vojinstvens'kyj 1967 sub *P.* cf. *perdix*);

early Pleistocene (MQ 1) of Betfia 7, Romania (Kessler 1975); early Pleistocene (MQ 1a) of Huéscar 1, Spain (Sánchez Marco 1989), Mas Rambault, France (Mourer-Chauviré 1975a sub *P. palaeoperdix*), Osztramos 5, Hungary (Jánossy 1976b sub *P. perdix jurcsaki*), Beremend 16, Hungary (Jánossy 1992 sub *Perdix* sp.), Beremend 17, Hungary (Jánossy 1992 sub *Perdix* sp.), Betfia 2, Romania (Čapek 1917, Jánossy 1976b sub *P. perdix jurcsaki*), Primorsk, Ukraine (Vojinstvens'kyj 1967), andŽevachova Hill, Ukraine (Dubrovo & Kapelist 1979); early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999), Sima del Elefante – unknown layer, Spain (Rosas et al. sub *P. paleoperdix*), Stránská skála – Čapek's sites 1-3, 5a, 9a, and 9b, Czechia (Jánossy 1972 sub *P.* aff. *perdix*), and Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *P.* aff. *perdix*), Stránská skála – Musil's talus cone, layers 5, and 6 (Mlíkovský 1995b), and Betfia 5, Romania (Kretzoi 1962, Jurcsák & Kessler 1973, Kessler 1975);

middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layers B, C, D, F, G and H, France (Mourer-Chauviré 1975a sub *P. palaeoperdix*), Vertesszőlős 2 – layer 200-240 cm, Hungary (Jánossy 1976b sub *P. perdix jurcsáki*), Várhegy – Fortuna Street 25, lower layer, Hungary (Jánossy 1976b, tentatively referred, Jánossy 1986 sub *P.* cf. *jurcsáki*), and Petralona, Greece (Kretzoi 1977 and Kretzoi & Poulianos 1981 sub *P.* cf. *jurcsaki*); middle Pleistocene (MQ 2B) of Tornewton, England (Harrison 1980b sub *Alectoris sutcliffei*, Stewart 1996, J.R. Stewart in Tyrberg 1998: 479), Atapuerca, Spain (Sánchez Marco 1987a,b), Aridos-1, Spain (Mourer-Chauviré 1980c sub *P. palaeoperdix*), Lunel-Viel – layers 2, 6, 7, 9 and 10, France (Mourer-Chauviré 1975 sub *P. palaeoperdix*), Fage – layers 2/3, CO and 29-40, France (Mourer-Chauviré 1975a,b sub *P. palaeoperdix*), Orgnac 3 – layers d-j, France (Mourer-Chauviré 1975 sub *P. palaeoperdix*), Lazaret 8, France (Mourer-Chauviré 1975a sub *P. palaeoperdix*), Biehle, France (Mourer-Chauviré 1975a,b sub *P. palaeoperdix*), Suard – layers V/VI and VIII, France (Mourer-Chauviré 1975 sub *P.* cf. *palaeoperdix*), Aldène, France (Mourer-Chauviré 1975a sub *P. palaeoperdix*), Carrière, France (Mourer-Chauviré 1975 sub *P. palaeoperdix*), Combe Grenal, France (Mourer-Chauviré 1975 sub *P. palaeoperdix*), and Azé 2, France (Mourer-Chauviré 1975a sub *P. palaeoperdix*), and Devetaška Cave, Bulgaria (Boev 1999a sub *P. palaeoperdix*); and

late Pleistocene (MQ 2D) of Temnata Cave, Bulgaria (Boev 1999a sub *P.* cf. *palaeoperdix*), Kozarnika, Bulgaria (Boev 1999a sub *P. palaeoperdix*), Ražiška Cave, Bulgaria (Boev 1999a sub *P. palaeoperdix*, Boev 2000g sub *P.* cf. *palaeoperdix*), and Cave 16, Bulgaria (Boev 1999a sub *P. palaeoperdix*).

An extralimital record was reported from the early Pleistocene (MQ 1b) of Dursunglu, Turkey (Louchart et al. 1998 sub *P. palaeoperdix*).

Remarks: *Perdix palaeoperdix* Mourer-Chauviré was described as a form ancestral to the modern *Perdix perdix* (Linnaeus). I synonymize it here with the latter secies. *Perdix jurcsaki* Kretzoi was synonymized with *Perdix perdix* (Linnaeus) by Jánossy (1976b: 37). *Alectoris sutcliffei* Harrison was synonymized with *Perdix perdix* (Linnaeus) by Stewart (1996, Stewart in Tyrberg 1998: 519).

Genus *Tetrao* Linnaeus

Tetrao Linnaeus, 1758 [Modern genus.]

Tetrao urogallus Linnaeus – Western Capercaillie

Tetrao urogallus Linnaeus, 1758 [Modern species.]

Tetrao praeurogallus Jánossy, 1969: 596 [Holotype from Včeláre 1: right carpometacarpus; GIB V-10.347. Figured by Jánossy 1969, pl. 1, fig. 4, Jánossy 1976a, pl. 1, fig. 1-2.]

Tetrao conjugens Jánossy, 1974a: 537 [Holotype from Węże 1: proximal end of left carpometacarpus; ISEZ, uncatalogued. Figured by Jánossy 1974a, pl. 23, fig. 9.]

Tetrao macropus Jánossy, 1976a: 17 [Holotype from Csarnóta 2: distal end of left tibiotarsus;

GIB V-10.348. Figured by Jánossy 1976a, pl. 1, fig. 6.]

Tetrao rhodopensis Boev, 1998d: 56 [Holotype from Dorkovo: distal end of left humerus; NMNHS 483. Figured by Boev 1998d, fig. 2c-d.]

Distribution: Early Pliocene (MN 14) of Dorkovo, Bulgaria (Boev 1998d); early Pliocene (MN 15) of Węże 1, Poland (Jánossy 1974a), and Csarnóta 2, Hungary (Jánossy 1976a); late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Bocheński 1989, 1991, 1993, see also Jánossy 1976a), and Osztramos 7, Hungary (Jánossy 1976a); late Pliocene (MN 18) of Kadzielnia 1, Poland (Bocheński 1989);

early Pleistocene (MQ 1a) of Żabia Cave, Poland (Bosák et al. 1982: 221); early Pleistocene (MQ 1b) of Sackdilling, Germany (Jánossy 1976a), Erpfingen, Germany (Jánossy 1976a), Holštejn 1, Czechia (Musil 1966 sub *T.* cf. *urogallus*), Stránská skála – Čapek's sites 1-3, 4c, 5a, and 9a, Czechia (Jánossy 1972), Stránská skála – Musil's talus cone, layers 11, and 13, Czechia (Mlíkovský 1995b), Zalesiaki 1A, Poland (Bocheński 1989), Kozi Grzbiet, Poland (Bocheński 1984 sub *T.* cf. *praeurogallus*), Včeláre 1, Slovakia (Jánossy 1969, 1976a), Nagyharsánhegy 1-4, Hungary (Jánossy 1976a), and Betfia 5, Romania (Kretzoi 1962, Jánossy 1976a); and middle Pleistocene (MQ 2A) of Tarkő – layer 10, Hungary (Jánossy 1976a sub *T. praeurogallus*).

Remarks: *Tetrao praeurogallus* Jánossy, *Tetrao conjugens* Jánossy, *Tetrao macropus* Jánossy, and *Tetrao rhodopensis* Boev are inseparable from the modern *Tetrao urogallus* Linnaeus (Mlíkovský orig.). Hence, I synonymize here the former four species with the latter one.

Tetrao tetrix Linnaeus – Black Grouse

Tetrao Tetrix Linnaeus, 1758 [Modern species.]

Lyrurus partium Kretzoi 1962: 171 [Holotype from Betfia 2: right tarsometatarsus, NMB G-50.155/1. Not figured.]

Lyrurus tetrix longipes Mourer-Chauviré 1975a: 94 [Holotype from Fage – layer 5: left tarsometatarsus, FSL 41617. Figured by Mourer-Chauviré 1975, pl. 10, fig. 3.]

Tetrao partium: Brodkorb 1964: 322 [New combination.]

Lagopus balcanicus Boev 1995a: 263 [Holotype from Văršec: left ulna; MNHNS F-1-1993. Figured by Boev 1995a, fig. 3.]

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1995a, 1999d); late Pliocene (MN 18) of Senèze, France (Stehlin 1923 sub ?*Lyrurus*), Villány 3, Hungary (Jánossy 1976a);

early Pleistocene (MQ 1a) of Deutsch-Altenburg 2C, Austria (Mlíkovský 1998d), Beremend 16, Hungary (Jánossy 1992), Beremend 17, Hungary (Jánossy 1992), Osztramos 2, Hungary (Jánossy 1976a), Osztramos 8, Hungary (Jánossy 1976a), Betfia 1, Romania (Jánossy 1976a), Betfia 2, Romania (Kretzoi 1941 sub Tetraonidarum g.ind. n.sp., Kretzoi 1962, Jánossy 1976a); early Pleistocene (MQ 1b) of Sackdilling, Germany (Brunner 1933), Erpfingen, Germany (Jánossy 1976a), Voigtstedt, Germany (Jánossy 1965, 1976a), Chlum 6, Czechia (Mlíkovský 1996t), Stránská skála – Čapek's sites 4a, 4c, 5a, 8, 9a, and 9b, Czechia (Jánossy 1972), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972), Stránská skála – Musil's "new large cave", Czechia (Jánossy 1972), and Stránská skála – Musil's talus cone, layers 4, 4a, 5, 6, 7, 7b, 8, 10, 11, 13, 14, 14c, 15c, and 15e, Czechia (Mlíkovský 1995b), Včeláre 1, Slovakia (Jánossy 1976a), Včeláre 4E, Slovakia (Mlíkovský orig.), Nagyharsányhegy 1-4, Hungary (Jánossy 1976a), and Somssichhegy 2, Hungary (Jánossy 1986);

middle Pleistocene (MQ 2A) of Hundsheim, Austria (Freudenberg 1914 sub *Lyrurus* sp., Jánossy 1974b sub *Lyrurus* cf. *partium*, Mlíkovský orig.), Gombasek, Slovakia (Jánossy 1976a sub *Lyrurus partium*), Tarkő – layers 2, 3, 7, 12, Hungary (Jánossy 1976a sub *Lyrurus partium*), Várhegy – Fortuna Street 25, Hungary (Jánossy 1976a sub *Lyrurus partium*), Vertesszőllős 2, Hungary (Jánossy 1976a and 1990 sub *Lyrurus partium*), and Čertkov 2, Ukraine (Vojinstvens'kyj 1967, Jánossy 1976a sub *Lyrurus partium*); and middle Pleistocene (MQ 2B) of Fage – layers 2/3, CO, 30, 32-40, France (Mourer-Chauviré 1975a sub *T. tetrix longipes*).

Remarks: *Tetrao partium* (Kretzoi) is a member of the *Tetrao tetrix* – lineage, and I synonymize it here thus with *Tetrao tetrix* Linnaeus. The holotypical ulna of *Lagopus balcanicus* Boev differs from the same element of *Lagopus* Brisson, and agrees with that of *Tetrao* Linnaeus (as judged from the figure) in having (1) ventral condyle more protruding distally, and (2) ventral condyle displaced more ventrally, which causes that the dorsal condyle is relatively broad. Within the genus *Tetrao* Linnaeus, *balcanicus* is slightly smaller than the modern *Tetrao tetrix* Linnaeus, falling thus in the size class of the alleged species *Tetrao partium* (Kretzoi). Hence, I synonymize here *Lagopus balcanicus* Boev with the modern *Tetrao tetrix* Linnaeus.

The Pliocene and early Pleistocene *Tetrao tetrix* Linnaeus tended to be smaller than the modern European Black Grouses (Mlíkovský, orig.).

Genus *Bonasa* Stephen

Bonasa Stephen, 1810 [Modern genus.]

Bonasa bonasia (Linnaeus) – Hazel Grouse

Tetrao Bonasia Linnaeus, 1758 [Modern species.]

Lagopus voinstvenskii Ganea, 1972: 29 [Lectotype from Brynzeny 1 – lower cultural layer (here selected. This is the only figured syntype, on the basis of which I determined the identity of the species.): right tarsometatarsus; IZC BRY-408. Figured by Ganea 1969, fig. 2 – center; and Ganea 1972, fig. 1 – center. Paralectotypes: 26 tarsometatarsi from Brynzeny 1 – lower cultural layer, Starye Duruitory – layers II, III-IV, Buteşti – cultural layer, and Trinka 1, and six other unspecified bones from some or all of these sites (see Ganea 1969: 128-129, 1972: 29-31). Not figured.]

Tetrastes praebonasia Jánossy, 1974b: 218 [Holotype from Tarkő – layer 12: right tarsometatarsus; NMB V-64.789. Not figured.]

Bonasa praebonasia (Jánossy): Bocheński 1991: 574 [New combination.]

Distribution: Early Pleistocene (MQ 1b) of Kozi Grzbiet, Poland (Bocheński 1984), and Stránská skála – Musil's talus cone, layers 8, 9 and 13, Czechia (Mlíkovský 1995b); middle Pleistocene (MQ 2A) of Montoussé 3, France (Clot et al. 1976a,b), Hundsheim, Austria (Freudenberg 1914 sub ?*Perdix cinerea*, Jánossy 1974b sub *Tetrastes praebonasia*), and Tarkő – layers 11, and 12, Hungary (Jánossy 1976a sub *Tetrastes praebonasia*). The alleged record from the early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992) is based on a humerus of *Alectoris donnezani* (Mlíkovský, orig.).

Remarks: *Tetrastes praebonasia* Jánossy was described as a chronospecies, directly ancestral to the modern *Bonasa bonasia* (Linnaeus). Hence I synonymize it here with the latter species.

Ganea (1972) named *Lagopus voinstvenskii* on the basis of 33 bones, incl. 27 tarsometatarsi from the late Pleistocene (MQ 2C) of the following four Moldovan localities: Brynzeny 1 – lower cultural layer (Ganea 1969 sub *Lagopus* sp., Ganea 1972), Starye Duruitory – layers II, III-IV (Ganea 1969 sub *Lagopus* sp., Ganea 1972), Buteşti – cultural layer (Ganea 1972), and Trinka 1 (Ganea 1972). The description of the tarsometatarsi, their measurements and the published photograph of the lectotype (here selected) clearly indicate that this species is identical with the modern *Bonasa bonasia* (Linnaeus), with which I synonymize it here.

Genus *Lagopus* Brisson

Lagopus Brisson, 1760 [Modern genus.]

Remarks: Past distribution of *Lagopus* spp. in Europe was mapped by Nehring (1883), and Tyrberg (1991b, 1995). Osteological variability of fossil populations of *Lagopus* spp. was studied particularly by Bocheński (1974: 138-154, 1985), Mourer-Chauviré (1975a: 85-94), and Stewart (1999a,b). General reference: Potapov 1988.

Lagopus lagopus (Linnaeus) – Willow Ptarmigan

Tetrao Lagopus Linnaeus, 1758 [Modern species.]

Lagopus medius Woldřich, 1893: 621 [Lectotype from Schusterlucke (selected by Mlíkovský 1997d: 109): right tarsometatarsus; NHMW 468. Figured by Woldřich 1893, pl. 6, figs. 30. Paralectotype from Schusterlucke: right tarsometatarsus, NHMW 489. Figured by Woldřich 1893, pl. 6, fig. 31.]

Lagopus lagopus atavus Jánossy 1974a: 534 [Lectotype from Rębielice Królewskie 1 (selected by Bocheński 1991: 570): proximal end of right humerus, ISEZ AF/26-RK1:22. Figured by Jánossy 1974a, pl. 24, fig. 6. Paralectotypes from Rębielice Królewskie 1 (listed after Jánossy 1974a: 534, and Bocheński 1991): two partial mandibulae, two cranial ends of left coracoids, three cranial ends of right coracoids, two diaphyses of right coracoids, three proximal ends of left scapulae, two proximal ends of right humeri, distal end of left humerus, proximal end of left ulna, two proximal ends of right ulnae, distal end of left ulna, distal end of right ulna, distal end of right radius, ulnare, left carpometacarpus, right carpometacarpus, proximal end of right carpometacarpus, three phalanges alae, proximal end of left femur, distal end of right tibiotarsus, 2 tarsometatarsi, and phalanx digiti pedis; ISEZ AF/26-RK1. Figured by Jánossy 1974a, pl. 24, fig. 4 (mandible), 5 (femur), 7 (carpometacarpus), and 8 (tarsometatarsus).]

Lagopus lagopus noaillensis Mourer-Chauviré 1975a: 86 [Holotype from Fage – layer 5: right tarsometatarsus, FSL 41594. Figured by Mourer-Chauviré 1975a, pl. 10, fig. 1.]

Lagopus atavus Jánossy: Jánossy 1976a: 33 [New rank.]

Distribution: Early Pliocene (MN 15) of Węże 1, Poland (Jánossy 1974a sub *L. lagopus atavus*), and Muselievo, Bulgaria (Boev 1998e sub *Lagopus* sp.); late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a sub *L. lagopus atavus*, Bocheński 1991 sub *L. atavus*); late Pliocene (MN 18) of Kielniki 3B, Poland (Jánossy 1974a sub *L. lagopus atavus*, Bocheński 1991 sub *L. atavus*);

early Pleistocene (MQ 1a) of Valerots, France (Mourer-Chauviré 1975a sub *L. lagopus*); early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 1-3, 4a, 4c, 5a, 5b, 9a, Czechia (Jánossy 1972, Mlíkovský orig.), and Stránská skála – Absolon's 2nd cave (Jánossy 1972 sub *L. lagopus*, Mlíkovský orig.); middle Pleistocene (MQ 2B) of Fage – layers CO, 34 and 40, France (Mourer-Chauviré 1975a sub *L. lagopus noaillensis*); and late Pleistocene (MQ 2C) of Schusterlucke, Austria (Woldřich 1893 sub *Lagopus medius*, Mlíkovský 1997d: 109).

Remarks: *Lagopus medius* Woldřich was synonymized with *Lagopus lagopus* (Linnaeus) by Mlíkovský (1997d: 109).

Lagopus mutus (Montin) – Rock Ptarmigan

Tetrao mutus Montin, 1781 [Modern species.]

Lagopus mutus correzensis Mourer-Chauviré 1975b: 87 [Holotype from Fage – layer 5: right tarsometatarsus, FSL 41601. Figured by Mourer-Chauviré 1975, pl. 10, fig. 2.

Distribution: Middle Pleistocene (MQ 2B) of Fage – layers 4, CO, 33, 37, 39 and 40, France (Mourer-Chauviré 1975a sub *Lagopus mutus correzensis*).

Remarks: This species was very abundant in late Pleistocene deposits of Europe, but it has no record earlier than MQ 2B, when it was reported from Westbury-sub-Mendip, England (Andrews 1990), Carrière, France (Mourer-Chauviré 1975a), Fage, France (see under Distribution), Hunas, Germany (Jánossy 1983b), and Hórvölgy, Hungary (Jánossy 1976a).

Genus incertae sedis

Alectoris pliocaena Tugarinov

Alectoris pliocaena Tugarinov, 1940b: 311 [Syntypes from Odesa – catacombs: proximal end of left carpometacarpus (IZAN 6940), and distal end of right ulna (IZAN 6941). Figured by Tugarinov 1940b, fig. 1a (carpometacarpus), 1b (ulna); and Dement'ev 1964, fig. 676a (carpometacarpus), 676b (ulna).]

Distribution: Early Pliocene (MN 15) of Odesa – catacombs, Ukraine (Tugarinov 1940b).

Remarks: Here transferred to the Phasianidae incertae sedis. The syntypes are too large for *Alectoris donnezani* (Depéret).

Gallus beremendensis Jánossy

Gallus beremendensis Jánossy, 1976b: 34 [Holotype from Beremend 5: right humerus; GIB, uncatalogued. Figured by Jánossy 1976b, pl. 8, fig. 5.]

Distribution: Late Pliocene (MN 16a) of Beremend 5, Hungary (Kretzoi 1956 sub "Phasianidae indet.", Jánossy 1976b).

Remarks: Jánossy (1976b) included this species in the genus *Gallus* Brisson without explanation, with the diagnosis "smaller than the hitherto known recent [sic!] or fossil forms of the genus". The taxonomic status of the species requires reexamination, because the holotype seems to differ from the corresponding element of *Gallus* in the shape of shaft, head, and bicipital crest (Mlíkovský orig.).

Gallus europaeus Harrison

Gallus europaeus Harrison, 1978: 375 [Holotype from Ostend: left coracoid; BMNH 18239. Not figured.]

Distribution: Middle Pleistocene (MQ 2A) of Ostend, England (Lydekker 1891a sub *Tetrao urogallus*, Harrison 1978, 1979d, 1985b).

Remarks: The taxonomic status of this species should be reevaluated. There is no evidence, that it belongs to the genus *Gallus* Brisson.

Gallus moldovicus Burčak-Abramovič et al.

Gallus moldovicus Burčak-Abramovič, Ganea & Šušpanov, 1993: 45.

Distribution: Late Pliocene of Moldova (Burčak-Abramovič et al. 1993).

Remarks: Not seen.

Palaeocryptonyx hungaricus Jánossy

Palaeocryptonyx hungaricus Jánossy, 1991: 14 [Holotype from Polgárdi 5: left humerus; GIB Vt-144-V-18.093. Figured by Jánossy 1991, pl. 2, fig. 6.]

Distribution: Late Miocene (MN 13) of Polgárdi 4, Hungary (Jánossy 1991), and Polgárdi 5, Hungary (Jánossy 1991).

Remarks: Ratio of the length of humerus and tarsometatarsus of *Palaeocryptonyx hungaricus* Jánossy is different from that of "*Palaeocryptonyx*" partridges, the tarsometatarsi being relatively shorter in *hungaricus* (Mlíkovský orig.).

Paraortygoides messelensis Mayr

Paraortygoides messelensis Mayr, 2000c: 48 [Holotype from Messel: almost complete skeleton in slab; SMF ME-1303a,b. Figured by Mayr 2000c, fig. 1, 2, 4, 7 and 8; and Mayr 2000g, fig. 9.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 2000c).

Remarks: *Paraortygoides messelensis* Mayr is type by original designation of the genus *Paraortygoides* Mayr, 2000c: 47.

Order Accipitriformes Vieillot

Accipitres Vieillot, 1816 [Modern order.]

Family Rallidae Vigors

Rallidae Vigors, 1825 [Modern family.]

Remarks: This list of the Rallidae is based mainly on previous lists by Cracraft (1973) and Olson (1977). It is certain, however, that the list presented below does not reflect true taxonomic structure of the family Rallidae at the genus and species levels, and even the allocation of some Eocene forms to this family is questionable.

Genus *Parvirallus* Harrison & Walker

Parvirallus Harrison & Walker, 1979a: 23 [Type by original designation: *Parvirallus gracilis* Harrison & Walker, 1979a.]

Parvirallus bassetti Harrison

Parvirallus bassetti Harrison, 1984a: 185 [Holotype from Sheppey: distal end of right tibio-tarsus; BMNH A-5282. Figured by Harrison 1984a, fig. 3a, 4b,c,e.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison 1984a).

Parvirallus medius Harrison

Parvirallus medius Harrison, 1984a: 185 [Holotype from Warden Point: distal end of right tibiotarsus; BMNH A-3546. Figured by Harrison 1984a, fig. 3b, 4a,d,f.]

Distribution: Early Eocene (MP 8-9) of Warden Point, Isle of Sheppey, England (Harrison 1984a).

Parvirallus gassoni Harrison

Parvirallus gassoni Harrison, 1984a: 185 [Holotype from Sheppey: distal end of right tibio-tarsus; BMNH A-5283. Figured by Harrison 1984a, fig. 3c, 4g.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison 1984a).

Parvirallus gracilis Harrison & Walker

Parvirallus gracilis Harrison & Walker, 1979a: 23 [Holotype humerus from Lee-on-Solent: distal end of left; BMNH A-4280. Figured by Harrison & Walker 1979a, pl. 1, row 5 partim.]

Distribution: Middle Eocene (MP 11-13) of Lee-on-Solent, England (Harrison & Walker 1979a).

Genus *Latipons* Harrison & Walker

Latipons Harrison & Walker, 1979a: 24 [Type by original designation: *Latipons gardneri* Harrison & Walker, 1979a.]

Latipons gardneri Harrison & Walker

Latipons gardneri Harrison & Walker, 1979a: 24 [Holotype from Lee-on-Solent: distal end of right tibiotarsus; BMNH A-5009. Figured by Harrison & Walker 1979a, pl. 1, row 3 partim, and row 4 partim.]

Distribution: Middle Eocene (MP 11-13) of Lee-on-Solent, England (Harrison & Walker 1979a).

Latipons robinsoni Harrison & Walker

Latipons robinsoni Harrison & Walker, 1979a: 25 [Holotype from Lee-on-Solent: distal end of left tibiotarsus; BMNH A-5011. Figured by Harrison & Walker 1979a, pl. 1, row 5 partim.]

Distribution: Middle Eocene (MP 11-13) of Lee-on-Solent, England (Harrison & Walker 1979a).

Genus *Ibidopsis* Lydekker

Ibidopsis Lydekker, 1891a: 74 [Type by monotypy: *Ibidopsis hordwelliensis* Lydekker, 1891a.]

Remarks: Lydekker (1891a) described this genus in the Plataleidae (= Threskiornithidae), but Cracraft (1973: 17) and Harrison & Walker (1976a: 342) transferred it to the Rallidae (see also Olson 1977).

Ibidopsis hordwelliensis Lydekker

Ibidopsis hordwelliensis Lydekker, 1891a: 74 [Holotype from Hordle: distal end of right tibiotarsus; BMNH 36793. Figured by Lydekker 1891a, fig. 20, Cracraft 1973, fig. 6a-d, Harrison & Walker 1976a, pl. 6, fig. a-e.]

Distribution: Late Eocene (MP 17) of Hordle, England (Lydekker 1891a, Cracraft 1973: 18, Harrison & Walker 1976a: 342).

Genus *Ludiortyx* Brodkorb

Ludiortyx Brodkorb, 1964: 298 [Type by original designation: *Palaeortyx blanchardi* Milne-Edwards, 1869.]

Eortyx Brodkorb, 1967: 111 [Type by original designation: *Tringa*? *hoffmanni* Gervais, 1852.]

Ludiortyx hoffmanni (Gervais)

Tringa? *hoffmanni* Gervais, 1852: 229 [Holotype from Montmarte: almost complete skeleton in two slabs; MNHN 7996 (not found in the collections in June 1999 – Mlíkovský, orig.). Figured by Gervais 1848-1852, pl. 49, fig. 4, Milne-Edwards 1869-1871, pl. 124, Zittel 1890, fig. 718, Brunet 1970, pl. D, Cracraft 1973, fig. 7.]

Palaeortyx hoffmanni (Gervais): Milne-Edwards 1869: 217 [New combination.]

Palaeortyx blanchardi Milne-Edwards, 1869: 223 [Holotype from Montmartre: associated skull, cervical vertebrae, scapula, humerus, ulna, radius, carpometacarpus and phalanx 1 digiti II in a slab; MNHN 7994. Figured by Milne-Edwards 1869-1871, pl. 126, fig. 1, Brunet 1970, pl. C below, and Cracraft 1973, fig. 8a-b.]

Ludiortyx blanchardi (Milne-Edwards): Brodkorb 1964: 298 [New combination.]

Eortyx hoffmanni (Gervais): Brodkorb 1967: 111 [New combination.]

Ludiortyx hoffmanni (Gervais): Brunet 1970: 33 [New combination.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Gervais 1848-1852, Bonaparte 1856: 1021 sub "Etourneau", Milne-Edwards 1869-1871, Brunet 1970, Cracraft 1973, Olson 1977).

Remarks: Originally described as a sandpiper (*hoffmanni*) and as a quail (*blanchardi*), the two species are conspecific, representing a rail (Brunet 1970: 33, Cracraft 1973: 19, Olson 1977: 343).

Genus *Montirallus* Mlíkovský

Montirallus Mlíkovský, 1981: 342 [Type by original designation: *Numenius gypsorum* Gervais, 1848. – See Mlíkovský 1995a: 313 for the citation of the type species.]

Montirallus gypsorum (Gervais)

Numenius gypsorum Gervais, 1844a: 18 [Nomen nudum; no description or indication.]
Numenius gypsorum Gervais, 1844b: 294 [Nomen nudum; no description or indication.]
Numenius gypsorum Gervais, 1852: 230 [Lectotype from Montmartre (selected by Mlíkovský 1995a: 313): partial skull imprint showing brain morphology in slab; MNHN 7992 partim. Figured by Gervais 1848-1852, pl. 49, fig. 2, and Dechaseaux 1970b, fig. 1, upper row. Paralectotypes from Montmartre: lateral sternum imprint in slab (MNHN 7920), and associated partial skull imprint and several cervical vertebrae (MNHN 7992 partim). Figured by Gervais 1848-1852, pl. 49, fig. 1 (skull with vertebrae) and 3 (sternum), and Brunet 1970, pl. A, fig. c (sternum).]
Numenius (*Limosa*) *gypsorum* (Gervais): Milne-Edwards, 1871: 551 [New combination.]
Limosa gypsorum (Gervais): Brodkorb 1967: 185 [New combination.]
Villetus gypsorum (Gervais): Harrison 1979b: 107 [New combination.]
Montirallus gypsorum (Gervais): Mlíkovský 1981: 342 [New combination.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Gervais 1844a,b, 1848-1852, Brunet 1970, Harrison 1979b, Mlíkovský 1981, 1995a).

Remarks: This species was originally described as a curlew. Brodkorb (1967: 185) and Harrison (1979b: 107) confirmed the identification (though in different genera), but Mlíkovský (1981) moved the species on the basis of the brain morphology to the family Rallidae.

Genus *Quercyrallus* Brodkorb

Quercyrallus Lambrecht, 1933: 461 [Nomen nudum; type not fixed after 1930.]
Quercyrallus Brodkorb, 1952: 175 [Type by original designation: *Rallus arenarius* Milne-Edwards, "1891" = 1892.]

Quercyrallus arenarius (Milne-Edwards)

Rallus arenarius Milne-Edwards, 1892: 74 [Holotype from Quercy: proximal end of left humerus; MNHN QU-3072. Figured by Gaillard 1908, fig. 33, Cracraft 1973, fig. 10a.]
Quercyrallus arenarius (Milne-Edwards): Lambrecht 1933: 461 [New combination, but the genus name was nomen nudum at this point.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908: 110, Cracraft 1973: 22, Olson 1977: 344).

Quercyrallus quercy Cracraft

Quercyrallus quercy Cracraft, 1973: 24 [Holotype from Quercy: distal end of right humerus; MNHN QU-3071. Figured by Cracraft 1973, fig. 10b-c.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Cracraft 1973, Olson 1977: 345).

Genus *Rallicrex* Lambrecht

Rallicrex Lambrecht, 1933: 463 [Type by monotypy: *Rallicrex kolozsvarensis* Lambrecht, 1933.]

Rallicrex kolozsvarensis Lambrecht

Rallicrex kolozsvarensis Lambrecht, 1933: 463 [Holotype from Cetăţuie: distal end of left (not right as stated by Olson 1977: 345) tarsometatarsus; GIB, uncatalogued. Figured by Lambrecht 1933, fig. 141a-b, and Jurcsák & Kessler 1973, fig. 9.]

Distribution: Middle Oligocene (MP 24) of Cetăţuie, Romania (Lambrecht 1933: 463, Cracraft 1973: 25, Olson 1977: 345).

Rallicrex polgardiensis Jánossy

Rallicrex polgardiensis Jánossy, 1991: 20 [Holotype from Polgárdi 5: left femur; GIB Vt-147-V-18.096. Figured by Jánossy 1991, pl. 3, fig. 9.]

Distribution: Late Miocene (MN 13) of Polgárdi 4, Hungary (Jánossy 1991), and Polgárdi 5, Hungary (Jánossy 1991).

Remarks: The generic position of this species is uncertain.

Genus *Paraortygometra* Lambrecht

Paraortygometra Lambrecht, 1933: 462 [Type by monotypy: *Rallus porzanoides* Milne-Edwards, 1869.]

Microrallus Švec, 1983: 32 [Type by original designation: *Microrallus fejfari* Švec, 1983.]

Paraortygometra porzanoides (Milne-Edwards)

Rallus porzanoides Milne-Edwards, 1869: 150 [Holotype from Saint-Gérand-le-Puy: right tarsometatarsus; MNHN Av-2871. Figured by Milne-Edwards 1869-1871, pl. 105, fig. 1-7, Cracraft 1973, fig. 17a-c. Cracraft (1973: 34) called the holotypical tarsometatarsus a lectotype, but Milne-Edwards 1869: 150 clearly based the species on a single tarsometatarsus, tentatively assigning to the species (on his p. 151) also distal end of a right femur (MNHN Av-2870) and a right humerus (MNHN Av-2869).]

Paraortygometra porzanoides (Milne-Edwards): Lambrecht 1933: 463 [New combination.]

Microrallus fejfari Švec, 1983: 37 [Holotype from Dolnice: distal end of left humerus; DP FNSP 4818. Figured by Švec 1983, text-fig. 1a, pl. 1.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Lambrecht 1933: 463, Cracraft 1973: 34, Olson 1977: 345); early Miocene (MN 4b) of Dolnice, Czechia (Švec 1983, Mlíkovský orig.); middle Miocene (MN 8) of Grive-Saint-Alban – fissure H, France (Ballmann 1969a, Cracraft 1973: 34, Olson 1977: 346); and late Miocene (MN 12) of Aljezar B, Spain (Cheneval & Adrover 1993). Extralimital record is available from the early Miocene (MN 3?) of Li Mae Long, Thailand (Cheneval et al. 1984, 1991).

Genus *Palaeoaramides* Lambrecht

Palaeoaramides Lambrecht, 1933: 462 [Type by monotypy: *Rallus christyi* Milne-Edwards, 1869.]

Pararallus Lambrecht, 1933: 466 [Type by monotypy: *Rallus dispar* Milne-Edwards, 1869.]

Tertiariaporphyrula Kuročkin & Ganea, 1972: 66 [Type by original designation: *Rallus beaumonti* Milne-Edwards, 1869.]

Remarks: The extralimital record is limited to *Palaeoaramides tugarinovi* Kuročkin, 1980 from the middle Pliocene of Mongolia (Kuročkin 1980). The genus *Tertiaporphyrula* Kuročkin & Ganea was synonymized with *Palaeoaramides* Lambrecht by Cracraft (1973: 30), and the genus *Pararallus* Lambrecht is synonymized with *Palaeoaramides* Lambrecht here (see under *Palaeoaramides beaumontii* Milne-Edwards).

Palaeoaramides christyi (Milne-Edwards)

Rallus Christyi Milne-Edwards, 1869: 146 [Lectotype from Saint-Gérand-le-Puy (selected by Cracraft 1973: 27): right tarsometatarsus; MNHN Av-2868. Figured by Milne-Edwards 1869-1871, pl. 104, fig. 1-6 (not pl. 103, fig. 1-5, as stated by Brodkorb 1967: 119). Paralectotype from Saint-Gérand-le-Puy: right tibiotarsus lacking proximal end; MNHN Av-2867. Figured by Milne-Edwards 1869-1871, pl. 104, fig. 1, 7-9.]

Rallus eximius Milne-Edwards, 1869: 149 [Holotype from Saint-Gérand-le-Puy: right tarso-

metatarsus; MNHN Av-2865. Figured by Milne-Edwards 1969-1871, pl. 103, fig. 6-11.]
Palaeoaramides christyi (Milne-Edwards): Lambrecht 1933: 462 [New combination.]
Palaeoaramides eximius (Milne-Edwards): Brodkorb 1967: 119 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871 sub *Rallus christyi*, Cracraft 1973: 27, Olson 1977: 346).

Remarks: *Rallus eximius* Milne-Edwards was synonymized with *Rallus christyi* Milne-Edwards by Lambrecht (1933: 462, see also Cracraft 1973, Olson 1977).

Palaeoaramides beaumontii (Milne-Edwards)

Rallus Beaumontii Milne-Edwards, 1869: 152 [Lectotype from Sansan (selected by Cracraft 1973: 30): distal end of right tibiotarsus; MNHN Sa-1205. Figured by Milne-Edwards 1969-1871, pl. 104, fig. 16-20. Paralectotypes from Saint-Gérand-le-Puy: proximal end of right humerus (MNHN Sa-1204), distal end of right humerus (MNHN Sa-1203), proximal end of right tarsometatarsus (present location unknown), and distal end of right tarsometatarsus (MNHN Sa-1206). Figured by Milne-Edwards 1869-1871, pl. 104, fig. 10-12 (distal end of tarsometatarsus), 13-15 (proximal end of tarsometatarsus), 21-22, 26 (proximal end of humerus), 21-25 (distal end of humerus); and Cracraft 1973, fig. 13a-b (distal end of humerus). The list of paralectotypes presented by Cheneval (2000: 357) incorrectly includes also several syntypes of *Palaeoperdix prisca* Milne-Edwards.]

Rallus dispar Milne-Edwards, 1869: 155 [Lectotype from Sansan (here selected): distal end of left tarsometatarsus; MNHN Sa-1210. Figured by Milne-Edwards 1869-1871, pl. 105, fig. 17-20, 22, and Cracraft 1973, fig. 16a-b. Paralectotypes from Sansan: proximal ends of two right tarsometatarsi (MNHN Sa-1207-1208), and proximal end of a left tarsometatarsus (Sa-1209). Figured by Milne-Edwards 1969-1871, pl. 105, fig. 17-21 (proximal end of right tarsometatarsus). Milne-Edwards (1869: 155) assigned to this species another two elements from Sansan, which led Brodkorb (1967: 120), Cracraft (1973: 33) and Olson (1977: 347) to believe that they form part of the syntypical series, which is not the case (see Mlíkovský 1998e: 338). Cracraft (1973: 33) erroneously selected one of the assigned elements (distal end of left humerus; MNHN Sa-1201) as a lectotype of the species, this action being invalid from the point of view of zoological nomenclature (ICZN 1999). Unfortunately, the "lectotypical" humerus belongs to a parrot (Cheneval 2000). In belief that the latter bone is the name-bearer of *Rallus dispar*, Cheneval (2000) applied the name to the parrot from Sansan, which is unsubstantiated (see also Mlíkovský 1998e).]

Pararallus dispar (Milne-Edwards): Lambrecht 1933: 466 [New combination.]
Pararallus beaumonti (Milne-Edwards): Brodkorb 1967: 120 [New combination.]
Tertiariaporphyrula beaumonti (Milne-Edwards): Kuročkin & Ganea 1972: 66 [New combination.]
Palaeoaramides beaumonti (Milne-Edwards): Cracraft 1973: 30 [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869-1871, Cracraft 1973, Olson 1977, Mlíkovský 1998e).

Remarks: The lectotype of *Rallus dispar* Milne-Edwards was assigned to *Palaeoaramides beaumonti* (Milne-Edwards) by Cheneval (2000: 357). Accordingly, I synonymize here the former with latter species.

Palaeoaramides lungi (Kuročkin & Ganea)

Tertiariaporphyrula lungi Kuročkin & Ganea, 1972: 67 [Holotype from Bujoru: distal end of right tibiotarsus; TGPI 4/60. Figured by Kuročkin & Ganea 1972, text-fig. 12, pl. 2, fig. 10.]
Palaeoaramides lungi (Kuročkin & Ganea): Olson 1977: 346 [New combination.]

Distribution: Late Miocene (MN 9-11) of Bujoru, Moldova (Kuročkin & Ganea 1972).

Genus *Miorallus* Lambrecht

Miorallus Lambrecht, 1933: 466 [Type by monotypy: *Rallus major* Milne-Edwards, 1869.]

Miorallus major (Milne-Edwards)

Rallus major Milne-Edwards, 1869: 157 [Holotype from Sansan: distal end of left humerus; MNHN Sa-1200. Figured by Milne-Edwards 1869-1871, pl. 103, fig. 12-16; Cracraft 1973, fig. 18a-b; and Cheneval 2000, fig. 17.]

Miorallus major (Milne-Edwards): Lambrecht 1933: 466 [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869-1871 sub *Rallus major*, Lambrecht 1933, Cracraft 1973, Olson 1977).

Miorallus sp.

Distribution: Late Miocene (MN 9) of Rudabánya, Hungary (Jánossy 1993).

Remarks: This is a doubtful record, based on a proximal end of a humerus, not figured, and said to be "on all sides damaged" (Jánossy 1993: 58).

Genus *Porzana* Vieillot

Porzana Vieillot, 1816 [Modern genus.]

Porzana estramosi Jánossy

Porzana estramosi Jánossy, 1979: 20 [Holotype tarsometatarsus from Osztramos 9: fragmentary distal end of left; GIB V-78.120. Figured by Jánossy 1979, pl. 4, fig. 8.]

Porzana estramosi veterior Jánossy, 1991: 19 [Holotype from Polgárdi 4: right tarsometatarsus; GIB Vt-146-V-18.095. Figured by Jánossy 1991, pl. 3, fig. 7.]

Distribution: Middle Miocene (MN 6-8) of Mátraszőlős 1, Hungary (Gál & Kessler in Gál et al. 1999 sub *Porzana* aff. *estramosi*); late Miocene (MN 13) of Polgárdi 4, Hungary (Jánossy 1991); and early Pliocene (MN 14) of Osztramos 9, Hungary (Jánossy 1979).

Porzana porzana (Linnaeus) – Spotted Crake

Rallus Porzana Linnaeus, 1766 [Modern species.]

Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub cf. *P. porzana*); early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992 sub *P.* cf. *porzana*); and early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965 sub *P.* cf. *porzana*), and Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972).

Porzana parva (Scopoli) – Little Crake

Rallus parvus Scopoli, 1769 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992 sub *P.* cf. *parva*).

Porzana sp.

Distribution: Late Pliocene (MN 18) of Vǎršec, Bulgaria (Boev 1997b: 70, 2000a); and early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layer 15e, Czechia (Mlíkovský 1995b).

Genus *Crex* Bechstein

Crex Bechstein, 1803 [Modern genus.]

Crex crex (Linnaeus) – Corn Crake

Rallus Crex Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 17) of Kryžanovka 1, Ukraine (Dubrovo & Kapelist 1979 sub *C.* cf. *crex*); early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *C.* cf. *crex*); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 4a, and 9a, Czechia (Jánossy 1972 sub *C.* cf. *crex*), and Stránská skála – Musil's talus cone, layers 8, 11, and 13, Czechia (Mlíkovský 1995b).

Crex sp.

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban – early collections, France (Mlíkovský orig., material in USNM); late Miocene (MN 10) of Kohfidisch, Austria (Mlíkovský orig., material in NHMW); and early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992).

Genus *Rallus* Linnaeus

Rallus Linnaeus, 1758 [Modern genus.]

Rallus aquaticus Linnaeus – Water Rail

Rallus aquaticus Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 15) of Csarnóta 2, Hungary (Jánossy 1979 sub *Rallus* sp. – *aquaticus* group); and early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layer 8, Czechia (Mlíkovský 1995b).

Rallus sp.

Distribution: Middle Miocene (MN 6-8) of Mátraszőlős 1, Hungary (Gál & Kessler in Gál et al. 1999).

Genus *Gallinula* Brisson

Gallinula Brisson, 1760 [Modern genus.]

Gallinula balcanica Boev

Gallinula balcanica Boev, 1997b: 70, 78 [Nomen nudum; no description or indication]

Gallinula balcanica Boev, 1999g: 43 [Holotype from Vǎršec: left ulna; NMNHS 112. Figured by Boev 1999g, fig. 1.]

Distribution: Late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 1999g).

Gallinula gigantea Tchernov

Gallinula gigantea Tchernov, 1980: 30 [Holotype from 'Ubeidiya I: fragmentary proximal end of right humerus; HUJ, uncatalogued. Figured by Tchernov 1980, pl. 2, fig. 4.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layer 13, Czechia (Mlíkovský 1995b). The extralimital record is limited to the early Pleistocene (MQ 1a) of 'Ubeidiya I, Israel (Tchernov 1980).

Gallinula chloropus (Linnaeus) – Common Moorhen

Fulica Chloropus Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene or early Pleistocene (MN 16 - MQ 1) of Bobila Ordis, Spain (Mayr & Gregor 1999 sub *G.* cf. *chloropus*); early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992 sub *G.* cf. *chloropus*); and early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979d), Boxgrove – quarry 1, England (Harrison & Stewart 1999), and Přezletice, Czechia (Jánossy 1983 sub *G.* aff. *chloropus*).

Gallinula sp.

Distribution: Early Pliocene (MN 15) of Csarnóta 2, Hungary (Jánossy 1979); and early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965 sub ?*Gallinula*).

Genus *Fulica* Linnaeus

Fulica Linnaeus, 1758 [Modern genus.]

Fulica atra Linnaeus – Eurasian Coot

Fulica atra Linnaeus, 1758 [Modern species.]

Fulica atra pontica Boev & Karajvanova, 1998: 60 [Holotype from Sozopol: right tibiotarsus; NMNHS 6568. Figured by Boev & Karajvanova 1998, fig. 2.]

Distribution: Early Pleistocene (MQ 1b) of Přezletice, Czechia (Jánossy 1983 sub *F.* aff. *atra*), and Stránská skála – Musil's talus cone – layers 4a, 5, 10b, 143, and 15e, Czechia (Mlíkovský 1995b); and middle Holocene (MQ 2E; ca. 7000-5500 BP) of Sozopol, Bulgaria (Boev & Karajvanova 1998 sub *F. atra pontica*).

Family Cariamidae Bonaparte

Cariamidae Bonaparte, 1850 [Modern family.]

Phorusrhacosidae Ameghino, 1889: 659 [Type genus: *Phororhacos* Ameghino, 1889, which is an incorrect subsequent spelling of *Phorusrhacus* Ameghino, 1887 – see Mlíkovský 2000f.]

Brontornithidae Moreno & Mercerat, 1891: 20 [Type genus: *Brontornis* Moreno & Mercerat, 1891.]

Stereornithidae Moreno & Mercerat, 1891: 21 [Type genus: *Stereornis* Moreno & Mercerat, 1891.]

Darwinornithidae Moreno & Mercerat, 1891: 24 [Type genus: *Darwinornis* Moreno & Mercerat, 1891.]

Pelecyornidae Ameghino, 1891: 448 [Type genus: *Pelecyornis* Ameghino, 1891. This is incorrect original spelling. This is a senior objective synonym of Psilopteridae Sáez, 1927 – see Mlíkovský 2000d.]

Patagornithidae Mercerat, 1897: 225 [Type genus: *Patagornis* Moreno & Mercerat, 1891.]

Phororhacidae Amegnino: Lydekker, 1893d: 43 [Spelling emended.]

Orthocnémides Gaillard, 1908: 113 [Vernacular name applied after 1900; not available for nomeclatural purposes – see Brodkorb 1967: 136, Mlíkovský 2000d.]

Hermosiornidae Rovereto, 1914: 110 [Type genus: *Hermosiornis* Rovereto, 1914. This is incorrect original spelling.]

Orthocnemidae Lambrecht, 1921: 70 [Type genus: *Orthocnemus* Milne-Edwards, 1892 = *Idiornis* Oberholser, 1899. Brodkorb (1967: 136) erroneously attributed this family-group name to Lambrecht 1933: 490.]

Bathornithinae Wetmore, 1927: 13 [Type genus: *Bathornis* Wetmore, 1927.]

Psilopteridae Sáez, 1927: 156 [Type genus: *Psilopterus* Moreno & Mercerat, 1891 = *Pelecyornis* Ameghino, 1891. This is a junior objective synonym of Pelecyornithidae Ameghino, 1891 – see Mlíkovský 2000d.]

Devincenziidae Kraglievich, 1932: 323 [Type genus: *Devincenzia* Kraglievich, 1932.]

Mesembriorniidae Kraglievich, 1932: 332 [Type genus: *Mesembriornis* Moreno & Mercerat, 1891. This is incorrect original spelling.]

Liorninae Kraglievich, 1932: 348 [Type genus: *Liornis* Ameghino, 1895 = *Rostrornis* Moreno & Mercerat, 1891. This is incorrect original spelling.]

Brontorniinae Moreno & Mercerat: Kraglievich 1932: 348 [New rank; spelling incorrect.]

Tolmodinae Kraglievich, 1932: 348 [Type genus: *Tolmodus* Ameghino, 1891.]

Agnopteridae Lambrecht, 1933: 333 [Type genus: *Agnopterus* Milne-Edwards, 1868.]
Bathornithidae Wetmore: Wetmore 1933: 301 [New rank.]
Hermosiornithidae Rovereto: Wetmore, 1934b: 7 [Spelling emended.]
Phororhacoidea Ameghino: Patterson 1941: 49 [New rank.]
Mesembriornithidae Kraglievich: Kraglievich 1946: 108 [Spelling emended.]
Hermosiornithinae Rovereto: Patterson & Kraglievich 1960: 17 [New rank.]
Phorusrhacidae Amegnino: Brodkorb 1963c: 111 [Spelling emended.]
Phorushacoidae Ameghino: Brodkorb 1963c: 111 [Spelling emended.]
Idiornithidae Brodkorb, 1965: 197 [Type genus: *Idiornis* Oberholser, 1899.]
Idiornithinae Brodkorb: Mourer-Chauviré 1983: 87 [New rank.]
Liornithidae Kraglievich: Mlíkovský 2000d: 79 [Spelling emended.]
Pelecyornithidae Ameghino: Mlíkovský 2000d: 80 [Spelling emended.]
Phorusrhacinae Mlíkovský this paper [New rank.]

Genus *Gypsornis* Milne-Edwards

Gypsornis Milne-Edwards, 1869: 140 [Type by monotypy: *Gypsornis cuvieri* Milne-Edwards, 1869.]

Percolinus Harrison & Walker, 1977a: 34 [Type by original designation: *Percolinus venablesi* Harrison & Walker, 1977a.]

Distribution: Early Eocene (MP 8-9) of England, and late Eocene (MP 19) of France.

Gypsornis venablesi (Harrison & Walker)

Percolinus venablesi Harrison & Walker, 1977a: 34 [Holotype from Sheppey: proximal end of left tarsometatarsus; BMNH A-3680. Figured by Harrison & Walker 1977a, pl. 8, fig. k-o.]

Gypsornis venablesi (Harrison & Walker): Mlíkovský, this paper [New combination.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1977a).

Remarks: This species was originally described in the Phasianidae (Harrison & Walker 1977), but its holotypical tarsometatarsus differs from the same element of phasianids and agrees with that of *Gypsornis* Milne-Edwards in the shape of its proximal end (best visible in proximal view), and in the configuration of hypotarsus. Hence, I include here *Percolinus venablesi* in the genus *Gypsornis*. Within the latter genus, *venablesi* is smaller (proximal width of tarsometatarsus = 7.2 mm vs. 11.7 mm) and older than *Gypsornis cuvieri* Milne-Edwards.

Gypsornis cuvieri Milne-Edwards

Gypsornis cuvieri Milne-Edwards, 1869: 140 [Holotype from Montmartre: proximal end of left tarsometatarsus; MNHN 7983. Figured by Cuvier 1822, pl. 74, fig. 7 (not pl. 73 as stated by Cuvier 1822: 324; see also Brunet 1970: 27); Milne-Edwards 1869-1871, pl. 103, fig. 1-5; and Cracraft 1973, fig. 21a-b.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Cuvier 1822 as an unnamed bird, Milne-Edwards 1869-1871, Brunet 1970, Cracraft 1973).

Remarks: This species was originally described as a rail (Milne-Edwards 1869-1871, see also Brunet 1970), but Cracraft (1973: 53) transferred it to the Idiornithidae.

Genus *Talantatos* Reichenbach

Talantatos Reichenbach, 1852: xiv [Type by monotypy: *Tantalus fossilis* Giebel, 1847. Note that this genus name was consistently misspelled as *Tantalatos* by Mlíkovský 1995a.]

Elaphrocnemus Milne-Edwards, 1892: 77 [Type by subsequent designation (Richmond 1902: 680): *Elaphrocnemus phasianus* Milne-Edwards, 1892.]

Filholornis Milne-Edwards, 1892: 67 [Type by subsequent designation (Richmond 1902: 684): *Filholornis paradoxa* Milne-Edwards, 1892.]

Distribution: Middle Eocene (MP 11-13) of England, and late Eocene to late Oligocene (MP 19-28) of France. *Phasianus alfhildae* Shufeldt, 1915 from the late Eocene of Wyoming was included in *Elaphrocnemus* Milne-Edwards by Brodkorb (1967: 138), but Cracraft (1973: 69) excluded it from the Cariamidae.

Talantatos proudlocki (Harrison & Walker)

Percolinus proudlocki Harrison & Walker, 1979a: 21 [Holotype from Lee-on-Solent: proximal end of right tarsometatarsus; BMNH A-4286. Figured by Harrison & Walker 1979a, pl. 1, row 3 partim.]

Talantatos proudlocki (Harrison & Walker): Mlíkovský, this paper [New combination.]

Distribution: Middle Eocene (MP 11-13) of Lee-on-Solent, England (Harrison & Walker 1979a).

Remarks: This species was originally described in the Phasianidae (Harrison & Walker 1979a), but its holotypical tarsometatarsus markedly differs from the same element of phasianids and agrees with that of *Talantatos* Reichenbach in the shape of its proximal end (in proximal view) and in the configuration of the hypotarsus. Accordingly, I transfer here *proudlocki* from the genus *Percolinus* Harrison & Walker to *Talantatos* Reichenbach. Within the latter genus, the holotypical tarsometatarsus of *proudlocki* agrees in size with *Talantatos fossilis* Reichenbach, but its internal hypotarsal ridge seems to be more slender and the species is much older. Hence, I retain here *proudlocki* as a separate species in the genus *Tantalatos* Reichenbach until more evidence is obtained.

Talantatos fossilis (Giebel)

T[antalus] fossilis Giebel, 1847: 27 [Holotype from Montmartre: right femur; MNHN 7992 partim. Figured by Cuvier 1822, pl. 73, fig. 14a-c. See Mlíkovský 1995a for the identity of the holotype.]

Talantatos fossilis (Giebel): Reichenbach 1852: xiv [New combination.]

Elaphrocnemus phasianus Milne-Edwards, 1892: 77 [Holotype from Quercy: left tarsometatarsus; MNHN QU-15514. Figured by Cracraft 1973, fig. 27a-b. Milne-Edwards (1892) described this species on the basis of a single tarsometatarsus. Its measurements agree with those of the tarsometatarsus labeled by Cracraft (1973: 61) as a lectotype, this being holotype in fact. Mourer-Chauviré (1983: 92) followed Cracraft in the erroneous assumption that this specimen is a lectotype.]

Filholornis paradoxa Milne-Edwards, 1892: 67 [Holotype from Quercy: left humerus; MNHN QU-16200. Not figured.]

Filholornis debilis Milne-Edwards, 1892: 69 [Holotype from Quercy: left humerus; MNHN QU-16227. Figured by Mourer-Chauviré 1983, pl. 1, fig. 3-4.]

Orthocnemus major Milne-Edwards, 1892: 76 [Holotype from Quercy: distal end of left tarsometatarsus; MNHN QU-15506. Figured by Cracraft 1973, fig. 29c-d. Milne-Edwards (1892: 76-77) clearly based the species on this distal end of tarsometatarsus, referring to it a proximal end of right tarsometatarsus from Quercy (MNHN QU-15505). Cracraft (1973: 57) erroneously selected the referred specimen as a lectotype of the species, being followed by Mourer-Chauviré (1983:110).]

Elaphrocnemus crex Milne-Edwards, 1892: 78 [Lectotype from Quercy: right tarsometatarsus; MNHN QU-15512 (formerly MNHN 3012). Figured by Cracraft 1973, fig. 29a-b. Paralectotypes from Quercy (all in MNHN): distal end of right tibiotarsus (QU-15680), right tarsometatarsus (QU-15518), left tarsometatarsus (QU-15566), distal end of right tarsometatarsus (QU-15513), and distal end of left tarsometatarsus (QU-15506). Figured by Cracraft 1973, fig. 29c-d (distal end of left tarsometatarsus). The list of paralectotypes is based on Cracraft's (1973: 66-67) and Mourer-Chauviré's (1983: 95) lists of bones from the early collections from Quercy from MNHN which could be at disposal to Milne-Edwards, and which were identified as belonging to *Elaphrocnemus crex* by these two modern

authors.]
Idiornis major (Milne-Edwards): Oberholser 1899: 202 [New combination.]
Telecrex peregrinus Mlíkovský, 1989b: 64 [Holotype from Quercy: left femur; NHMW 1988/28/1. Figured by Mlíkovský 1989b, pl. 1, fig. a-f.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908, 1939, Cracraft 1973, Mourer-Chauviré 1983); late Eocene (MP 19) of Montmartre, France (Cuvier 1822 as an unidentified bird, Giebel 1847, Mlíkovský 1995a), Rosières 2, France (Mourer-Chauviré 1983), Escamps C, Escamps III and Escamps IV, France (Mourer-Chauviré 1983); early Oligocene (MP 21) of Aubrelong 1, France (Mourer-Chauviré 1983) and Ravet Lupovici, France (Mourer-Chauviré 1983); early Oligocene (MP 22) of Plante 2, France (Mourer-Chauviré 1983); middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1983), Roqueprune 2, France (Mourer-Chauviré 1983), and Crabit 1, France (Mourer-Chauviré 1983); and late Oligocene (MP 28) of Desse, France (Mourer-Chauviré 1983), and Fraysse, France (Mourer-Chauviré 1983).

Remarks: The nomenclatural history of *Tantalus fossilis* was traced by Mlíkovský (1995a: 312). Gervais (1848-1852: 230) synonymized *Tantalus fossilis* Giebel with *Numenius gypsorum* Gervais. This decision was followed by Brodkorb (1967: 185) and Brunet (1970: 25), who believed that these two forms were based on the same types. This is not true, however (see Mlíkovský 1995a: 312). I examined the holotypical femur of *Tantalus fossilis* in MNHN, finding that it is identical in both size and morphology with the same element of *Elaphrocnemus phasianus* Milne-Edwards. The two species are thus synonymous, with *Talantatos fossilis* (Giebel) being the senior synonym.

Filholornis paradoxa Milne-Edwards and *Filholornis debilis* Milne-Edwards were synonymized with *Elaphrocnemus phasianus* Milne-Edwards by Mourer-Chauviré (1983: 88, 92). Cracraft (1973: 65) and Mourer-Chauviré (1983: 95) recognized *Elaphrocnemus crex* Milne-Edwards as a separate species, size being the distinguishing character. The measurements (Mourer-Chauviré 1983, pl. 1-2) show that *Elaphrocnemus phasianus* Milne-Edwards was based on smaller, while *Elaphrocnemus crex* Milne-Edwards on larger specimens of a single species. Accordingly, I synonymize here the latter with the former species.

Orthocnemus major Milne-Edwards was synonymized with *Orthocnemus cursor* Milne-Edwards by Cracraft (1973: 57; see also Mourer-Chauviré 1983: 88, 110). This synonymization was based on a misidentified holotype (see above). The proper holotype, erroneously considered paralectotype by Cracraft (1973) and Mourer-Chauviré (1983), was referred by both these authors to *Elaphrocnemus crex* Milne-Edwards. Hence, *Orthocnemus major* Milne-Edwards must be removed from the synonymy of *Orthocnemus cursor* Milne-Edwards [= *Agnopterus gallicus* (Milne-Edwards)], and synonymized with *Talantatos fossilis* (Giebel), following the taxonomic treatment of the genus *Talantatos* Reichenbach accepted in the present paper. *Telecrex peregrinus* Mlíkovský, originally described as a guinea-fowl, was synonymized with *Elaphrocnemus phasianus* Milne-Edwards [= *Talantatos fossilis* (Giebel)] by Mourer-Chauviré (1992b: 87).

Talantatos brodkorbi (Mourer-Chauviré)

Elaphrocnemus brodkorbi Mourer-Chauviré, 1983: 97 [Holotype from Quercy: proximal end of left tarsometatarsus; MNHN QU-15500. Figured by Mourer-Chauviré 1983, pl. 2, fig. 3-4.]
Talantatos brodkorbi (Mourer-Chauviré): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1983); and middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1983 sub *Elaphrocnemus crex*, reidentified by Mlíkovský, orig.).

Remarks: Mourer-Chauviré (1983: 95) attributed proximal end of left femur from Itardiès (USTL ITD-597) to *Elaphrocnemus crex* Milne-Edwards [= *Talantatus fossilis* (Giebel)], but the measurements (Mourer-Chauviré 1983, tab. 2) indicate that the specimen is too large for this species, corresponding in size with the holotype of *Talantatos brodkorbi* (Mourer-Chauviré).

Genus *Agnopterus* Milne-Edwards

Agnopterus Milne-Edwards, 1867: 83 [Type by monotypy: *Agnopterus laurillardi* Milne-Edwards, 1868.]

Orthocnemus Milne-Edwards, 1892: 74 [Type by subsequent designation (Brodkorb 1967: 136): *Orthocnemus gallicus* Milne-Edwards, 1892. The type was designated by original decision according to Brodkorb (1967: 136), but I found nothing in Milne-Edwards (1892) what would indicate which of the three species included in the genus was deemed to be its type. Accordingly, I attribute here the respective nomenclatural act to Brodkorb (1967) himself. This is a junior homonym of *Orthocnemus* Jekel, 1857.]

Idiornis Oberholser, 1899: 202 [New name for *Orthocnemus* Milne-Edwards, 1892; hence its junior objective synonym.]

Distribution: Early Eocene (MP 11) of Germany, and late Eocene to late Oligocene (MP 16-28) of France.

Remarks: My restudy of the holotypical tibiotarsus of *Agnopterus laurillardi* Milne-Edwards showed that it is identical with the same element of the cariamas included by Mourer-Chauviré (1983) in the genus *Idiornis* Oberholser. *Agnopterus* Milne-Edwards has precedence over *Idiornis* Oberholser, which results in several nomenclatural changes (new combinations) that are made below.

Agnopterus tuberculatus (Peters)

Idiornis tuberculata Peters, 1995: 107 [Holotype from Messel: crushed skeleton in slab and counter-slab; IRScNB, uncatalogued (= field-number 160 of the 1986 excavations in Messel). Figured by Peters 1995, fig. 1-6, 9.]

Agnopterus tuberculatus (Peters): Mlíkovský, this paper [New combination.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Peters 1995).

Agnopterus gallicus (Milne-Edwards)

Filholornis gravis Milne-Edwards, 1892: 69 [Holotype from Quercy: left ulna; MNHN QU-15558. Figured by Mourer-Chauviré 1983, pl. 2, fig. 10-11. Milne-Edwards (1892: 69) attributed to *Filholornis gravis* also left carpometacarpus from Quercy (MNHN QU-16206). Mourer-Chauviré (1983: 88, 105) erroneously considered both the specimens syntypes of the species.]

Orthocnemus gallicus Milne-Edwards, 1892: 74 [Lectotype from Quercy (selected by Cracraft 1973: 54): right tarsometatarsus; MNHN QU-15502. Figured by Cracraft 1973, fig. 22a-b, and Mourer-Chauviré 1983, pl. 2, fig. 14-15. Paralectotype from Quercy: distal end of left tibiotarsus, MNHN QU-15605. Figured by Mourer-Chauviré 1983, pl. 3, fig. 10.]

Orthocnemus cursor Milne-Edwards, 1892: 76 [Holotype from Quercy: left tarsometatarsus; MNHN QU-15508. Figured by Cracraft 1973, fig. 24a, and Mourer-Chauviré 1983, pl. 3, fig. 1-2. Cracraft (1973: 57) and Mourer-Chauviré (1983: 110) referred to the holotypical tarsometatarsus as to the lectotype. However, Milne-Edwards (1892: 76) clearly based *Orthocnemus cursor* on a complete tarsometatarsus (only one was available to him), referring to the species several other tarsometatarsi smaller than the holotype, and distal end of a tibiotarsus. The latter specimens thus do not form part of a syntypical series, and the complete tarsometatarsus is to be regarded as the holotype.]

Idiornis gallicus (Milne-Edwards): Oberholser 1899: 202 [New combination.]

Idiornis cursor (Milne-Edwards): Oberholser 1899: 202 [New combination.]

Idiornis gaillardi Cracraft, 1973: 59 [Holotype from Quercy: left tarsometatarsus; MNHN QU-

15534. Figured by Cracraft 1973, fig. 26a-c, and Mourer-Chauviré 1983, pl. 3, fig. 18-19.]

Agnopterus gallicus (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908, 1939, Cracraft & Rich 1972 sub *Diatropornis ellioti* [see Mourer-Chauviré 1983: 111], Cracraft 1973, Mourer-Chauviré 1983); late Eocene (MP 16) of Bretou, France (Mourer-Chauviré 1983) and Lavergne, France (Mourer-Chauviré 1983); late Eocene (MP 16-20) of Garrigues, France (Mourer-Chauviré 1983); late Eocene (MP 17) of Perrière, France (Mourer-Chauviré 1983), Salème, France (Mourer-Chauviré 1983), and Bouffie, France (Mourer-Chauviré 1983); late Eocene (MP 19) of Escamps, France (Mourer-Chauviré 1983), and Lostanges, France (Mourer-Chauviré 1983); Oligocene (MP 21-28) of Boussac 2, France (Mourer-Chauviré 1983); middle Oligocene (MP 22) of Mas de Got B, France (Mourer-Chauviré 1983); middle Oligocene (MP 23) of Roqueprune 2, France (Mourer-Chauviré 1983); and late Oligocene (MP 28) of Desse, France (Mourer-Chauviré 1983), and Fraysse, France (Mourer-Chauviré 1983).

Remarks: *Filholornis gravis* Milne-Edwards was synonymized with *Orthocnemus* [= *Agnopterus*] *gallicus* (Milne-Edwards) by Mourer-Chauviré (1983: 88, 104). Both Cracraft (1973) and Mourer-Chauviré (1983) recognized three small-sized species within the genus *Idiornis* Oberholser, incl. *Idiornis gallicus* (Milne-Edwards), *Idiornis cursor* (Milne-Edwards), and *Idiornis gaillardi* Cracraft. Reconsidering the published measurements (Cracraft 1973, tab. 19-21, Mourer-Chauviré 1983, tab. 4-7), I found that the overall coefficient of variability for these three species is less than 10 %, which is well within the standard. Hence, I synonymize here the former two species with *Agnopterus gallicus* (Milne-Edwards).

Agnopterus minor (Milne-Edwards)

Orthocnemus minor Milne-Edwards, 1892: 77 [Holotype from Quercy: distal end of right tarsometatarsus; MNHN QU-15504. Figured by Cracraft 1973, fig. 25a-b.]

Idiornis minor (Milne-Edwards): Oberholser 1899: 202 [New combination.]

Agnopterus minor (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Mourer-Chauviré 1983); late Eocene (MP 17) of Bouffie, France (Mourer-Chauviré 1983), and Perrière, France (Mourer-Chauviré 1983); and late Eocene (MP 16-20) of Garrigues, France (Mourer-Chauviré 1983).

Agnopterus laurillardi Milne-Edwards

Agnopterus laurillardi Milne-Edwards, 1867: 83 [Holotype from Montmartre: distal end of left tibiotarsus; MNHN 7979. Figured by Milne-Edwards, 1867-1868, pl. 89, fig. 10-15; and Brunet 1970, fig. 3a-d.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Milne-Edwards 1867, Brunet 1970).

Remarks: This species was originally described as a flamingo (see also Brunet 1970). My restudy of the holotypical tibiotarsus showed that it differs in its general shape and in the shape of the internal condyle from the same element of the Phoenicopteridae and agrees with that of *Agnopterus* Milne-Edwards, where it is larger than other species (see Mourer-Chauviré 1983: 108 for measurements). The holotype of *A. laurillardi* Milne-Edwards has the following dimensions: depth of internal condyle = ca. 20 mm, posterior width of distal end = ca. 13 mm (Mlíkovský orig.).

Agnopterus gracilis (Milne-Edwards)

Elaphrocnemus gracilis Milne-Edwards, 1892: 78 [Holotype from Quercy: left tarsometa-tarsus; MNHN QU-15511. Figured by Cracraft 1973, fig. 31, and Mourer-Chauviré 1983, pl. 4, fig. 1-2.]

Idiornis gracilis (Milne-Edwards): Mourer-Chauviré 1983: 115 [New combination.]
Agnopterus gracilis (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908); middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1983); late Oligocene (MP 25) of Belgarric 1, France (Mourer-Chauviré 1983); and late Oligocene (MP 28) of Desse, France (Mourer-Chauviré 1983).

Agnopterus itardiensis (Mourer-Chauviré)

Idiornis itardiensis Mourer-Chauviré, 1983: 116 [Holotype from Itardiès: distal end of left tarsometatarsus; USTL ITD-595. Figured by Mourer-Chauviré 1983, pl. 4, fig. 12.]
Agnopterus itardiensis (Mourer-Chauviré): Mlíkovský, this paper [New combination.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 2000h sub *I.* cf. *itardiensis*); Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1983); middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1983), and Roqueprune 2, France (Mourer-Chauviré 1983); late Oligocene (MP 25) of Belgarric 4A, France (Mourer-Chauviré 1983); and late Oligocene (MP 28) of Fraysse, France (Mourer-Chauviré 1983).

Genus *Propelargus* Lydekker

Propelargus Lydekker, 1891a: 65 [Type by original designation: *Propelargus cayluxensis* Lydekker, 1891a.]

Geranopsis Milne-Edwards, 1892: 72 [Type by monotypy: *Geranopsis elatus* Milne-Edwards, 1892. This is a junior homonym of *Geranopsis* Lydekker, 1891a.]

Occitaniavis Mourer-Chauviré, 1983: 121 [Type by original designation: *Geranopsis elatus* Milne-Edwards, 1892.]

Oblitavis Mourer-Chauviré, 1983: 124 [Type by original designation: *Oblitavis insolitus* Mourer-Chauviré, 1983.]

Propelargus cayluxensis Lydekker

Propelargus cayluxensis Lydekker, 1891a: 66 [Holotype from Quercy: distal end of right tarsometatarsus; BMNH A-109. Figured by Lydekker 1891a, fig. 16.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Lydekker 1891a, Mourer-Chauviré 1983).

Propelargus elatus (Milne-Edwards)

Geranopsis elatus Milne-Edwards, 1892: 72 [Holotype from Quercy: distal end of right tibiotarsus; MNHN QU-15601. Figured by Mourer-Chauviré 1983, pl. 5, fig. 7-8.]
Occitaniavis elatus (Milne-Edwards): Mourer-Chauviré 1983: 122 [New combination.]
Propelargus elatus (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Cracraft 1973: 85, Mourer-Chauviré 1983).

Remarks: Milne-Edwards (1892: 72) described this species as being more similar to cranes (family Gruidae) than to other birds. Gaillard (1908: 82) included *Geranopsis elatus* Milne-Edwards in the synonymy of *Geranopsis hastingsiae* Lydekker (see also Lambrecht 1933: 517). Cracraft (1973: 85) resurrected the species, but relegated it to the Aves incertae sedis. Mourer-Chauviré (1983: 122) included this species in the Cariamidae, subfamily Idiornithinae. I found the holotypical tibiotarsus of this species to be strikingly similar to the same element of *Propelargus cayluxensis* Lydekker. Hence, I transfer here the species to the genus *Propelargus* Lydekker, synonymizing at the same time *Geranopsis* Milne-Edwards and *Occitaniavis* Mourer-Chauviré with that genus.

Propelargus insolitus (Mourer-Chauviré)

Oblitavis insolitus Mourer-Chauviré, 1983: 126 [Holotype from Quercy: right humerus; ML PQ-1201. Figured by Mourer-Chauviré 1983, pl. 5, fig. 5-6.]

Propelargus insolitus (Mourer-Chauviré): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1983).

Remarks: Mourer-Chauviré (1983: 126) stated that this species could be a small representative of either *Propelargus* Lydekker, 1891a or *Occitaniavis* Mourer-Chauviré, 1983. Because *Occitaniavis* Mourer-Chauviré is synonymous with *Propelargus* Lydekker (see above), I include *Oblitavis insolitus* Mourer-Chauviré in the latter genus as well. *Oblitavis* Mourer-Chauviré becomes herewith a synonym of *Propelargus* Lydekker.

Genus *Aenigmavis* Peters

Aenigmavis Peters, 1987a: 72 [Type by original designation: *Aenigmavis sapea* Peters, 1987a.]

Aenigmavis sapea Peters

Aenigmavis sapea Peters, 1987a: 73 [Holotype from Messel: incomplete skeleton in two slabs; coll. Maschwitz, uncatalogued. Figured by Peters 1987a, fig. 1-11.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Peters 1987).

Genus *Ameghinornis* Mourer-Chauviré

Ameghinornis Mourer-Chauviré, 1981a: 638 [Type by original designation: *Strigogyps minor* Gaillard, 1939.]

Ameghinornis minor (Gaillard)

Strigogyps minor Gaillard, 1939: 10 [Holotype from Quercy: left humerus; MNHN 16293. Figured by Gaillard 1939, fig. 4, Mourer-Chauviré 1981, pl. 1, fig. 1-2.]

Ameghinornis minor (Gaillard): Mourer-Chauviré 1981a: 639 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1939, Mourer-Chauviré 1981a); and middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1981a). See also Buffetaut & Rage (1982) and Mourer-Chauviré (1982b).

Genus incertae sedis

"Diatryma" cotei Gaillard

Diatryma (?) *Côtei* Gaillard, 1937a: 113 [Holotype from Lissieu: distal end of left tarsometatarsus (in a bad state), middle trochlea of left tarsometatarus (identification of the bone uncertain), two phalanges I digiti, distal end of a phalanx II digiti, and eight ungual phalanges; ML L-71 (tarsometatarsus), L-72 (?trochlea of a tarsometatarsus), L-66 and L-67 (phalanges I), L-76 (phalanx II), and L-69, 70, 73-75, 77, 88 (phalanges III). Figured by Gaillard 1937, fig. 1, 1a, 8, 8a (tarsometatarsus), 2, 2a-c, 9, 9a (trochlea), 3, 3a (phalanx I digiti III), 4, 4a (phalanx I digiti II), 5-6 (ungual phalanges), and 10 (composed skeleton).]

Diatryma cotei Gaillard: Brodkorb 1967: 144 [Spelling emended.]

Distribution: Middle Eocene (MP 14) of Lissieu, France (Gaillard 1937, 1939); and late Eocene (MP 16) of Lavergne, France (Mourer-Chauviré 1983: 128 sub Phorusrhacidae indet.; tentatively referred – Mlíkovský orig.). Brodkorb (1967: 145) attributed to this species also records from the middle Eocene (MP 11) of Messel, Germany (Berg 1965 sub *Diatryma* sp.), and Geiseltal XIII and XIV, Germany (Fischer 1962 sub *Diatryma* sp.). All German records belong to *Diatryma sarasini* Schaub (see above).

Remarks: Andors (1988, 1992) observed that this is not a diatryma, and placed the species in Aves incertae sedis.

Family Cuculidae Wagler

Cuculidae Wagler, 1830 [Modern family.]
Musophagidae Bonaparte, 1831 [Modern family.]
Apopempsidae Brodkorb, 1971b: 201 [Type genus: *Apopempsis* Brodkorb, 1971b.]
Veflintornithidae Kašin, 1976: 231 [Type genus: *Veflintornis* Kašin, 1976.]

Distribution: Unidentified "Musophagidae" were reported also from the late Oligocene (MP 28) of Gaimersheim 1, Germany (Ballmann 1970), and the middle Miocene (MN 5) of Vieux-Collonges, France (Ballmann 1972).

Genus *Dynamopterus* Milne-Edwards

Dynamopterus Milne-Edwards, 1892: 64 [Type by monotypy: *Dynamopterus velox* Milne-Edwards, 1892.]

Dynamopterus velox Milne-Edwards

Dynamopterus velox Milne-Edwards, 1892: 64 [Holotype from Quercy: right humerus; MNHN QU-16225. Not figured.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892).

Dynamopterus boulei Gaillard

Dynamopterus Boulei Gaillard, 1939: 19 [Holotype from Quercy: right humerus; MNHN QU-16296. Figured by Gaillard 1939, fig. 8.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1939).

Genus *Veflintornis* Kašin

Apopempsis Brodkorb, 1971: 202 [Type by original designation: *Musophaga meini* Ballmann, 1969a. This is a junior homonym of *Apopempsis* Schenkling, 1903.]
Veflintornis Kašin, 1976: 231 [New name for *Apopempsis* Brodkorb, 1971; hence its junior objective synonym.]

Remarks: The extralimital record of the genus *Veflintornis* Kašin is limited to "*Apopempsis*" *africanus* Harrison from the early Miocene of Kenya (Harrison 1980d), if the latter species was correctly identified to the genus.

Veflintornis meini (Ballmann)

Musophaga meini Ballmann, 1969a: 188 [Holotype from Grive-Saint-Alban – fissure M: proximal end of right carpometacarpus; FSL 62229 (formerly coll. Mein 118). Figured by Ballmann 1969a, pl. 13, fig. 5-9.]
Apopempsis meini (Ballmann): Brodkorb 1971: 202 [New combination.]
Veflintornis meini (Ballmann): Kašin 1976: 231 [New combination.]

Distribution: Middle Miocene (MN 8) of Grive-Saint-Alban – fissure M, France (Ballmann 1969a).

Genus *Cuculus* Linnaeus

Cuculus Linnaeus, 1758 [Modern genus.]

Cuculus csarnotanus Jánossy

Cuculus csarnotanus Jánossy, 1979: 25 [Holotype: distal end of left humerus from Csarnóta 2 – layer 3; NMB Vt-80. Figured by Jánossy 1979, fig. 4/6.]

Distribution: Early Pliocene (MN 15) of Csarnóta 2 – layer 3, Hungary (Jánossy 1979).

Cuculus canorus Linnaeus – Common Cuckoo

Cuculus canorus Linnseus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001); and (MQ 1b) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972), and Stránská skála – Musil's talus cone, layer 6, Czechia (Mlíkovský 1995b).

Cuculus sp.

Distribution: Late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1987b, 1990b, 1992).

Family Accipitridae Vigors

Accipitridae Vigors, 1824 [Modern family.]

Sagittariidae Finsch & Hartlaub, 1870 [Modern family.]

Remarks: All Tertiary forms listed below are in need of revision, excepting the genera *Polemaetus* Heine and *Pelargopappus* Stejneger.

Genus *Palaeocircus* Milne-Edwards

Palaeocircus Milne-Edwards, 1871: 454 [Type by monotypy: *Palaeocircus cuvieri* Milne-Edwards, 1871.]

Palaeocircus cuvieri Milne-Edwards

Palaeocircus Cuvieri Milne-Edwards, 1871: 454 [Holotype from Montmartre: right carpometacarpus; MNHN 7988. Figured by Cuvier 1822, pl. 75, fig. 3, Cuvier 1836, pl. 156, fig. 3, Milne-Edwards 1869-1871, pl. 185, fig. 16, and Brunet 1970, pl. A, fig. a-b.]

Distribution: Late Eocene (MP 17) of Hordle, England (Lydekker 1891a: 22, Harrison & Walker 1976a: 339); and late Eocene (MP 19) of Montmartre, France (Cuvier 1822: 317, 326 sub “Oiseau de proie de la grandeur du Balbuzard” = bird of the size of *Pandion haliaeetus*, Milne-Edwards 1869-1871, Brunet 1970: 44, Harrison 1979b).

Genus *Palaeohierax* Milne-Edwards

Palaeohierax Milne-Edwards, 1871: 156 [Type by monotypy: *Palaeohierax gervaisii* Milne-Edwards, 1863.]

Palaeohierax gervaisii (Milne-Edwards)

Aquila gervaisii Milne-Edwards, 1863: 156 [Holotype from Chaptuzat: left tarsometatarsus; MNHN Av-2832. Figured by Gervais 1848-1852, pl. 50, fig. 3-3a, Gervais 1859, pl. 50, fig. 3-3a, and Milne-Edwards 1869-1871, pl. 183, fig. 1-6.]

Palaeohierax gervaisi (Milne-Edwards): Milne-Edwards 1871: 456 [New combination.]

Distribution: Late Oligocene (MP 25) of Chaptuzat, France (Gervais 1844: 22 sub "Oiseau de proie", Gervais 1848-1852: 234 and 1859: 414 sub "*Aquila* ou *Pandion*", Milne-Edwards 1863, 1869-1871); and early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871: 457). Lambrecht (1933: 406) mentioned that Lydekker (1891) attributed two pedal phalanges from the Eocene of Hordwell (= Hordle) to this species. This is obviously an error, because Lydekker's action refers to *Palaeocircus cuvieri* Milne-Edwards, as correctly listed by Lambrecht (1933: 406 above).

Genus *Pernis* Cuvier

Pernis Cuvier, 1817 [Modern genus.]

Pernis apivorus (Linnaeus) – European Honey Buzzard

Falco apivorus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *P.* cf. *apivorus*).

Genus *Milvus* Lacépède

Milvus Lacépède, 1799 [Modern genus.]

Milvus milvus (Linnaeus) – Red Kite

Falco Milvus Linnaeus, 1758 [Modern species.]

Corvus crassipennis Giebel, 1847: 17 [Holotype from Seveckenberg: distal end of left radius; MNHN, uncatalogued. Not figured.]

Distribution: Late Pleistocene (MQ 2C) of Seveckenberg, Germany (Giebel 1847; Mlíkovský orig.).

Remarks: I restudied the holotypical radius of *Corvus crassipennis* Giebel, finding it inseparable from the same element of the modern *Milvus milvus* (Linnaeus). Accordingly, I synonymize here *Corvus crassipennis* Giebel with the latter species.

Genus *Haliaeetus* Savigny

Haliaeetus Savigny, 1809 [Modern genus.]

Haliaeetus piscator Milne-Edwards

Haliaetus [sic!] *piscator* Milne-Edwards, 1871: 464 [Holotype from Sansan: proximal end of left carpometacarpus; MNHN Sa-14034. Figured by Milne-Edwards 1868-1871, pl. 185, fig. 9-11; and Cheneval 2000, fig. 2.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869-1871, Cheneval 2000).

Remarks: There is no evidence, that this species belongs to the genus *Haliaeetus* Savigny.

Haliaeetus albicilla (Linnaeus) – White-tailed Eagle

Falco albicilla Linnaeus, 1758 [Modern species]

Haliaetus [sic!] *angustipes* Jánossy, 1983: 257 [Holotype from Přezletice: distal end of left tarsometatarsus; formerly in coll. Fejfar, probably destroyed – O. Fejfar, pers. communication, 1999. Figured by Jánossy 1983, pl. 2, fig. 3-4.]

Distribution: Late Pliocene (MN 17) of Tegelen, Holland (Junge 1953); early Pleistocene (MQ 1a) of Sima del Elefante – layer E-10, Spain (Rosas et al. 2001), and Untermassfeld, Germany (Jánossy 1997 sub *H.* aff. *brevipes* [sic!]); and early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965 sub *Haliaeetus* sp.), Přezletice, Czechia (Jánossy 1983 sub *H. angustipes*; Mlíkovský 1997c), and Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *H.* aff. *albicilla*).

Remarks: *Haliaeetus angustipes* Jánossy was synonymized with *Haliaeetus albicilla* (Linnaeus) by Mlíkovský (1997c). Jánossy (1988, 1997) consistently misspelled *angustipes* as *brevipes*. In spite of that, there is no indication in his writings, that he intended to rename the species. Hence, *brevipes* has no standing in zoological nomenclature.

Genus *Gypaetus* Storr

Gypaëtus Storr, 1784 [Modern genus.]

Gypaetus barbatus (Linnaeus) – Lammergeier

Vultur barbatus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001).

Genus *Gyps* Savigny

Gyps Savigny, 1809 [Modern genus.]

Gyps melitensis Lydekker

Gyps melitensis Lydekker, 1890: 404 [Syntypes from Zebbug (as listed by Lydekker 1891a: 29-32): five cervical vertebrae (BMNH 49354), proximal end of right femur (BMNH 49355), distal end of right femur (BMNH 49355a), distal ends of three right tibiotarsi (BMNH 49356, BMNH 49357, BMNH 49359), distal end of left tibiotarsus (BMNH 49360), distal ends of two left tarsometatarsi (BMNH 49363, BMNH 49363a), 3rd trochlea of a tarsometatarsus (BMNH 49363b), and 10 pedal phalanges (BMNH 49364). Figured by Lydekker 1890, pl. 35, fig. 1 (tibiotarsus 49359), 2, 2a (tibiotarsus 39356), 4, 4a (femur 49355a), 6 (tarsometatarsus 49363), 8 (pedal phalanx 49364a), and 9 (pedal phalanx 49364f), pl. 36, fig. 7, 7a-b (vertebra 49354), and Lydekker 1891a, fig. 7 (tibiotarsus 49359).]

Aegypius melitensis (Lydekker): Tugarinov 1940a: 207 [New combination.]

Distribution: Middle Pleistocene (MQ 2A) of Mosbach, Germany (Mourer-Chauviré 1977, but see Mlíkovský 1998g); late Pleistocene (MQ 2C) of Soulabé – 'galerie profonde', unknown layer, France (Mourer-Chauviré 1975a), Prince – layer B, Monaco (Boule 1919: 307, Mourer-Chauviré 1975a), Coscia – northwestern cave and southern abri, Corsica, France (Bonifay et al. 1998), Zebbug, Malta (Lydekker 1890, 1891a), Ta'Kandja, Malta (Despott 1929 sub *Gyps* sp., Lambrecht 1933: 403 sub *Gyps* sp.), Liko, Crete, Greece (Weesie 1987, 1988), and Simonelli, Crete, Greece (Weesie 1987, 1988); and late Pleistocene (MQ 2D) of Harpons, France (Saint-Périer 1920, Mourer-Chauviré 1975a, Clot & Mourer-Chauviré 1986),.

Tyrberg (1998) erroneously listed this species also from Benghisa and Ghaqba, Malta, giving Lambrecht (1933) and Northcote (1992) as a source of this information. However, reports of the latter two authors do not include these data. Similarly, Lambrecht's (1933: 402) statement that Bate (1916) reported on *Gyps melitensis* from Ghar Dalam, Malta, is erroneous (Brodkorb 1964: 278). The following record of *Gyps melitensis* is invalid: middle Pleistocene (MQ 2A) of Hundsheim, Austria (Jánossy 1974b – see Mlíkovský 1998g), and Vértösszőlős 2, Hungary (Jánossy 1977, 1986 – see Mlíkovský 1998g), and late Pleistocene (MQ 2C) of Kálmán Lambrecht cave, Hungary (Jánossy 1964; reidentified as *Gyps fulvus* by Jánossy 1977, 1986, see also Mlíkovský 1998g). The record from the late Miocene (MN 11-13) of Novaja Slobodka, Ukraine (Tugarinov 1940a, Burčak-Abramovič 1958) is highly improbable for stratigraphical and zoogeographical reasons (Mlíkovský orig.).

Remarks: The taxonomic status of this species is uncertain. All alleged records from Central Europe were already shown to belong to other species of vultures (Mlíkovský 1998g), while no revision of the syntypes was undertaken thus far. It remains to be shown, whether *Gyps melitensis* Lydekker is different from modern species of vultures.

Gyps sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b, 2000a).

Genus *Aegypius* Savigny

Aegypius Savigny, 1809 [Modern genus.]

Aegypius mochachus (Linnaeus) – Eurasian Black Vulture

Vultur monachus Linnaeus, 1766 [Modern species]

Gyps fulvus spelaeus Friant, 1950c: 1165 [Lectotype from Goyet (selected by Mlíkovský 2000a: 101): incomplete skeleton (= "femelle *b*" of Friant 1950c, 1951), incl. right coracoid, distal end of left humerus, right radius, shaft of left radius, fragments of an ulna, distal end of left femur, and distal end of left tibiotarsus; IRScNB, uncatalogued. Figured by Friant 1950c, fig. 1 (unnumbered, tibiotarsus), and Friant 1951, fig. 3/i (coracoid), 3/ii (humerus), 3/iii (femur), and 3/iv/1-2 (tibiotarsus), and fig. 4 (radius). Paralectotypes from Goyet (all in IRScNB): fragment of left tibiotarsus of "femelle *a*", distal end of left humerus of "mâle *c*", shaft of right tibiotarsus of "mâle *d*", fragments of an ulna of specimen "*e*", and fragments of a coracoid, an ulna and ribs of "mâle *f*". Unfigured.]

Gyps fulvus spelaeus Friant, 1951: 423 [Same type material (and same lectotype – see Mlíkovský 2000a: 101) as for *Gyps fulvus spelaeus* Friant, 1950c. Description of this species was independently published in two journals. The paper by Friant (1950c) was regarded as a preliminary version of Friant (1951), but contains a valid description of the subspecies. This is both a junior homonym and a junior synonym of *Gyps fulvus spelaeus* Friant, 1950c.]

Torgos tracheliotus todei Kleinschmidt, 1953a: 24 [Syntypes from Salzgitter-Lebenstedt: fragmentary sternum, proximal end of left tibiotarsus, fragmentary shaft of left ulna, and fragmentary shaft of left radius; LMB. Figured by Kleinschmidt 1953a, fig. 1 left (sternum), 2 right (sternum), 3 left (tibiotarsus), and 4 (ulna and radius).]

Gyps melitensis aegypioides Jánossy, 1989: 25 [Lectotype from Repolusthöhle (selected by Mlíkovský 1998g: 25): distal end of left tarsometatarsus; MG 54.625. Figured by Jánossy 1989, pl. 1, fig. 1a-b. Paralectotypes from Repolust Cave: 2 pedal phalanges (MG 54.628 and MG 57.759). Figured by Jánossy 1989, pl. 1, fig 2-3.]

Distribution: Late Pleistocene (MQ 2C) of Goyet, Belgium (Friant 1950c and 1951 sub *G. fulvus spelaeus* – see Mlíkovský 2000a), Salzgitter-Lebenstedt, Germany (Kleinschmidt 1953a,b sub *Torgos tracheliotus todei* – see Mlíkovský 1998g), and Repolusthöhle, Austria (Jánossy 1989 sub *G. melitensis aegypioides* – see Mlíkovský 1998g).

Remarks: *Torgos tracheliotus todei* Kleinschmidt and *Gyps melitensis aegypioides* Jánossy were synonymized with the modern *Aegypius monachus* (Linnaeus) by Mlíkovský (1998g). *Gyps fulvus spelaeus* Friant was synonymized with the modern *Aegypius monachus* (Linnaeus) by Mlíkovský (2000a).

Genus *Circaetus* Vieillot

Circaetus Vieillot, 1816 [Modern genus.]

Circaetus sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b: 70, 2000a).

Genus *Circus* Lacépède

Circaetus Lacépède, 1799 [Modern genus.]

Circus sp.

Distribution: Early Pleistocene (MN 1a) of Betfia 2, Romania (Čapek 1917), and Osztramos 2, Hungary (Jánossy 1977).

Genus *Accipiter* Brisson

Accipiter Brisson, 1760 [Modern genus.]

Accipiter gentilis (Linnaeus) – Northern Goshawk

Falco gentilis Linnaeus, 1758 [Modern species.]

Accipiter gentilis brevidactylus Mourer-Chauviré, 1975a: 63 [Holotype from Saint-Estève-Janson – layer B: incomplete, disarticulated skeleton; coll. Bonifay CD66-B-4002, 4004, 4008-4012, 4017, 4026-2029, 4031, 4041, 4045, 4058, 4065-4066, 4071, 4074, 4078, 4091-4092, 4098-4099, 4104, 4108-4109, 4113-4114, 4122, 4129-4130, 4134, 4136-4139. Figured by Mourer-Chauviré 1975a, pl. 22, fig. 6 (carpometacarpus), 7 (coracoid), and 8 (ulna).

Distribution: Early Pliocene (MN 15) of Muselievo, Bulgaria (Boev 1998e: 220 sub *A.* cf. *gentilis*); early Pleistocene (MQ 1b) of Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972); middle Pleistocene (MQ 2A) of Cimay, France (Mourer-Chauviré 1975a sub *A. g. brevidactylus*), Saint-Estève-Janson – layers B, C, D, E, F and H, France (Mourer-Chauviré 1975a sub *A. g. brevidactylus*); and middle Pleistocene (MQ 2B) of Lunel-Viel – layer 7, France (Mourer-Chauviré 1975a sub *A. g. brevidactylus*), Saint-Sol-Belcastel, France (Philippe et al. 1980 sub *A. g.* cf. *brevidactylus*).

Accipiter nisus (Linnaeus) – Eurasian Sparrowhawk

Falco Nisus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *A.* cf. *nisus*).

Accipiter sp.

Distribution: Early Miocene (MN 4b) of Dolnice, Czechia (Mlíkovský, orig., sub cf. *Acipiter*); middle Miocene (MN 6) of Sansan, France (Cheneval 2000 sub aff. *Accipiter*); and late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a).

Genus *Buteo* Lacépède

Buteo Lacépède, 1799 [Modern genus.]

Remarks: Ennouchi (1930: 123) and Ballmann (1969a: 172) mentioned *Buteo arvernensis* Shufeldt, without citing the source of this information. This is probably a misprint for *Bubo arvernensis* Milne-Edwards (a barn owl), but I was not able to find the reason, why Shufeld was cited as the author of the name.

Buteo pusillus Ballmann

Buteo pusillus Ballmann, 1969a: 173 [Holotype from Grive-Saint-Alban – fissure M: proximal end of right carpometacarpus; FSL, coll. Mein 117. Figured by Ballmann 1969a, pl. 13, fig. 1-4.]

Distribution: Middle Miocene (MN 8) of Grive-Saint-Alban – fissure M, France (Ballmann 1969a).

Buteo spassovi Boev

Buteo spassovi Boev in Boev & Kovačev, 1998: 126 [Holotype from Chadžidimovo: left tibiotarsus; NMNHS 10190. Figured by Boev & Kovačev 1998, fig. 1, 4.]

Distribution: Late Miocene (MN 11-12) of Chadžidimovo, Bulgaria (Boev & Kovačev 1998).

Buteo buteo (Linnaeus) – Common Buzzard

Falco buteo Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Ževachova Hill, Ukraine (Dubrovo & Kapelist 1979: 88 sub *B.* cf. *buteo*); and early Pleistocene (MQ 1b) of Sima del Elefante – unknown layer, Spain (Rosas et al. 2001).

Buteo rufinus (Cretzschmar) – Long-legged Buzzard

Falco rufinus Cretzschmar, 1827 [Modern species]

Buteo rufinus jansoni Mourer-Chauviré 1975c: 533 [Holotype from Saint-Estève-Janson – layer H: incomplete skeleton; coll. Bonifay CD66-H base-7381. Figured by Mourer-Chauviré 1975c, pl. 1, fig. 1 (coracoid), 3-4 (humerus), 5 (ulna), 6 (tibiotarsus), 7 (carpometacarpus), 8-9 (femur), 10 tarsometatarsus), 11 (scapula), 12 (pedal phalanx), and 13 (ulnare).]

Distribution: Middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layer H, France (Mourer-Chauviré 1975a, c).

Buteo sp.

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Ennouchi 1930: 57); late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a); late Pliocene (MN 18) of Ca Na Reia, Eivissa, Balearics (Alcover 1989); and early Pleistocene (MQ 1b) of Bacton, England (Harrison 1979d sub *Buteo ?buteo* or *B. buteo*/*lagopus*/*rufinus* superspecies).

Genus *Garganoaetus* Ballmann

Garganoaetus Ballmann, 1973: 8 [Type by original designation: *Garganoaetus freudenthali* Ballmann, 1973.]

Distribution: Early Pliocene (MN 14-15) of the island (now peninsula) of Gargano, Italy.

Garganoaetus freudenthali Ballmann

Garganoaetus freudenthali Ballmann, 1973: 9 [Holotype from San Giovannino: right tarsometatarsus; RGM 177924. Figured by Ballmann 1973, text-fig. 1a-g, pl. 1, fig. 1-3.]

Distribution: Early Pliocene (MN 14-15) of Chirò 4, and San Giovannino, Italy (Ballmann 1973, 1976a), and Chirò 20C, Italy (Ballmann 1976a).

Garganoaetus murivorus Ballmann

Garganoaetus murivorus Ballmann, 1973: 17 [Holotype from Chirò 10C: distal end of right tarsometatarsus; RGM 177646. Figured by Ballmann 1973, text-fig. 5a-e, pl. 3, fig. 4-7.]

Distribution: Early Pliocene (MN 14-15) of Chirò 10C, Italy (Ballmann 1973), and Chirò 2S, Chirò 14B, Chirò 20E, and Chirò 24, Italy (Ballmann 1976a).

Genus *Aquila* Brisson

Aquila Brisson, 1760 [Modern genus.]

Aquila rapax (Temminck) – Tawny Eagle

Falco rapax Temminck, 1828 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Vallonnet, France (Mourer-Chauviré 1975a sub *A.* cf. *rapax*).

Aquila chrysaetos (Linnaeus) – Golden Eagle

Falco Chrysaëtos Linnaeus, 1758 [Modern species]

Aquila chrysaetos bonifacti Mourer-Chauviré, 1975a: 50 [Holotype from Saint-Estève-Janson – layer H below: partial skeleton; coll. Bonifay CD66-H base-4744, 4746, and 4747. Not figured.]

Aquila chrysaetos simurgh Weesie, 1988: 18 [Holotype from Liko cave: left tibiotarsus lacking proximal end; UUT Li-V804. Figured by Weesie 1987, pl. 5, fig. 3a-b., and Weesie 1988, pl. 5, fig. 3a-b.]

Distribution: Early Pleistocene (MQ 1a) of Osztramos 2, Hungary (Jánossy 1977 sub *A.* cf. *chrysaetos*); middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layers B, C, E/F, F, G, H, France (Mourer-Chauviré 1975a sub *A. chrysaetos bonifacti*); middle Pleistocene (MQ 2B) of Lunel Viel – cave IV (Mourer-Chauviré 1975a sub *A. chrysaetos bonifacti*); and late Pleistocene (MQ 2C) of Liko, Crete, Greece (Weesie 1987 and 1988 sub *A. chrysaetos simurgh*).

Aquila sp.

Distribution: Late Miocene (MN 9-10) of Sokolov, Ukraine (Vojinstvens'kyj 1967); late Miocene (MN 10) of Viladecavalls, Spain (Villalta 1963); late Miocene (MN 11-13) of Kujal'nik, Ukraine (Vojinstvens'kyj 1967); and late Pliocene (MN 17) of Puebla de Valverde, Spain (Adrover et al. 1974), and Văršec, Bulgaria (Boev 1997b: 71, 2000a).

Genus *Hieraaetus* Kaup

Hieraaëtus Kaup, 1844 [Modern genus.]

Hieraaetus edwardsi (Sharpe)

Aquila minuta Milne-Edwards, 1871: 463 [Holotype from Sansan: distal end of left tibiotarsus; MNHN Sa-1220. Figured by Milne-Edwards 1869-1871, pl. 185, fig. 5-8. This is a junior primary homonym of *Aquila minuta* Brehm, 1831 = *Hieraaetus pennatus* (Gmelin, 1788).]

Eutolmaëtus edwardsi Sharpe, 1899: 262 [New name for *Aquila minuta* Milne-Edwards, 1871.]

Nisaëtus edwardsi (Sharpe): Paris 1912: 288 [New combination.]

Hieraaëtus [sic!] *Edwardsi* (Sharpe): Ammon 1918: 50 [New combination.]

Aquila Edwardsi (Sharpe): Lambrecht 1933: 408 [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869-1871, Cheneval 2000); and middle/late Miocene (MN 8-9) of Hostalets de Pierola, Spain (Villalta 1963 sub *A.* cfr. *minuta*).

Hieraaetus fasciatus (Vieillot) – Bonneli's Eagle

Aquila fasciata Vieillot, 1822 [Modern species.]

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b: 70 sub *Hieraetus* sp., Boev 2000a sub *H.* cf. *fasciatus*).

Genus *Polemaetus* Heine

Polemaetus Heine, 1890 [Modern genus.]

Polemaetus sp.

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869, pl. 183, fig. 20-21 as an unnamed raptor, Mlíkovský 1999e, orig.); and early Miocene (MN 3) of Tuchořice, Czechia (Mlíkovský orig.).

Genus *Pelargopappus* Stejneger

Pelargopsis Milne-Edwards, 1868: 460 [Type by monotypy: *Pelargopsis magnus* Milne-Edwards, 1868. This is a junior homonym of *Pelargopsis* Gloger, 1841.]

Pelargopappus Stejneger, 1885: 163 [New name for *Pelargopsis* Milne-Edwards, 1868; hence its junior objective synonym.]

Pelargodes Lydekker, 1891b: 477 [New name for *Pelargopsis* Milne-Edwards, 1868; hence its junior objective synonym.]

Pelargocrex Milne-Edwards, 1893: liv [New name for *Pelargopsis* Milne-Edwards, 1868; hence its junior objective synonym.]

Amphiserpentarius Gaillard, 1908: 44 [Type by monotypy: *Amphiserpentarius schlosseri* Gaillard, 1908.]

Amynoptilon Cracraft & Rich, 1972: 278 [Type by original designation: *Serpentarius robustus* Milne-Edwards, 1868.]

Pelargopappus magnus (Milne-Edwards)

Pelargopsis magnus Milne-Edwards, 1868: 460 [Holotype from Saint-Gérand-le-Puy: distal end of right tarsometatarsus; MNHN Av-8735. Figured by Milne-Edwards, 1867-1868, pl. 72, fig. 4-7, and Mourer-Chauviré & Cheneval 1983, pl. 1, fig. 4a-b. Brodkorb (1963c: 287) and Mourer-Chauviré & Cheneval (1983: 446) erroneously believed, that the holotype is a lectotype designed by Lydekker (1891a: 68), but Milne-Edwards (1868: 460) clearly based the species on the holotypical tarsometatarsus, and Lydekker (1891a: 68) correctly referred to it as to "the type tarso-metatarsus".]

Serpentarius robustus Milne-Edwards, 1870: 557 [Holotype from Saint-Gérand-le-Puy: right tarsometatarsus (not left as stated by Mourer-Chauviré & Cheneval 1983: 446); MNHN Av-2816. Figured by Milne-Edwards 1869-1871, pl. 186, fig. 1-6, Lambrecht 1933, fig. 132b, Rich & Cracraft 1972, fig. 10a-c, Jollie 1977b, fig. 127B/a-g, and Mourer-Chauviré & Cheneval 1983, pl. 1, fig. 1, 2a-b, 3a-b.]

Pelargopappus magnus (Milne-Edwards): Stejneger 1885: 163 [New combination.]

Pelargodes magnus (Milne-Edwards): Lydekker 1891b: 477 [New combination.]

Pelargocrex magnus (Milne-Edwards): Milne-Edwards 1893: liv [New combination.]

Amphiserpentarius Schlosseri Gaillard, 1908: 45 [Holotype from Quercy: distal end of left tibiotarsus; BSP 1 - apparently destroyed in the World War II - Mlíkovský, orig. Cast in FSL PQ-1045. Figured by Gaillard 1908, text-fig. 7, pl. 2, fig. 5-8, and Rich & Cracraft 1972, fig. 5a-d.]

Pelargopsis Stehlini Gaillard, 1908: 82 [Holotype from Quercy: distal end of right tarsometatarsus; BaM QH-146. Figured by Gaillard 1908, text-fig. 21, pl. 4, fig. 5-8.]

Pelargopsis Trouessarti Gaillard, 1908: 84 [Holotype from Quercy: distal end of left tarsometatarsus; BaM QH-147. Figured by Gaillard 1908, text-fig. 22, pl. 4, fig. 9-12.]

Pelargodes Stehlini (Gaillard): Lambrecht 1933: 322 [New combination.]

Pelargodes Trouessarti (Gaillard): Lambrecht 1933: 323 [New combination.]

Amphiserpentarius robustus (Milne-Edwards): Lambrecht 1933: 400 [New combination.]

Pelargopappus stehlini (Gaillard): Brodkorb 1963c: 287 [New combination.]

Pelargopappus trouessarti (Gaillard): Brodkorb 1963c: 287 [New combination.]

Amynoptilon robustum (Milne-Edwards): Cracraft & Rich 1972: 278 [New combination.]

Pelargopappus schlosseri (Milne-Edwards): Mourer-Chauviré & Cheneval 1983: 448 [New combination.]

Distribution: Middle Oligocene (MP 23) of Roqueprune 2, France (Mourer-Chauviré & Cheneval 1983); late Oligocene (MP 28) of Desse, France (Mourer-Chauviré & Cheneval 1983) and Fraysse, France (Mourer-Chauviré & Cheneval 1983); and early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1867-1868, 1869-1871, Gaillard 1908, Mourer-Chauviré & Cheneval 1983).

Remarks: The species *magnus, stehlini* and *trouessarti* were originally described in the Ciconiidae, while *robustus* and *schlosseri* in the Sagittariidae. Cracraft & Rich (1972) transferred *schlosseri* in the Cathartidae. Mourer-Chauviré & Cheneval (1983) observed that all these species are based on bones of sagittariid birds, recognizing *Pelargopappus schlosseri* (incl. *stehlini* and *trouessarti*) from Saint-Gérand-le-Puy and *Pelargopappus magnus* (incl. *robustus*) from Quercy. The alleged differences in size between the two species are negligible (see Tab. 1 in Mourer-Chauviré & Cheneval 1983: 451), so that I synonymize here *Serpentarius robustus* Milne-Edwards, *Amphiserpentarius schlosseri* Gaillard, *Pelargopsis stehlini* Gaillard and *Pelargopsis trouessarti* Gaillard with *Pelargopappus magnus* (Milne-

Edwards).

Genus incertae sedis

Aquila corroyi Gaillard

Aquila Corroyi Gaillard, 1939: 3 [Holotype from Quercy: right tarsometatarsus; FSUM, uncatalogued. Figured by Gaillard 1939, fig. 1.]

Aquilavus corroyi (Gaillard): Brodkorb 1964: 263 [New combination; in *Aquilavus* Brodorb, 1952.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1939).

Aquila delphinensis Gaillard

Aquila Delphinensis Gaillard, 1939: 35 [Holotype from Grive-Saint-Alban – early collections: proximal end of left tarsometatarsus; ML LGr-6030. Figured by Gaillard 1939, fig. 16.]

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Gaillard 1939).

Aquila depredator Milne-Edwards

Aquila depredator Milne-Edwards, 1871: 458 [Holotype: right tarsometatarsus from Saint-Gérand-le-Puy; MNHN Av-2817. Figured by Milne-Edwards 1869-1871, pl. 184, fig. 5-10. Brodkorb's (1964: 263) indication that Lydekker (1891: 25) selected the tarsometatarsus as a lectotype of this species is erroneous.]

Eutolmaëtus depredator (Milne-Edwards): Sharpe 1899. [New combination; fide Lambrecht 1921: 32, 1933: 407.]

Nisaëtus depredator (Milne-Edwards): Paris 1912: 288 [New combination.]

Aquilavus depredator (Milne-Edwards): Lambrecht 1933: 407 [New combination; in *Aquilavus* Lambrecht, 1933.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871).

Remarks: Genus-group name *Aquilavus* was established by Lambrecht (1933: 407) expressly for a collective group, consisting of "alle bisher beschriebenen paläogenen Raubvogelreste des europäischen Paläogens" = "all Paleogene raptor remains from the European Paleogene, described thus far" (the forms from Saint-Gérand-le-Puy, France, were also included in belief that the locality is late Oligocene in age). Accordingly, *Aquilavus* Lambrecht has no type species, and competes with other genus-group names for homonymy, but not for priority (ICZN 1999). Brodkorb (1952: 175) designed *Aquila depredator* Milne-Edwards, 1871 as the type species of *Aquilavus* Lambrecht. Herewith he created a new genus-group name, *Aquilavus* Brodkorb, 1952, which is a junior homonym of *Aquilavus* Lambrecht, 1933.

Aquila fossilis Giebel

Aquila fossilis Giebel, 1847: 9 [Syntypes from Monte Reale: distal end of humerus, ulna, radius, carpometacarpus, costa, and tarsometatarsus; present location unknown. Figured by Wagner 1832, pl. I, fig. 41a-c (tarsometatarsus), 42 (ulna), 43 (radius), 44 (humerus), pl. II, fig. 45 (humerus), 46a-b (carpometacarpus), 46c-d (costa).]

Distribution: Middle/late Pleistocene (MQ 2A-C) of Monte Reale, Sardinia, Italy (Wagner 1832 sub Falke?, Giebel 1847).

Remarks: Lambrecht (1921: 33-34) erroneously attributed *Aquila fossilis* to Portis (1884: 383) and believed that this is a new combination of *Vultur fossilis* Giebel, but both Giebel (1847) and Portis (1884) clearly understood these forms as separate species. Lambrecht (1933) omitted *Aquila fossilis* Giebel, and Brodkorb (1964: 282) listed it in the synonymy of the modern *Buteo buteo* (Linnaeus) without explanation, which is unsubstantiated.

Aquila hypogaea Milne-Edwards

Aquila hypogaea Milne-Edwards, 1892: 60 [Holotype from Quercy: left femur; MNHN QU-15748. Not figured.]
Aquilavus hypogaea (Milne-Edwards): Lambrecht 1933: 407 [New combination; in *Aquilavus* Lambrecht, 1933.]
Aquilavus hypogaeus (Milne-Edwards): Brodkorb 1964: 263 [New combination; in *Aquilavus* Brodkorb, 1964; and ending corrected.]
Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892).

Aquila pennatoides Gaillard

Aquila pennatoïdes Gaillard, 1939: 37 [Holotype from Grive-Saint-Alban – early collections: proximal end of left tarsometatarsus; ML LGr-6029. Figured by Gaillard 1939, fig. 17.]
Aquila pennatoides Gaillard: Mlíkovský, this paper [Spelling emended. This spelling appeared already in an upper paragraph on p. 76 in Gaillard 1939. However, Gaillard (1939) consistently used the spelling *pennatoïdes* in his paper, so that I interprete here the "emended" spelling in his paper as a printers error.]
Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban – early collections, France (Gaillard 1939).

Aquila prisca Milne-Edwards

Aquila prisca Milne-Edwards, 1863: 157 [Syntypes from Saint-Gérand-le-Puy: distal end of left tarsometatarsus and "divers os des ailes" = various wing bones. Should be in MNHN, but I was not able to find them there in June 1999. Figured by Milne-Edwards 1869-1871, pl. 184, fig. 1-4 (tarsometatarsus).]
Eutolmaëtus priscus (Milne-Edwards): Sharpe 1899. [New combination; fide Lambrecht 1921: 33, 1933: 408.]
Nisaëtus priscus (Milne-Edwards): Paris 1912: 288 [New combination.]
Aquilavus priscus (Milne-Edwards): Lambrecht 1933: 408 [New combination; in *Aquilavus* Lambrecht, 1933.]
Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1869-1871).

Buthierax pouliani Kretzoi

Buthierax pouliani Kretzoi, 1977: 132 [Holotype from Petralona – section A, layer 2: left tarsometatarsus; MP TA-19. Figured by Kretzoi & Poulianos 1981, fig. 1; and Poulianos 1996, photo 10.7.]
Distribution: Middle Pleistocene (MQ 2A) of Petralona – section A, layer 2, Greece (Kretzoi 1977, Kretzoi & Poulianos 1981).
Remarks: *Buthierax pouliani* Kretzoi, 1977 is type by original designation of the genus *Buthierax* Kretzoi, 1977.

Milvus brachypterus Jánossy

Milvus brachypterus Jánossy, 1977: 26 [Holotype from Nagyharsányhegy 1-4: proximal end of left carpometacarpus; present location unknown. Figured by Jánossy 1977, fig. 5/1-2.]
Distribution: Early Pleistocene (MQ 1b) of Nagyharsányhegy 1-4, Hungary (Lambrecht 1916 sub *Archibuteo lagopus*, Jánossy 1977).

Milvus deperditus Milne-Edwards

Milvus deperditus Milne-Edwards, 1871: 461 [Holotype from Saint-Gérand-le-Puy: right tarsometatarsus; MNHN Av-2838. Figured by Milne-Edwards 1869-1871, pl. 185, fig. 1-4.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Lambrecht 1933: 418); and early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Wetmore 1956: 3).

Milvus incertus Gaillard

Milvus incertus Gaillard, 1939: 40 [Holotype from Saint-Gérand-le-Puy: right tarsometatarsus; ML SGr-217. Figured by Gaillard 1939, fig. 19.]

Promilio incertus (Gaillard): Brodkorb 1964: 274 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Gaillard 1939); and late Miocene (MN 9 or 11) of Bujoru, Moldova (Kuročkin & Ganea 1972: 63).

Order Columbiformes Latham

Columbae Latham, 1790 [Modern order.]

Family Caprimulgidae Vigors

Caprimulgidae Vigors, 1825 [Modern family.]
Steatornithidae Bonaparte, 1842 [Modern family.]
Nyctibiidae Bonaparte, 1853 [Modern family.]
Archaeotrogonidae Mourer-Chauviré, 1980a: 18 [Type genus: *Archaeotrogon* Milne-Edwards, 1892.]
Eocypselidae Harrison, 1984c: 174 [Type genus: *Eocypselus* Harrison 1984c.]
Preficinae Olson, 1987: 59 [Type genus: *Prefica* Olson, 1987: 59]

Remarks: I consider the modern Steatornithidae and Nyctibiidae survivors of ancient radiation(s) of the Caprimulgidae, and include them in the latter family. The taxonomic position of all Tertiary caprimulgids is uncertain. The genera are thus listed here in the chronological sequence.

Olson (1987: 60) referred partial skeleton of a bird from the middle Eocene (MP 11) of Messel (see Olson 1985a, fig. 4) to *Prefica nivea* Olson, 1987, described from the early Eocene (Wasatchian) of Wyoming as a member of the subfamily Preficinae of the family Steatornithidae. Mayr (1999c: 525) observed, that the Messel specimen does not belong to the latter family (see also Mayr & Daniels 2001). Accordingly, *Prefica nivea* Olson must be deleted from the list of the European fossil birds.

The Caprimulgidae have an interesting fossil record in Europe. They are rather common in the early Eocene through early Miocene deposits, being absent from the middle to late Miocene and Pliocene deposits, to re-appear in the early Pleistocene. The early Miocene record is based on undescribed bones from Merkur, Czechia (MN 3, Mlíkovský orig., bone in coll. Dvořák), and Petersbuch 28, Germany (MN 3-4, Mlíkovský orig., bones in coll. Rummel).

Genus *Eocypselus* Harrison

Eocypselus Harrison, 1984c: 161 [Type by original designation: *Eocypselus vincenti* Harrison, 1984c.]

Eocypselus vincenti Harrison

Eocypselus vincenti Harrison, 1984c: 162 [Holotype from Walton-on-the-Naze: associated left humerus, incomplete right humerus, left coracoid, proximal end of left ulna, left radius; BMNH A-5429. Figured by Harrison 1984c, fig. 1e (humerus), and 3e (wing skeleton).]

Distribution: Early Eocene (MP 8) of Walton-on-the-Naze, England (Harrison 1984c).

Remarks: Here transferred from the Apodiformes. *Eocypselus* Harrison may be identical with *Archaeotrogon* Milne-Edwards, but drawings of the holotype do not allow for a closer examination.

Genus *Fluvioviridiavis* Mayr & Daniels

Fluvioviridiavis Mayr & Daniels, 2001: 394 [Type by original designation: *Fluvioviridiavis platyrhamphus* Mayr & Daniels, 2001.]

Distribution: Extralimital record is confined to *Fluvioviridiavis platyrhamphus* Mayr & Daniels, 2001 from the early Eocene (Green River Formation) of Wyoming (Mayr & Daniels 2001).

Remarks: Described in order and family incertae sedis. Here included in the Caprimulgidae in the broad sense accepted here (Mlíkovský, orig.).

Fluvioviridiavis sp.

Distribution: Early Eocene (MP 8) of Walton-on-the-Naze, England (Mayr & Daniels 2001; tentatively referred); and middle Eocene (MP 11) of Messel, Germany (Mayr & Daniels; tentatively referred).

Genus *Paraprefica* Mayr

Paraprefica Mayr, 1999c: 525 [Type by original designation: *Paraprefica kelleri* Mayr, 1999c.]

Distribution: Middle Eocene (MP 11) of Germany.

Remarks: Described in the Preficinae (Mayr 1999c), and later trasferred in the Nyctibiidae (Mayr 2001b).

Paraprefica kelleri Mayr

Paraprefica kelleri Mayr, 1999c: 526 [Holotype from Messel: partial skeleton in slab; SMF ME-3376. Figured by Mayr 1999c, fig. 6.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1999c).

Paraprefica major Mayr

Paraprefica major Mayr, 1999c: 529 [Holotype from Messel: anterior part of the skeleton in slab; SMNS 81654. Figured by Mayr 1999c, fig. 12; and Mayr 2000g, fig. 11.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1999c, 2000b).

Genus *Ventivorus* Mourer-Chauviré

Ventivorus Mourer-Chauviré, 1988a: 34 [Type by original designation: *Ventivorus ragei* Mourer-Chauviré, 1988a.]

Remarks: Described in the Caprimulgidae s. str. (Mourer-Chauviré 1988a).

Ventivorus ragei Mourer-Chauviré

Ventivorus ragei Mourer-Chauviré, 1988a: 35 [Holotype from Bretou: anterior end of right coracoid; USTL BRT-1015. Figured by Mourer-Chauviré 1988a, pl. 2, fig. 1-3.]

Distribution: Late Eocene (MP 16) of Bretou, France (Mourer-Chauviré 1988a).

Genus *Archaeotrogon* Milne-Edwards

Archaeotrogon Milne-Edwards, 1892: 64 [Type by monotypy: *Archaeotrogon venustus* Milne-Edwards, 1892.]

Distribution: Late Eocene (MP 22) through late Oligocene (MP 28) of France.

Remarks: *Archaeotrogon* Milne-Edwards was described as a relative of modern trogons (see also Mourer-Chauviré 1980), but Olson (1985a: 128-120) showed that it has caprimulgid affinities.

Archaeotrogon cayluxensis (Lydekker)

Palaeortyx cayluxensis Lydekker, 1891a: 138 [Syntypes from Quercy: right and left ulna; BMNH A-137a (both specimens). Not figured. This is a senior primary homonym of *Palaeortyx cayluxensis* Milne-Edwards, 1892.]

Archaeotrogon venustus Milne-Edwards, 1892: 64 [Holotype from Quercy: right humerus; MNHN QU-15781. Not figured. The humerus figured by Mourer-Chauviré 1980, fig. 3a-b (MNHN QU-15782) is too small for being the holotype (Mlíkovský orig.).]

Archaeotrogon Zitteli Gaillard, 1908: 70 [Holotype from Quercy: left humerus; formerly in BSP 128, apparently destroyed in the World War II – Mlíkovský, orig.; cast in FSL PQ-

1053. Figured by Gaillard 1908, text-fig. 17, pl. 3, fig. 24-25.]
Ludiortyx cayluxensis (Lydekker): Brodkorb 1964: 299 [New combination.]
Archaeotrogon hoffstetteri Mourer-Chauviré, 1980: 28 [Holotype from Quercy: right humerus; MNHN QU-15796. Figured by Mourer-Chauviré 1980, fig. 3t,w.]
Archaeotrogon cayluxensis (Lydekker): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908, Mourer-Chauviré 1980); late Eocene (MP 16-20) of Garrigues, France (Mourer-Chauviré 1980); late Eocene (MP 17) of Perrière, France (Mourer-Chauviré 1980); late Eocene (MP 19) of Escamps A, and Escamps III, France (Mourer-Chauviré 1980); early Oligocene (MP 22) of Plante 2, France (Mourer-Chauviré 1980), and Mas de Got B, France (Mourer-Chauviré 1980); middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1980), Mounayne, France (Mourer-Chauviré 1980), and Roqueprune 2, France (Mourer-Chauviré 1980); late Oligocene (MP 28) of Desse, France (Mourer-Chauviré 1980), and Fraysse, France (Crochet 1971, Mourer-Chauviré 1980); and Oligocene (MP 21-28) of Belgarite 4A, France (Mourer-Chauviré 1980), Boussac 1, France (Mourer-Chauviré 1980), Boussac 2, France (Mourer-Chauviré 1980), and Fonbonne 1, France (Mourer-Chauviré 1980).

Remarks: These three alleged species of *Archaeotrogon* Milne-Edwards fall in the same size category. Mourer-Chauviré (1992b: 83) reexamined the syntypes of *Palaeortyx cayluxensis* Lydekker, concluding that they belong to an *Archaeotrogon* Milne-Edwards of the size of *Archaeotrogon zitteli* Gaillard. Accordingly, I synonymize here *Archaeotrogon venustus* Milne-Edwards, *Archaeotrogon zitteli* Gaillard and *Archaeotrogon hoffstetteri* Mourer-Chauviré with *Archaeotrogon cayluxensis* (Lydekker), which has priority.

Archaeotrogon nocturnus n. n.

Archaeotrogon Cayluxensis Gaillard, 1908: 67 [Holotype from Quercy: right humerus; FSL PQ-2. Figured by Gaillard 1908, text-fig. 15, pl. 4, fig. 1-4, and Mourer-Chauviré 1980, fig. 4k-l. This is junior secondary homonym of *Palaeortyx* (= *Archaeortogon*) *cayluxensis* Lydekker, 1891a.]
Archaeotrogon nocturnus Mlíkovský, this paper [New name for *Archeotrogon cayluxensis* Gaillard, 1908; hence its junior objective synonym.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1908, 1939, Mourer-Chauviré 1980); early Oligocene (MP 25) of Garouillas, France, and late Oligocene (MP 28) of Fraysse, France (Mourer-Chauviré 1980).

Remarks: *Archaeotrogon cayluxensis* Gaillard, 1908 is preoccupied by *Archaeotrogon cayluxensis* (Lydekker, 1891a). Hence, a new name for the species is proposed here. The species name (lat. nocturnus = nocturnal) is selected in allusion of the nocturnal habits of modern nightjars.

Genus *Euronyctibius* Mourer-Chauviré

Euronyctibius Mourer-Chauviré, 1989a: 2052 [Type by original designation: *Euronyctibius kurochkini* Mourer-Chauviré, 1989a.]

Remarks: Described in the Nyctibiidae.

Euronyctibius kurochkini Mourer-Chauviré

Euronyctibius kurochkini Mourer-Chauviré, 1989a: 2053 [Holotype from Quercy: proximal end of right humerus; MNHN QU-16231. Figured by Mourer-Chauviré 1989a, fig. 2/8-9.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1989a).

Genus *Caprimulgus* Linnaeus

Caprimulgus Linnaeus, 1758 [Modern genus.]

Caprimulgus europaeus Linnaeus – European Nightjar

Caprimulgus europaeus Linnaeus, 1758 [Modern species.]
Caprimulgus europaeus fossilis Čapek, 1917: 29 [Holotype from Betfia 2: left coracoid; GIB Vt-63. Not figured.]
Caprimulgus capeki Jánossy, 1977: 21 [Holotype from Betfia 2: left coracoid; GIB Vt-63. Not figured. This is a junior objective synonym of *Caprimulgus europaeus fossilis* Čapek, 1917.]
Caprimulgus fossilis Čapek: Tyrberg 1998: 552 [New rank.]

Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1977); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub aff. *C. europaeus*, Jánossy 1977 sub *C. capeki*; reidentified as *Caprimulgus europaeus* by Mlíkovský, orig.).

Remarks: Jánossy (1977) regarded Čapek's name for this species as unavailable for nomenclatural purposes, probably because it was proposed conditionally. However, such names are available if published before 1961 (ICZN 1999, Art. 15). In the taxonomic treatment of the form I follow Čapek (1917), and I synonymize accordingly *Caprimulgus capeki* Jánossy with the modern *Caprimulgus europaeus* Linnaeus.

Family Aegialornithidae Lydekker

Aegialornithidae Lydekker, 1891a: 182 [Type genus: *Aegialornis* Lydekker, 1891a: 183.]
Hemiprocnidae Oberholser, 1906 [Modern family.]
Primapinae Harrison, 1984c: 174 [Type genus: *Primapus* Harrison & Walker, 1975.]
Jungornithidae Karchu, 1988: 80 [Type genus: *Jungornis* Karchu, 1988.]
Aegialornithinae Lydekker: Karchu 1992: 384 [New rank.]
Primapodinae Harrison: Mlíkovský 2000d: 81 [Spelling emended.]

Distribution: Early to late Eocene (MP 8/9-19) of England, France and Germany, with a questionable record from the middle Oligocene (MP 23) of France. Extralimital record includes an unnamed form from the early Eocene of Virginia (Olson 1999b), *Jungornis tesselatus* Karchu, 1988 from the early Oligocene of Adygea in Russia, and modern genus *Hemiprocne* Nitzsch, 1829 from the SE Asia.

Remarks: Although based on a fossil genus, this family includes modern tree-swifts of the genus *Hemiprocne* Nitzsch, 1829 (Mlíkovský 1982b, 1985, see also Harrison 1975c, 1984c, Mourer-Chauviré 1988b, Karchu 1988, 1992). The family Hemiprocnidae Oberholser was synonymized with the Aegialornithidae Lydekker by Mlíkovský (1982b: 251). See Oberholser (1906), Brodkorb (1971b: 238-240) and Bock (1994: 143, 188) for the nomenclatural status of the Hemiprocnidae.

I see no reason why to separate the genus *Jungornis* Karchu from the Aegialornithidae at the family level, and I synonymize here Jungornithidae Karchu with Aegialornithidae Lydekker.

The taxonomic status of the family Aegialornithidae (incl. Hemiprocnidae) is uncertain. Brodkorb (1977: 240) included the Hemiprocnidae in the Apodidae as a subfamily. It is well possible, that the aegialornithids represent an early radiation of the Apodidae, and that they should be included in the Apodidae. However, typical aegialornithids and typical apodids were coexistent in the Eocene of Europe, which supports the possibility, that the two groups evolved independently within the Columbiformes (in the present sense). Until this question is solved, I leave Aegialornithidae as a separate family.

Genus *Primapus* Harrison & Walker

Primapus Harrison & Walker, 1975: 162 [Type by original designation: *Primapus lacki* Harrison & Walker, 1975.]

Remarks: Peters (1985) synonymized *Primapus* Harrison & Walker with *Aegialornis* Lydekker, but Karchu (1988, 1992) resurrected the genus (see also Mourer-Chauviré 1988b, and Mayr & Peters 1999).

Primapus lacki Harrison & Walker

Primapus lacki Harrison & Walker, 1975: 162 [Holotype from Bognor Regis: right humerus; BMNH A-2166. Figured by Harrison & Walker 1975, pl. 14, fig. a-f.]

Aegialornis lacki (Harrison & Walker): Peters 1985: 158 [New combination.]

Distribution: Early Eocene (MP 8-9) of Bognor Regis, England (Harrison & Walker 1975, Harrison 1984c), and Warden Point on Sheppey, England (Harrison & Walker 1975, Harrison 1984c).

Genus *Aegialornis* Lydekker

Aegialornis Lydekker, 1891a: 183 [Type by original designation: *Aegialornis gallicus* Lydekker, 1891a.]

Tachyornis Milne-Edwards, 1892: 66 [Type by monotypy: *Tachyornis hirundo* Milne-Edwards, 1892.]

Belornis Milne-Edwards, 1893: liv [New name for *Tachyornis* Milne-Edwards, 1892, established in the erroneous belief that the name is preoccupied by *Tachornis* Gosse, 1847. *Belornis* Milne-Edwards is a junior objective synonym of *Tachyornis* Milne-Edwards.]

Distribution: Middle Eocene (MP 12) of Germany and late Eocene (MP 16-17) of France.

Aegialornis germanicus n. sp.

Holotype from Geiseltal L: right humerus with damaged proximal end; GM L-9-1969. Figured by Peters 1998, fig. 1 partim.

Diagnosis: An *Aegialornis*, smaller than *Aegialornis gallicus* Milne-Edwards, the only other species known from the genus.

Measurements: See Peters (1998, for the holotype), and Mourer-Chauviré (1988b, for *Aegialornis gallicus*).

Etymology: After Germany, where the holotype was found.

Distribution: Middle Eocene (MP 12) of Geiseltal L, Germany (Peters 1998 sub *A. breweri*, Mlíkovský orig.).

Aegialornis gallicus Lydekker

Aegialornis gallicus Lydekker, 1891a: 183 [Lectotype from Quercy (selected by Harrison 1984c: 163): right humerus; BMNH A-60. Figured by Lydekker, 1891a, fig. 41a. Paralectotypes from Quercy: 12 humeri from the phosphorites of Quercy; BMNH A-60 (all syntypes). Not figured.]

Tachyornis hirundo Milne-Edwards, 1892: 66 [Holotype from Quercy: right humerus; MNHN QU-15473. Not figured.]

Belornis hirundo (Milne-Edwards): Milne-Edwards 1893a: liv [New combination.]

Aegialornis Leehnardti Gaillard, 1908: 60 [Lectotype from Quercy (selected by Collins 1976a: 123): right humerus; MNHM, uncatalogued. Figured by Gaillard 1908, text-fig. 11, pl. 3, fig. 3-6, Collins 1976a, fig. 2, 4a. Paralectotype from Quercy: left tarsometatarsus from Quercy; ML. Figured by Gaillard 1908, pl. 3, fig. 1-2. Gaillard (1908) based this species on two syntypes, one of which was erroneously called holotype by Collins (1976: 123, 125), and Mourer-Chauviré (1988b: 387). Collin's action can be interpreted as a selection of the lectotype.]

Aegialornis leenhardti Gaillard: Brodkorb 1971b: 234 [Spelling emended.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Lydekker 1891a, Milne-Edwards 1892, 1893a,b, Gaillard 1908, 1939, Lowe 1939, Collins 1976a, Harrison 1975c, 1984c, Mourer-Chauviré 1988b); late Eocene (MP 16) of Bretou, France (Mourer-Chauviré 1988b), and Lavergne, France (Mourer-Chauviré 1988b); and late Eocene (MP 17) of Bouffie, France (Mourer-Chauviré 1988b) and Pradigues, France (Mourer-Chauviré 1988b).

Remarks: *Tachyornis hirundo* Milne-Edwards was synonymized with *Aegialornis gallicus* Lydekker by Milne-Edwards (1892: 80). *Aegialornis leenhardti* Gaillard seems to be based on large individuals of *Aegialornis gallicus* Lydekker. Accordingly, I synonymize here the former with the latter species.

Genus *Mesogiornis* n. g.

Mesogiornis Mlíkovský, this paper [Type by original designation: *Aegialornis wetmorei* Collins, 1976a.]

Diagnosis: Member of the family Aegialornithidae, differing from *Aegialornis* Lydekker in having on humerus: (1) external tuberosity closer to the top of the head, (2) deltoid crest more bend, (3) deltoid crest narrower and more pointed, and (4) ectepicondylar process located more proximally. It differs from *Cypselavus* Gaillard in having shaft of humerus more robust, and from *Primapus* Harrison in having ectepicondylar process located more proximally.

Etymology: "Inland bird", from Greek *μεσογειοσ* (inland) and *ορνισ* (bird). This an opposite to Lydekker's (1891a) *Aegialornis* (= sea-shore bird, from Greek *αιγιαλοσ*, sea-shore), coined in the erroneous belief, that the bird was related to gulls.

Included species: Type species only.

Mesogiornis wetmorei (Collins)

Aegialornis wetmorei Collins, 1976a: 124 [Holotype from Quercy: right humerus; MNHN QU-15478. Figured by Collins 1976a, fig. 3a, 4c.]

Aegialornis broweri Collins, 1976a: 124 [Holotype from Quercy: imperfect right humerus; MNHN QU-15481. Figured by Collins 1976a, fig. 3b, 4d.]

Mesogiornis wetmorei (Collins): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Collins 1976a, Mourer-Chauviré 1988b); late Eocene (MP 16) of Bretou, France (Mourer-Chauviré 1988b); late Eocene (MP 17) of Bouffie, France (Mourer-Chauviré 1988b), and Pradigues, France (Mourer-Chauviré 1988b); and late Eocene (MP 18) of Sainte-Néboule, France (Mourer-Chauviré 1978b, 1988b).

Remarks: I examined types of both *Aegialornis wetmorei* Collins and *Aegialornis broweri* Collins in MNHN. *Aegialornis broweri* seems to be based on a small (subadult?) individual of *Aegialornis wetmorei*. Accordingly, I synonymize here the former with the latter species.

Genus *Cypselavus* Gaillard

Cypselavus Gaillard, 1908: 63 [Type by monotypy: *Cypselavus gallicus* Gaillard, 1908.]

Palescyvus Karchu, 1988: 86 [Type by original designation: *Palescyvus escampensis* Karchu, 1988.]

Cypselavus gallicus Gaillard

Cypselavus gallicus Gaillard, 1908: 63 [Lectotype from Quercy (selected by Brodkorb 1971b: 239): right humerus; BSP 29 partim, apparently destroyed in the World War II – Mlíkovský, orig. Figured by Gaillard 1908, text-fig. 13, pl. 3, fig. 12-15. Paralectotypes from Quercy: a humerus (BSP 29 partim, apparently destroyed during World War II – Mlíkovský, orig.), and another humerus; BaM QD-98.]

Palescyvus escampensis Karchu, 1988: 86 [Holotype from Escamps III: left coracoid; UUT, uncatalogued. Figured by Mourer-Chauviré 1988b, pl. 2, fig. 7-8; and Karchu 1988, fig. 3b.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1908, Mourer-Chauviré 1988b); late Eocene (MP 16) of Lavergne, France (Mourer-Chauviré 1988b); late Eocene (MP 17) of Pradigues, France (Mourer-Chauviré 1988b), and Perrière, France (Mourer-Chauviré 1988b); late Eocene (MP 19) of Escamps III, France (Mourer-Chauviré 1988b, Karchu 1988); and middle Oligocene (MP 23) of Crabit (Mourer-Chauviré 1978).

Remarks: *Palescyvus escampensis* was described by Karchu (1988) on the basis of a coracoid, which was originally identified as belonging to *Cypselavus gallicus* Gaillard (Mourer-Chauviré 1978). Karchu (1988) observed that this coracoid is different from same element of *Jungornis tesselatus* Karchu from the early Oligocene of Adygea, but presented no evidence, why the coracoid should not belong to *Cypselavus gallicus* Gaillard. Accordingly, I synonymize here *Palescyvus escampensis* Karchu with *Cypselavus gallicus* Gaillard, and *Palescyvus* Karchu with *Cypselavus* Gaillard.

Family Apodidae Olphe-Galliard

Apodidae Olphe-Galliard, 1887 [Modern family.]

Genus *Scaniacypselus* Harrison

Scaniacypselus Harrison, 1984c: 166 [Type by original designation: *Scaniacypselus wardi* Harrison 1984c.]

Distribution: Early Eocene (MP 8) of Denmark, and middle Eocene (MP 11) of Germany.

Remarks: General information: Dyke 2001b, Mayr 2001e.

Scaniacypselus wardi Harrison

Scaniacypselus wardi Harrison, 1984c: 166 [Holotype from Røsnaes: associated left humerus, left ulna, left carpometacarpus and alular phalanx; BMNH A-5430. Figured by Harrison 1984c, fig. 2d, 4d, 6a-k.]

Distribution: Early Eocene (MP 8) of Røsnaes, Denmark (Harrison 1984c, Mayr & Peters 1999).

Scaniacypselus szarskii (Peters)

Aegialornis szarskii Peters, 1985: 144 [Holotype from Messel: almost complete skeleton in slab; SMNK Me-301. Figured by Peters 1985, fig. 1, 4a-b.]

Primapus szarskii (Peters): Mourer-Chauviré 1988b: 372 [New combination.]

Scaniacypselus szarskii (Peters): Mayr & Peters 1999: 314 [New combination.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Peters 1985, Karchu 1988, Mayr & Peters 1999).

Genus *Procypseloides* Harrison

Procypseloides Harrison, 1984c: 168 [Type by original designation: *Cypselus ignotus* Milne-Edwards, 1871.]

Distribution: Eocene or Oligocene (MP 16-28) of France, and early Miocene (MN 2-3) of France and Czechia.

Procypseloides mourerchauvireae (Mlíkovský)

Cypseloides mourerchauvireae Mlíkovský, 1989a: 60 [Holotype from Quercy: right tibiotarsus; NHMW 1988/27. Figured by Mlíkovský 1989a, pl. 1, fig. a-d.]

Procypseloides mourerchauvireae (Mlíkovský): Mlíkovský, this paper [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mlíkovský 1989a). The original expectation, that the specimen originated from the late Eocene deposits of Quercy (Mlíkovský 1989a), is not necessarily correct (C. Mourer-Chauviré, in litt., 1990), and the stratigraphic distribution of *Procypseloides* Harrison makes the Oligocene age of this fossil more probable.

Remarks: While describing the species, I followed the taxonomic treatment of mid-Tertiary swifts proposed by Collins (1976b). My subsequent research showed, that Harrison (1984c) is right in separating these swifts at the generic level. Accordingly, I transfer here *Cypseloides mourerchauvireae* Mlíkovský to the genus *Procypseloides* Harrison.

Procypseloides ignotus (Milne-Edwards)

Cypselus ignotus Milne-Edwards, 1871: 394 [Lectotype from Saint-Gérand-le-Puy (here selected): right carpometacarpus; MNHN 2849. Figured by Milne-Edwards 1869-1871, pl. 159, fig. 18-19, and Collins 1976b, fig. 1b. Paralectotype from Saint-Gérand-le-Puy: left ulna; MNHN Av-2851. Figured by Milne-Edwards 1869-1871, pl. 177, fig. 9-13.]

Collocalia incerta Milne-Edwards, 1871: 394 [Holotype from Saint-Gérand-le-Puy: left tibiotarsus; MNHN Av-2862. Figured by Milne-Edwards 1869-1871, pl. 177, fig. 1-9, Collins 1976b, fig. 1c-d.]

Apus ignotus (Milne-Edwards): Paris 1912: 286 [New combination.]

Cypselavus intermedius Gaillard, 1939: 42 [Holotype from Saint-Gérand-le-Puy: left humerus; ML LGr-218. Figured by Gaillard 1939, fig. 20.]

Cypseloides ignotus (Milne-Edwards): Collins 1976b: 129 [New combination.]

Procypseloides ignotus (Milne-Edwards): Harrison 1984c: 169 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1871, Gaillard 1939, Lowe 1939, Collins 1976b, Harrison 1984c), and early Miocene (MN 3) of Merkur, Czechia (Mlíkovský orig.).

Remarks: *Collocalia incerta* Milne-Edwards and *Cypselus ignotus* Gaillard were synonymized with *Cypselus ignotus* Milne-Edwards by Collins (1976b). As judged from figures and published data, the holotype of *Cypselavus intermedius* Gaillard agrees in both morphology and size with *Cypselus* (= *Procypseloides*) *ignotus* Milne-Edwards (Mlíkovský orig.), so that I synonymize here the former with the latter species.

Genus *Apus* Scopoli

Apus Scopoli, 1777 [Modern genus.]

Apus gaillardi (Ennouchi)

Cypselus Gaillardi Ennouchi, 1930: 98 [Holotype from Grive-Saint-Alban: right humerus; ML LGr-47. Figured by Ennouchi 1930, pl. 4, fig. 9-12.]

Apus gaillardi (Ennouchi): Brodkorb 1971: 240 [New combination.]

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban – early collections, France (Ennouchi 1930).

Apus wetmorei Ballmann

Apus wetmorei Ballmann, 1976a: 35 [Holotype from Chirò 24: right humerus; RGM 178975. Figured by Ballmann 1976, text-fig. 15a-c, pl. 3, fig. 11-13.]

Apus baranensis Jánossy, 1977: 24 [Holotype from Beremend 5: left ulna; GIB Vt-65. Figured by Jánossy 1977, fig. 5/12.]

Distribution: Early Pliocene (MN 14-15) of Chirò 24, Italy (Ballmann 1976a); late Pliocene (MN 16a) of Beremend 5, Hungary (Jánossy 1977); and late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b, 1998f, 2000e sub *A. baranensis*).

Remarks: *Apus wetmorei* Ballmann was a very small swift. *Apus baranensis* Jánossy falls in the same size class. Because of general agreement in age and locality, I synonymize here the latter with the former species.

Apus apus (Linnaeus) – Common Swift

Hirundo Apus Linnaeus, 1758 [Modern species.]

Apus apus palapus Jánossy, 1974b: 227 [Lectotype from Hundsheim (here selected): right humerus; UWPI 1899/63-partim). Not figured. Paralectotypes: two left coracoids, seven ulnae (5 left, 2 right), right carpometacarpus, proximal end of right carpometacarpus, and distal end of left tibiotarsus; UWPI 1899/63-partim. Not figured.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites1-3, 4c, 5a, and 9a, Czechia (Jánossy 1972), Stránská skála – Absolon's 2nd cave (Jánossy 1972), Stránská skála – Musil's talus cone, layers 3b, 4a, 6, and 13 (Mlíkovský 1995b), and Kövesvárad, Hungary (Jánossy 1977 sub *A. apus* cf. *palapus*); and middle Pleistocene (MQ 2A) of Hundsheim, Austria (Jánossy 1974b sub *A. apus palapus*, Mlíkovský orig.), and Tarkő – layer 1, Hungary (Jánossy 1977 sub *A. apus* cf. *palapus*, Jánossy 1986 sub *A. apus*).

Apus melba (Linnaeus) – Alpine Swift

Hirundo melba Linnaeus, 1758 [Modern species.]

Apus submelba Jánossy, 1972: 56 [Holotype from Tarkő – layer 4: left ulna; NMB V-64.435. Not figured.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *A. melba*); middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layer B, France (Mourer-Chauviré 1975a sub. *A.* cf. *submelba*), Tarkő – layers 2, 3, and 4, Hungary (Jánossy 1972 sub *A. melba*), and Uppony 1 – layer 7, Hungary (Jánossy 1977 sub *A. submelba*).

Remarks: The alleged metrical differences between *Apus submelba* Jánossy and *Apus melba* Linnaeus (see Jánossy 1972: 57) do not substantiate the specific status of *submelba*. Hence, I synonymize here the former with the latter species.

Genus *Chaetura* Stephen

Chaetura Stephen, 1826 [Modern genus.]

Chaetura baconica Jánossy

Chaetura baconica Jánossy, 1977: 22 [Holotype from Sümeg: right ulna; GIB Vt-64. Figured by Jánossy 1977, fig. 5/13.]

Distribution: Late Miocene (MN 11-12) of Sümeg, Hungary (Jánossy 1977).

Remarks: The generic position of this species should be reevaluated.

Family Podargidae Gray

Podargidae Gray, 1840 [Modern family.]

Remarks: This family is traditionally considered as allied to the Caprimulgidae, but the podargids are much more similar to the Strigidae (Mlíkovský orig., see also Mayr 1999c).

Genus *Masillapodargus* Mayr

Masillapodargus Mayr, 1999c: 521 [Type by original designation: *Masillapodargus* Mayr, 1999c.]

Masillapodargus longipes Mayr

Masillapodargus longipes Mayr, 1999c: 522 [Holotype from Messel: incomplete skeleton in slab; SMNK PAL-1083. Figured by Mayr 1999c, fig. 1, 4.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1999c, 2000b).

Family Sophiornithidae Mourer-Chauviré

Sophiornithidae Mourer-Chauviré, 1987: 117 [Type genus: *Sophiornis* Mourer-Chauviré, 1987.]

Distribution: Late Paleocene (MP 6) of France, and Eocene or Oligocene (MP 16-28) of France. While some of the representatives of this family are certainly younger than MP 15, there is no firm evidence, that the family survived into the Oligocene.
Remarks: The taxonomic position of this family requires restudy.

Genus *Berruornis* Mourer-Chauviré

Berruornis Mourer-Chauviré, 1994: 339 [Type by original designation: *Berruornis orbisantiqui* Mourer-Chauviré, 1994.]

Berruornis orbisantiqui Mourer-Chauviré

Berruornis orbisantiqui Mourer-Chauviré, 1994: 340 [Holotype from Berru: right tarsometatarsus with damaged distal end; MNHN R-4155. Figured by Mourer-Chauviré 1994, pl. 1, fig. 1-5.]

Distribution: Late Paleocene (MP 6) Cernay-les-Reims (incl. Berru), France (Mourer-Chauviré 1994).

Genus *Palaeobyas* Mourer-Chauviré

Palaeobyas Mourer-Chauviré, 1987: 108 [Type by original designation: *Palaeobyas cracrafti* Mourer-Chauviré, 1987.]

Palaeobyas cracrafti Mourer-Chauviré

Palaeobyas cracrafti Mourer-Chauviré, 1987: 109 [Holotype from Quercy: left tarsometatarsus; MNHN QU-15746. Figured by Mourer-Chauviré 1987, pl. 3, fig. 1-4.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1987).

Remarks: Transferred from the Tytoninae by Mlíkovský (1998c).

Genus *Sophiornis* Mourer-Chauviré

Sophiornis Mourer-Chauviré, 1987: 118 [Type by original designation: *Sophiornis quercynus* Mourer-Chauviré, 1987.]

Sophiornis quercynus Mourer-Chauviré

Sophiornis quercynus Mourer-Chauviré, 1987: 119 [Holotype from Quercy: left tarsometatarsus; ML PQ-1202. Figured by Mourer-Chauviré 1987, pl. 4, fig. 1-4.]

Distribution: Eocene or Oligocene of Quercy (MP 16-28), France (Mourer-Chauviré 1987). Tentatively assigned were bone fragments and pedal phalanges from the late Oligocene (MP 25) of Belgarric, France (Mourer-Chauviré 1987: 119).

Genus *Palaeotyto* Mourer-Chauviré

Palaeotyto Mourer-Chauviré, 1987: 109 [Type by original designation: *Palaeotyto cadurcensis* Mourer-Chauviré, 1987.]

Palaeotyto cadurcensis Mourer-Chauviré

Palaeotyto cadurcensis Mourer-Chauviré, 1987: 111 [Holotype from Quercy: left coracoid; MNHN QU-16953. Figured by Mourer-Chauviré 1987, text-fig. 3a-b, pl. 4, fig. 11-12.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy (MP 16-28), France (Mourer-Chauviré 1987, Mlíkovský 1998c).

Family Strigidae Vigors

Strigidae Vigors, 1825 [Modern family.]

Palaeoglaucinae Mourer-Chauviré, 1987: 116 [Type genus: *Palaeoglaux* Mourer-Chauviré, 1987.]

Necrobyinae Mourer-Chauviré, 1987: 116 [Type genus: *Necrobyas* Milne-Edwards, 1892.]

Selenornithinae Mourer-Chauviré, 1987: 116 [Type genus: *Selenornis* Mourer-Chauviré, 1987.]

Remarks: Three successive radiations can be discerned within this family (Mlíkovský 1998c,f), which are understood here as subfamilies. They include the extinct Palaeoglaucinae Mourer-Chauviré (with *Palaeoglaux* Mourer-Chauviré, and perhaps also *Oligostrix* Fischer), modern Tytoninae Ridgway (with *Necrobyas* Milne-Edwards, *Prosybris* Brodkorb, *Basityto* Mlíkovský, and the modern *Tyto* Billberg and *Phodilus* Geoffroy-Saint-Hilaire), and modern Striginae Vigors (with *Mioglaux* Mlíkovský, *Intulula* Mlíkovský, *Alasio* Mlíkovský, and all modern European genera of owls but *Tyto* Billberg and *Phodilus* Geoffroy-Saint-Hilaire). The remaining fossil genera are of uncertain taxonomic position.

Genus *Palaeoglaux* Mourer-Chauviré

Palaeoglaux Mourer-Chauviré, 1987: 113 [Type by original designation: *Palaeoglaux perrierensis* Mourer-Chauviré, 1987.]

Distribution: Middle to late Eocene (MP 11-17) of France and Germany.

Palaeoglaux artophoron Peters

Palaeoglaux artophoron Peters, 1992: 163 [Holotype from Messel: nearly complete postcranial skeleton in slab and counter-slab; SMF ME-1144a,b. Figured by Peters 1992, fig. 1-8.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Peters 1992).

Palaeoglaux perrierensis Mourer-Chauviré

Palaeoglaux perrierensis Mourer-Chauviré, 1987: 116 [Holotype from Perrière: humeral end of left coracoid; USTL PRR-2585. Figured by Mourer-Chauviré 1987, pl. 3, fig. 7-9.]

Distribution: Late Eocene (MP 17) of Perrière, France (Mourer-Chauviré 1987, Peters 1992), and Salème, France (Mourer-Chauviré 1987, Peters 1992).

Genus *Necrobyas* Milne-Edwards, 1892

Necrobyas Milne-Edwards, 1892: 61 [Type by subsequent designation (Richmond 1902: 699): *Necrobyas harpax* Milne-Edwards 1892.]

Paratyto Brodkorb, 1970: 159 [Type by original designation: *Bubo arvernensis* Milne-Edwards, 1863.]

Distribution: Early Oligocene (MP 21) to early Miocene (MN 2a) of France.

Remarks: *Paratyto* Brodkorb was synonymized with *Necrobyas* Milne-Edwards by Mourer-Chauviré (1987: 91).

Necrobyas harpax Milne-Edwards

Necrobyas harpax Milne-Edwards, 1892: 61 [Holotype from Quercy: imperfect left tarsometatarsus; MNHN QU-15696. Not figured. In an erroneous belief that Milne-Edwards based this species on a series of syntypes, Mourer-Chauviré (1987: 97) selected a left tarsometatarsus from Quercy, MNHN QU-15695, as a lectotype. The "lectotype" was figured by Mourer-Chauviré 1987, pl. 1, fig. 1-4. Mlíkovský (1998c: 250) attempted to identify another left tarsometatarsus, MNHN QU-15742 as the holotype of the species on the basis of size, but Mourer-Chauviré (1999c: 363) showed that Milne-Edwards's description fits to another specimen, which I list here as the holotype of the species. The actions by Mourer-Chauviré (1987) and Mlíkovský (1998c) have no bearing on the nomenclatural status of *Necrobyas harpax*.]

Necrobyas Rossignoli Milne-Edwards, 1892: 63 [Holotype from Quercy: left tarsometatarsus; MNHN QU-15698. Figured by Mourer-Chauviré 1987, pl. 1, fig. 19-20.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908, 1939, Mourer-Chauviré 1987, 1999c, Mlíkovský 1998c, 1999d); early Oligocene (MP 21-28) of Fonbonne 1, France (Mourer-Chauviré 1987), and Phalip, France (Mourer-Chauviré 1987); early Oligocene (MP 21) of Aubrelong 1, France (Mourer-Chauviré 1987), and Ravet-Lupovici, France (Mourer-Chauviré 1987); early Oligocene (MP 22) of Mas de Got, France (Mourer-Chauviré 1987); and middle Oligocene (MP 23) of Crabit, France (Mourer-Chauviré 1987, Mlíkovský 1998c.). The alleged records from the late Eocene (MP17) of Perrière, France (Mourer-Chauviré 1987), and late Eocene (MP 19) of Rosières, France (Mourer-Chauviré 1987) are doubtful at best (Mlíkovský 1998c: 250). General references: Mlíkovský 1998c, 1999d, Mourer-Chauviré 1999c.

Remarks: *Necrobyas rossignoli* Milne-Edwards was synonymized with *Necrobyas harpax* Milne-Edwards by Mlíkovský (1998c).

Necrobyas arvernensis (Milne-Edwards)

Bubo arvernensis Milne-Edwards, 1863: 158 [Lectotype from Saint-Gérand-le-Puy (selected by Mlíkovský 1998c: 250): right tarsometatarsus; MNHN Av-2834b. Figured by Milne-Edwards 1869-1871, pl. 192, fig. 10-15. Paralectotype from Saint-Gérand-le-Puy: right tibiotarsus; MNHN Av-2834a. Figured by Milne-Edwards 1869-1871, pl. 192, fig. 20-23.]

Necrobyas Edwardsi Gaillard, 1939: 8 [Holotype from Quercy: left tarsometatarsus; MNHN QU-16294. Figured by Gaillard 1939, fig. 3, Mourer-Chauviré 1987, pl. 2, fig. 1-2.]

Paratyto arvernensis (Milne-Edwards): Brodkorb 1970: 159 [New combination.]

Necrobyas arvernensis (Milne-Edwards): Mourer-Chauviré 1987: 91 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1939, Mourer-Chauviré 1987, Mlíkovský 1998c); late Oligocene (MP 28) of Desse, France (Mourer-Chauviré 1987), and Fraysse, France (Mourer-Chauviré 1987); and early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1869-1871, Mourer-Chauviré 1987, Mlíkovský 1998c). The record from the middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Shufeldt 1896) is invalid, as the bones belong to *Tyto sanctialbani* Lydekker (Mlíkovský orig.; bones restudied in USNM).

Remarks: *Necrobyas edwardsi* Gaillard was synonymized with *Necrobyas arvernensis* (Milne-Edwards) by Mlíkovský (1998c).

Genus *Prosybris* Brodkorb

Prosybris Brodkorb, 1970: 159 [Type by original designation: *Strix antiqua* Milne-Edwards, 1863.]

Distribution: Middle Oligocene (MP 23) of France, and early Miocene (MN 3-4) of Austria.

Prosybris media (Mourer-Chauviré)

Necrobyas medius Mourer-Chauviré, 1987: 104 [Holotype from Quercy: distal end of right tarsometatarsus; BaM QH-150. Figured by Mourer-Chauviré 1987, pl. 3, fig. 16-17.]

Prosybris media (Mourer-Chauviré): Mlíkovský 1998c: 252 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1908 sub *Asio henrici*, Mourer-Chauviré 1987, 1999c, Mlíkovský 1998c, 1999d).

Prosybris antiqua (Milne-Edwards)

Strix antiqua Milne-Edwards, 1863: 158 [Nomen nudum; no description or indication.]

Strix antiqua Milne-Edwards, 1869: 498 [Holotype from Saint-Gérand-le-Puy: left tarsometatarsus; MNHN Av-2837. Figured by Milne-Edwards 1869-1871, pl. 192, fig. 3-9.]

Prosybris antiqua (Milne-Edwards): Brodkorb 1970: 159 [New combination.]

Necrobyas minimus Mourer-Chauviré, 1987: 105 [Holotype from Fonbonne 1: distal end of right tarsometatarsus; UUT Fo-1. Figured by Mourer-Chauviré 1987, pl. 2, fig. 19-20.]

Distribution: Oligocene (MP 21-28) of Fonbonne 1, France (Mourer-Chauviré 1987, Mlíkovský 1987c); middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1987, Mlíkovský 1998c); early Miocene (MP 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Brodkorb 1970, Mlíkovský 1998c); and early Miocene (MN 3-4) of Limberg, Austria (Bachmayer 1980 sub *Falco* cf. *naumanni*, Mlíkovský 1998c).

Remarks: *Necrobyas minimus* Mourer-Chauviré was synonymized with *Prosybris antiqua* (Milne-Edwards) by Mlíkovský (1998c: 252, see also Mourer-Chauviré 1999c).

Genus *Basityto* Mlíkovský

Basityto Mlíkovský, 1998c: 248 [Type by original designation: *Basityto rummeli* Mlíkovský, 1998c.]

Basityto rummeli Mlíkovský

Basityto rummeli Mlíkovský, 1998c: 248 [Holotype from Grafenmühle 21: left humerus in two pieces; coll. Rummel, not catalogued. Figured by Mlíkovský 1998c, fig. 1a, 2.]

Distribution: Early Miocene (MN 2-3) of Grafenmühle 21, Germany (Mlíkovský 1998c).

Genus *Tyto* Billberg

Tyto Billberg, 1828 [Modern genus.]

Tyto sanctialbani (Lydekker)

Strix sancti-albani Lydekker, 1893: 518 [Syntypes from Grive-Saint-Alban: "no less than eleven ... bones", BMNH. The following syntypes were illustrated by Lydekker 1893, pl. 41: distal end of right tibiotarsus (fig. 1-2), proximal end of left tarsometatarsus (fig. 3, 3a), and distal end of left tarsometatarsus (fig. 4, 4a).

Strix sancti albani Lydekker: Ennouchi 1930: 66 [Spelling emended.]

Strix Sancti-albani Lydekker: Gaillard 1939: 82 [Spelling emended.]

Tyto sanctialbani (Lydekker): Ballmann 1969a: 191 [New combination and spelling emended.]

Tyto campiterrae Jánossy, 1991: 25 [Holotype from Polgárdi 5: left tarsometatarsus; GIB Vt-148-V-18.097. A tarsometatarsus was figured by Jánossy 1991, pl. 3, fig. 1, but Jánossy (1991) listed two complete tarsometatarsi from the type locality and did not state which of them was figured.]

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban – early collections, France (Lydekker 1893, Shufeldt 1896 sub *Bubo arvernensis*, Ennouchi 1930, Ballmann 1969a, Mlíkovský 1998c); middle Miocene (MN 8) of Grive-Saint-Alban – fissure M, France (Ballmann 1969a); late Miocene (MN 10) of Kohfidisch, Austria (Mlíkovský 1998c); and late Miocene (MN 13) of Polgárdi 5, Hungary (Jánossy 1991, Mlíkovský 1998c). The alleged record of *Tyto sanctialbani* from the early Pliocene (MN 14-15) of Gargano, Italy (Ballmann

1973, 1976a) is invalid, because the bones belong to *Tyto balearica* Mourer-Chauviré et al. (Mlíkovský 1998c).

Remarks: *Tyto campiterrae* Jánossy was synonymized with *Tyto sanctialbani* (Lydekker) by Mlíkovský (1998c).

Tyto balearica Mourer-Chauviré et al.

Tyto balearica Mourer-Chauviré, Alcover, Moyà & Pons, 1980: 804 [Holotype from Canet: left coracoid; MNCM, uncatalogued. Figured by Mourer-Chauviré et al 1980, pl. 1, fig. 3-4.]

Distribution: Late Miocene (MN 12) of Aljezar B, Spain (Cheneval & Adrover 1993); early Pliocene (MN 14-15) of several fissures on Gargano, Italy, incl. Biancone, Cantatore 3A, Chirò 2S, Chirò 3, Chirò 15, Chirò 20A,C,D, Chirò 24, Fina D, Gervaisio 2, Rinascita 1, and San Giovannino (Ballmann 1973, 1976a sub *Tyto sanctialbani*, Mlíkovský 1998c); early Pliocene (MN 15) of Layna, Spain (Mourer-Chauviré & Sánchez Marco 1988), and Sète, France (Mourer-Chauviré & Sánchez Marco 1988); late Pliocene (MN 16) of Moreda, Spain (Sánchez Marco 1996, in litt.), Balaruc 2, France (Mourer-Chauviré & Sánchez Marco 1988); late Pliocene (MN 18) of Canet, Mallorca, Balearics (Mourer-Chauviré et al. 1980, Mourer-Chauviré & Sánchez Marco 1988), S'Onix, Mallorca Balearics (Mourer-Chauviré et al. 1980, Mourer-Chauviré & Sánchez Marco 1988), Binigaus, Minorca, Balearics (Mourer-Chauviré et al. 1980, Mourer-Chauviré & Sánchez Marco 1988), and Almenara 1, Spain (Mourer-Chauviré & Sánchez Marco 1988); middle Pleistocene (MQ 2A-C) of Monte Reale, Sardinia (Mlíkovský 2000b), Son Bauçá, Mallorca, Balearics (Ballmann & Adrover 1970 sub *Strix* sp., Mourer-Chauviré et al. 1980: tentatively referred to *T. balearica*); and middle Pleistocene (MQ 2B) of Castiglione 3, Corsica, France (Salotti et al. 1997). For maps see Mlíkovský (1998c, fig. 6, and 2000b, fig. 1).

Tyto gigantea Ballmann

Tyto robusta Ballmann, 1973: 33 [Holotype from Chirò 12: right femur; RGM 177523. Figured by Ballmann 1973, text-fig. 8a-e, pl. 5, fig. 4-6.]

Tyto gigantea Ballmann, 1973: 37 [Holotype from San Giovannino: right tibiotarsus; RGM 177687. Figured by Ballmann 1973, text-fig. 9a-f, pl. 6, fig. 4-7.]

Distribution: Early Pliocene (MN 14-15) of Gargano, Italy, incl. the following fissures: Chirò 2N, Chirò 2S, Chirò 3, Chirò 4, Chirò 5, Chirò 6, Chirò 7, Chirò 9, Chirò 10, Chirò 11, Chirò 12, Chirò 14A, Chirò 20, Chirò 22, Chirò 24, Chirò 27, Falcone 2A, Fina D, Fina H, Gervaisio 1, Gervaisio 2, Monte Granata, Nazario 2B, Nazario 3, Nazario 4, Pirro 11, Pizzioli 4, Posticchia 1B, and San Giovannino (Ballmann 1973, 1976a).

Remarks: *Tyto robusta* Ballmann was synonymized with *Tyto gigantea* Ballmann by Mlíkovský (1998c).

Tyto alba (Scopoli) – Barn Owl

Strix alba Scopoli, 1769 [Modern species.]

Strix melitensis Lydekker, 1891a: 13 [Holotype from an unknown site in Malta: left femur; BMNH 49322. Not figured.]

Tyto melitensis (Lydekker): Brodkorb 1970a: 231 [New combination.]

Distribution: Late Pleistocene (MQ 2C) of an unknown site in Malta (Lydekker 1891a, Mourer-Chauviré et al. 1980, Mlíkovský 1998c).

Remarks: *Strix melitensis* Lydekker was synonymized with the modern *Tyto alba* (Scopoli) by Mlíkovský (1998c: 255, see also Mourer-Chauviré et al. 1980).

Genus *Mioglaux* Mlíkovský

Mioglaux Mlíkovský, 1998f: 6 [Type by original designation: *Mioglaux debellatrix* Mlíkovský, 1998f.]

Distribution: Early Miocene (MN 2-3) of France and Czechia.

Mioglaux poirrieri (Milne-Edwards)

Bubo Poirrieri Milne-Edwards, 1863: 158 [Holotype from Saint-Gérand-le-Puy: right tarsometatarsus; MNHN Av-2836. Figured by Milne-Edwards 1869-1871, pl. 192, fig. 24-29.]

Mioglaux poirrieri (Milne-Edwards): Mlíkovský 1998f: 11 [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1863, 1869-1871, Mlíkovský 1998f).

Mioglaux debellatrix Mlíkovský

Mioglaux debellatrix Mlíkovský, 1998f: 6 [Holotype from Merkur: distal end of right tibiotarsus; coll. Fejfar, uncatalogued. Figured by Mlíkovský 1998f, fig. 1, 2b.]

Distribution: Early Miocene (MN 3) of Merkur, Czechia (Mlíkovský 1998f).

Genus *Intulula* Mlíkovský

Intulula Mlíkovský, 1998f: 8 [Type by original designation: *Intulula tinnipara* Mlíkovský, 1998f.]

Distribution: Early Miocene (MN 3) of Germany and Czechia.

Intulula tinnipara Mlíkovský

Intulula tinnipara Mlíkovský, 1998f: 9 [Holotype from Merkur: left tarsometatarsus lacking distal end; coll. Fejfar, uncatalogued.]

Distribution: Early Miocene (3a) of Wintershof-West, Germany (Ballmann 1969b sub *Otus wintershofensis*, Mlíkovský orig.); and early Miocene (MN 3) of Merkur, Czechia (Mlíkovský 1998f).

Remarks: Ballmann (1969b) referred to his *Otus wintershofensis* a partial humerus. I restudied the bone in BSP, finding that it has a strongly bent shaft, characteristic for the Surniini. It falls in the same size class with *Intulula tinnipara* Mlíkovský, and I refer here the bone to the latter species. *Otus wintershofensis* Ballmann belongs in the Bubonini (see Mlíkovský 1998f, and below).

Intulula brevis (Ballmann)

Strix brevis Ballmann, 1969b: 38 [Holotype from Wintershof-West: left humerus lacking proximal end; BSP 1937-II-18012. Figured by Ballmann 1969b, pl. 1, fig. 7a-b.]

Intulula brevis (Ballmann): Mlíkovský, this paper [New combination.]

Distribution: Early Miocene (MN 3) of Wintershof-West, Germany (Ballmann 1969b, Mlíkovský 1998f); and late Miocene (MN 9) of Rudabánya, Hungary (Jánossy 1977 sub *Strix* aff. *brevis*, Jánossy 1980b sub *Strix* cf. *brevis*). The record from Hungary is doubtful because of its age (Mlíkovský, orig.).

Remarks: The holotypical humerus of this species clearly belongs in the Surniini, being indeterminate within the latter tribe (Mlíkovský 1998f, and unpublished reexamination of the specimen in BSP). I restudied in BSP the referred material of this species, of which the tarsometatarsus (BSP 1937-II-18113) was especially diagnostic. I found it to be similar in morphology to the same element (holotype) of *Intulula tinnipara* Mlíkovský from the early Miocene (MN 3) of Czechia. Hence, I transfer here *Strix brevis* Ballmann to the genus *Intulula* Mlíkovský. Within the latter genus, *Intulula brevis* (Ballmann) is larger than *Intulula tinnipara* Mlíkovský (proximal width of the tarsometatarsus of *Intulula tinnipara* from Merkur = ca. 5.5 mm, the same dimension of the tarsometatarsus from Wintershof-West = 8.2 mm; Mlíkovský orig.).

Genus *Alasio* Mlíkovský

Alasio Mlíkovský, 1998f: 12 [Type by original designation: *Strix collongensis* Ballmann, 1972.]

Alasio collongensis (Ballmann)

Strix collongensis Ballmann, 1972: 97 [Holotype from Vieux-Collonges: left coracoid; FSL 62226. Figured by Ballmann 1972, text-fig. 1a-b, pl. 1, fig. 1-3.]

Alasio collongensis (Ballmann): Mlíkovský 1998f: 12 [New combination.]

Distribution: Middle Miocene (MN 5) of Vieux-Collonges, France (Ballmann 1972, Mlíkovský 1998f).

Genus *Otus* Pennant

Otus Pennant, 1769 [Modern genus.]

Otus scops (Linnaeus) – European Scops Owl

Strix Scops Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995); and early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001), and Betfia 2, Romania (Čapek 1917, Jánossy 1977 sub ?*O. scops*)

Genus *Bubo* Duméril

Bubo Duméril, 1806 [Modern genus.]

Nyctea Stephens, 1826 [Modern genus.]

Ophtalmomegas Dehaut, 1911: 55 [Type by monotypy: *Ophtalmomegas lamarmorae* Dehaut, 1911.]

Bubo bubo (Linnaeus) – Great Eagle-Owl

Strix bubo Linnaeus, 1758 [Modern species.]

Ardea lignitum Giebel, 1860: 152 [Holotype from Rippersroda 1: left femur; present location unknown. Figured by Giebel 1860, pl. 1, fig. 2.]

Bubo lignitum (Giebel): Brodkorb 1980: 90 [New combination.]

Bubo bubo davidi Mourer-Chauviré, 1975a: 164 [Holotype from Saint-Estève-Janson – layer B: right tibiotarsus; coll. Bonifay CD66-B-11970. Not figured.]

Distribution: Early Pliocene (MN 14) of Vojničevo, Ukraine (Vojinstvens'kyj 1967 sub *B.* cf. *bubo*); early Pliocene (MN 15) of Csarnóta 2, Hungary (Jánossy 1977 sub *B.* aff. *bubo*); late Pliocene (MN 16) of Rębielice Królewskie 1A, Poland (Jánossy 1974a sub ?*Bubo* sp.); late Pliocene (MN 16b) of Osztramos 7, Hungary (Jánossy 1977 sub *B.* aff. *bubo*); late Pliocene (MN 18) of Rippersroda 1, Germany (Giebel 1860 sub *Ardea lignitum*, Brodkorb 1980 sub *B. lignitum*, Mlíkovský 1992b), and Villány 3, Hungary (Jánossy 1977 sub *B.* aff. *bubo*); early Pleistocene (MQ 1a) of Betfia 2, Romania (Jánossy 1977 sub *B.* aff. *bubo*); early Pleistocene (MQ 1b) of East Runton, England (Harrison 1979d), and Nagyharsányhegy 1-4, Hungary (Jánossy 1977 sub *B.* aff. *bubo*); and middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layers B, C, D, F, G and H, France (Mourer-Chauviré 1975a sub *B. bubo davidi*, see also Arredondo & Olson 1994), and Vértesszõlõs 2, Hungary (Jánossy 1977 sub *B.* aff. *bubo*).

Remarks: *Ardea lignitum* Giebel was synonymized with the modern *Bubo bubo* (Linnaeus) by Mlíkovský (1992b: 437).

Bubo zeylonensis (Gmelin) – Brown Fish Owl

Strix zeylonensis Gmelin, 1788 [Modern species.]

Ophtalmomegas lamarmorae Dehaut, 1911: 55 [Lectotype from Figari (selected by Pavia 1999a: 5): fragmentary cranium; MPUT PU-29860. Figured by Dehaut 1911, pl. 1, fig. 1, Dehaut 1914, pl. 4, fig. 2, Dehaut 1920, fig. 24, and Pavia 1999a, pl. 1, fig. 1, 5. Paralectotypes from Figari: endocranial cast with associated vertebrae (PU-29861), distal end of a humerus (PU-29862), and imprint of a femur (PU-29863). Figured by Dehaut 1911, pl. 1, fig. 2-5.]

Strix? *perpasta* Ballmann, 1976a: 27 [Holotype from San Giovannino: left tarsometatarsus; RGM 178978. Figured by Ballmann 1976a, text-fig. 10a-c, pl. 7, fig. 9-11.]

Bubo perpastus (Ballmann): Mlíkovský 1998f: 14 [New combination.]

Bubo insularis Mourer-Chauviré & Weesie, 1986: 198 [Holotype from Rapaci: right ulna; UUT Rp-27. Figured by Mourer-Chauviré & Weesie 1986, pl. 1, fig. 1-2.]

Bubo lamarmorae (Dehaut): Pavia 1999a: 3 [New combination.]

Distribution: Early Pliocene (MN 14-15) of Gargano, Italy, incl. fissures Chirò 5, Chirò 20, Pirro 11, and San Giovannino (Ballmann 1976a sub *Strix*? *perpasta*); late Pleistocene (MQ 2C) of Coscia – northwestern cave, Corsica, France (Bonifay et al. 1998 sub *B. insularis*), Monte San Giovanni, Sardinia, Italy (Lydekker 1891b sub *B.* cf. *africanus*, Mourer-Chauviré & Weesie 1986 sub *B. insularis*), Pietro Tampoia Cave, Tavolara near Sardinia, Italy (Lydekker 1891b sub *B.* cf. *africanus*, Mourer-Chauviré & Weesie 1986 sub *B. insularis*), Figari, Sardinia, Italy (Dehaut 1911, 1914 and 1920 sub *O. lamarmorae*, Comaschi Caria 1969 and 1970 sub *Aquila* sp., Pavia 1999a sub *B. lamarmorae*), Corbeddu – hall I, hall II, hall IV: layer 1, Sardinia, Italy (Mourer-Chauviré & Weesie 1986 and Weesie 1999 sub *B. insularis*), Rapaci, Sardinia, Italy (Mourer-Chauviré & Weesie 1986 sub *B. insularis*), Dorgali, Sardinia, Italy (Kotsakis 1980 sub *Strix uralensis*, Mourer-Chauviré & Weesie 1986 sub *B. insularis*), and Macinaggio, Corsica, France (Mourer-Chauviré & Weesie 1986 sub *B. insularis*), Liko – layer D, Crete, Greece (Weesie 1987, 1988). An extralimital record is available from the early Pleistocene (MQ 1a) of 'Ubeidyia – layer II-23, Israel (Tchernov 1980).

Remarks: *Ophtalmomegas lamarmorae* Dehaut was described as a primate by Dehaut (1911, see also Dehaut 1914, 1920). The avian affininities of the lectotypical skull were recognized by S. Schaub & A. Azzaroli (in Comaschi Caria 1969, 1970), and Pavia (1999a) identified the species with *Bubo insularis* Mourer-Chauviré & Weesie. The paratypes of *Ophtalmomegas lamarmorae* Dehaut belong to the primate *Macaca majori* Azzaroli (S. Schaub & A. Azzaroli in Comaschi Caria 1969, see also Pavia 1999a).

Ophtalmomegas lamarmorae Dehaut, *Strix* (= *Bubo*, see Mlíkovský 1998f: 14) *perpasta* Ballmann, and *Bubo insularis* Mourer-Chauviré & Weesie fall in the same size class as the modern *Bubo zeylonensis* (Gmelin) (Mlíkovský, orig.), with which they were formerly not compared, perhaps because the species is often separated in the genus *Ketupa* Lesson, 1831 (but see Ford 1967 for osteological similarities, and König et al. 1999). Hence I synonymize here the former three species with the latter one.

Bubo zeylonensis (Gmelin) is now extinct in Europe, with nearest existing populations in the Middle East (Cramp 1989, Del Hoyo et al. 1999, König et al. 1999).

Bubo scandiacus (Linnaeus) – Snowy Owl

Strix scandiaca Linnaeus, 1758 [Modern species.]

Nyctea scandiaca gallica Mourer-Chauviré, 1975a: 159 [Holotype from Saint-Estève-Janson – layer H: partial disarticulated skeleton; coll. Bonifay CD66-H-4741. Not figured.]

Distribution: Early Pleistocene (MQ 1b) of Bourgade, France (Mourer-Chauviré 1976); middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layers C? and H, France (Mourer-Chauviré 1975a sub *Nyctea scandiaca gallica*), and Fage – layers CO and 40, France (Mourer-Chauviré 1975a,b sub *Nyctea scandiaca gallica*); and late Pleistocene (MQ 2D) of Morin –

layers A1-2, A3, and A4, France (Mourer-Chauviré 1975a sub *Nyctea scandiaca* cf. *gallica*).

Bubo sp.

Distribution: Late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a, tentatively referred).

Genus *Surnia* Duméril

Surnia Duméril, 1806 [Modern genus.]

Surnia robusta Jánossy

Surnia robusta Jánossy, 1977: 10 [Holotype from Villány 3: left tarsometatarsus; NMB Vt-62. Figured by Jánossy 1977, fig. 2a-d, 5/2.]

Distribution: Late Pliocene (MN 16) of Beremend 4, Hungary (Jánossy 1977), and Osztramos 7, Hungary (Jánossy 1977); late Pliocene (MN 18) of Villány 3, Hungary (Jánossy 1977, Mlíkovský 1998f); and early Pleistocene (MQ 1b) of Nagyharsányhegy 1-4, Hungary (Jánossy 1977).

Surnia capeki Jánossy

Surnia čapeki Jánossy, 1972: 53 [Holotype from Stránská skála – Čapek's site 9a: left tarsometatarsus; MMB Ča-807. Figured by Jánossy 1972, pl. 2, fig. 7.]

Surnia capeki Jánossy: Mlíkovský, this paper [Spelling emended.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972).

Genus *Glaucidium* Boie

Glaucidium Boie, 1826 [Modern genus.]

Glaucidium passerinum (Linnaeus) – Eurasian Pygmy Owl

Strix passerina Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1977 sub ?*Otus scops*).

Glaucidium sp.

Distribution: Late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a).

Genus *Athene* Boie

Athene Boie, 1822 [Modern genus.]

Remarks: General reference: Pavia & Mourer-Chauviré 2000.

Athene angelis Mourer-Chauviré et al.

Athene angelis Mourer-Chauviré, Salotti, Pereira, Quinif, Courtois, Dubois & La Milza, 1997: 679 [Holotype from Castiglione 3: incomplete skeleton; MS CAST-3-CG-O-44. Figured by Mourer-Chauviré et al. 1997, unnumbered pl., fig. 1-2 (skull), 3-5 (premaxilla), 6-7 (tibiotarsus), 8-9 (humerus), 11-12 (femur), 13-14 (coracoid), 15-16 (carpometacarpus), and 18-19 (tarsometatarsus).]

Distribution: Middle Pleistocene (MQ 2B) of Castiglione 3, Corsica, France (Mourer-Chauviré et al. 1997); and late Pleistocene (MQ 2C) of Castiglione 1 – layer A, Corsica, France (Mourer-Chauviré et al. 1997).

Athene cretensis Weesie

Athene cretensis Weesie, 1982: 328 [Holotype from Liko: left humerus; RMG Lic-203. Figured by Weesie 1982, fig. 1.]

Distribution: Late Pleistocene (MQ 2C) of Liko – layers A, B, D, a, b, c, and d, Crete, Greece (Weesie 1982, 1987a,b, 1988), and Gumbes B, and Gumbes C, Crete, Greece (Weesie 1982, 1987a,b, 1988).

Athene noctua (Scopoli) – Little Owl

Strix noctua Scopoli, 1769 [Modern species.]

Athene noctua lunellensis Mourer-Chauviré, 1975a: 168 [Holotype from Lunel-Viel, cave I: distal end of right ulna; coll. Bonifay LVI-11-5822. Figured by Mourer-Chauviré 1975a, pl. 22, fig. 11.]

Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001), Mas Rambault, France (Mourer-Chauviré 1975a sub *A. noctua lunellensis*), Beremend 16, Hungary (Jánossy 1992 sub *A. veta*; tentatively included here), Beremend 17, Hungary (Jánossy 1992 sub *A. veta*; tentatively included here), and Betfia 2, Romania (Čapek 1917); early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layers 6, 13, and 15e, Czechia (Mlíkovský 1995b); middle Pleistocene (MQ 2A) of Terra Amata, France (Mourer-Chauviré 1975a sub *A. noctua lunellensis*); middle Pleistocene (MQ 2B) of Lunel-Viel – cave 1, layers 1, 2, and 5, France (Mourer-Chauviré 1975a), Orgnac 3 – layers h, i, j, France (Mourer-Chauviré 1975a sub *A. noctua lunellensis*), and Lazaret 8 – layers 8, 12 and 13, France (Mourer-Chauviré 1975a sub *A. noctua lunellensis*).

Athene sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a).

Remarks: Jánossy (1993: 59) attributed a pedal phalanx from the late Miocene (MN 9) of Rudabánya, Hungary, to *Athene* sp., doubting on the same page its referral to the genus *Athene*, and indicating that the bone is not identifiable even to the genus.

Genus *Strix* Linnaeus

Strix Linnaeus, 1758 [Modern genus.]

Strix wintershofensis (Ballmann)

Otus wintershofensis Ballmann, 1969b: 39 [Holotype from Wintershof-West: distal end of right tibiotarsus; BSP 1937-II-18121. Figured by Ballmann 1969b, pl. 1, fig. 11, 11a, 11b.]

Strix wintershofensis (Ballmann): Mlíkovský 1998f: 12 [New combination.]

Distribution: Early Miocene (MN 3a) of Wintershof-West, Germany (Ballmann 1969b, Mlíkovský 1998f), and Merkur, Czechia (Mlíkovský 1998f).

Strix edwardsi (Ennouchi)

Strix Edwardsi Ennouchi, 1930: 66 [Holotype from Grive-Saint-Alban: distal end of left tibiotarsus; ML LGr-41. Figured by Ennouchi 1930, pl. 5, fig. 9-12.]

Tyto edwardsi (Ennouchi): Brodkorb 1971b: 230 [New combination.]

Strix edwardsi (Ennouchi): Mlíkovský 1998f: 12 [New combination. Note that Ennouchi described the species in the genus *Strix* auct. [= *Tyto* Billberg, 1828], not in *Strix* Linnaeus, 1758.]

Distribution: Middle Miocene (MN 6) of Petersbuch 39, Germany (Mlíkovský 1998f), and middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Ennouchi 1930, Mlíkovský 1998f).

Strix aluco Linnaeus – Tawny Owl

Strix aluco Linnaeus, 1758 [Modern species.]

Strix intermedia Jánossy, 1972: 53 [Holotype from Tarkő – layer 11 (Jánossy 1972: 54) or layer 12 (Jánossy 1977: 21): left coracoid; NMB V-64.746. Not figured.]

Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001), Beremend 16, Hungary (Jánossy 1992 sub *S. intermedia*), Beremend 17, Hungary (Jánossy 1992 sub *S. intermedia*); early Pleistocene (MQ 1b) of Boxgrove – quarry 1, England (Harrison & Stewart 1999), Koněprusy C-718, Czechia (Jánossy 1972 and Mlíkovský 1996t sub *S. intermedia*), Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *S. intermedia*, Mlíkovský orig.), and Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *S. intermedia*, Mlíkovský orig.); and middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layer C/D, France (Mourer-Chauviré 1975a sub *S. intermedia*), Hundsheim, Austria (Jánossy 1974b sub *S. intermedia*, Mlíkovský orig.), and Tarkő – layers 10, 11, 12, and 13, Hungary (Jánossy 1972 and 1977 sub *S. intermedia*).

Remarks: Although my first impression was that *Strix intermedia* Jánossy is a valid species (Mlíkovský 1996t), an examination of a large series of bones belonging to modern *Strix aluco* Linnaeus in USNM, and of all fossil material from Czechia and Austria referred by Jánossy (1972, 1974a, 1977) to *Strix intermedia* Jánossy convinced me that *Strix intermedia* Jánossy is not separable from the modern *Strix aluco* Linnaeus. It is questionable, whether all material referred by Jánossy to his *Strix intermedia* belongs to *Strix aluco*.

Strix sp.

Distribution: Late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a sub array of *Strix nebulosa*)

Genus *Aegolius* Kaup

Aegolius Kaup, 1829 [Modern genus.]

Aegolius funereus (Linnaeus) – Tengmalm's Owl

Strix funerea Linnaeus, 1758 [Modern species.]

Athene noctua veta Jánossy, 1974a: 555 [Holotype from Rębielice Królewskie 1: humeral end of right (not left, as stated by Jánossy 1974a) coracoid; ISEZ, uncatalogued. Figured by Jánossy 1974a, pl. 24, fig. 1.]

Athene veta Jánossy: Jánossy 1977: 19 [New rank; see also Jánossy 1981.]

Distribution: Late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a sub *Athene noctua veta*, Jánossy 1977 sub *Athene noctua veta*, Jánossy 1981 sub *Athene veta*, Mlíkovský 1992b), and Osztramos 7, Hungary (Jánossy 1977). Tyrberg (1998: 59) listed *A.* cf. *funereus* (Linnaeus) from the early Pleistocene (MQ 1b) of "Koněprusy" (= Koněprusy C-718), Czechia, but I was not able to find the species in the papers he cited (i.e. Jánossy 1972, 1976d, 1977, 1979), and I found no bone resembling an owl of this size in my study of the relevant material (Mlíkovský 1996t).

Remarks: *Athene noctua veta* Jánossy was synonymized with the modern *Aegolius funereus* (Linnaeus) by Mlíkovský (1992b: 443).

Aegolius sp.

Distribution: Late Miocene (MN 15) of Csarnóta, Hungary (Jánossy 1980b, exact locality not given); and late Pliocene (MN 18) of Villány 3, Hungary (Jánossy 1980b). However, Jánossy (1986) did not list *Aegolius* from either of the latter two localities.

Genus *Asio* Brisson

Asio Brisson, 1760 [Modern genus.]

Asio longaevus (Umans'ka)

Bubo longaevus Umans'ka, 1979b: 779 [Holotype from Čebotarevka: right tibiotarsus; ZINK 45-3994. Figured by Umans'ka 1979b. fig. 1.]

Asio longaevus (Umans'ka): Mlíkovský 1998f: 13 [New combination.]

Distribution: Late Miocene (MN 11-13) of Čebotarevka, Ukraine (Umans'ka 1979b, Mlíkovský 1998f).

Asio flammeus (Pontoppidan) – Short-eared Owl

Strix flammea Pontoppidan, 1763 [Modern species.]

Distribution: Late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a sub *Asio* aff. *flammeus*); early Pleistocene (MQ 1a) of Osztramos 8, Hungary (Jánossy 1977 sub *A.* aff. *flammeus*), and Betfia 2, Romania (Jánossy 1977 sub *A.* aff. *flammeus*); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 1-3, 5a, Czechia (Jánossy 1972 sub *A.* aff. *flammeus* and *Strix intermedia*, Mlíkovský orig.), and Stránská skála – Musil's talus cone, layers 4, 5, 8, 12, and 13, Czechia (Mlíkovský 1995b).

Asio sp.

Distribution: Early Miocene (MN 3a) of Wintershof-West, Germany (Ballmann 1969b); and early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992).

Remarks: Some postcranial bones of the Asionini are morphologically very similar to those of the Surniini (Mlíkovský orig.). The taxonomic identity of the *Asio* bones from Wintershof-West thus should be treated with caution.

Genus incertae sedis

Asio pygmaeus Serebrovs'kyj

Asio pygmaea Serebrovs'kyj, 1941b: 476 [Holotype from Odesa – catacombs: proximal end of right ulna; present location unknown. Figured by Serebrovskij 1941b, fig.; and Dement'ev 1964, fig. 703a-b.]

Asio pigmaeus Serebrovs'kyj: Brodkorb 1971b: 221 [Ending corrected; species name misspelled.]

Distribution: Early Pliocene (MN 15) of Odesa – catacombs, Ukraine (Serebrovs'kyj 1941b).

Remarks: Indeterminate after the figures (Mlíkovský, orig.).

Bubo florianae Kretzoi

Bubo (?) *florianae* Kretzoi, 1957: 243 [Holotype from Csákvár: phalanx 2 digiti II; GIB, uncatalogued. Figured by Kretzoi 1957, fig. 47-49.]

Distribution: Late Miocene (MN 10) of Csákvár, Hungary (Kretzoi 1957, Jánossy 1977).

Remarks: This phalanx indeed originated from a large owl, but it is indeterminate within the family, being tentatively assigned by Kretzoi (1957) to the genus *Bubo* Duméril on the basis of the size alone (Mlíkovský 1998f).

Nocturnavis incerta (Milne-Edwards)

Bubo incertus Milne-Edwards, 1892: 63 [Holotype from Quercy: right humerus; MNHN QU-16223. Figured by Mourer-Chauviré 1987, text-fig. 2 (left), pl. 2, fig. 15-16.]

Nocturnavis incerta (Milne-Edwards): Mourer-Chauviré 1987: 108 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1982, Mourer-Chauviré 1987); and late Eocene (MP 19) of Escamps, France (Mourer-Chauviré

1987).

Remarks: *Bubo incertus* Milne-Edwards is type by original designation of the genus *Nocturnavis* Mourer-Chauviré, 1987: 106.

Oligostrix rupelensis Fischer

Oligostrix rupeliensis [sic!] Fischer, 1982: 152 [Nomen nudum; no description or indication.]

Oligostrix rupelensis Fischer, 1983b: 483 [Holotype from Espenhain: distal end of left tibiotarsus; NHMB Av-730. Figured by Fischer 1983b.]

Distribution: Middle Oligocene (MP 23-24) of Espenhain, Germany (Fischer 1983b).

Remarks: *Oligostrix rupelensis* Fischer, 1983b is type by original designation of the genus *Oligostrix* Fischer, 1983b: 483. *Oligostrix* Fischer, 1982: 152 is a nomen nudum, because it was not accompanied by an available species name after 1930.

Selenornis henrici (Milne-Edwards)

Otus Henrici Milne-Edwards, 1892: 63 [Holotype from Quercy: distal end of left tibiotarsus; MNHN QU-16222. Figured by Mourer-Chauviré 1987, pl. 3, fig. 5-6.]

Asio Henrici (Milne-Edwards): Gaillard 1908: 36 [New combination.]

Selenornis henrici (Milne-Edwards): Mourer-Chauviré 1987: 113 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Mourer-Chauviré 1987).

Remarks: Taxonomic position of this species is uncertain (Mlíkovský 1998c). *Otus henrici* Milne-Edwards, 1892 is type by original designation of the genus *Selenornis* Mourer-Chauviré, 1987: 112.

Strix ignota Milne-Edwards

Strix ignota Milne-Edwards, 1871: 580 [Holotype from Sansan: distal end of left tarsometatarsus, lacking trochlea of digit IV; MNHN Sa-1254. Figured by Milne-Edwards 1869-1871, pl. 192, fig. 1, 1a, 2, 2a; and Cheneval 2000.]

Tyto ignota (Milne-Edwards): Brodkorb 1971b: 230 [New combination.]

Asio (?) *ignotus* (Milne-Edwards): Cheneval 2000: 365 [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1969-1871 sub *Strix* sp. (p. 499) and *Strix ignota* (p. 580), Mlíkovský 1998c, Mourer-Chauviré 1999c, Cheneval 2000).

Remarks: Lambrecht (1933: 613) and Brodkorb (1971: 230) erroneously attributed this name to Paris (1912). Paris (1912: 287) and Lambrecht (1921: 97) attributed this name to Milne-Edwards (1871: 499), referring to a page, where the name does not appear. This led Mlíkovský (1998c: 255) to conclude, that the name never did exist, and that Paris (1912) listed it in error. However, Mourer-Chauviré (1999c: 363) and Cheneval (2000: 368) observed, that Milne-Edwards (1871) created the name on p. 580 with a notice, that the species originated from Sansan, and under the reference to p. 499 of the same work. Accordingly, *Strix ignota* is available with Milne-Edwards (1871: 580) as its author.

Cheneval (2000) compared the fossil with only a few modern European owl genera, not considering e.g. the Surniini. He presented no convincing evidence that the species belongs to *Asio* Brisson, and correctly expressed his doubts about this allocation, adding a question-mark to the genus. I leave the species in the Strigidae inc. sedis, but I agree with Cheneval (2000), that it belongs to the Striginae (in the present sense), not to the Tytoninae.

Family Columbidae Illiger

Columbidae Illiger, 1811 [Modern family.]

Genus *Columba* Linnaeus

Columba Linnaeus, 1758 [Modern genus.]

Columba pisana (Portis)

Falco sp. (*Pisanus*) Portis, 1887: 195 [Nomen nudum; no description or indication.]

Falco sp. (*pisanus*) Portis, 1889: 14 [Holotype from Orciano Pisano: distal end of ulna; IGF 14876. Figured by Portis, 1889, pl. 1, fig. 27a-b.]

Columba omnisanctorum Ballmann, 1976a: 30 [Holotype from Biancone 1: distal end of right tarsometatarsus; RGM 178782. Figured by Ballmann 1976, text.-fig. 12, pl. 7, fig. 3-5.]

Columba pisana (Portis): Mlíkovský, this paper [New combination.]

Distribution: Early Pliocene (MN 14-15) of Biancone 1, Italy (Ballmann 1976a), Biancone 2, Italy (Ballmann 1976a), and San Giovannino, Italy (Ballmann 1976a); and middle Pliocene (MN 15-16) of Orciano Pisano, Italy (Portis 1889).

Remarks: C. Mourer-Chauviré (in Olson 1985a: 111) found that the holotypical ulna of *Falco pisanus* is from a columbid bird. In size it agrees with *Columba omnisanctorum* Ballmann, which was described from similarly old deposits near the paleosea shore. In view of the coincidence in age, type of habitat and size I synonymize here *Columba omnisanctorum* Ballmann with *Columba pisana* (Portis). The generic position follows Ballmann (1976a).

Columba melitensis Lydekker

Columba melitensis Lydekker, 1891a: 124 [Holotype from an unknown site in Malta: left coracoid; BMNH A-212. Figured by Lydekker 1891a, fig. 29.]

Distribution: Late Pleistocene (MQ 2C) of an unknown site in Malta (Lydekker 1891a).

Columba livia Gmelin – Rock Dove

Columba livia Gmelin, 1789 [Modern species.]

Columba livia occitanica Mourer-Chauviré, 1975a: 146 [Holotype from Saint-Estève-Janson – layer B/C: left humerus; coll. Bonifay CD66-B = C-11623. Figured by Mourer-Chauviré 1975a, pl. 22, fig. 5.]

Columba livia minuta Mourer-Chauviré, 1975a: 150 [Holotype from Fage – layer 5: left humerus; FSL 41665. Figured by Mourer-Chauviré 1975a, pl. 14, fig. 5. This is a junior primary homonym of *Columba minuta* Linnaeus, 1758, and *Columba minuta* Temminck, 1838-1843.]

Columba livia lazaretensis Mourer-Chauviré, 1975a: 152 [Holotype from Lazaret 8, layer V_2: left humerus; LPLN 23ab. Figured by Mourer-Chauviré 1975a, pl. 14, fig. 11.]

Distribution: Early Pleistocene (MQ 1) of Monte Argentario, Italy (Cassoli 1980: 184); early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001), Mas Rambault, France (Mourer-Chauviré 1975a), Beremend 17, Hungary (Jánossy 1992 sub *C.* cf. *livia*), and Primorsk, Ukraine (Vojinstvens'kyj 1967); early Pleistocene (MQ 1b) of Sima del Elefante – unknown layer, Spain (Rosas et al. 2001); middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layers B, C, D, F, G and H, France (Mourer-Chauviré 1975a sub *C. livia occitanica*), and Cimay, France (Mourer-Chauviré 1975a); and middle Pleistocene (MQ 2B) of Lunel-Viel, France (Mourer-Chauviré 1975a sub *C. livia occitanica*), Fage – layers 2/3, 31 through 40, and CO, France (Mourer-Chauviré 1975a sub *C. livia minuta*), and Lazaret 8, layers I/II through XX, France (Mourer-Chauviré 1975a sub *C. livia lazaretensis*).

The extralimital record includes middle Pleistocene (MQ 2B) of Treugolnaja Cave, Karachaevo-Cherkessia in Russia (Potapova & Baryšnikov 1993 and Baryšnikov & Potapova 1995 sub *C. l. occitanica*).

Columba oenas Linnaeus – Stock Dove

Columba oenas Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Petralona – layers 11, 13, 15, 24, 26, and "mausoleum", Greece (Kretzoi 1977, Kretzoi & Poulianos 1981, Poulianos 1996).

Remarks: These bones should be compared with those of the modern *Columba livia* Linnaeus.

Columba palumbus Linnaeus – Common Wood Pigeon

Columba palumbus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972), Stránská skála – Musil's talus cone, layer 15e, Czechia (Mlíkovský 1995b), Nagyharsányhegy 1-4, Hungary (Jánossy 1980a sub *C.* aff. *palumbus*), and Petralona – layers 11 and 15, Greece (Kretzoi 1977, Kretzoi & Poulianos 1981, Poulianos 1996).

Columba sp.

Distribution: Late Pliocene (MN 17) of Šandalja 1 – layer 6, Croatia (Malez-Bačić 1979); and late Pliocene (MN 17) of Vāršec, Bulgaria (Boev 1997b, 2000a).

Genus *Streptopelia* Bonaparte

Streptopelia Bonaparte, 1855 [Modern genus.]

Streptopelia sp.

Distribution: Late Pliocene (MN 17) of Vāršec, Bulgaria (Boev 2000a).

Family Falconidae Leach

Falconidae Leach, 1819 [Modern family.]

Genus *Falco* Linnaeus

Falco Linnaeus, 1758 [Modern genus.]

Falco medius Umans'ka

Falco medius Umans'ka, 1981: 18 [Holotype from Čebotarevka: left carpometacarpus; IZAN 45-4033. Figured by Umans'ka 1981, fig. 2a,b,v.]

Distribution: Late Miocene (MN 11-13) of Čebotarevka, Ukraine (Umans'ka 1981).

Remarks: This fossil is in need of revision.

Falco bakalovi Boev

Falco bakalovi Boev, 1999c: 132 [Holotype from Vāršec: postacetabular part of the left part of pelvis; NMNHS 1642. Figured by Boev 1999c, fig. 1a-b, 4 (partim).]

Distribution: Late Pliocene (MN 17) of Vāršec, Bulgaria (Boev 1999c).

Remarks: A dubious species, whose taxonomic position should be reevaluated.

Falco tinnunculus Linnaeus – Common Kestrel

Falco Tinnunculus Linnaeus, 1758 [Modern species]

Falco tinnunculus atavus Jánossy, 1972: 45 [Lectotype (here selected): proximal end of left humerus from Stránská skála – Čapek's site 9a; MMB Ča-622. Not figured. Paralectotypes from Stránská skála – Čapek's site 4c: pedal phalanx (MMB Ča-551); Stránská skála –

Čapek's site 5a: proximal end of left scapula (MMB Ča-194), distal end of left ulna (MMB Ča-387), distal end of left (not right as stated by Jánossy 1972: 45) carpometacarpus (MMB Ča-195), and distal end of right (not left as stated by Jánossy 1972: 45) tarsometatarsus; Stránská skála – Čapek's site 5b: distal end of right tibiotarsus (MMB Ča-483); Stránská skála – Čapek's site 9a: proximal end of right scapula (MMB Ča-630), proximal end of left humerus (MMB Ča-622), distal end of right (not left as stated by Jánossy 1972: 46) radius (MMB Ča-631), left phalanx I digiti majoris (MMB Ča-632), right phalanx I digiti majoris (MMB Ča-630), distal end of left femur (MMB Ča-623), proximal end of left (not right as stated by Jánossy 1972: 46) tarsometatarsus (MMB Ča-627), proximal ends of 2 right tarsometatarsi (MMB Ča-625, Ča-633), distal end of right tarsometatarsus (MMB Ča-628), and 4 pedal phalanges (MMB Ča-634-637; Ča-635 absent from the collection); Stránská skála – Čapek's site 9b: proximal end of right scapula (MMB Ča-794), right carpometacarpus (MMB Ča-793), and distal end of right (not left as stated by Jánossy 1972: 46) tarsometatarsus (MMB Ča-799); Stránská skála – Absolon's 2nd cave: left coracoid (MMB Abs-1063), and right ulna (MMB Abs-64); Stránská skála – unidentified sites: sternal end of left coracoid (MMB Va-6), proximal end of left scapula (MMB SS-2063; absent from the collection), right humerus (MMB Ča-563), proximal end of right humerus (MMB SS-2061), 2 left ulnae (MMB Ča-3561, Ča-3562), right ulna (MMB Va-2), left carpometacarpus (MMB Ča-3564), right carpometacarpus (MMB Ča-3565), proximal end of left femur (MMB Ča-3566), distal ends of 2 left tibiotarsi (MMB Ča-3563, Va-3), and right tarsometatarsus (MMB Va-4); Betfia 2 (after Jánossy 1977: 29; coll. Kormos): two coracoids, proximal end of a humerus, distal ends of three humeri, proximal ends of two carpometacarpi, and a tarsometatarsus; Hundsheim (UWPI 1889/53): distal end of left humerus, distal end of right humerus, distal end of left carpometacarpus, distal end of left tibiotarsus, distal end of right tarsometatarsus, and a pedal phalanx; and "Koněprusy" = Koněprusy C-718 (after Jánossy 1972: 46): a humerus (present location unknown, not found by Mlíkovský 1996t). Not figured. Both syntypes from the Absolon's 2nd cave belong to other species: coracoid Abs-1063 to *Falco vespertinus*, and ulna Abs-64 to *Falco subbuteo* – Mlíkovský, orig.]

Distribution: Late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1987b and 1990b sub *F. tinnunculus* cf. *atavus*, Jánossy 1992 sub *F. tinnunculus atavus*); early Pleistocene (MQ 1a) of Mas Rambault, France (Mourer-Chauviré 1975a sub *F. tinnunculus atavus*), Valerots, France (Mourer-Chauviré 1975a sub *F. tinnunculus atavus*), Deutsch-Altenburg 4B, Austria (Jánossy 1981 sub *F. tinnunculus atavus*, Mlíkovský 1998d), Beremend 16, Hungary (Jánossy 1992 sub *F. tinnunculus atavus*), Beremend 17, Hungary (Jánossy 1992 sub *F. tinnunculus atavus*), and Betfia 2, Romania (Čapek 1917, Jánossy 1972 and 1977 sub *F. tinnunculus atavus*); early Pleistocene (MQ 1b) of Kozi Grzbiet, Poland (Bocheński 1984 sub *F. tinnunculus atavus*), Koněprusy C-718, Czechia (Jánossy 1972), Přezletice, Czechia (Jánossy 1983 sub *F. tinnunculus atavus*), Stránská skála – Čapek's sites 4c, 5a, 5b, 9a, 9b and unidentified sites, Czechia (Jánossy 1972 sub *F. tinnunculus atavus*), Stránská skála – Musil's talus cone, layers 4, 5, 6, 13, 15a, 16e, and 16, Czechia (Mlíkovský 1995), Včeláre 1, Slovakia (Jánossy 1977 sub *F. tinnunculus atavus*), Nagyharsányhegy 1-4, Hungary (Jánossy 1977 sub *F. tinnunculus atavus*), Somssichhegy 2, Hungary (Jánossy 1986: 56 sub *F. tinnunculus atavus*), and Betfia 5, Romania (Kretzoi 1962), and Petralona – layer "mausoleum", Greece (Kretzoi 1977, Kretzoi & Poulianos 1981, Poulianos 1996); middle Pleistocene (MQ 2A) of Gombasek, Slovakia (Jánossy 1980b sub *F. tinnunculus atavus*), and Tarkő – layers 2 and 4, Hungary (Jánossy 1986: 74-75 sub *F. tinnunculus atavus*); and middle Pleistocene (MQ 2B) of Fage – layers 2-3, 4, 31, 32, 33, 34, 35, 36, 37, 38, 39, and 41, France (Mourer-Chauviré 1975a sub *F. tinnunculus atavus*), Orgnac 3 – layer h, i, j, France (Mourer-Chauviré 1975a sub *F. tinnunculus atavus*), Biehle, France (Mourer-Chauviré 1975a sub *F. tinnunculus atavus*), and Fournier Quarry, France (Mourer-Chauviré 1975a sub *F. tinnunculus atavus*).

Falco vespertinus Linnaeus – Red-footed Falcon

Falco vespertinus Linnaeus, 1766 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *F.* cf. *vespertinus*), and Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *F.* cf. *vespertinus*), and Somssichhegy 2, Hungary (Jánossy 1986 sub *F.* cf. *vespertinus*).

Falco subbuteo Linnaeus – Eurasian Hobby

Falco subbuteo Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Betfia 5, Romania (Kretzoi 1962 sub *F.* cf. *subbuteo*); and early Pleistocene (MQ 1b) of Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub ?*F.* aff. *subbuteo*), and Stránská skála – Musil's talus cone, layers 5, 6, and 13, Czechia (Mlíkovský 1995b).

Falco cherrug Gray – Saker Falcon

Falco cherrug Gray, 1844 [Modern species.]

Falco antiquus Mourer-Chauviré, 1975a: 75 [Holotype: right tarsometatarsus from Fage – layer 5; FSL 41584. Figured by Mourer-Chauviré 1975a, pl. 9, fig. 3.]

Distribution: Middle Pleistocene (MQ 2B) of Fage – layer 5, France (Mourer-Chauviré 1975a sub *Falco antiquus*), and Hórvölgy, Hungary (Jánossy 1977: 28 sub *F.* aff. *atavus*, an apparent misprint for *antiquus*).

Remarks: The differences between *Falco cherrug* Gray and *Falco antiquus* Mourer-Chauviré do not go beyond the intraspecific variability (Mlíkovský, orig.). Hence, I synonymize here the latter with the former species.

Falco rusticolus Linnaeus – Gyr Falcon

Falco rusticolus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *F.* aff. *rusticolus*).

Falco peregrinus Tunstall – Peregrine Falcon

Falco peregrinus Tunstall, 1771 [Modern species.]

Distribution: Eearly Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *F.* aff. *cherrug*, Mlíkovský orig.), and Stránská skála – Musil's talus cone, layers 4, 8, 11, 13, and 14a, Czechia (Mlíkovský 1995b).

Falco sp.

Distribution: Early Pliocene (MN 15) of Muselievo, Bulgaria (Boev 1998e, 2000a); late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a); late Pliocene (MN 18) of Slivnica, Bulgaria (Boev 2000a); and early Pleistocene (MQ 1b) of Sima del Elefante – unknown layer, Spain (Rosas et al. 2001), and Stránská skála – Čapek's site 1-3, Czechia (Jánossy 1972 sub *F.* aff. *cherrug*, Mlíkovský orig.).

Order Coraciiformes Forbes

Coraciiformes Forbes, 1884 [Modern order.]

Family Coraciidae Vigors

Coraciidae Vigors, 1825 [Modern family.]

Eocoraciidae Mayr & Mourer-Chauviré, 2000: 534 [Type genus: *Eocoracias* Mayr & Mourer-Chauviré, 2000.]

Geranopteridae Mayr & Mourer-Chauviré 2000: 538 [Type genus: *Geranopterus* Milne-Edwards, 1892.]

Remarks: Mayr & Mourer-Chauviré (2000) created the families Eocoraciidae and Geranopteridae on the basis of negligible characters, showing at the same time that the taxa are closely allied to the modern Coraciidae. I see no reason why the observed differences should not be interpreted as generic characters of *Eocoracias* Mayr & Mourer-Chauviré, and *Geranopterus* Milne-Edwards, respectively, and I synonymize here thus Eocoraciidae Mayr & Mourer-Chauviré, and Geranopteridae Mayr & Mourer-Chauviré with the modern Coraciidae Vigors.

Genus *Eocoracias* Mayr & Mourer-Chauviré

Eocoracias Mayr & Mourer-Chauviré, 2000: 534 [Type by original designation: *Eocoracias brachyptera* Mayr & Mourer-Chauviré, 2000.]

Eocoracias brachyptera Mayr & Mourer-Chauviré

Eocoracias brachyptera Mayr & Mourer-Chauviré, 2000: 534 [Holotype from Messel: complete articulated skeleton on two slabs; SMNK PAL-2663a,b. Figured by Mayr & Mourer-Chauviré 2000, fig. 1, 6; and Mayr 2000g, fig. 7-8.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr & Mourer-Chauviré 2000).

Genus *Geranopterus* Milne-Edwards

Geranopterus Milne-Edwards, 1892: 66 [Type by monotypy: *Geranopterus alatus* Milne-Edwards, 1892.]

Geranopterus alatus Milne-Edwards

Geranopterus alatus Milne-Edwards, 1892: 66 [Holotype from Quercy: left humerus; MNHN QU-15890, cast in coll. Mlíkovský, uncatalogued. Figured by Mayr & Mourer-Chauviré 2000, fig. 8a-b.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Mourer-Chauviré 1999a, see also Mayr 1998c); late Eocene (MP 18) of Gousnat, France (Mayr & Mourer-Chauviré 2000); and late Eocene (MP 19) of Escamps, France (Mourer-Chauviré 1999a, Mayr & Mourer-Chauviré 2000), Rosières, France (Mayr & Mourer-Chauviré 2000), and Pécarel, France (Mayr & Mourer-Chauviré 2000).

Remarks: Milne-Edwards (1892: 66) compared this species with the Coraciidae and Momotidae. Lambrecht (1933: 627) and Brodkorb (1971: 250) included it in the Coraciidae without comments. Mayr & Mourer-Chauviré (2000) confirmed the coraciid affinities of *Geranopterus* Milne-Edwards.

Geranopterus milneedwardsi Mayr & Mourer-Chauviré

Geranopterus milneedwardsi Mayr & Mourer-Chauviré, 2000: 543 [Holotype from Quercy: proximal end of left humerus; MNHN QU-17037. Figured by Mayr & Mourer-Chauviré

2000, fig. 9a-b.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mayr & Mourer-Chauviré 2000); and late Eocene (MP 17) of Perrière, France (Mayr & Mourer-Chauviré 2000).

Genus *Cryptornis* Milne-Edwards

Cryptornis Milne-Edwards, 1871: 371 [Type by monotypy: *Centropus antiquus* Gervais, 1852.]

Cryptornis antiquuus (Gervais)

Centropus? *antiquus* Gervais, 1852: 229 [Holotype from Montmartre: partial skeleton in slab; MNHN 7991. Figured by Gervais 1852, pl. 49, fig. 1, Laurillard 1849, pl. 2, and Milne-Edwards 1869-1871, pl. 175.]

Cryptornis antiquus (Gervais): Milne-Edwards, 1871: 371 [New combination.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Laurillard 1849 sub *Alcedo*, Gervais 1852, Milne-Edwards 1869-1871).

Remarks: This species was described as a cuckoo (Gervais 1848-1852), and later believed to be related to the Bucerotidae (Milne-Edwards 1869-1871: 374, Murie 1873, Brodkorb 1971: 249), Picidae (Paris 1912: 285, Furon & Soyer 1947, Brunet 1970), and Coraciidae (Harrison 1979b: 107, Mayr 1998c: 29). I follow here Harrison (1979b) in placing provisionally the species in the family Coraciidae. Mayr & Mourer-Chauviré (2000) observed that the holotype agrees in size with the bones of *Geranopterus alatus* Milne-Edwards, concluding that "an evaluation of the possible synonymy of the genera *Cryptornis* Milne-Edwards [...] and *Geranopterus* Milne-Edwards [...] must await the discovery of better preserved specimens of *C. antiquus*" (Mayr & Mourer-Chauviré 2000: 538).

Genus *Coracias* Linnaeus

Coracias Linnaeus, 1758 [Modern genus.]

Coracias garrulus Linnaeus

Coracias Garrulus Linnaeus, 1758 [Modern genus.]

Distribution: Early Pleistocene (MQ 1a) of Tarchankut, Ukraine (Vojinstvens'kyj 1967 sub *C.* aff. *garrulus*).

Family Trogonidae Lesson

Trogonidae Lesson, 1828 [Modern family.]

Genus *Primotrogon* Mayr

Primotrogon Mayr, 1999a: 427 [Type by original designation: *Primotrogon wintersteini* Mayr, 1999a.]

Primotrogon wintersteini Mayr

Primotrogon wintersteini Mayr, 1999a: 428 [Holotype from Céreste: skeleton in a slab; BSP 1997-I-38. Figured by Mayr 1999a, fig. 1-2, 6.]

Distribution: Middle Oligocene (MP 23) of Céreste, France (Mayr 1999a).

Genus *Apaloderma* Swainson

Apaloderma Swainson, 1833 [Modern genus.]

Paratrogon Lambrecht, 1933: 626 [Type by monotypy: *Trogon gallicus* Milne-Edwards,

1871.]

Apaloderma gallica (Milne-Edwards)

Trogon gallicus Milne-Edwards, 1871: 395 [Lectotype from Saint-Gérand-le-Puy (here selected): right humerus; MNHN Av-9675. Figured by Milne-Edwards 1869-1871, pl. 177, fig. 18-22. Milne-Edwards (1871: 395) based this species expressly on two humeri, but I found only one at MNHN in June 1999. The missing humerus should be regarded as the paralectotype of this species.]

Paratrogon gallicus (Milne-Edwards): Lambrecht 1933: 626 [New combination.]

Apaloderma gallica (Milne-Edwards): Mlíkovský, this paper [New combination.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Mourer-Chauviré 1980a, Mlíkovský orig.); and early Miocene (MN 3) of Merkur, Czechia (Mlíkovský orig.).

Remarks: The lectotypical humerus of *Trogon gallicus* Milne-Edwards agrees with the same element of *Apaloderma* Swainson, and differs from that of all other modern trogonid genera (sensu Espinosa de los Monteros 1998), in having entepicondylar prominence large and distinct. In absence to any evidence to the contrary, I transfer here *Trogon gallicus* Milne-Edwards to the genus *Apaloderma* Swainson. Accordingly, I synonymize here the genus *Paratrogon* Lambrecht with *Apaloderma* Swainson.

Family Alcedinidae Rafinesque

Alcedinidae Rafinesque, 1815 [Modern family.]

Genus *Alcedo* Linnaeus

Alcedo Linnaeus, 1758 [Modern genus.]

Alcedo atthis (Linnaeus) – Common Kingfisher

Gracula Atthis Linnaeus, 1758 [Modern species.]

Distribution: Late Oligocene (MP 30) of Aix-en-Provence, France (Bayan 1873). This record is based on a feather imprint, and is highly improbable.

Remarks: Tyrberg (1998) cited three late Pleistocene localities from Europe, where *Alcedo* Linnaeus was found, but none of them contains unmixed material older than the Holocene. There is no evidence, that *Alcedo* Linnaeus existed in Europe before the Holocene.

Family Todidae Vigors

Todidae Vigors, 1825 [Modern family.]

Momotidae Gray, 1840 [Modern family.]

Remarks: A feather fragment found in the late Eocene (MP 14-20) Baltic amber, which originated in Finland (Katinas 1983, Mlíkovský 1996g), was tentatively attributed to the "Momotidae" by Bachofen-Echt (1936b: 346-347, pl. 5, fig. 1-3).

Genus *Palaeotodus* Olson

Palaeotodus Olson, 1976: 112 [Type by original designation and monotypy: *Palaeotodus emryi* Olson, 1976.]

Distribution: Late Eocene (MP 19) and middle Oligocene (MP 23) of France. The extralimital record includes only *Palaeotodus emryi* Olson, 1976a from the middle Oligocene (Orellanian) of Wyoming (Olson 1976a). The European record requires revision.

Palaeotodus escampsensis Mourer-Chauviré

Palaeotodus escampsensis Mourer-Chauviré, 1985b: 408 [Holotype from Escamps: right humerus lacking proximal end; USTL ECA-3215. Figured by Mourer-Chauviré 1985b, pl. 1, fig. 1-3.]

Distribution: Late Eocene (MP 19) of Escamps, France (Mourer-Chauviré 1985b).

Palaeotodus itardiensis Mourer-Chauviré

Palaeotodus itardiensis Mourer-Chauviré, 1985b: 409 [Holotype from Itardies: proximal end of left ulna; USTL ITD-576. Figured by Mourer-Chauviré 1985b, pl. 1, fig. 4-5.]

Distribution: Oligocene (MP 21-28) of Fonbonne 1, France (Mourer-Chauviré 1985b); and middle Oligocene (MP 23) of Itardiès, France (Mourer-Chauviré 1985b).

Genus *Protornis* Meyer

Protornis Meyer, 1844: 338 [Type by monotypy: *Protornis glarniensis* Meyer, 1844.]

Protornis glarniensis Meyer

Protornis glarniensis Meyer, 1844: 338 [Holotype from Matt: Incomplete skeleton in slab and counter-slab; NMZ, uncatalogued. Figured by Meyer 1856, pl. 15, fig. 12, and Peyer 1957, text-fig. 1, 7b-c, 8 (right), 9, 11, 13, 15, 17, 19, 21, pl. 1-5.]

Osteornis scolopacinus Gervais, 1844a: 38 [Holotype: Same as for *Protornis glarniensis* Meyer, 1844. This name was listed as a nomen nudum by Brodkorb 1978: 222, and Mlíkovský 1992b: 444. However, Gervais 1844a: 38 based it on a bird formerly described by Meyer from the "schistes du Canton du Glaris", with reference to Escher (see Gervais 1844a: 12). This reference can be traced back to the paper by Meyer (1839: 683-684), where the bird is briefly described, though not named. With this reference, *Osteornis scolopacinus* Gervais, 1844a is an available name.]

Protornis glaronensis Meyer, 1856: 92 [Unjustified emendation of *Protornis glarniensis* and consequently its junior objective synonym.]

Distribution: Early/middle Oligocene (MP 21-24) of Matt, Switzerland (Meyer 1839c, 1844, 1856, Studer 1840, Gervais 1844a, Peyer 1949, 1957; see also Baumann 1958, Stüssi 1958, and Olson 1976a).

Remarks: Cracraft (1980: 13) and Mayr (1998c: 38) casted some doubt on the allocation of *Protornis glarniensis* Meyer to the Momotidae (= Todidae). Mlíkovský (1992b: 444) erroneously listed *Protornis glarisiensis* Anonymous, 1844: v as a nomen nudum, this being only an incorrect subsequent spelling.

Family Meropidae Vigors

Meropidae Vigors, 1825 [Modern family.]

Genus *Merops* Linnaeus

Merops Linnaeus, 1758 [Modern genus.]

Merops radoboyensis (Meyer)

Batrachites Radoboyensis H. Freyer, between 1844-1845 [Label name; not available for nomenclatural purposes – see Mlíkovský 1997a.]

Pelophilus Radoboyensis (Freyer) J.J. von Tschudi, between 1845-1849 [New combination; label name; not available for nomenclatural purposes – see Mlíkovský 1997a.]

Fringilla (?) Radoboyensis Meyer, 1865: 125 [Holotype from Radoboj: partial skeleton of hind limbs in a plate; NHMW 1845/XXII/1. Figured by Meyer 1865, pl. 30, fig. 1; Mlíkovský

1997a, fig. 2-3.]
Merops radoboyensis (Meyer): Mlíkovský 1997a: 145 [New combination.]
Distribution: Middle Miocene (MN 7) of Radoboj, Croatia (Meyer 1865, Mlíkovský 1997a).

Order Passeriformes Linnaeus

Passeres Linnaeus, 1758 [Modern order.]

Family Eurylaimidae Lesson

Eurylaiminae Lesson, 1831 [Modern family.]

Distribution: Early Miocene (MN 3) of Wintershof-West, Germany (Ballmann 1969b sub unidentified representative).

Family Hirundinidae Rafinesque

Hirundinidae Rafinesque, 1815 [Modern family.]

Genus *Riparia* Forster

Riparia Forster, 1817 [Modern genus.]

Riparia riparia (Linnaeus) – Sand Martin

Hirundo riparia Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layer 8, Czechia (Mlíkovský 1995b).

Genus *Hirundo* Linnaeus

Hirundo Linnaeus, 1758 [Modern genus.]

Hirundo rustica Linnaeus – Barn Swallow

Hirundo rustica Linnaeus, 1758 [Modern species.]

Distribution: Early Pliocene (MN 15) of Ivanovce 1, Slovakia (Mlíkovský orig.); early Pleistocene (MQ 1a) of Deutsch-Altenburg 4B, Austria (Jánossy 1981 sub *H.* cf. *rustica*, Mlíkovský 1998d), Deutsch-Altenburg 2C, Austria (Mlíkovský 1998d), Osztramos 8, Hungary (Jánossy 1986 sub *H.* cf. *rustica*), and Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *Hirundo* sp.); early Pleistocene (MQ 1b) of Koněprusy C-718, Czechia (Mlíkovský 1996t), Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972), Stránská skála – Musil's talus cone, layers 10a, 13 and 15a, Czechia (Mlíkovský 1995b), Včeláre 4E, Slovakia (Mlíkovský orig.), and Somsssichhegy 2, Hungary (Jánossy 1986 sub *H.* cf. *rustica*).

Hirundo sp.

Distribution: Early Pliocene (MN 15) of Csarnóta 1, Hungary (Kretzoi 1956); late Pliocene (MN 18) of Villány 3, Hungary (Jánossy 1979); early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992); and early Pleistocene (MQ 1b) of Nagyharsányhegy 1-4, Hungary (Jánossy 1979).

Genus *Delichon* Horsfield & Moore

Delichon Horsfield & Moore, 1854 [Modern genus.]

Delichon urbica (Linnaeus) – Common House Martin

Hirundo urbica Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001), and Betfia 2, Romania (Čapek 1917); and early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layers 6, 8, 9, 10a, 13, 14a, and 15e, Czechia (Mlíkovský 1995b).

Family Alaudidae Vigors

Alaudidae Vigors, 1825 [Modern family.]
Remarks: Unidentified Alaudidae were reported also from the middle Miocene (MN 5) of Vieux-Collonges, France (Ballmann 1972).

Genus *Melanocorypha* Boie

Melanocorypha Boie, 1828 [Modern genus.]

Melanocorypha sp.

Distribution: Late Miocene (MN 11-13) of Chrabărsko, Bulgaria (Boev 1996 sub cf. *Galerida*, Boev 2000a,d); late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a); and early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992).

Genus *Calandrella* Kaup

Calandrella Kaup, 1829 [Modern species.]

Calandrella cinerea (Gmelin) – Red-capped Lark

Alauda cinerea Gmelin, 1789 [Modern species.]
Distribution: Early Pleistocene (MQ 1a) of Tarchankut, Ukraine (Vojinstvens'kyj 1967 sub *C.* cf. *cinerea*).

Genus *Galerida* Boie

Galerida Boie, 1828 [Modern genus.]

Galerida cristata (Linnaeus) – Crested Lark

Alauda cristata Linnaeus, 1758 [Modern genus.]
Distribution: Early Pleistocene (MQ 1b) of Somssichhegy 2, Hungary (Jánossy 1986 sub *G.* cf. *cristata*), and Betfia 5, Romania (Kessler 1975).

Galerida sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b, 2000a); and early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992).

Genus *Lullula* Kaup

Lullula Kaup, 1829 [Modern genus.]

Lullula arborea (Linnaeus) – Wood Lark

Alauda arborea Linnaeus, 1758 [Modern species.]
Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995).

Lullula sp.

Distribution: Late Miocene (MN 11-13) of Chrabărsko, Bulgaria (Boev 1996 sub cf. *Lullula*); late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b, 2000a), and Slivnica, Bulgaria (Boev 2000a sub aff. *Lullula* sp.).

Genus *Alauda* Linnaeus

Alauda Linnaeus, 1758 [Modern genus.]

Alauda arvensis Linnaeus – Eurasian Lark

Alauda arvensis Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Valerots, France (Mourer-Chauviré 1975a sub cf. *A. arvensis*), Beremend 16, Hungary (Jánossy 1992 sub *A.* cf. *arvensis*), and Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *A.* cf. *arvensis*); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 9a and 9b, Czechia (Jánossy 1972 sub *A.* cf. *arvensis*).

Alauda sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b, 2000a).

Genus *Eremophila* Boie

Eremophila Boie, 1828 [Modern genus.]

Eremophila alpestris Linnaeus – Horned Lark

Eremophila alpestris Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Mas Rambault, France (Mourer-Chauviré 1975a sub *E.* cf. *alpestris*).

Eremophila sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a).

Family Bombycillidae Swainson

Bombycillidae Swainson, 1831 [Modern family.]

Genus *Bombycilla* Vieillot

Bombycilla Vieillot, 1807 [Modern genus.]

Bombycilla garrulus (Linnaeus) – Bohemian Waxwing

Lanius Garrulus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992 sub *B.* cf. *garrulus*).

Family Laniidae Rafinesque

Laniidae Rafinesque, 1815 [Modern family.]

Genus *Lanius* Linnaeus

Lanius Linnaeus, 1758 [Modern genus.]

Lanius collurio Linnaeus – Red-backed Shrike

Lanius collurio Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Betfia 7, Romania (Kessler 1975 sub *L.* cf. *collurio*).

Lanius minor Gmelin – Lesser Grey Shrike

Lanius minor Gmelin, 1788 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Jánossy 1979 sub *L.* cf. *minor*); and early Pleistocene (MQ 1b) of Petralona – layer 24, Greece (Kretzoi 1977, Kretzoi & Poulianos 1981).

Lanius sp.

Distribution: Late Miocene (MN 13) of Polgárdi 2, Hungary (V. Čapek in Lambrecht 1933: 780 sub cf. *L. minor*, Jánossy 1991).

Family Sturnidae Rafinesque

Sturnidae Rafinesque, 1815 [Modern family.]

Genus *Sturnus* Linnaeus

Sturnus Linnaeus, 1758 [Modern genus.]

Sturnus vulgaris Linnaeus – Common Starling

Sturnus vulgaris Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Beremend 16, Hungary (Jánossy 1992 sub *S.* cf. *vulgaris*), Beremend 17, Hungary (Jánossy 1992 sub *S.* cf. *vulgaris*), Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *S.* cf. *vulgaris*); and early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979d sub *S.* ?*vulgaris* or *S. vulgaris*/*unicolor* superspecies), Boxgrove – quarry 2, England (Harrison & Stewart 1999), and Přezletice, Czechia (Jánossy 1983 sub *S.* cf. *vulgaris*).

Sturnus sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a).

Family Corvidae Vigors

Corvidae Vigors, 1825 [Modern family.]

Genus *Miocorvus* Lambrecht

"*Miocorax*" = *Miocorvus* Lambrecht, 1933: 636 [Type by monotypy: *Corvus larteti* Milne-Edwards, 1871. *Miocorax* Lambrecht 1933: 636 is a misprint for *Miocorvus* – see Lambrecht 1933: 1024.]

Miocorvus larteti (Milne-Edwards)

Corvus larteti Milne-Edwards, 1871: 381 [Lectotype from Sansan (selected by Cheneval 2000: 374): distal end of right right tarsometatarsus; NMNH Sa-1248. Not figured. Cheneval (2000: 374) believed that this bone is figured by Milne-Edwards 1869-1871, pl. 152, figs. 4, 4a, 5, 5a, 6, 6a, 7, that is was "presque complet" at the time of drawing, and that it subsequently lost its proximal end. However, at least two different tarsometatarsi are shown in those figured (which are apparently side-reversed): an almost complete right tarsometatarsus with damaged distal end (figs. 1-3, and perhaps also 6-8), and a well preserved distal end of a left tarsometatarsus (figs. 4, 5 and 9). Milne-Edwards's statement "de même os" refers to tarsometatarsus as such, not to the specimen.

Paralectotypes from Sansan (all in MNHN; list derived from Cheneval 2000: 374-375): right coracoid (Sa-1412), three cranial ends of left coracoids (Sa-1459, Sa-1607, Sa-1670), sternal end of left coracoid (Sa-1608), sternal end of right coracoid (Sa-1671), two proximal ends of left scapulae (Sa-1665, Sa-1667), proximal ends of three right scapulae (Sa-1663, Sa-1664, Sa-1666), left humerus (Sa-1246), distal end of left humerus (Sa-1316), distal end of right humerus (Sa-11317), eight proximal ends of left ulnae (Sa-1219, Sa-1309, Sa-1403, Sa-1468, Sa-1652, Sa-1659-1661), seven proximal ends of right ulnae (Sa-1266, Sa-1648, Sa-1653, Sa-1655, Sa-1656, Sa-1658, Sa-1662), seven distal ends of left ulnae (Sa-1389, Sa-1419, Sa-1647, Sa-1649-1651, Sa-1657), five distal ends of right ulnae (Sa-1294, Sa-1315, Sa-1420, Sa-1469, Sa-1654), three right carpometacapi (Sa-1291, Sa-1400, Sa-1615), six proximal ends of left carpometacarpi (Sa-1305, Sa-1332, Sa-1333, Sa-1630, Sa-1631, Sa-1635), nine proximal ends of right carpometacarpi (Sa-1277, Sa-1286, Sa-1287, Sa-1301, Sa-1331, Sa-1609, Sa-1632, Sa-1636, Sa-1637), six distal ends of left carpometacarpi (Sa-1424, Sa-1633, Sa-1634, Sa-1638, Sa-1640, Sa-1643), three distal end of right carpometacarpi (Sa-1639, Sa-1641, Sa-1642), two left phalanges I digiti majoris (Sa-1611, Sa-1644), right phalanx digiti majoris (Sa-1610), two proximal ends of left femora (Sa-1604, Sa-1612), three distal ends of right femora (Sa-1605, Sa-1613, Sa-1614), proximal end of left tibiotarsus (Sa-1437), three proximal ends of right tibiotarsi (Sa-1255, Sa-1433, Sa-1434), 14 distal ends of left tibiotarsi (Sa-1247, Sa-1439-1441, Sa-1444, Sa-1446, Sa-1447, Sa-1449, Sa-1452, Sa-1453, Sa-1455, Sa-1458, Sa-1497, Sa-1646), 12 distal ends of right tibiotarsi (Sa-1313, Sa-1330, Sa-1435, Sa-1436, Sa-1442, Sa-1443, Sa-1445, Sa-1448, Sa-1450, Sa-1451, Sa-1454, Sa-1494), five proximal ends of left tarsometatarsi (Sa-1278, Sa-1289, Sa-1323, Sa-1616, Sa-1621), five proximal ends of right tarsometatarsi (Sa-1256, Sa-1267, Sa-1491, Sa-1617, Sa-1619), 13 distal ends of left tarsometatarsi (Sa-1258, Sa-1275, Sa-1283, Sa-1295, Sa-1322, Sa-1325, Sa-1326, Sa-1329, Sa-1392, Sa-1431, Sa-1624-1626), 13 distal ends of right tarsometatarsi (Sa-1257, Sa-1302, Sa-1311, Sa-1321, Sa-1324, Sa-1327, Sa-1328, Sa-1618, Sa-1620, Sa-1622, Sa-1623, Sa-1627, Sa-1628), and right metatarsus I (Sa-1541). Figured by Milne-Edwards, 1869-1871, pl. 151 (reconstructed skeleton), pl. 52, fig. 1-3 (tarsometatarsus), fig. 4, 4a, 5, 5a, 9 (distal end of tarsometatarsus), fig. 6, 6a, 7, 8 (proximal end of tarsometatarsus), fig. 10, 10a, 11, 11a, 12, 12a, 15 (distal end of tibiotarsus Sa-1247), 13-14 (proximal end of tibiotarsus Sa-1255), 16-18 (proximal end of femur Sa-1604), 16-17, 19 (distal end of femur Sa-1605), 20, 20a, 21, 21a (cranial end of coracoid Sa-1607 and sternal end of coracoid Sa-1608), 22-24 (humerus Sa-1246), 27, 27a, 28, 28a (carpometacarpus Sa-1615), and pl. 153, fig. 21a-c (metatarsus I Sa-1541), and Cheneval 2000, fig. 29 (humerus Sa-1246), 30 (carpometacarpus Sa-1615), 31 (proximal end of tibiotarsus Sa-1255), 32 (distal end of tibiotarsus Sa-1247), and 33 (proximal end of tarsometatarsus Sa-1258).]

Miocorax [sic! = *Mocorvus*] *larteti* (Milne-Edwards): Lambrecht 1933: 636 [New combination.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1871, Cheneval 2000).

Remarks: Taxonomic position of this species requires reexamination.

Genus *Corvus* Linnaeus

Corvus Linnaeus, 1758 [Modern genus.]

Remarks: Three size classes of Plio-Pleistocene *Corvus* crows can be distinguished in Europe, which correspond to the modern species *Corvus monedula* Linnaeus, *Corvus corone* Linnaeus plus *Corvus frugilegus* Linnaeus, and *Corvus corax* Linnaeus. For biometrical studies on the bones of modern and fossil corvids of the Holarctic see Mourer-Chauviré (1975a: 228-258), Magish & Harris (1976), Bährmann (1978), Moreno (1986), Kessler & Moldvai (1993), and Tomek & Bocheński (2000).

Corvus corax Linnaeus – Common Raven

Corvus corax Linnaeus, 1758 [Modern species.]

Corvus fossilis Giebel, 1847: 16 [Holotype from Seveckenberg: right tibiotarsus (in two pieces); MNHN, uncatalogued. Not figured.]

Corvus pliocaenus janossyi Mourer-Chauviré, 1975a: 230 [Holotype from Saint-Estève-Janson – layer D: left humerus; coll. Bonifay CD66-D-11290. Figured by Mourer-Chauviré 1975a, pl. 18, fig. 1-2.]

Corvus antecorax Mourer-Chauviré, 1975a: 239 [Holotype from Fage – layer C5 (Mourer-Chauviré, in litt., 2001): left humerus; FSL 41707. Not figured.]

Corvus corax antecorax Mourer-Chauviré: Brodkorb 1978: 170 [New rank.]

Corvus janossyi Mourer-Chauviré: Jánossy 1979: 31 [New rank.]

Distribution: Late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1987b and 1990b sub *Corvus* sp., Jánossy 1992 sub *C. janossyi*); early Pleistocene (MQ 1a) of Mas Rambault, France (Mourer-Chauviré 1975a sub *C. antecorax*), Untermassfeld, Germany (Jánossy 1997 sub *C.* aff. *janossyi*), Valerots, France (Mourer-Chauviré 1975a sub *C. antecorax*), Beremend 16, Hungary (Jánossy 1992), Beremend 17, Hungary (Jánossy 1992), and Betfia 5, Romania (Kessler 1975); early Pleistocene (MQ 1b) of Sima del Elefante – layers E-12, E-13, E-14, Spain (Rosas et al. 2001 sub *C. antecorax*), and Stránská skála – Musil's talus cone, layers 13, 15e, Czechia (Mlíkovský 1995 sub *C. pliocaenus*); middle Pleistocene (MQ 2A) of Arago, France (Mourer-Chauviré 1975a sub *C.* cf. *antecorax*), Saint-Estève-Janson – layers B, C, D, E, E/F, G, H, France (Mourer-Chauviré 1975a sub *C. pliocaenus janossyi*), and Tarkő – layer 2, Hungary (Jánossy 1979 sub *C. janossyi*, Jánossy 1986 sub *C.* cf. *corax*); and middle Pleistocene (MQ 2B) of Lunel Viel – cave 1, layers 2, 4, 6, France (Mourer-Chauviré 1975a sub *C. antecorax*), Lunel-Viel – cave 1, layer 7, France (Mourer-Chauviré 1975a sub *C. pliocenicus janossyi*), Orgnac 3 – layers f, h, i, j, France (Mourer-Chauviré 1975a sub *C. antecorax*), Fage – layers 2/3, 4, CO, and 29 through 41, France (Mourer-Chauviré 1975a sub *C. antecorax*), Fage – layer 33, France (Mourer-Chauviré 1975a sub *C. pliocenicus janossyi*), Lazaret 8 – layer 17, France (Mourer-Chauviré 1975a sub *C. antecorax*), Biehle, France (Mourer-Chauviré 1975a sub *C. antecorax*), and Azé 2 – layer 6, France (Mourer-Chauviré 1975a sub *C. antecorax*); and late Pleistocene (MQ 2C) of Seveckenberg, Germany (Giebel 1847 sub *C. fossilis*, Mlíkovský orig.).

Remarks: I restudied the holotypical tibiotarsus of *Corvus fossilis* Giebel, finding that it belongs to a large *Corvus* of the size of *Corvus corax* Linnaeus. *Corvus pliocaenus janossyi* Mourer-Chauviré was based on a humerus, which is disproportionally large for most other bones from Saint-Estève-Janson, agreeing in size with the same element of *Corvus corax* Linnaeus (see Mourer-Chauviré 1975a for measurements). Hence, I synonymize here *Corvus fossilis* Giebel and *Corvus pliocaenus janossyi* Mourer-Chauviré with the modern *Corvus corax* Linnaeus.

See Brodkorb (1978: 170) for possible synonyms of *Corvus corax* Linnaeus from the North American Pleistocene.

Corvus corone Linnaeus – Carrion Crow

Corvus corone Linnaeus, 1758 [Modern species.]

Corvus cornix fossilis Giebel, 1847 [Holotype from Monte Reale: right (if the figure is not side-reversed) femur; present location unknown. Figured by Wagner 1832, pl. 2, fig. 53. This is – by my present decision on the principle of the first reviser – a junior primary homonym of *Corvus fossilis* Giebel.]

Numenius sp. (*pliocaenus*) Portis, 1887: 194 [Nomen nudum; no description or indication.]

Numenius sp. (*pliocaenus*) Portis, 1889: 13 [Holotype from Montecarlo: distal end of right ulna; IGF 937. Figured by Portis 1889, pl. 1, fig. 26a-b, Regàlia 1902, pl. 27, fig. 1.]

Corvus pliocaenus (Portis): Regàlia 1902: 220 [New combination.]

Corvus praecorax Depéret, 1892: 691 [Syntypes from Perpignan: distal end of right humerus, tibiotarsus, and left tarsometatarsus; FSL. Figured by Depèret 1897, pl. 13, fig. 12-13 (tarsometatarsus), 14 + 14a (tibiotarsus), and 17 + 17a (humerus).]

Corvus betfianus Kretzoi, 1962: 172 [Holotype from Betfia 5: distal end of left carpometacarpus; RMO 1899a/4. Figured by Jurcsák & Kessler 1973, fig. 31.]

Corvus simionescui Kessler, 1979: 136 [Holotype from Maluşteni-Bereşti: left coracoid; LPUB 211. Figured by Kessler 1979, fig. 3-4.]

Distribution: Late Miocene (MN 11-13) of Il'inka, Ukraine (Vojinstvens'kyj 1967 sub *C.* cf. *corone*); early Pliocene (MN 15) of Perpignan, France (Depéret 1892, 1897, and Mourer-Chauviré 1975a: 248 sub *C. praecorax*), and of Maluşteni-Bereşti, Romania (Kessler 1979 sub *C. simionescui*); late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Mourer-Chauviré et al. 1977 and Sondaar et al. 1995 sub *C. pliocaenus*), Montoussé 5, France (Clot et al. 1976a,b sub *C. pliocaenus*), Slivnica, Bulgaria (Boev 1995a and 2000a sub *C.* cf. *praecorax*), and Tourkobounia 2, Greece (Mourer-Chauviré 1980b sub *C. pliocaenus*); Pliocene or Pleistocene (MN 16 - MQ 1) of Montecarlo, Italy (Portis 1887 and 1889 sub *Numenius pliocaenus*, Regàlià 1902 sub *C. pliocaenus*);

early Pleistocene (MQ 1b) of Soave, France (Mourer-Chauviré 1980b sub *C. pliocaenus*), Stránská skála – Čapek's sites 5a, 9a, Czechia (Jánossy 1972), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972), Stránská skála – Musil's talus cone, layers 5, 13, 15e, Czechia (Mlíkovský 1995b), and Betfia 5, Romania (Kretzoi 1962 sub *C. betfianus*, Kessler 1975 sub *C. corone*/*betfianus*); middle Pleistocene (MQ 2A) of Arago, France (Mourer-Chauviré 1975a sub *C. corone* and *C. pliocaenus*); and middle Pleistocene (MQ 2B) of Saint-Sol-Belcastel, France (Philippe et al. 1980 sub *C. pliocaenus*).

Remarks: *Corvus cornix fossilis* Giebel was based on a complete femur, which was found by C.L. Nitzsch (in Wagner 1833) to be identical with the same element of the modern *Corvus cornix* Linnaeus (= *Corvus corone* Linnaeus), which is supported by the figure in Wagner (1832). *Numenius* (= *Corvus*) *pliocaenus* Portis, *Corvus praecorax* Depéret, *Corvus betfianus* Kretzoi, and *Corvus simionescui* Kessler fall in the same size category with the modern *Corvus corone* Linnaeus. In absence of the evidence to the contrary, I synonymize here *Corvus cornix fossilis* Giebel, *Numenius pliocaenus* Portis, *Corvus praecorax* Depéret, and *Corvus betfianus* Kessler with *Corvus corone* Linnaeus.

It is symptomatic, that the modern *Corvus frugilegus* Linnaeus, 1758 (Rook) was not identified from pre-middle Pleistocene deposits of Europe. This species is osteologically similar to *Corvus corone* Linnaeus, and the two species cannot be separated from each other on the basis of the postcranial skeleton with certainty, although the bones of *C. corone* Linnaeus tend to be larger and more robust. It is well possible, that some of the records listed here under *Corvus corone* Linnaeus belong to *Corvus frugilegus* Linnaeus.

Corvus monedula Linnaeus – Western Jackdaw

Corvus monedula Linnaeus, 1758 [Modern species.]

Pica pica major Jánossy, 1972: 59 [Lectotype from Stránská skála – Absolon's 2nd cave, whitish fossilization (here selected): distal end of left tarsometatarsus; MMB Abs-146. Not figured. Paralectotypes from Stránská skála – Absolon's 2nd cave (whitish fossilization): right (not left as stated by Jánossy 1972: 59) tibiotarsus (MMB Abs-1003), distal end of left tarsometatarsus (MMB Abs-144); Stránská skála – Absolon's 2nd cave (black fossilization): left humerus (MMB Abs-134), left femur (MMB Abs-131), proximal end of right tibiotarsus (MMB Abs-1084), left (not right as stated by Jánossy 1972: 59) tibiotarsus lacking proximal end (MMB Abs-138), left tarsometatarsus (MMB Abs-132); Stránská skála – unknown site (whitish fossilization): distal end of right humerus (MMB SS-298); and Stránská skála – unknown site (black fossilization): distal end of left humerus (MMB SS-19). Not figured.]

Corvus moravicus Mlíkovský, 1995b: 120 [Holotype from Stránská skála – Musil's talus cone, layer 4: distal end of left femur; MMB 804/2. Figured by Mlíkovský 1995b, fig. 1.]

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 1-3, 4a, 4c, 5a, 9a, 9b, Czechia (Jánossy 1972 sub

Coloeus cf. *monedula*), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *Coloeus* cf. *monedula*), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *Pica pica major*, Mlíkovský orig.), and Stránská skála – Musil's talus cone, layers 3a, 4a, 8, 10, 13, 15a, 15e, Czechia (Mlíkovský 1995b).

Remarks: Black and whitish fossilized bones evidently originated from different sites within the Stránská skála complex. Black bones are older than Quaternary in general appearance and it is possible that Absolon excavated in his cave a fossiliferous pocket of Pliocene or late Miocene age (O. Fejfar, pers. communication). All black bones attributed by Jánossy (1972) to his *Pica pica major* indeed belong to the genus *Pica* Brisson and indeed are larger than corresponding elements of the modern European *Pica pica* (Linnaeus), representing an extinct species of *Pica* Brisson. However, I prefer to leave this species unnamed, because it is of unknown age. Whitish colored bones are apparently of Quaternary origin. One of the whitish syntypes (distal end of tarsometatarsus Abs-146) belongs to the modern *Nucifraga caryocatactes* (Linnaeus), while all other (as listed above, incl. the lectotype) originated from juvenile Jackdaws of the modern species *Corvus monedula* Linnaeus (Mlíkovský orig.). Accordingly, I synonymize here *Pica pica major* Jánossy with the latter species.

According to the data in Kessler & Moldvai (1993), *Corvus moravicus* Mlíkovský is not larger than the modern *C. monedula* Linnaeus (contra Mlíkovský 1995b). Hence, I synonymize here the former with the latter species.

Corvus sp.

Distribution: Late Miocene (MN 9) of Rudabánya, Hungary (Jánossy 1993); late Miocene (MN 13) of Polgárdi 4, Hungary (Jánossy 1991); late Pliocene (MN 17) of Puebla de Valverde, Spain (Adrover et al. 1974); and late Pliocene (MN 18) of Slivnica, Bulgaria (Boev 2000a).

Genus *Garrulus* Brisson

Garrulus Brisson, 1760 [Modern species.]

Garrulus glandarius (Linnaeus) – Eurasian Jay

Corvus glandarius Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 18) of Montoussé 5, France (Clot et al. 1976a,b); early Pleistocene (MQ 1a) of Untermassfeld, Germany (Jánossy 1997 sub *G.* aff. *glandarius*), Deutsch-Altenburg 4B, Austria (Jánossy 1981 sub *G.* cf. *glandarius*, Mlíkovský 1998d), Beremend 17, Hungary (Jánossy 1992 sub *G.* cf. *glandarius*), and Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *G.* aff. *glandarius*); and early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979d sub *G* ?*glandarius* or *Garrulus* superspecies), Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub *G.* aff. *glandarius*), Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *G.* aff. *glandarius*), and Stránská skála – Musil's talus cone, layer 13, Czechia (Mlíkovský 1995b).

Garrulus sp.

Distribution: Early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965).

Genus *Pica* Brisson

Pica Brisson, 1760 [Modern genus]

Pica pica (Linnaeus) – Common Magpie

Corvus Pica Linnaeus, 1758 [Modern species.]

Distribution: Early Pliocene (MN 15) of Csarnóta 1 and 2, Hungary (Jánossy 1979 sub *P.* aff. *pica major*); late Pliocene (MN 18) of Villány 3, Hungary (Jánossy 1979 sub *P.* aff. *pica* *major*); early Pleistocene (MQ 1b) of Nagyharsányhegy 1-4, Hungary (Jánossy 1979 sub *P.* aff. *pica major*); middle Pleistocene (MQ 2A) of Saint-Estève-Janson – layers B, C? and H, France (Mourer-Chauviré 1975a sub *P. pica major*), and Vértesszőllős 2, Hungary (Jánossy 1979 sub *P.* aff. *pica major*); and middle Pleistocene (MQ 2B) of Lunel-Viel, France (Mourer-Chauviré 1975a). The record from the middle Pleistocene (MQ 2A) of Hundsheim, Austria (Jánossy 1974b) is invalid, because I found that four out of six relevant bones belong to *Pyrrhocorax graculus* (Linnaeus), one to *Garrulus glandarius* (Linnaeus) and one is indeterminate (Mlíkovský orig.).

Pica sp.

Distribution: Late Pliocene (MN 17) of Vӑršec, Bulgaria (Boev 1997b, 2000a).

Genus *Nucifraga* Brisson

Nucifraga Brisson, 1760 [Modern species.]

Nucifraga caryocatactes (Linnaeus) – Spotted Nutcracker

Corvus Caryocatactes Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub cf. *N. caryocatactes*); and early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layer 13, Czechia (Mlíkovský 1995b).

Nucifraga sp.

Distribution: Late Pliocene (MN 17) of Vӑršec, Bulgaria (Boev 2000a sub ?*Nucifraga* sp.).

Genus *Pyrrhocorax* Tunstall

Pyrrhocorax Tunstall, 1771 [Modern genus.]

Pyrrhocorax graculus (Linnaeus) – Alpine Chough

Corvus graculus Linnaeus, 1766 [Modern species]

Pyrrhocorax graculus vetus Kretzoi, 1962: 173 [Nomen nudum; conditionally proposed after 1960.]

Pyrrhocorax graculus vetus "Kretzoi" Mourer-Chauviré, 1975a: 222 [Holotype from Betfia 5: left carpometacarpus; RMO 297/2. Not figured. Mourer-Chauviré (1975a: 222) was first to use this name in a manner required by the ICZN (1999). She thus becomes its author, although she attributed it to Kretzoi 1962.]

Distribution: Early Pliocene (MN 15) of Csarnóta 2 – layers 2 and 23, Hungary (Jánossy 1979 sub *P.* aff. *graculus*); late Pliocene (MN 17) of Vӑršec, Bulgaria (Boev 1997b sub *P. graculus* cf. *vetus*, Boev 2000a sub *P.* cf. *graculus*); late Pliocene (MN 18) of Meda Gran, Spain (Villalta 1965);

early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992), and Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *P.* aff. *graculus*); early Pleistocene (MQ 1b) of Koněprusy C-718, Czechia (Mlíkovský 1996t), Včeláre 1, Slovakia (Jánossy 1979 sub *P.* aff. *graculus*), Betfia 5, Romania (Kretzoi 1962 and Mourer-Chauviré 1975a sub *P. graculus vetus*), and Petralona – layer 11, Greece (Kretzoi 1977 and Kretzoi & Poulianos 1981 sub *P. graculus vetus*); middle Pleistocene (MQ 2A) of Cimay, France (Mourer-Chauviré 1975a sub *P. graculus vetus*), Saint-Estève-Janson – layers B, C/D, E, F, G and H, France (Mourer-Chauviré 1975a sub *P. graculus vetus*), Arago, France (Mourer-Chauviré 1975a sub *P. graculus vetus*), and Petralona – layer 10, Greece (Kretzoi 1977 and Kretzoi & Poulianos 1981 sub *P. graculus vetus*); and middle Pleistocene (MQ 2B) of Fage – layers 2/3, 4, CO and 29-41, France (Mourer-Chauviré 1975a sub *P. graculus* cf. *vetus*), Orgnac 3 – layers g, h, France

(Mourer-Chauviré 1975a sub *P. graculus* cf. *vetus*), Lazaret 8 – layers iv, v, v1, v2, vi, vii, viii, ix, xi, xii, xiii, xiv, xv, xvi, xvii, xviii, France (Mourer-Chauviré 1975a sub *P. graculus vetus*), Suard, France (Mourer-Chauviré 1975a sub *P. graculus vetus*), and Aldène – layers v-vi, viii, ix, France (Mourer-Chauviré 1975a sub *P. graculus vetus*).

Extralimital records include early Pleistocene (MQ 1b) of Treugol'naja Cave – layers 6, 7a, 7b, Karachaevo-Cherkessia, Russia (Potapova & Baryšnikov 1993, Baryšnikov & Potapova 1995 sub *P. graculus vetus*); middle Pleistocene (MQ 2A) of Treugol'naja Cave – layers 5b, 5c, Karachaevo-Cherkessia, Russia (Potapova & Baryšnikov 1993, Baryšnikov & Potapova 1995 sub *P. graculus vetus*); and late Pleistocene (MQ 2C-D) of Treugol'naja Cave – layers 4b and 4d, Karachaeovo-Cherkessia, Russia (Potapova & Baryšnikov 1993, Baryšnikov & Potapova 1995 sub *P. graculus vetus*).

Pyrrhocorax pyrrhocorax (Linnaeus) – Red-billed Chough

Upupa pyrrhocorax Linnaeus, 1758 [Modern species]

Pyrrhocorax primigenius Milne-Edwards, 1875: 487 [Lectotype from Massat (here selected): left tarsometatarsus; MNHN 1906-26 partim. Not figured. Paralectotypes: right tarsometatarsus (MNHN 1906-26 partim), and proximal end of juvenile right tarsometatarsus (MNHN 1906-26 partim). Not figured. Mourer-Chauviré (1975a: 222) selected two tarsometatarsi from Massat deposit at MNHN as syntypes of this species. Her action is invalid according to the ICZN (1999).]

Pyrrhocorax pyrrhocorax primigenius Milne-Edwards: Mourer-Chauviré 1975a: 219 [New rank.]

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a sub *P.* aff. *pyrrhocorax*); late Pliocene (MN 18) of Meda Gran, Spain (Villalta 1965 sub *P.* cf. *pyrrhocorax*), and S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *P.* cf. *pyrrhocorax*); middle Pleistocene (MQ 2B) of Lazaret, layers iv, v, v1, v2, vi, vii, viii, ix, xiii, xiv, xv, xvi, xviii, France (Mourer-Chauviré 1975a sub *P. pyrrhocorax primigenius*), Fage – layers CO, 30-33, 35, 36, 38 and 40, France (Mourer-Chauviré 1975a sub *P. pyrrhocorax* cf. *primigenius*), and Lazaret, layers i-ii, iii, France (Mourer-Chauviré 1975a sub *P. pyrrhocorax primigenius*); and late Pleistocene (MQ 2D) of Massat, France (Milne-Edwards 1875 and Mourer-Chauviré 1975a sub *P. pyrrhocorax primigenius*), Vieulac, France (Rivière 1887 and 1892 sub *P. primigenius*), and Pageyral, France (Rivière 1887 and 1892 sub *P. primigenius*). Tyrberg (1998) listed *P. pyrrhocorax primigenius* Milne-Edwards from a number of other localities of Europe, referring to Mourer-Chauviré (1975a). However, the latter author listed these sites under the heading "*Pyrrhocorax pyrrhocorax* and *Pyrrhocorax pyrrhocorax primigenius*", and it follows from the subsequent text, that she recognized *primigenius* only from a much more limited number of sites.

Extralimital records include early Pleistocene (MQ 1b) of Treugol'naja Cave – layers 6, 7b, Karachaevo-Cherkessia, Russia (Potapova & Baryšnikov 1993, Baryšnikov & Potapova 1995 sub *P. p. primigenius*); middle Pleistocene (MQ 2A) Treugol'naja Cave – layers 5a, 5b and 5c, Karachaevo-Cherkessia, Russia (Potapova & Baryšnikov 1993, Baryšnikov & Potapova 1995 sub *P. p. primigenius*); and middle Pleistocene (MQ 2B) of Treugol'naja Cave – layers 4b and 4c, Karachaevo-Cherkessia, Russia (Potapova & Baryšnikov 1993 and Baryšnikov & Potapova 1995 sub *P. p. primigenius*).

Remarks: Paris (1912: 284) and Lambrecht (1921: 90) erroneously attributed *Pyrrhocorax primigenius* to Rivière ("1891" = 1892: 372).

Pyrrhocorax sp.

Distribution: Late Pliocene (MN 18) of Slivnica, Bulgaria (Boev 2000a).

Family Troglodytidae Swainson

Troglodytidae Swainson, 1831 [Modern family.]

Genus *Troglodytes* Vieillot

Troglodytes Vieillot, 1807 [Modern genus.]

Troglodytes troglodytes (Linnaeus) – Winter Wren

Motacilla Troglodytes Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *T.* cf. *troglodytes*).

Family Turdidae Rafinesque

Turdidae Rafinesque, 1815 [Modern family.]
Muscicapidae Fleming, 1822 [Modern family.]

Genus *Erithacus* Cuvier

Erithacus Cuvier, 1800 [Modern genus.]

Erithacus rubecula (Linnaeus) – European Robin

Motacilla Rubecula Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *E.* cf. *rubecula*); and early Pleistocene (MQ 1b) of Boxgrove – quarry 2, England (Harrison & Stewart 1999 sub cf. *E. rubecula*).

Erithacus sp.

Distribution: Early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992).

Genus *Luscinia* Forster

Luscinia Forster, 1817 [Modern genus.]

Luscinia svecica (Linnaeus) – Bluethroat

Motacilla svecica Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *L.* cf. *svecica*).

Luscinia sp.

Distribution: Late Miocene (MN 13) of Polgárdi 4, Hungary (Jánossy 1991); late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a sub array of *L. svecica*); and early Pleistocene (MQ 1a) of Deutsch-Altenburg 4B, Austria (Jánossy 1981 sub *Sylvia* sp., Mlíkovský 1998d).

Genus *Phoenicurus* Forster

Phoenicurus Forster, 1817 [Modern genus.]

Phoenicurus ochruros (Gmelin)

Motacilla Ochruros Gmelin, 1774 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001).

Genus *Saxicola* Bechstein

Saxicola Bechstein, 1803 [Modern genus.]

Saxicola torquata (Linnaeus) – Common Stonechat

Muscicapa torquata Linnaeus, 1766 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001), and Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *S.* cf. *torquata*); and early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965 sub *S.* cf. *torquata*).

Genus *Oenanthe* Vieillot

Oenanthe Vieillot, 1816 [Modern genus.]

Oenanthe oenanthe (Linnaeus) – Northern Wheatear

Motacilla Oenanthe Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *O.* aff. *oenanthe*).

Oenanthe hispanica (Linnaeus) – Black-eared Wheatear

Motacilla hispanica Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001).

Oenanthe sp.

Distribution: Late Pliocene (MN 18) of Montoussé 5, France (Clot et al. 1976a,b).

Genus *Monticola* Boie

Monticola Boie, 1822 [Modern genus.]

Monticola solitarius (Linnaeus) – Blue Rock Thrush

Turdus solitarius Linnaeus, 1758 [Modern species.]

Turdus cyanus Linnaeus, 1758 [Modern species.]

Distribution: Early Pliocene (MN 15) of Perpignan, France (Depéret 1897 sub *Turdus* aff. *cyanus*).

Genus *Turdus* Linnaeus

Turdus Linnaeus, 1758 [Modern species.]

Turdus merula Linnaeus – Common Blackbird

Turdus merula Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b sub *T.* cf. *merula*); late Pliocene (MN 18) of Montoussé 5, France (Clot et al. 1976a,b sub *T.* cf. *merula*), and S'Onix, Mallorca (Sondaar et al. 1995 sub *T.* cf. *merula*); early Pleistocene (MQ 1a) of Mas Rambault, France (Mourer-Chauviré 1975a sub *T.* cf. *merula*), and Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *T.* cf. *merula*); and early Pleistocene (MQ 1b) of West Runton – Upper Freshwater Bed, England (Harrison 1979d sub *T.* ?*merula* or *T.* *merula*/*boulboul* superspecies).

Turdus pilaris Linnaeus – Fieldfare

Turdus pilaris Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 5a, 9a and 9b, Czechia (Jánossy 1972 sub *T.* cf. *pilaris*).

Turdus philomelos Brehm – Song Thrush

Turdus Ericetorum Turton, 1807 [Modern species.]
Turdus philomelos Brehm, 1831 [Modern species.]
Distribution: Late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 1997b sub *T.* cf. *philomelos*); late Pliocene (MN 18) of Slivnica, Bulgaria (Boev 2000a sub *T.* cf. *philomelos*); early Pleistocene (MQ 1a) of Untermassfeld, Germany (Jánossy 1997 sub *T.* aff. *philomelos*), Beremend 16, Hungary (Jánossy 1992 sub *T.* cf. *philomelos*), Beremend 17, Hungary (Jánossy 1992 sub *T.* cf. *philomelos*), Betfia 2, Romania (Jánossy 1979 sub *T.* cf. *philomelos*), and Primorsk, Ukraine (Vojinstens'kyj 1967 sub *T.* cf. *ericetorum*); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 8, Czechia (Jánossy 1972 sub *T.* cf. *philomelos*).

Turdus iliacus Linnaeus – Redwing

Turdus iliacus Linnaeus, 1766 [Modern species.]
Distribution: Late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 2000a); late Pliocene (MN 18) of S'Onix, Mallorca (Sondaar et al. 1995); early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992 sub *T.* aff. *iliacus*); and early Pleistocene (MQ 1b) of Vallonnet, France (Mourer-Chauviré 1975a sub cf. *T. iliacus*).

Turdus viscivorus Linnaeus – Mistle Thrush

Turdus viscivorus Linnaeus, 1758 [Modern species.]
Distribution: Early Pliocene (MN 15) of Csarnóta 2, layer 21, Hungary (Jánossy 1979 sub *T. viscivorus*–group); late Pliocene (MN 18) of Montoussé 5, France (Clot et al. 1976a,b sub *T.* cf. *viscivorus*); early Pleistocene (MQ 1) of Gènova, Mallorca (Mourer-Chauviré et al. 1977 sub *T.* cf. *viscivorus*); early Pleistocene (MQ 1a) of Valerots, France (Mourer-Chauviré 1975a sub cf. *T. viscivorus*), and Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *T.* cf. *viscivorus*–group); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 5a and 9a, Czechia (Jánossy 1972 sub *T.* cf. *viscivorus*), and Stránská skála – Absolon's 2nd cave, Czechia (Jánossy 1972 sub *T.* cf. *viscivorus*).

Turdus sp.

Distribution: Late Miocene (MN 13) of Polgárdi 4, Hungary (Jánossy 1991); early Pliocene (MN 15) of Ivanovce 1, Slovakia (Mlíkovský orig.); late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a); late Pliocene (MN 17) of Šandalja 1 – layer 6, Croatia (Malez-Bačić 1979); late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 2000a); late Pliocene (MN 18) of Binigaus, Mallorca. Balearics (Alcover et al. 1981 sub *Turdus iliacus*/*philomelos*); early Pleistocene (MQ 1a) of Untermassfeld, Germany (Jánossy 1988), and Deutsch-Altenburg 4B, Austria (Jánossy 1981 sub *T.* cf. *viscivorus*, Mlíkovský 1998d sub *Turdus* – large sp.); and early Pleistocene (MQ 1b) of Koněprusy C-718, Czechia (Mlíkovský 1996t), Stránská skála – Musil's talus cone, layer 13, Czechia (Mlíkovský 1995b sub *Turdus* – large and medium spp.), Petralona – layers 15 and 24, Greece (Kretzoi 1977, Kretzoi & Poulianos 1981).

Genus *Muscicapa* Brisson

Muscicapa Brisson, 1760 [Modern genus.]

Muscicapa striata (Pallas) – Spotted Flycatcher

Motacilla striata Pallas, 1764 [Modern species.]

Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *M.* cf. *striata*).

Muscicapa sp.
Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a).

Genus *Ficedula* Brisson
Ficedula Brisson, 1760 [Modern species.]

Ficedula hypoleuca (Pallas) – European Pied Flycatcher
Motacilla hypoleuca Pallas, 1764 [Modern species.]
Distribution: Early Pleistocene (MQ 1a) of Mas Rambault, France (Mourer-Chauviré 1975a sub cf. *F. hypoleuca*).

Ficedula sp.
Distribution: Late Pliocene (MN 18) of Montoussé 5, France (Clot et al. 1976a,b).

Family Sylviidae Leach
Sylviidae Leach, 1820 [Modern family.]

Genus *Cettia* Bonaparte
Cettia Bonaparte, 1834 [Modern genus.]

Cettia sp.
Distribution: Late Miocene (MN 13) of Polgárdi 4, Hungary (Jánossy 1991).

Genus *Locustella* Kaup
Locustella Kaup, 1829 [Modern genus.]

Locustella sp.
Distribution: Late Miocene (MN 9) of Rudabánya, Hungary (Jánossy 1993).

Genus *Acrocephalus* Naumann
Acrocephalus Naumann, 1811 [Modern genus.]

Acrocephalus palustris (Bechstein) – Marsh Warbler
Motacilla s. *Sylvia palustris* Bechstein, 1811 [Modern species.]
Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *A.* cf. *palustris*).

Acrocephalus arundinaceus (Linnaeus) – Great Reed Warbler
Turdus arundinaceus Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1) of Betfia 7, Romania (Kessler 1975 sub *A.* cf. *arundinaceus*).

Acrocephalus sp.
Distribution: Late Miocene (MN 9) of Rudabánya, Hungary (Jánossy 1993); late Miocene

(MN 13) of Polgárdi 4, Hungary (Jánossy 1991), and Polgárdi 5, Hungary (Jánossy 1991); and early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layer 5, Czechia (Mlíkovský 1995b).

Genus *Hippolais* Baldenstein

Hippolais Baldenstein, 1827 [Modern genus.]

Hippolais sp.

Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Jánossy 1979).

Genus *Sylvia* Scopoli

Sylvia Scopoli, 1769 [Modern species.]

Sylvia communis Latham – Common Whitethroat

Sylvia communis Latham, 1787 [Modern species.]
Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *S.* cf. *communis*).

Sylvia atricapilla (Linnaeus) – Blackcap

Motacilla Atricapilla Linnaeus, 1758 [Modern species.]
Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995). The record of *Sylvia* aff. *atricapilla* from the early Pleistocene (MQ 1a) of Deutsch-Altenburg 4B, Austria (Jánossy 1981) was reidentified as belonging to *Luscinia* sp. (Mlíkovský 1998d).

Sylvia sp.

Distribution: Late Miocene (MN 13) of Polgárdi 4, Hungary (Jánossy 1991).

Genus *Phylloscopus* Boie

Phylloscopus Boie, 1826 [Modern genus.]

Phylloscopus sibilatrix (Bechstein) – Wood Warbler

Motacilla Sibilatrix Bechstein, 1793 [Modern species.]
Distribution: Early Pleistocene (MQ 1a) of Čerdženica, Bulgaria (Boev 2000c).

Genus *Regulus* Cuvier

Regulus Cuvier, 1800 [Modern genus.]

Regulus ignicapillus (Temminck) – Firecrest

Sylvia ignicapilla Temminck, 1820 [Modern species.]
Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *R.* cf. *ignicapillus*).

Family Prunellidae Richmond

Prunellidae Richmond, 1908 [Modern family.]

Genus *Prunella* Vieillot

Prunella Vieillot, 1816 [Modern genus.]

Prunella modularis Linnaeus – Dunnock

Motacilla modularis Linnaeus, 1758 [Modern species.]
Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995); and early Pleistocene (MQ 1b) of Boxgrove – quarry 2, England (Harrison & Stewart 1999 sub cf. *P. modularis*).

Prunella collaris (Scopoli)

Sturnus collaris Scopoli, 1769 [Modern species.]
Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 4a, Czechia (Jánossy 1972 sub aff. *P. collaris*).

Family Aegithalidae Reichenbach

Aegithalidae Reichenbach, 1850 [Modern family.]

Genus *Aegithalos* Hermann

Aegithalos Hermann, 1804 [Modern species.]

Aegithalos caudatus (Linnaeus) – Long-tailed Tit

Parus caudatus Linnaeus, 1758 [Modern species.]
Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *A.* cf. *caudatus*); and early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *A.* cf. *caudatus*).

Family Paridae Vigors

Paridae Vigors, 1825 [Modern family.]
Sittidae Lesson, 1828 [Modern family.]

Genus *Parus* Linnaeus

Parus Linnaeus, 1758 [Modern genus.]

Parus cristatus Linnaeus – Crested Tit

Parus cristatus Linnaeus, 1758 [Modern species.]
Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *P.* cf. *cristatus*).

Parus ater Linnaeus – Coal Tit

Parus ater Linnaeus, 1758
Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *P.* cf. *ater*).

Parus caeruleus Linnaeus – Blue Tit

Parus caeruleus Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *P.* cf. *caeruleus*).

Parus major Linnaeus – Great Tit

Parus major Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *P.* cf. *major*); and early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001), Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *P.* cf. *major*), and Tarchankut, Ukraine (Vojinstvens'kyj 1967).

Parus sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1987b, 2000a).

Genus *Sitta* Linnaeus

Sitta Linnaeus, 1758 [Modern genus.]

Sitta europaea Linnaeus – Eurasian Nuthatch

Sitta europaea Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Deutsch-Altenburg 4B, Austria (Jánossy 1981 sub *S.* cf. *europaea*; Mlíkovský 1998d doubted the record); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *S.* cf. *europaea*).

Sitta sp.

Distribution: Late Miocene (MN 15) of Csarnóta 2 – layers 17, 19 and 21, Hungary (Jánossy 1974a, 1979); and late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a). The record from early Pleistocene (MQ 1a) of Deutsch-Altenburg 4B, Austria (Jánossy 1981) is invalid (Mlíkovský 1998d).

Family Certhiidae Leach

Certhiidae Leach, 1820 [Modern family.]

Genus *Certhia* Linnaeus

Certhia Linnaeus, 1758 [Modern genus.]

Certhia familiaris Linnaeus – Eurasian Treecreeper

Certhia familiaris Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *C.* cf. *familiaris*).

Family Motacillidae Horsfield

Motacillidae Horsfield, 1821 [Modern family.]

Genus *Anthus* Bechstein

Anthus Bechstein, 1805 [Modern genus.]

Anthus campestris (Linnaeus) – Tawny Pipit

Alauda campestris Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Mas Rambault, France (Mourer-Chauviré 1975a sub *A.* cf. *campestris*).

Anthus pratensis (Linnaeus) – Meadow Pipit
Alauda pratensis Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001).

Anthus cervinus (Pallas) – Red-throated Pipit
Motacilla cervina Pallas, 1811 [Modern species.]
Distribution: Late Pliocene (MN 16) of Rębielice Królewskie 1, Poland (Jánossy 1974a sub *A.* cf. *cervinus*).

Anthus sp.
Distribution: Late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1987b, 1990b, 1992); late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a); early Pleistocene (MQ 1a) of Kövesvárad, Hungary (Jánossy 1986), and Čerdženica, Bulgaria (Boev 2000c); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972), and Stránská skála – Musil's talus cone, layers 6 and 13, Czechia (Mlíkovský 1995b).

Genus *Motacilla* Linnaeus
Motacilla Linnaeus, 1758 [Modern genus.]

Motacilla alba Linnaeus – White Wagtail
Motacilla alba Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1979).

Motacilla sp.
Distribution: Late Miocene (MN 13) of Polgárdi 5, Hungary (Jánossy 1991); late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a); and early Pleistocene (MQ 1b) of Stránská skála – Musil's talus cone, layer 3b, Czechia (Mlíkovský 1995).

Family Passeridae Rafinesque
Passeridae Rafinesque, 1815 [Modern family.]

Genus *Passer* Brisson
Passer Brisson, 1760 [Modern genus.]

Passer montanus (Linnaeus) – House Sparrow
Fringilla montana Linnaeus, 1758 [Modern species.]
Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *P.* cf. *montanus*).
Remarks: This is a doubtful record, based on a single carpometacarpus (Mlíkovský orig.).

Passer sp.
Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Mourer-Chauviré 1995a: 342).
Remarks: This record is questionable because of its age (Mlíkovský orig.).

Genus *Petronia* Kaup

Petronia Kaup, 1829 [Modern genus.]

Petronia petronia (Linnaeus) – Rock Sparrow

Fringilla petronia Linnaeus, 1766 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Mas Rambault, France (Mourer-Chauviré 1975a sub *P.* cf. *petronia*).

Family Fringillidae Leach

Fringillidae Leach, 1820 [Modern family.]

Genus *Fringilla* Linnaeus

Fringilla Linnaeus, 1758 [Modern genus.]

Fringilla coelebs Linnaeus – Common Chaffinch

Fringilla coelebs Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 1997b); late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995); and early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *F.* cf. *coelebs*), and Tarchankut, Ukraine (Vojinstvens'kyj 1967).

Fringilla sp.

Distribution: Middle/late Miocene (MN 8-9) of Hostalets de Pierola, Spain (Villalta 1963); and late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 2000a).

Genus *Serinus* Koch

Serinus Koch, 1816 [Modern genus.]

Serinus sp.

Distribution: Late Pliocene (MN 16) of Beremend 15, Hungary (Jánossy 1987b, 1990b, 1992); and early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992).

Genus *Carduelis* Brisson

Carduelis Brisson, 1760 [Modern genus.]

Carduelis chloris (Linnaeus) – European Greefinch

Loxia chloris Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001), and Mas Rambault, France (Mourer-Chauviré 1975a sub cf. *C. chloris*); and early Pleistocene (MQ 1b) of Sima del Elefante – unknown layer, Spain (Rosas et al. 2001).

Carduelis carduelis (Linnaeus) – European Goldfinch

Fringilla Carduelis Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 1997b sub *C.* cf. *carduelis*); late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub *C.* cf. *carduelis*); early Pleistocene (MQ 1a) of Quibas, Spain (Montoya et al. 1999, 2001); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 1-3 and 9a, Czechia (Jánossy 1972 sub *C.* aff. *carduelis*, both these records are doubtful – Mlíkovský orig.).

Carduelis spinus (Linnaeus) – Eurasian Siskin

Fringilla Spinus Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Mas Rambault, France (Mourer-Chauviré 1975a sub cf. *C. spinus*).

Carduelis cannabina (Linnaeus) – Common Linnet

Fringilla cannabina Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1a) of Čerdženica, Bulgaria (Boev 2000c).

Carduelis sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 2000a); and early Pleistocene (MQ 1a) of Beremend 17, Hungary (Jánossy 1992).

Genus *Loxia* Linnaeus

Loxia Linnaeus, 1758 [Modern species.]

Remarks: General reference: Tyrberg 1991a.

Loxia patevi Boev

Loxia patevi Boev, 1999h: 53 [Holotype from Văršec: distal end of right humerus; NMNHS 307. Figured by Boev 1999h, fig. 2a.]

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b sub *Loxia* sp., Boev 1999a,h).

Loxia curvirostra Linnaeus – Common Crossbill

Loxia curvirostra Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 5a, Czechia (Jánossy 1972 sub cf. *L. curvirostra*, the record is doubtful – Mlíkovský, orig.).

Loxia sp.

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Mourer-Chauviré 1995b: 342).

Genus *Pyrrhula* Brisson

Pyrrhula Brisson, 1760 [Modern genus.]

Pyrrhula pyrrhula (Linnaeus) – Eurasian Bullfinch

Loxia Pyrrhula Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's site 9a, Czechia (Jánossy 1972 sub *P.* cf. *pyrrhula*).

Pyrrhula sp.

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1997b).

Genus *Coccothraustes* Brisson

Coccothraustes Brisson, 1760 [Modern species.]

Coccothraustes coccothraustes (Linnaeus) – Hawfinch

Loxia Coccothraustes Linnaeus, 1758 [Modern species.]

Distribution: Late Pliocene (MN 18) of S'Onix, Mallorca, Balearics (Sondaar et al. 1995 sub

C. cf. *coccothraustes*); early Pleistocene (MQ 1a) of Deutsch-Altenburg 4B, Austria (Jánossy 1981 sub *Pinicola* cf. *enucleator*, Mlíkovský 1998d), and Betfia 2, Romania (Čapek 1917, Jánossy 1979 sub *C.* cf. *coccothraustes*); and early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 8 and 9a, Czechia (Jánossy 1972 sub *C.* cf. *coccothraustes*), and Stránská skála – Musil's talus cone, layer 10b, Czechia (Mlíkovský 1995b).

Family Emberizidae Vigors

Emberizidae Vigors, 1825 [Modern family.]

Genus *Emberiza* Linnaeus

Emberiza Linnaeus, 1758 [Modern genus.]

Emberiza citrinella Linnaeus – Yellowhammer

Emberiza citrinella Linnaeus, 1758 [Modern species.]

Distribution: Early Pleistocene (MQ 1b) of Stránská skála – Čapek's sites 5a and 9a, Czechia (Jánossy 1972 sub *E.* cf. *citrinella*).

Emberiza sp.

Distribution: Late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 1997b, 2000a); late Pliocene (MN 18) of Slivnica, Bulgaria (Boev 2000a); early Pleistocene (MQ 1a) of Deutsch-Altenburg 4B, Austria (Jánossy 1981 sub *Serinus* sp., *Serinus* cf. *canaria* and *Serinus* aff. *serinus*. All these names refer to a single humerus, reidentified by Mlíkovský 1998d as belonging to *Emberiza* sp.), Beremend 17, Hungary (Jánossy 1992); and early Pleistocene (MQ 1b) of Nagyharsányhegy 1-4, Hungary (Jánossy 1979).

Family incertae sedis

Alauda gypsorum Portis

Alauda gypsorum Portis, 1887: 186 [Holotype from Senigallia: incomplete skeleton in a slab; MCI, uncatalogued. Figured by Portis 1887, fig. 4.]

Distribution: Late Miocene (MN 13) of Senigallia, Italy (Portis 1887).

Alauda major Portis

Alauda major Portis, 1887: 190 [Holotype from Gabbro: incomplete hindlimbs in a slab; present location unknown – Delle Cave 1996: 270].

Distribution: Late Miocene (MN 13) of Gabbro, Italy (Portis 1887).

Anthus bosniaskii Pycraft

Anthus bosniaskii Pycraft, 1909: 370 [Holotype from Gabbro: incomplete hindlimbs in slab and counter-slab; BMNH. Figured by Pycraft 1909, fig. 47.]

Distribution: Late Miocene (MN 13) of Gabbro, Italy (Pycraft 1909).

Coccothraustes balcanicus Boev

Coccothraustes balcanicus Boev, 1998b: 89 [Holotype from Slivnica: imperfect anterior part of a mandible; NMNHS 440. Figured by Boev 1998b, fig. 2a-c, 3b-c (bottom).]

Distribution: Late Pliocene (MN 18) of Slivnica, Bulgaria (Boev 1998b).

Remarks: Posterior end of the symphysis of the holotypical mandible does not resemble mandibles of *Coccothraustes* Brisson (Mlíkovský, orig.).

Coccothraustes simeonovi Boev

Coccothraustes simeonovi Boev, 1998b: 92 [Holotype from Vǎršec: distal end of left humerus; NMNHS 120. Figured by Boev 1998b, fig. 4a-b.]

Distribution: Late Pliocene (MN 17) of Vǎršec, Bulgaria (Boev 1998b).

Corvus hungaricus Lambrecht

Corvus hungaricus Lambrecht, 1916: 164 [Holotype from Nagyharánhegy 1-4: left tarsometatarsus; present location unknown. Figured by Lambrecht 1916, fig. 2.]

Distribution: Late Pliocene (MN 18) of Senèze, France (Stehlin 1923, Lambrecht 1933); early Pleistocene (MQ 1b) of Nagyharsányhegy 1-4, Hungary (Lambrecht 1916, Mourer-Chauviré 1975a: 249, Jánossy 1979: 31).

Remarks: The holotypical tarsometatarsus of this species certainly belongs to a rather large songbird, but no evidence has been presented that it belongs to the family Corvidae or even to the genus *Corvus* Linnaeus, from which it differs in having the tarsometatarsus very slender. I relegate thus *Corvus hungaricus* to the category of Passeriformes incertae sedis until its holotype is located and restudied.

Fringilla trochanteria Giebel

Fringilla trochanteria Giebel, 1847: 15 [Holotype from Seveckenberg: right femur with damaged ends; MNHN uncatalogued. Not figured.]

Distribution: Late Pleistocene (MQ 2C) of Seveckenberg, Germany (Giebel 1847).

Remarks: The holotypical femur is indeterminate within the Passeriformes (Mlíkovský, orig.).

Hirundo fossilis Giebel

Hirundo fossilis Giebel, 1847: 18 [Syntypes from Seveckenberg: furcula, distal end of left ulna and distal end of right ulna (originally referred to as distal ends of two radii), right carpometacarpus, and proximal end of right tarsometatarsus; MNHN uncatalogued. Not figured. I did not find (in 1999) among the syntypes the furcula, but two unidentifiable scraps of tiny bones were present in the box with the remaining syntypes. I am not able to decide whether one or both of them were regarded by Giebel as the syntypical furcula.]

Distribution: Late Pleistocene (MQ 2C) of Seveckenberg, Germany (Giebel 1847).

Remarks: Both ulnae, the carpometacarpus and the tarsometatarsus belong to small song bird(s), but cannot be identified more exactly. Nevertheless, none of the syntypes belongs to any member of the Hirundinidae, which are morphologically distinct (Mlíkovský, orig.).

Lanius miocaenus Milne-Edwards

Lanius miocaenus Milne-Edwards, 1871: 391 [Holotype from Saint-Gérand-le-Puy: left humerus; MNHN Av-2855. Figured by Milne-Edwards 1869-1871, pl. 159, fig. 1, 1a, 2-3.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871).

Motacilla humata Milne-Edwards

Motacilla humata Milne-Edwards, 1871: 390 [Holotype from Saint-Gérand-le-Puy: left tibiotarsus; MNHN Av-2848. Figured by Milne-Edwards, 1869-1871, pl. 159, fig. 10, 10a, 11-12.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871).

Motacilla major Milne-Edwards

Motacilla major Milne-Edwards, 1871: 391 [Syntypes from Saint-Gérand-le-Puy: distal end of tibiotarsus (MNHN Av-2845), and right tarsometatarsus (MNHN Av-2864). Figured by Milne-Edwards 1869-1871, pl. 158, fig. 1-6 (tarsometatarsus), and pl. 159, fig. 13-15 (tibiotarsus).]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871).

Remarks: Lambrecht (1933: 641) observed that the syntypical tarsometatarsus of this species is figured with an open hypotarsus and that this would preclude the species from being a songbird. However, my direct examination of the specimen in MNHN showed that its hypotarsus is broken and that it is correctly assigned to the Passeriformes. The syntypes are indeterminate within the latter order (Mlíkovský, orig.).

Parus lugubris fossilis Čapek

Parus lugubris fossilis Čapek, 1917: 31 [Holotype from Betfia 2: premaxilla; present location unknown. Not figured.]

Distribution: Early Pleistocene (MQ 1a) of Betfia 2, Romania (Čapek 1917).

Remarks: Jánossy (1979) listed this record sub *Parus* cf. *lugubris* Temminck.

Regulus bulgaricus Boev

Regulus bulgaricus Boev, 1999f: 110 [Holotype from Văršec: left ulna; MNHNS 24. Figured by Boev 1999f, fig. 1, 3 (left), 4 (left).]

Distribution: Late Pliocene (MN 17) of Văršec, Bulgaria (Boev 1999f).

Sitta senogalliensis Portis

Sitta Senogalliensis Portis, 1887: 184 [Holotype from Senigallia: incomplete skeleton in a slab; MCI, uncatalogued. Figured by Portis 1887, fig. 3.]

Distribution: Late Miocene (MN 13) of Senigallia, Italy (Portis 1887).

Troglodytes gracilis Brunner

Troglodytes gracilis Brunner, 1958: 511 [Holotype from Breitenberghöhle: right carpometacarpus; BSP 1982-X-6651. Figured by Brunner 1958, fig. 10.]

Distribution: Late Pleistocene (MQ 2C-E) of Breitenberghöhle, Germany (Brunner 1958). The age of the locality is uncertain (Tyrberg 1998: 205).

Turdicus tenuis Kretzoi

Turdicus tenuis Kretzoi, 1962: 173 [Holotype from Betfia 5: imperfect left coracoid; RMO 3. Not figured.]

Distribution: Early Pleistocene (MQ 1b) of Betfia 5, Romania (Kretzoi 1962).

Remarks: This species was tentatively placed in the Turdidae by Kretzoi (1962). It is indeterminate within the Passeriformes (Mlíkovský, orig.). *Turdicus tenuis* Kretzoi, 1962 is type by monotypy of the genus *Turdicus* Kretzoi, 1962: 173.

Turdoides borealis Jánossy

Turdoides borealis Jánossy, 1979: 27 [Holotype from Osztramos 1: proximal end of left humerus; GIB V-78119. Figured by Jánossy 1979, fig. 4/7.]

Distribution: Early Pliocene (MN 15) of Osztramos 1, Hungary (Jánossy 1979, see also Jánossy 1972), and Csarnóta 2, Hungary (Jánossy 1979, tentatively referred).

Remarks: The holotype is badly eroded, and the taxonomic position of this species within the Passeres remains unclear (Mlíkovský 1992b: 444). *Turdoides borealis* Jánossy is type by original designation of the genus *Turdoides* Jánossy, 1979: 27.

Turdus bresciensis Giebel

Turdus bresciensis Giebel, 1847: 13 [Holotype from Monte Reale: right (if the figure is not side-reversed) humerus; present location unknown. Figured by Wagner 1832, pl. 2, fig. 57a-c.]

Distribution: Middle Pleistocene (MQ 2A-C) of Monte Reale, Sardinia (Wagner 1832 and 1833 sub *Turdus* sp., Giebel 1847).

Aves incertae sedis

Actiornis anglicus Lydekker

Actiornis anglicus Lydekker, 1891a: 56 [Holotype from Hordle: proximal end of right ulna; BMNH 30328. Figured by Lydekker 1891a, fig. 13, and Harrison & Walker 1976a, pl. 2, fig. k-n.]

Distribution: Late Eocene (MP 17) of Hordle, England (Lydekker 1891a, Harrison & Walker 1976a).

Remarks: This fossil was described in the Phalacrocoracidae (which included also the Sulidae at that time). Harrison & Walker (1976a) transferred it to the Threskiornithidae, but Olson (1981) observed that its holotype is neither from a cormorant, nor from an ibis. *Actiornis anglicus* Lydekker, 1891a is type by original designation of the genus *Actiornis* Lydekker, 1891a: 56.

Anas creccoides Beneden

Anas creccoïdes Beneden, 1871: 260 [Lectotype from Rupelmonde (selected by Brodkorb 1962: 707): a humerus lacking proximal end; IRScNB or Ulg. Figured by Beneden 1871, pl. 1 (unnumbered), fig. 3. Paralectotypes from Rupelmonde: shaft of a humerus, proximal end of an ulna, distal end of an ulna, proximal end of a tibiotarsus; IRScNB or ULg. Figured by Beneden 1871, unnumbered pl., fig. 4 (shaft of humerus), 5 (proximal and distal ends of ulnae), and 6 (tibiotarsus). Brodkorb (1962: 707) identified from Beneden's figures from which body side the bones originated. However, drawings of bones were often, though not always, side-reversed in the 19th century publications, so that this information remains unknown. *Anas creccoides* is a junior primary homonym of *Anas creccoides* King, 1828.]

Anas creccoides Beneden: Lambrecht 1921: 15 [Spelling emended.]

Anas benedeni Sharpe 1899: 217 [New name for *Anas creccoïdes* Beneden, 1871; hence its junior objective synonym.]

Distribution: Middle Oligocene (MP 23-24) of Rupelmonde, Belgium (Beneden 1871).

Remarks: This species was described as a duck (Beneden 1871), but Brodkorb (1962: 707) relegated it to Aves incertae sedis.

Anas lignitifila Portis

Anas lignitifila Portis, 1884: 372 [Holotype from Bamboli: crushed partial skeleton in slab; MGPUT. Figured by Gastaldi 1866b, pl. 6, fig. 7.]

Anas lignitiphila Weithofer, 1888: 367. [Unjustified emendation of *Anas lignitifila* Portis, hence a new name, and a junior objective synonym of *Anas lignitifila* Portis, 1884.]

Distribution: Late Miocene (MN 13) of Bamboli, Italy (Gastaldi 1866a: 43 sub "un magnifico Ornitolite", T. Salvadori in Gastaldi 1866b as an unnamed bird, Portis 1884, Weithofer 1888, Ristori 1891, Howard 1964).

Remarks: This is a meaningless name until the holotype is restudied. Portis (1884: 371-372) attributed the species name to Salvadori, because he created the name on the basis of a description presented by the latter author (T. Salvadori in Gastaldi 1866b: 223-225). Nevertheless, the authorship of the name remains with Portis (1884).

Anas skalicensis Bayer

Anas skalicensis Bayer, 1882: 21 [Holotype from Skalice: scraps of long bones; NMP ČM-1520. Figured by Bayer 1882, fig. 8/2; Bayer 1883, fig. 2; Mlíkovský & Švec 1989, pl. 2, fig. a.]

Anas skalicensis Bayer, 1883: 64 [Same holotype, repeated description. This is both a junior homonym and a junior objective synonym of *Anas skalicensis* Bayer, 1882.]

Distribution: Middle Oligocene (MP 23-24) of Skalice, Czechia (Krejčí 1877: 915 sub "genus indet.", Bayer 1882, 1883, Mlíkovský & Švec 1989).

Remarks: The holotype of this species is indeterminate, even at the ordinal level (Mlíkovský & Švec 1989).

Ardea rupeliensis Beneden

Ardea rupeliensis Beneden, 1873a: 373 [Holotype from Rupelmonde: distal end of a tibiotarsus; present location unknown, perhaps in IRScNB or ULg. – cf. Cheneval 1996a: 538). Not figured.]

Distribution: Middle Oligocene (MP 23-24) of Rupelmonde, Belgium (Beneden 1873a).

Remarks: Superficial description ("un peu petit que le butor" = slightly smaller than *Botaurus stellaris*) and the absence of illustration relegates this species to Aves incertae sedis until its holotype is located and restudied (see also Brodkorb 1978: 212).

Ardea piveteaui Brunet

Ardea piveteaui Brunet, 1970: 16 [Holotype from Romainville: associated shaft of right ulna and distal end of right radius; MNHN 1951-1. Figured by Brunet 1970, pl. A, fig. d-e (ulna).]

Distribution: Late Eocene (MP 20) of Romainville, France (Brunet 1970, Harrison 1979a, Olson 1985a: 166).

Remarks: Indeterminate at the present state of our knowledge of the Eocene birds (see Harrison 1979a, Olson 1985a: 166). Nevertheless, the ulna is almost triangular in cross-section and bears distinct papillae remigiales caudales, which opens the possibility, that it will be identified in future (Mlíkovský orig.).

Ardeacites molassicus Haushalter

Ardeacites molassicus Haushalter, 1855: 11 [Holotype from Harbatshofen: right humerus; present location unknown. Figured by Haushalter 1855, pl. 2, fig. 1.]

Distribution: Early Miocene (MN 3) of Harbatshofen, Germany (Haushalter 1855, Brodkorb 1980).

Remarks: The species was originally described as a heron. Brodkorb (1980: 91) relegated *Ardeacites molassicus* Haushalter to Aves incertae sedis, being "unable to get it in an order, much less a family." My attempt at identifying the holotype according to its figure in Haushalter (1855) gave the same result (Mlíkovský orig.). *Ardeacites molassicus* Haushalter, 1855 is type by monotypy of the genus *Ardeacites* Haushalter, 1855: 11.

Argillipes aurorum Harrison & Walker

Argillipes aurorum Harrison & Walker, 1977a: 32 [Holotype from the Warden Point on the Isle of Sheppey: proximal end of right tarsometatarsus; BMNH A-3130. Figured by Harrison & Walker 1977, pl. 7, fig. p-t.]

Distribution: Early Eocene (MP 8-9) of Warden Point, Sheppey, England (Harrison & Walker 1977a).

Remarks: Originally described in the Phasianidae (Harrison & Walker 1977a). Here transferred to the Aves incertae sedis. *Argillipes aurorum* Harrison & Walker, 1977a is by original designation type of the genus *Argillipes* Harrison & Walker, 1977a: 32.

Argillipes magnus Harrison & Walker

Argillipes magnus Harrison & Walker, 1979b: 37 [Holotype from Yarmouth: proximal end of left tarsometatarsus; BMNH A-4409. Figured by Harrison & Walker 1979b, pl. 2, row B: 3-7.]

Distribution: Middle Oligocene (MP 21-23) of Yarmouth, England (Harrison & Walker 1979b).

Remarks: Described in the Phasianidae. As judged from figures, the holotypical tarsometatarsus resembles the holotype of *Diatropornis ellioti* (Milne-Edwards) (Mlíkovský orig.).

Argillipes paralectoris Harrison & Walker

Argillipes paralectoris Harrison & Walker, 1977a: 33 [Holotype from Sheppey: proximal end of left tarsometatarsus; BMNH A-3604. Figured by Harrison & Walker 1977a, pl. 8, fig. f-j.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1977a).

Remarks: Described in the Phasianidae (Harrison & Walker 1977a). Here transferred to the Aves incertae sedis.

Branta minor Kessler & Gál

Branta minor Kessler & Gál, 1996: 73 [Holotype from Chişinău: proximal end of right carpometacarpus; LPUI 65-MS. Figured by Kessler & Gál 1996, fig. 1a-b.]

Distribution: Late Miocene (MN 9) of Chişinău, Moldova (Kessler 1984b sub cf. *Phalacrocorax lautus*, Kessler & Gál 1996).

Remarks: The diagnosis is invalid, but the almost useless figures indicate, that this is not an anatid (Mlíkovský orig.).

Cerestenia pulchrapenna Mayr

Cerestenia pulchrapenna Mayr, 2000i: 629 [Holotype from Céreste: nearly complete, articulated postcranial skeleton on a slab; SMNK PAL-3805. Figured by Mayr 2000i, fig. 4-6.]

Distribution: Middle Oligocene (MP 23) of Céreste, France (Mayr 2000i).

Remarks: Mayr (2000i) tentatively included this species in the family Turnipacidae Mayr, 2000i. *Cerestenia pulchrapenna* Mayr, 2000i is type by original designation of the genus *Cerestenia* Mayr, 2000i: 629.

Chenornis graculoides Portis

Chenornis graculoides Portis, 1884: 364 [Holotype from Ceva: partial skeleton in slab; MGPUT. Figured by Portis 1884, pl. 1, fig. 5.]

Distribution: Early Miocene (MN 1-2) of Ceva, Italy (Portis 1884).

Remarks: Portis (1884) was uncertain as regards the taxonomic position of this species. Lambrecht (1933: 367) listed it among the Anseriformes incertae sedis. Brodkorb (1964: 211) included it in the subfamily Anserinae of the Anatidae, but Howards (1964) doubted its anatid affinies. The specimen closely resembles cormorants in skeletal proportions and may be attributable to the Phalacrocoracidae (Mlíkovský, orig.). *Chenornis graculoides* Portis, 1884 is type by monotypy of the genus *Chenornis* Portis, 1884: 364.

Colymbus portisi Regàlia

Colymbus Portisi Regàlia, 1902: 231 [Holotype from Orciano Pisano: incomplete cervical vertebra; probably lost – see Delle Cave et al. 1984: 89, Delle Cave 1996: 676. Figured by Regàlia 1902, pl. 27, fig. 19-20.]

Gavia portisi (Regàlia): Brodkorb, 1963: 224 [New combination.]

Distribution: Middle Pliocene (MN 15-16) of Orciano Pisano, Italy (Regàlia 1902, 1907, Delle Cave et al. 1984).

Remarks: This is a meaningless name, based upon a probably indeterminate vertebra. There is no evidence, that the vertebra is referable to a gaviid and, if so, that it represents a valid species.

Coturnipes cooperi Harrison & Walker

Coturnipes cooperi Harrison & Walker, 1977a: 35 [Holotype from Burnham-on-Crouch: distal end of left tarsometatarsus; BMNH A-3706. Figured by Harrison & Walker 1977a, pl. 8, fig. p-t.]

Distribution: Early Eocene (MP 8-9) of Burnham-on-Crouch, England (Harrison & Walker 1977a). A tentative extralimital record is known from the early Eocene (Nanjemoy Formation) of Fisher/Sullivan Site in Virginia (Olson 1999b).

Remarks: Described in the Phasianidae (Harrison & Walker 1977a). Olson (1999b: 127) relegated this species to the category of Aves incertae sedis. *Coturnipes cooperi* Harrison & Walker, 1977a is type by original designation of genus *Coturnipes* Harrison & Walker 1977a: 35.

Cygnus herenthalsi Lambrecht

Cygnus Herenthalsii Beneden, 1871: 261 [Nomen nudum; no description or indication.]

Cygnus Herenthalsii Beneden, 1872: 288 [Nomen nudum; no description or indication.]

Cygnus herenthalsii Beneden, 1873a: 372 [Nomen nudum; no description or indication.]

Cygnus herrenthalsi [sic!] "Beneden" Lambrecht, 1933: 383 [Holotype from Antwerp: pedal phalanx; IRScNB. Not figured. Lambrecht (1933: 383) attributed this name to Beneden (see also Stejneger 1882: 181, Lambrecht 1921: 10), giving title of the article as in Beneden 1872 and year and place of publication as in Beneden 1871. Beneden (1871, 1872, 1873a) mentioned this name on three occasions, but it is a pure nomen nudum in all cases. Lambrecht (1933: 383) provided a very brief description of the bird, which makes him the author of its name, although he attributed it to Beneden (see ICZN 1999). Note that Brodkorb (1964: 209) and Howard (1964: 260) just repeated incorrect data given by Lambrecht (1933: 383).]

Distribution: Middle Miocene (MN 7-8) of Antwerp, Belgium (Beneden 1871, 1872, 1873a, Lambrecht 1933).

Remarks: Beneden (1871, 1872, 1873a) believed that the pedal phalanx belongs to a swan, and Lambrecht (1933: 383) confirmed this opinion. Nevertheless, I concur with Howard (1964: 261) that a pedal phalanx is a dubious element upon which to base a new species and I relegate here *Cygnus herenthalsi* Lambrecht, 1933 to the category of Aves incertae sedis until its holotype is located and restudied.

Dolichopterus viator Milne-Edwards

Dolicopterus viator Aymard, 1856: 234 [Nomen nudum; no description or indication – see Olson 1978.]

Dolichopterus [sic!] *viator* Milne-Edwards, 1868: 365 [Holotype from Ronzon: associated vertebra, proximal end of radius, carpometacarpus and three unidentified bone fragments in a slab; present location unknown. Figured by Milne-Edwards 1867-1868, pl. 57, fig. 24 (figure caption erroneously refers to fig. 23). Lydekker (1891a: 175) correctly observed that *Dolichopterus* was based solely on this material, but subsequent authors (Lambrecht 1933: 534, Brodkorb 1967: 191, Olson 1978: 448) thought that Milne-Edwards based the species on a syntypical series which included also a partial coracoid in slab (Milne-Edwards 1867-1868, pl. 57, fig. 25; figure caption erroneously refers to fig. 24) and crushed tarsometatarsus in still another slab (Milne-Edwards 1867-1868, pl. 57, fig. 23; figure caption erroneously refers to fig. 25). Referring to the partial skeleton in a slab (pl. 57, fig. 24), Milne-Edwards (1868: 366) clearly stated that this is the specimen upon which the determination of *Dolichopterus viator* is based ("la pièce sur laquelle est basée cette détermination"). *Dolicopterus* is an incorrect original spelling as evidenced from the etymology and spelling in the caption to pl. 57 in Milne-Edwards 1867-1868, and confirmed by the decision of the first reviser (Lydekker 1891a: 175).]

Distribution: Early Oligocene (MP 21) of Ronzon, France (Aymard 1856, Milne-Edwards 1868-1869, Olson 1978).

Remarks: Aymard (1856) and Milne-Edwards (1968) tentatively included this fossil in their family "Longipennes", which included Wetmorean family Laridae and order Procellariiformes. Lambrecht (1933) and Brodkorb (1967) listed the species in the Charadriidae without explanation. I concur with Olson (1978: 446) that *Dolichopterus viator* Milne-Edwards should be relegated to the category of Aves incertae sedis until its type is located and restudied. *Dolichopterus viator* is type by monotypy of the genus *Dolichopterus* Milne-Edwards, 1868: 365. *Dolicopterus* Aymard, 1856: 234 is a nomen nudum.

Eleutherornis helveticus Schaub

Eleutherornis helveticus Schaub, 1940a: 283 [Holotype from Egerkingen: anterior portion of pelvis; BaM Eh-781. Figured by Schaub 1940a, fig. 1-4.]

Distribution: Middle Eocene (MP 11-13) of Egerkingen, Switzerland (Schaub 1940a,b, Mlíkovský 1992: 444).

Remarks: This species is of uncertain taxonomic position (Mlíkovský 1992b). *Eleutherornis helveticus* Schaub, 1940a is type by original designation of the genus *Eleutherornis* Schaub, 1940a: 283. *Eleutherornis* Schaub, 1940a is type of the family Eleutherornithidae Wetmore, 1951: 3. Cracraft (1974) included this taxon in the Struthionidae as a tribe, Eleutherornithini.

Gaillard (1936) observed, that the pedal phalanx of a giant bird from Egerkingen, described and figured by Schaub (1929: 598, fig. 12-13) resembles the same element of *Diatryma cotei* Gaillard. This opens the possibility, that *Eleutheornis helveticus* Schaub is a phorusrhacid, but it should be compared also with *Gastornis* Hébert.

Elornis anglicus Lydekker

Elornis (?) *anglicus* Lydekker, 1891a: 80 [Holotype from Hordle: left humerus; BMNH 36792. Figured by Lydekker 1891a, fig. 22, and Harrison & Walker 1976a, pl. 2, fig. e-j.]

Helornis anglicus (Lydekker): Lydekker, 1891d: 396 [Unjustified emendation of the genus name, hence a new combination.]

Distribution: Late Eocene (MP 17) of Hordle, England (Lydekker 1891a, Harrison & Walker 1976a).

Remarks: Being originally described in the Phoenicopteridae, this fossil was later transferred to the Threskiornithidae, and synonymized with *Actiornis anglicus* Lydekker (Harrison & Walker 1976a). According to Olson (1981: 168), the holotype was not "convincingly shown to belong in the Threskiornithidae". Accordingly, I relegate here *Elornis anglicus* Lydekker to the Aves incertae sedis until its holotype is properly restudied.

Elornis grandis Milne-Edwards

Elornis grandis Aymard, 1856: 233 [Nomen nudum; no description or indication – see Olson 1978.]

Elornis grandis Milne-Edwards, 1869: 87 [Holotype from Ronzon: proximal end of a humerus; formerly in coll. Aymard, present location unknown. Not figured.]

Distribution: Early Oligocene (MP 21) of Ronzon, France (Aymard 1856, Milne-Edwards 1869, Olson 1978).

Remarks: This is clearly an Avis incertae sedis until its holotype is located and restudied.

Elornis littoralis Milne-Edwards

Elornis (?) *littoralis* Aymard, 1856: 234 [Nomen nudum; no description or indication – see Olson 1978.]

Elorn[*is*] *antiquus* Aymard, 1856: 234 [Not available; published as a synonym and never used as a valid name – see Olson 1978.]

Elornis littoralis Milne-Edwards, 1868: pl. 90 [Holotype from Ronzon: associated distal end of tibiotarsus and proximal end of tarsometatarsus in a slab; formerly in coll. Aymard, present location unknown. Figured by Milne-Edwards 1967-1868, pl. 90, fig. 1. Several other skeletal elements from Ronzon, figured by Milne-Edwards 1867-1868, pl. 90, fig. 2-7, were included in the type series upon which Milne-Edwards allegedly based this species by Lambrecht (1933: 343), Brodkorb (1963c: 272) and Olson (1978: 447), but Milne-Edwards (1869: 86) attributed the species to Aymard and clearly stated that Aymard based it on the above mentioned slab. The latter specimen should be deemed to be the holotype of *Elornis littoralis* Milne-Edwards.]

Helornis littoralis ("Aymard" = Milne-Edwards): Lydekker 1891d: 396 [New combination, although Lydekker intended just to correct spelling of the generic name.]

Distribution: Early Oligocene (MP 21) of Ronzon, France (Aymard 1856, Milne-Edwards 1867-1868, 1869-1871, Olson 1978).

Remarks: *Elornis littoralis* Milne-Edwards was said to be flamingo-like by Aymard (1856), and included in the Phoenicopteridae by Lydekker (1891a: 80), Lambrecht (1933: 343), Brodkorb (1963c: 272) and Olson (1978: 445, tentatively). As judged from the figure, the distal end of the holotypical; tibiotarsus of *Elornis littoralis* Milne-Edwards markedly differs from the same element of the Phoenicopteridae. Hence, I relegate here this species in the category of Aves incertae sedis until its type is rediscovered and restudied.

Genus *Elornis* Aymard, 1856: 234 is a nomen nudum (see also Olson 1978). *Elornis littoralis* Milne-Edwards, 1868 is type by subsequent designation (Lydekker 1891a: 80) of the genus *Elornis* Milne-Edwards, 1868. *Helornis* Lydekker, 1891d: 396 is an unsubstantiated emendation of *Elornis* "Aymard" Milne-Edwards, 1868, and hence a new name. *Helornis* Lydekker is thus a junior objective synonym of *Elornis* Milne-Edwards.

Eocathartes robustus Lambrecht

Eocathartes robustus Lambrecht, 1935: 362 [Holotype from Cecilie I: partial skeleton in slab; GM 6883. Figured by Lambrecht 1935, pl. 18, fig. 2.]

Distribution: Middle Eocene (MP 13) of Geiseltal – Cecilie I, Germany (Lambrecht 1935).

Remarks: Described as a vulture. This is almost certainly not a vulturid (P. Houde in Olson 1985a: 191). Its affinities await clarification. *Eocathartes robustus* Lambrecht, 1935 is type by monotypy of the genus *Eocathartes* Lambrecht, 1935: 362.

Eostrix vincenti Harrison

Eostrix vincenti Harrison, 1980a: 85 [Holotype from Grange Farm: left phalanx I digiti III; BMNH A-5164. Figured by Harrison 1980a, fig. 1b,d,f, and 2c,d,f.]

Distribution: Early Eocene (MP 7-10) of Grange Farm, England (Harrison 1980a).

Remarks: Here relegated to the category of Aves incertae sedis (see also Houde & Olson 1992: 157). Type species of the genus *Eostrix* Brodkorb, 1971b: 214 is *Protostrix minima* Wetmore, 1938 from the early Eocene (Wasatch Formation) of Wyoming.

Eupterornis remensis Lemoine

Eupterornis remensis Lemoine, 1878: 56 [Lectotype from Cernay-les-Reims (selected by Mourer-Chauviré 1994: 346): distal end of right ulna; MNHN CRL-2480. Figured by Lemoine 1878, pl. 5, fig. 1-3 (not pl. 3 as stated by Lemoine 1878: 56). Paralectotype from

Cernay-les-Reims: phalanx I digiti majori (= ?); MNHN, uncatalogued. Figured by Lemoine 1878, pl. 5, fig. 4-6. Mourer-Chauviré 1994 erroneously called the ulnar fragment a type of the species. Nevertheless, this can be interpreted as a selection of the syntype.]

Distribution: Late Paleocene (MP 6) of Cernay-les-Reims, France (Lemoine 1878, Olson 1985a: 213).

Remarks: This species was described as gull-like (Lemoine 1878). Paris (1912: 214) and Lambrecht (1921: 20) allied it with the Cretaceous Hesperornithidae. Lambrecht (1933: 261) placed it in his order Colymbo-Podicipediformes, and Brodkorb (1963c: 222) included it in the Gaviidae without explanation. Olson (1985a: 213) relegated *Eupterornis remensis* Lemoine to the Aves incertae sedis until its types are restudied. I restudied both syntypes of this species in MNHN and found them indeterminate. The lectotypical ulna is largely reconstructed, its figure in Lemoine being rather fictitious, while the "phalanx" is an indeterminate scrap of bone. *Eupterornis remensis* Lemoine, 1878 is type by monotypy of the genus *Eupterornis* Lemoine, 1878: 56.

Fluviatilavis antunesi Harrison

Fluviatilavis antunesi Harrison, 1983a: 14 [Holotype from Silverinha: right femur; UNL, uncatalogued (C.J. Hazevoet, in litt.). Figured by Harrison 1983a, fig. 1a-e.]

Distribution: Early Eocene (MP 7) of Silveirinha, Portugal (Harrison 1983a).

Remarks: The figure in Harrison (1983a) does not show recurvirostrid features. I relegate this species to the category of Aves incertae sedis until its holotype is restudied. *Fluviatilavis antunesi* Harrison, 1983a is type by original designation of the genus *Fluviatilavis* Harrison, 1983a: 14.

Fulica dejardinii Beneden

Fulica Dejardinii Bedenen, 1871: 261 [Holotype from Antwerp: distal end of left femur; perhaps in IRScNB or ULg. Figured by Beneden 1871, fig. 8.]

Miofulica Dejardini (Beneden): Lambrecht 1933: 480 [New combination.]

Distribution: Middle Miocene (MN 7-8) of Antwerp, Belgium (Beneden 1871).

Remarks: Described as a coot (family Rallidae), but should be relegated to Aves incertae sedis until its holotype is located and restudied (see also Cracraft 1973: 36, Olson 1977: 348). *Fulica dejardinii* Beneden, 1871 is type by monotypy of the genus *Miofulica* Lambrecht, 1933: 480.

Gastornis minor Lemoine

Gastornis minor Lemoine, 1878: 12 [Holotype from Cernay-les-Reims: distal fragment of a tibiotarsus; present location unknown. Figured by Lemoine 1881c, pl. 4, fig. 1-5. Brodkorb (1967: 141) said that the figure in Lemoine shows a left tibiotarsus, but figures in Lemoine's papers were side-reversed, so that the holotypical tibiotarsus originated probably from the right side of the body.]

Remiornis minor (Lemoine): Lydekker 1891a: 360 [New combination.]

Distribution: Late Paleocene (MP 6) of Cernay-les-Reims, France (Lemoine 1878, 1881a,b,c, Martin 1992).

Remarks: Indeterminate from figures, hence a meaningless name until the holotype is found and restudied (Martin 1992).

Geiseloceros robustus Lambrecht

Geiseloceros robustus Lambrecht, 1935: 365 [Holotype from Cecilie I: partial skeleton in a slab; GM 5884. Figured by Lambrecht 1935, pl. 2.]

Distribution: Middle Eocene (MP 13) of Geiseltal – Cecilie I, Germany (Lambrecht 1935).

Remarks: Described as a bucerotid, but certainly not belonging to the Bucerotidae. Taxonomic identity of *Geiseloceros robustus* Lambrecht remains unclear, although P. Houde (in Olson 1985a: 136, 191) conjectured that it may be identical with *Eocathartes robustus* Lambrecht, an alleged vulture from the same locality. *Geiseloceros robustus* Lambrecht, 1935 is type by monotypy of the genus *Geiseloceros* Lambrecht, 1935: 365.

Gigantibis incognita Harrison & Walker

Gigantibis incognita Harrison & Walker, 1976a: 332 [Holotype from Hordle: proximal end of left femur; IGS GSM-1113109. Figured by Harrison & Walker 1976a, pl. 3, fig. c-g.]

Distribution: Late Eocene (MP 17) of Hordle, England (Harrison & Walker 1976a).

Remarks: This fossil was described in the Threskiornithidae, but Olson (1981) relegated it to the category of Aves incertae sedis. *Gigantibis incognita* Harrison & Walker, 1976a is type by original designation of the genus *Gigantibis* Harrison & Walker, 1976a: 331.

Gracilitarsus mirabilis Mayr

Gracilitarsus mirabilis Mayr, 1998c: 56 [Holotype from Messel: incomplete skeleton in a slab; SMNK Me-1085. Figured by Mayr 1998c, pl. 17; Mayr 2001c, fig. 1.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1998c, Mayr 2001c).

Remarks: Described in order and family incertae sedis (Mayr 1998c), and later placed in its own family (Mayr 2001d). *Gracilitarsus mirabilis* Mayr, 1998c is type by original designation of the genus *Gracilitarsus* Mayr, 1998c: 55. *Gracilitarsus* Mayr, 1998c is type of the family Gracilitarsidae Mayr, 2001c: 78. Mayr (2001c) indicated that this species can be closely related to *Eutreptodactylus itaboraiensis* Baird & Vickers-Rich, 1997, an alleged cuckoo from the late Paleocene of Brazil (but see Mourer-Chauviré 1999b).

Hassiavis laticauda Mayr

Hassiavis laticauda Mayr, 1998a: 122 [Holotype from Messel: partial skeleton in slab and counter-slab; HLMD Me-9047a,b. Figured by Mayr 1998a, fig. 2-3.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1998a).

Remarks: Mayr (1998a) tentatively assigned this species to the Archaeotrogonidae, from which it markedly differs in osteological characters described by Mayr (1998a) and/or those visible in the figures. Until restudied, this species should be relegated to the Aves incertae sedis. *Hassiavis laticauda* Mayr, 1998a is type by original designation of the genus *Hassiavis* Mayr, 1998a: 122.

Homalopus picoides Milne-Edwards

Homalopus picoides Milne-Edwards, 1871: 385 [Holotype from Sansan: distal end of left tarsometatarsus; MNHN Sa-1240. Figured by Milne-Edwards 1869-1871, pl. 178, fig. 15-20; and Cheneval 2000, fig. 27. Cheneval (2000) incorrectly called this specimen a lectotype, without mentioning any paralectotypes.]

Distribution: Middle Miocene (MN 6) of Sansan, France (Milne-Edwards 1869-1871, Cheneval 2000).

Remarks: Milne-Edwards (1869-1871) was not certain about the taxonomic position of this bird. Paris (1912: 285) and Lambrecht (1921: 89, 1933: 631) assigned it to the piciform birds. Brodkorb (1971: 249) placed it in the Bucerotidae, and Cheneval (1996b, 2000: 372) in the Dendrocolaptidae. The latter assignment was doubted on paleozoogeographical grounds by Mlíkovský (1996s: 812). *Homalopus picoides* Milne-Edwards, 1871 is type by original designation of the genus *Homalopus* Milne-Edwards, 1871: 385.

Horusornis vianeyliaudae Mourer-Chauviré

Horusornis vianeyliaudae Mourer-Chauviré, 1991: 190 [Holotype from Bouffie: left tarsometatarsus with damaged proximal end; USTL BFI-1974. Figured by Mourer-Chauviré 1991, pl. 1, fig. 8-9.]

Distribution: Late Eocene (MP 17) of Bouffie, France (Mourer-Chauviré 1991).

Remarks: Described as a raptor of unknown relationships. Until restudied, this species should be relegated to the Aves incertae sedis. *Horusornis vianeyliaudae* Mourer-Chauviré, 1991 is type by original designation of the genus *Horusornis* Mourer-Chauviré, 1991: 190. *Horusornis* Mourer-Chauviré, 1991 is type of the family Horusornithidae Mourer-Chauviré, 1991: 184.

Howardia eous Harrison & Walker

Howardia eous Harrison & Walker, 1976a: 337 [Holotype from Hordle: anterior portion of sternum; BMNH A-4355. Figured by Harrison & Walker 1976a, pl. 4, fig. f.]

Palaeopapia eous (Harriosn & Walker): Harrison & Walker 1979c: 110 [New combination.]

Distribution: Late Eocene (MP 17) of Hordle, England (Harrison & Walker 1976a); and early Oligocene (MP 21-23) of Hamstead, England (Harrison & Walker 1979b, tentatively referred specimen).

Remarks: Described in the Anatidae. *Howardia eous* Harrison & Walker, 1976a is type by original designation of the genus *Howardia* Harrison & Walker, 1976a: 337 (a junior homonym of *Howardia* Berlese & Leonardi, 1896). *Palaeopapia* Harrison & Walker, 1979c: 110 is a new name for *Howardia* Harrison & Walker, 1976a, hence its junior objective synonym.

Ibidopodia palustris Milne-Edwards

Ibidopodia palustris Milne-Edwards, 1871: 465 [Holotype from Saint-Gérand-le-Puy: left tarsometatarsus; MNHN, lost? – I was not able to locate it in MNHN in 1999. Figured by Milne-Edwards 1969-1871, pl. 71, fig. 17-21. Milne-Edwards (1869-1871) clearly based this species on the tarsometatarsus, attributing to it tentatively the partial skull MNHN Av-8730 (p. 467: "J'incline à penser qu'un tęte d'oiseau ... pourrait bien appartenir à l'*Ibidopodia palustris* ou à quelque genre voisin, ..." = I am inclined to think that a head of a bird ... could well belong to *Ibidopodia palustris* or to an allied genus, ..." (my translation). The latter skull is figured by Milne-Edwards 1869-1871, pl. 71, fig. 13-16, and Cheneval & Escullié 1992, fig. 5. Brodkorb (1963c: 278) erroneously stated that Lydekker (1891: 74) selected the latter skull as the lectotype of *Ibidopodia palustris*, while the latter author clearly regarded the tarsometatarsus as the holotype of the species. Olson (1981a: 168) erroneously stated that Milne-Edwards based the species on both of these elements.]

Distribution: Early Miocene (MN 2a) of Saint-Gérand-le-Puy, France (Milne-Edwards 1869-1871, Olson 1981).

Remarks: Milne-Edwards (1969-1871) described this species as an ibis, but Olson (1981a: 168) excluded it from the family, relegating it to the category of Aves incertae sedis. The skull mentioned by Milne-Edwards (1869-1871: 467) – and sometimes erroneously regarded as a part of the alleged syntypical series – belongs to *Palaelodus ambiguus* Milne-Edwards (Cheneval & Escuillié 1992). *Ibidopodia palustris* Milne-Edwards, 1871 is type by monotypy of the genus *Ibidopodia* Milne-Edwards, 1871: 465.

Kievornis rogovitshi Aver'janov et al.

Kievornis rogovitshi Aver'janov, Potapova & Nesov, 1990: 6 [Holotype from Kyjiv: associated right humerus lacking proximal end, and right ulna; ZIN 3926a-b. The humerus (ZIN 3926a) was called "main specimen of the holotype" and the ulna "additional specimen of the holotype" by Aver'janov et al. in captions to pl. 1-2. Figured by Rogovič 1875a, pl. 2, figs.

3-4; and Aver'janov et al. 1990, pl. 1, fig. 1-5, pl. 2, fig. 1-5.]

Distribution: Late Eocene (MP 17-20) of Kyjiv, Ukraine (Rogovič 1875a: 82 sub *Scolopax* sp., Aver'janov et al. 1990).

Remarks: Aver'janov et al. (1990) described this genus in the family Graculavidae, created by Fürbringer (1888) for the genus *Graculavus* Marsh, 1872 from the late Cretaceous or early Paleocene of New Jersey (see Olson & Parris 1987, Olson 1994). *Kievornis rogovitshi* Aver'janov, Potapova & Nesov, 1990 is type by original designation of the genus *Kievornis* Aver'janov, Potapova & Nesov, 1990: 5.

Laputa robusta Dyke

Laputa robusta Dyke, 2001b.

Laputavis robusta (Dyke): Dyke 2001c: 214 [New combination.]

Distribution: Early Eocene of "London Clay", England (Dyke 2001b,c, Mayr 2001d).

Remarks: Not seen. Described in the Apodiformes. *Laputa* Dyke, 2001b is type by original designation of the genus *Laputa* Dyke, 2001b (preoccupied). *Laputavis* Dyke, 2001c: 214 is new name for *Laputa* Dyke, 2001b.

Larus toliapicus König

Larus toliapicus König, 1825: pl. 16 [Holotype from Sheppey: imperfect cranium; BMNH A-130. Figured by König 1825, pl. 16, fig. 193, Owen 1846, fig. 234a-b, 235, Harrison & Walker 1972, text-fig. 1-5, 6d, 7i, 9a, pl. 1a-c, 2a-c, 3e, Harrison & Walker 1977, pl. 11, fig. a-d.]

Halcyornis toliapicus (König): Owen 1846: 554 [New combination.]

Distribution: Early Eocene (MP 8) of Sheppey, England (König 1825, Owen 1846, Lydekker 1891a, 1896, Harrison & Walker 1972, 1977).

Remarks: This species was described as a gull (König 1825), and later included in the Laridae (Lydekker 1891a, 1896, Lambrecht 1933, Brodkorb 1967: 205), or considered to be allied with the Alcedinidae (Owen 1846, Harrison & Walker 1972, 1977). *Halcyornis toliapicus* Owen, 1846 is type by monotypy of the genus *Halcyornis* Owen, 1846: 554. The latter genus is type of the family Halcyornithidae Harrison & Walker, 1972: 168.

Litoripes medius Harrison & Walker

Litoripes medius Harrison & Walker, 1979a: 22 [Holotype from Yateley: right tarsometatarsus; BMNH A-5014. Figured by Harrison & Walker 1979, pl. 1, row 4 partim.]

Distribution: Middle Eocene (MP 11-13) of Yateley, England (Harrison & Walker 1979a).

Remarks: Described in the Phasianidae. Here transferred to the Aves incertae sedis. *Litoripes medius* Harrison & Walker, 1979a is type by original designation of the genus *Litoripes* Harrison & Walker, 1979a: 22.

Marinavis longirostris Harrison & Walker

Marinavis longirostris Harrison & Walker, 1977a: 6 [Holotype from Abbey Wood: fragmentary right dentary and associated posterior portion of left edge of rostrum; BMNH A-4267. Figured by Harrison & Walker 1977a, fig. 1a-b.]

Distribution: Early Eocene (MP 8-9) of Abbey Wood, England (Harrison & Walker 1977a).

Remarks: This species was based on such a bone splinter, that its taxonomic validity, as well as the taxonomic validity of the genus and the family, remain uncertain. *Marinavis longirostris* Harrison & Walker, 1977a is type by original designation of the genus *Marinavis* Harrison & Walker, 1977a: 6. *Marinavis* Harrison & Walker, 1977a is type of the family Marinavidae Harrison & Walker, 1977a: 6.

Mergus ronzoni Gervais

Mergus Ronzoni Gervais, 1849: 220 [Nomen nudum; no description or indication.]

Mergus Ronzoni Gervais, 1848-1852: 232 [Holotype from Ronzon: imperfect pelvis in slab; MNHN 1909-40. Figured by Milne-Edwards, 1867-1868, pl. 44, fig. 9.]

Sula ronzoni (Gervais): Milne-Edwards 1867: 271 [New combination.]

Prophalacrocorax ronzoni (Gervais): Harrison 1975a: 52 [New combination.]

Distribution: Early Oligocene (MP 21) of Ronzon, France (Gervais 1844a,b sub "Harle", Gervais 1849, 1848-1852, Milne-Edwards 1867-1868, Harrison 1975a).

Remarks: Brodkorb (1963c: 257) and Harrison (1975a: 52) attributed the species name to Milne-Edwards (1867), overlooking that Gervais (1848-1852: 232-233) provided a very brief, but valid description for this species. Harrison (1975a) transferred this species to the Phalacrocoracidae, but Olson (1985a) returned it to the Sulidae until its type is restudied. I briefly studied the holotype in MNHN, concluding that it is indeterminate at the genus, and perhaps even at the family level. *Mergus ronzoni* Gervais, 1848-1852 is type by original designation of the genus *Prophalacrocorax* Harrison, 1975a: 52.

Messelornis russelli Mourer-Chauviré

Messelornis russelli Mourer-Chauviré, 1995a: 96 [Holotype from Cernay-les-Reims: distal end of left humerus; MNHN BR-14033. Figured by Mourer-Chauviré 1995a, text-fig. 1 (left), pl. 1, fig. 2-3.]

Distribution: Late Paleocene (MP 6) of Cernay-les-Reims, France (Mourer-Chauviré 1995a).

Remarks: The holotypical humerus of this species is very different from the same element of the Messelornithidae. Until restudied, I relegate here *Messelornis russelli* Mourer-Chauviré to the category of Aves incertae sedis.

Microena goodwini Harrison & Walker

Microena goodwini Harrison & Walker 1977a: 40 [Holotype from Bognor Regis: left tarsometatarsus; BMNH A-3685. Figured by Harrison & Walker 1977a, pl. 9, fig. n-r.]

Distribution: Early Eocene (MP 8-9) of Bognor Regis, England (Harrison & Walker 1977a).

Remarks: Described in the Columbidae (Harrison & Walker 1977a). Here relegated to the Aves incertae sedis. *Microena goodwini* Harrison & Walker, 1979a is type by original designation of the genus *Microena* Harrison & Walker, 1977a: 39.

Milvoides kempi Harrison & Walker

Milvoides kempi Harrison & Walker, 1979a: 20 [Holotype from Lee-on-Solent: distal end of right tarsometatarsus lacking trochlea for digit II; BMNH A-5005. Figured by Harrison & Walker 1979a, pl. 1, row 1.]

Distribution: Middle Eocene (MP 11-13) of Lee-on-Solent, England (Harrison & Walker 1979a).

Remarks: The holotype of this species is too fragmentary for a certain identification of an Eocene bird. *Milvoides kempi* Harrison & Walker, 1979a is type by original designation of the genus *Milvoides* Harrison & Walker, 1979a: 20.

Oligocathartes olsoni Harrison & Walker

Oligocathartes olsoni Harrison & Walker, 1979b: 36 [Holotype from Yarmouth: incomplete distal end of left tarsometatarsus; BMNH A-4985. Figured by Harrison & Walker 1979b, pl. 2, row A: 6-8, row B: 1-2.]

Distribution: Early/late Oligocene (MP 21-23) of Yarmouth, Isle of Wight, England (Harrison

& Walker 1979b).

Remarks: Described in the Cathartidae, but the holotypical tarsometatarsus seems to be too fragmentary for proper identification (Mlíkovský, orig.). *Oligocathartes olsoni* Harrison & Walker, 1979b is type by original designation of the genus *Oligocathartes* Harrison & Walker, 1979b: 36.

Ornitholithes bosniaskii Portis

Ornitholithes Bosniaskii Portis, 1887: 189 [Syntypes from Ancona: two feather imprints; present location unknown (Delle Cave 1996: 670). Figured by Portis 1887, fig. 9-10.]

Distribution: Late Miocene (MN 11-13) of Ancona, Italy (Portis 1887).

Ornitholithes faujasi Omboni

Ornitholithes Faujasi Omboni, 1885: 772 [Syntypes from Vestena Nova: three feather imprints; MPUP. Figured by Omboni 1885, fig. 1-3.]

Distribution: Late Eocene (MP 17-20) of Vestena Nova, Italy (Omboni 1885).

Ornitholithes gabbrensis Portis

Ornitholithes gabbrensis Portis, 1887: 192 [Syntypes from Gabbro: five feather imprints; MSNUP. Figured by Portis 1887, fig. 13-17.]

Distribution: Late Miocene (MN 13) of Gabbro, Italy (Portis 1887).

Ornitholithes procaccinii Portis

Ornitholithes Procaccinii Portis, 1887: 188 [Syntypes from Senigallia: four feather imprints; MCI. Figured by Portis 1887, fig. 5-8.]

Distribution: Late Miocene (MN 13) of Senigallia, Italy (Procaccini Ricci 1840, Portis 1887).

Ornitholithes tenuipennis Omboni

Ornitholithes tenuipennis Omboni, 1885: 772 [Syntypes from Vestena Nova: three feather imprints; MPUP. Figured by Omboni 1885, fig. 5-7.]

Distribution: Late Eocene (MP 17-20) of Vestena Nova, Italy (Omboni 1885).

Ornitholithus arcuatus Dughi & Sirugue

Ornitholithus arcuatus Dughi & Sirugue, 1962: 75 [Syntypes from Basse Provence: eggshell fragments; MHNA, uncatalogued. Figured by Dughi & Sirugue 1962, pl. 3, fig. 6.]

Ornitholithus mammosus Dughi & Sirugue, 1962: 75 [Syntypes Basse Provence: eggshell fragments from; MHNA, uncatalogued. Figured by Dughi & Sirugue 1962, pl. 3, fig. 3-4.]

Ornitholithus mammillatus Dughi & Sirugue, 1962: 75 [Syntypes from Basse Provence: eggshell fragments; MHNA, uncatalogued. Figured by Dughi & Sirugue 1962, pl. 3, fig. 5.]

Ornitholithus mammeatus Dughi & Sirugue, 1962: 75 [Syntypes from Basse Provence: eggshell fragments; MHNA, uncatalogued. Figured by Dughi & Sirugue 1962, pl. 3, fig. 7.]

Distribution: Early Eocene (MP 7) of Basse Provence, France (Dughi & Sirugue 1959, 1962, 1968, Fabre-Taxy & Touraine 1960, Touraine 1960, 1961, 1969, Rey 1969, Cailleux 1969, Kerourio & Aujard 1987, Dauphin 1991, 1992, 1994); and early/middle Eocene (MP 7-10) of Aude, France (Plaziat 1964, Villatte 1966, Cailleux 1969, Dughi et al. 1969, Kerourio & Aujard 1987).

Remarks: Dughi & Sirugue (1962) understood *arcuatus, mammosus, mammillatus* and *mammeatus* as a group of species, and they used *arcuatus* in the broader sense elsewhere (Dughi & Sirugue 1968, Dughi et al. 1969, see also Villatte 1966). Accordingly, I list here *mammosus, mammillatus* and *mammeatus* in the synonymy of *Ornitholithus arcuatus* Dughi &

Sirugue.

Ornitholithus biroi Dughi & Sirugue

Ornitholithus biroi Dughi & Sirugue, 1962: 74 [Syntypes from Basse Provence: eggshell fragments; MHNA, uncatalogued. Figured by Dughi & Sirugue 1962, pl. 3, fig. 2.]

Distribution: Early Eocene (MN 7) of Basse Provence, France (Dughi & Sirugue 1959, 1962, 1968, Kerourio & Aujard 1987).

Remarks: *Ornitholithus biroi* Dughi & Sirugue, 1962 is type by subsequent designation (Vjalov 1971: 50) of the genus *Ornitholithus* Dughi & Sirugue, 1962: 74.

Palaeoaramides minutus Cracraft

Palaeoaramides minutus Cracraft, 1973: 30 [Holotype from Grive-Saint-Alban: right tarsometatarsus; BMNH A-332. Figured by Cracraft 1973, fig. 14a-b.]

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Cracraft 1973).

Remarks: The holotypical tarsometatarsus of this species differs in the position and shape of trochlea digiti II (as seen in distal view) from the same element of the Rallidae (Mlíkovský, orig.). Accordingly, I relegate here *Palaeoaramides minutus* Cracraft to the Aves incertae sedis until its holotype is restudied.

Palaeopsittacus georgei Harrison

Palaeopsittacus georgei Harrison, 1982c: 205 [Holotype from Walton-on-the-Naze: 11 associated bones, incl. left scapula lacking the tip, right coracoid, thoracic vertebra, proximal end of right ulna, distal end of right ulna, proximal end of left radius, right cuneiforme, distal end of left carpometacarpus, distal end of left femur, distal end of right tibiotarsus, and proximal end of right tarsometatarsus; BMNH A-5163. Figured by Harrison 1982c, text-fig. 2a (ulna), 3a (scapula), 4c,f (coracoid), 5b (tibiotarsus), and 6a (tarsometatarsus), and pl. 10, fig. a-c (tibiotarsus), h-j (femur), l-m (tarsometatarsus), n-p (proximal end of ulna), q-s (coracoid), t-u (distal end of ulna), v-x (carpometacarpus), y (radius), z (scapula), aa-bb (vertebra).]

Distribution: Early Eocene (MP 8) of Walton-on-the-Naze, England (Harrison 1982c, Mayr & Daniels 1998); and middle Eocene (MP 11-13) of Lee-on-Solent, England (Harrison 1982c; specimen tentatively referred).

Remarks: This species was described in the Psittacidae (Harrison 1982c), and later transferred in the Quercypsittidae (Mourer-Chauviré 1992c). Mayr & Daniels (1998) observed that the bird has an anisodactyl foot and relegated it to the category of Aves incertae sedis. The species was called *Poicephalus georgei* in the caption to Fig. 6a by Harrison (1982c: 205). This is certainly a misprint, not a new combination. *Palaeopsittacus georgei* Harrison, 1982a is type by original designation of the genus *Palaeopsittacus* Harrison, 1982a: 204.

Pararallus hassenkampi Martini

Pararallus hassenkampi Martini, 1967a: 8 [Nomen nudum; no description or indication – Mlíkovský 1992b: 441.]

Pararallus hassenkampi Martini, 1967b: 289 [Holotype from Sieblos: associated pedal phalanges with crushed distal fragment of left tarsometatarsus in a slab and a counter-slab; GPIW F-1237 (slab) and F-1238 (counter-slab). Figured by Martini 1967b, text-fig. 1 (reconstruction), pl. 29, fig. 1 (slab), and 2 (counter-slab), and Martini 1988, fig. 1 (counter-slab).]

Distribution: Early/middle Oligocene (MP 21-24) of Sieblos, Germany (Martini 1967a,b, 1988, see also Hassenkamp 1858: 207, Meyer 1858: 111).

Remarks: Probably indeterminate (see also Cracraft 1973: 38).

Parvicuculus minor Harrison & Walker

Parvicuculus minor Harrison & Walker, 1977a: 44 [Holotype from Burnham-on-Crouch: left tarsometatarsus; BMNH A-4919. Figured by Harrison & Walker 1977, pl. 10, fig. a-f, Harrison 1982a, fig. 1a, 2a-e.]

Distribution: Early Eocene (MP 8-9) of Burnham-on-Crouch, England (Harrison & Walker 1977a, Olson & Feduccia 1979, Harrison 1982a).

Remarks: Described in the family Cuculidae. Olson & Feduccia (1979) removed the species to the Primobucconidae, conjecturing that *Parvicuculus* Harrison & Walker "may prove to be a synonym of *Neanis* Brodkorb", but Harrison (1982a: 73) returned it back to cuckoos, placing it together with *Procuculus* Harrison & Walker in his new family Parvicuculidae. Martin (in Martin & Mengel 1984) restudied the holotype of *Parvicuculus minor* Harrison & Walker, concluding that the bird was neither a cuckoo, nor a primobucconid, but that its “assignment to the Coraciiformes would not be unlikely.” Baird & Vickers-Rich (1997) restudied a cast of the holotype, and excluded the fossil from both the Cuculidae and Primobucconidae, leaving it in the Aves incertae sedis. *Parvicuculus minor* Harrison & Walker, 1977a is type by original designation of the genus *Parvicuculus* Harrison & Walker, 1977a: 43. *Parvicuculus* Harrison & Walker, 1982a is type of the family Parvicuculidae Harrison , 1982a: 75.

Parvigyps praecox Harrison & Walker

Parvigyps praecox Harrison & Walker, 1977a: 31 [Holotype from Sheppey: distal end of right humerus; BMNH A-71. Figured by Harrison & Walker 1977a, pl. 7, fig. d-h.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1977a).

Remarks: Described in the Accipitridae. Here relegated to the category of Aves incertae sedis. *Parvigyps praecox* Harrison & Walker, 1977a is type by original designation of the genus *Parvigyps* Harrison & Walker, 1977a: 31.

Parvulivenator watteli Harrison

Parvulivenator watteli Harrison, 1982b: 79 [Holotype from Walton-on-the-Naze: distal end of right tarsometatarsus with associated os metatarsale I, and four pedal phalanges; BMNH A-5172. Figured by Harrison 1982b, fig. 1a-j, 2a-l.]

Distribution: Early Eocene (MP 8) of Walton-on-the-Naze, England (Harrison 1982b).

Remarks: Described in the Falconidae. Here transferred to the Aves incertae sedis. *Parvulivenator watteli* Harrison, 1982b is type by original designation of the genus *Parvulivenator* Harrison, 1982b: 79.

Pelargosteon tothi Kretzoi

Pelargosteon tóthi Kretzoi, 1962: 169 [Holotype from Betfia 5: incomplete crushed sternum; RMO 1899/1. Figured by Jurcsák & Kessler 1973, fig. 24.]

Pelargosteon tothi Kretzoi: Brodkorb 1963c: 290 [Spelling emended.]

Distribution: Early Pleistocene (MQ 1a) of Kőröshegy, Hungary (Kretzoi & Krolopp 1977), and Betfia 2, Romania (Jánossy 1980a); early Pleistocene (MQ 1b) of Voigtstedt, Germany (Jánossy 1965 sub "Ciconiidae indet.", reidentified by Jánossy 1980a: 20), and Betfia 5, Romania (Kretzoi 1962, Jurcsák & Kessler 1973); and middle Pleistocene (MQ 2A) of Várhegy – Fortuna Street 25, Hungary (Jánossy 1980a, Jánossy 1986: 87 sub cf. *Pelargosteon tothi*).

Remarks: Described in the Ciconiidae. The figure of the holotype is too indistinct to allow for a taxonomic assessment of the species. *Pelargosteon tothi* Kretzoi, 1962 is type by monotypy of the genus *Pelargosteon* Kretzoi, 1962: 169.

Petropluvialis simplex Harrison & Walker

Petropluvialis simplex Harrison & Walker, 1976a: 348 [Holotype from Hordle: cranial end of right coracoid; BMNH 30327. Figured by Harrison & Walker 1976a, pl. 7, fig. f-i.]

Distribution: Late Eocene (MP 17) of Hordle, England (Harrison & Walker 1976a).

Remarks: Described in the Burhinidae. Here relegated to the category of Aves incertae sedis. *Petropluvialis simplex* Harrison & Walker, 1976a is type by original designation of the genus *Petropluvialis* Harrison & Walker, 1976a: 348.

Picus gaudryi Depéret

Picus gaudryi Depéret, 1887: 282 [Holotype from Grive-Saint-Alban: right femur; ML LGr-56. Figured by Depéret 1887, pl. 13, fig. 53, 53a.]

Zygodactylus gaudryi (Depéret): Brodkorb 1971: 258 [New combination.]

Distribution: Middle Miocene (MN 7-8) of Grive-Saint-Alban, France (Depéret 1887).

Remarks: The taxonomic identity of this species is unclear (cf. Brodkorb 1971a,b).

Piscator tenuirostris Harrison & Walker

Piscator tenuirostris Harrison & Walker, 1976a: 328 [Holotype from Hordle: anterior end of premaxilla; BMNH A-146. Figured by Harrison & Walker 1976a, pl. 2, fig. a-d.]

Distribution: Late Eocene (MP 17) of Hordle, England (Harrison & Walker 1976a).

Remarks: Described in the Phalacrocoracidae. Here relegated to the category of Aves incertae sedis. *Piscator tenuirostris* Harrison & Walker, 1976a is type by original designation of the genus *Piscator* Harrison & Walker, 1976a: 328.

Plesiocathartes europaeus Gaillard

Plesiocathartes europaeus Gaillard, 1908: 41 [Holotype from Quercy: distal end of left tarsometatarsus; MNHN QU-1058. Figured by Gaillard 1908, text-fig. 6, pl. 2, fig. 13-16, Cracraft & Rich 1972, fig. 4a-b.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1908, Cracraft & Rich 1972).

Remarks: Jollie (1977c: 112) observed, that "this fossil ... in details shows nothing to link it conclusively with [the Cathartidae]." *Plesiocathartes europaeus* Gaillard, 1908 is type by monotypy of the genus *Plesiocathartes* Gaillard, 1908: 41.

Plesiocathartes gaillardi Crusafont & Villalta

Plesiocathartes (?) *gaillardi* Crusafont Pairó & Villalta, 1955: 236 [Holotype from Fallol: distal end of left tarsometatarsus; formerly in IPS (Crusafont & Villalta 1955: 237), present location unknown (Sánchez Marco 1996: 722). Figured by Crusafont Pairó & Villalta 1955, fig. 55.]

Distribution: Early Miocene (MN 3) of Fallol, Spain (Crusafont Pairó & Villalta 1955, Villalta 1963).

Remarks: Described in the Cathartidae, but important differences from vulturids are mentioned in the description, and the drawing of the holotype is very generalized (Mlíkovský, orig.). Accordingly, I relegate here *Plesiocathartes gaillardi* Crusafont Pairó & Villalta to the Aves incertae sedis until its holotype is located and restudied.

Pliogrus germanicus Lambrecht

Pliogrus germanicus Lambrecht, 1933: 522 [Holotype from Eppelsheim: distal end of left tibiotarsus; ZGIB. Figured by Lambrecht 1933, fig. 156a-b.]

Distribution: Late Miocene (MN 9) of Eppelsheim, Germany (Lambrecht 1933).

Remarks: Described in the Gruidae. Fischer & Stephan (1971) and Mourer-Chauviré et al. (1985) independently excluded this species from the Gruidae, and Fischer & Stephan (1971) transferred it to the Phoenicopteridae. Figures of the holotype of this species are rather indistinct, but the specimen appears to be neither flamingo-like, nor crane-like in its general shape (Mlíkovský, orig.). *Pliogrus germanicus* Lambrecht thus should be relegated to the category of Aves incertae sedis until its holotype is restudied. *Pliogrus germanicus* Lambrecht, 1933 is type by monotypy of the genus *Pliogrus* Lambrecht, 1933: 522.

Precursor litorum Harrison & Walker

Precursor litorum Harrison & Walker, 1977a: 26 [Holotype from Sheppey: distal end of right humerus; BMNH A-3135. Figured by Harrison & Walker 1977a, pl. 6, fig. k-o.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1977a).

Remarks: Described in the Glareolidae (tentatively), to which the species bears little resemblance (Mlíkovský orig.).

Precursor magnus Harrison & Walker

Precursor magnus Harrison & Walker, 1977a: 26 [Holotype from Sheppey: distal end of right tarsometatarsus; BMNH A-3683. Figured by Harrison & Walker 1977a, pl. 6, fig. f-j.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1977a).

Remarks: Described in the Glareolidae (tentatively), to which it bears little resemblance (Mlíkovský, orig.).

Precursor parvus Harrison & Walker

Precursor parvus Harrison & Walker, 1977a: 25 [Holotype from Bognor Regis: distal end of left humerus; BMNH A-3684. Figured by Harrison & Walker 1977a, pl. 6, fig. a-e.]

Distribution: Early Eocene (8-9) of Bognor Regis, England (Harrison & Walker 1977a), and Warden Point, Sheppey, England (Harrison & Walker 1977).

Remarks: Described in the Glareolidae (tentatively), to which it bears little resemblance (Mlíkovský, orig.). *Precursor parvus* Harrison & Walker, 1977a is by original designation type of genus *Precursor* Harrison & Walker, 1977: 24.

Proceriavis martini Harrison & Walker

Proceriavis martini Harrison & Walker, 1979b: 30 [Holotype from Yarmouth: imperfect cervical vertebra; BMNH A-4413. Figured by Harrison & Walker 1979b, pl. 1, row A.]

Distribution: Early/middle Oligocene (MP 21-23) of Yarmouth, England (Harrison & Walker 1979b).

Remarks: This species was based on a fragmentary cervical vertebra, unsuitable for exact identification. Harrison & Walker (1979b) tentatively included the species in the Eleutherornithidae. *Proceriavis martini* Harrison & Walker, 1979b is type by original designation of the genus *Proceriavis* Harrison & Walker, 1979b: 30.

Procuculus minutus Harrison & Walker

Procuculus minutus Harrison & Walker, 1977a: 45 [Holotype from Bognor Regis: distal end of right (not left as stated by Harrison & Walker 1977a: 45 – corrected by Harrison 1982a: 73) tarsometatarsus; BMNH A-4680. Figured by Harrison & Walker 1977a, pl. 10, fig. g-k, Harrison 1982a, fig. 3a-e.]

Distribution: Early Eocene (MP 8-9) of Bognor Regis, England (Harrison & Walker 1977a, Olson & Feduccia 1979, Harrison 1982a).

Remarks: Described as a cuckoo, but subsequently removed from the Cuculidae by Olson & Feduccia (1979). Harrison (1982a: 73) returned the species to the cuckoos, placing it in the separate family Parvicuculidae. Olson (1985a: 135) indicated that *Procuculus minutus* Harrison & Walker may belong in *Primapus* Harrison & Walker from the family Apodidae. Baird & Vickers-Rich (1997: 123) restudied a cast of the holotype, concluding that the species belongs neither to the Cuculidae, nor to the Primobucconidae, and leaving it in the Aves incertae sedis. *Procuculus minutus* Harrison & Walker, 1977a is type by original designation of the genus *Procuculus* Harrison & Walker, 1977a: 44.

Proherodius oweni Lydekker

Proherodius oweni Lydekker, 1891a: 60 [Holotype from Primrose Hill: imperfect sternum; BMNH 43164. Figured by Owen 1846, fig. 236, Harrison & Walker 1977a, pl. 6, fig. p-q, Harrison & Walker 1978a, fig. 1b, 2b.]

Distribution: Early Eocene (MP 7-10) of Primrose Hill, England (Owen 1846: 556 sub "small wading bird", Lydekker 1891a, Harrison & Walker 1977a, 1978a, Harrison 1979a).

Remarks: Described as a heron (Lydekker 1891a). Harrison & Walker (1978a) and Harrison (1979a) transferred the species to the Presbyornithidae, but Olson (1985a: 166) disagreed. Hence, I relegate it to the Aves incertae sedis until its holotype is restudied. *Proherodius oweni* Lydekker, 1891a is type by original designation of the genus *Proherodius* Lydekker, 1891a: 60.

Proplegadis fisheri Harrison & Walker

Proplegadis fisheri Harrison & Walker, 1971: 368 [Holotype from Sheppey: distal end of left humerus; BMNH A-10. Figured by Harrison & Walker 1971, pl. 11, fig. a-e, and Harrison & Walker 1977, pl. 7, fig. a-c.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison & Walker 1971, 1977a).

Remarks: Described in the Threskiornithidae. Olson (1981a: 167) relegated the species to the category of Aves incertae sedis. *Proplegadis fisheri* Harrison & Walker, 1971 is type by original designation of the genus *Proplegadis* Harrison & Walker, 1971: 368.

Protopelicanus cuvieri Reichenbach

Protopelicanus cuvieri Reichenbach, 1852: vii [Holotype from Montmartre: right femur; MNHN 7978. Figured by Cuvier 1822, pl. 73, fig. 13, Cuvier 1835, pl. 139, fig. 13, and Brunet 1970, fig. 2a-d.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Cuvier 1822, 1835, Reichenbach 1852, Brunet 1970, Harrison 1979b, Olson 1985a, Mlíkovský 1995a).

Remarks: This species was originally treated as a pelican (Reichenbach 1852, Brunet 1970). Harrison (1979b) transferred it to the Sulidae, and Olson (1985a: 202) found some similarities to the Pelagornithidae. The taxonomic position and validity of this species is uncertain until its holotype is restudied (see also Mlíkovský 1995a). *Protopelicanus cuvieri* Reichenbach, 1852 is type by monotypy of the genus *Protopelicanus* Rechenbach, 1852: vii.

Protornis blumeri Heer

Protornis blumeri Heer, 1865: 236 [Holotype from Matt: partial skeleton impression in a slab; lost - Peyer 1957. Figured by Heer 1865, fig. 143, Heer 1879, fig. 178, and Peyer 1957, fig. 25.]

Distribution: Early Oligocene (MP 21-24) of Matt, Switzerland (Heer 1865, 1879, Peyer 1957, Olson 1976a).

Remarks: The identity of this species is indeterminate on the basis of the poorly illustrated hootype. If the specimen belongs to a bird, which is not certain, then *Protornis blumeri* is a meaningless name until its holotype is located and restudied (see also Peyer 1957, Olson 1976a, Mlíkovský 1992b).

Pumiliornis tessellatus Mayr

Pumiliornis tessellatus Mayr, 1999b: 76 [Holotype from Messel: almost complete skeleton in a slab; SMF ME-2092a,b. Figured by Mayr 1999b, fig. 1a,b.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1999b).

Remarks: Described in order and family incertae sedis. *Pumiliornis tessellatus* Mayr, 1999b is type by original designation of the genus *Pumiliornis* Mayr 1999b: 76.

Quasisyndactylus longibrachis Mayr

Quasisyndactylus longibrachis Mayr 1998c: 36 [Holotype from Messel: almost complete skeleton in a slab; SMF ME-1418a-b. Figured by Mayr 1998c, pl. 8-9.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 1998c).

Remarks: Described in the Alcediniformes incertae sedis. *Quasisyndactylus longibrachis* Mayr, 1998c is type by original designation of the genus *Quasisyndactylus* Mayr, 1998c: 30.

Quercypodargus olsoni Mourer-Chauviré

Quercypodargus olsoni Mourer-Chauviré, 1989a: 2051 [Holotype from Quercy: right tarso-metatarsus; MNHN QU-15876. Figured by Mourer-Chauviré 1989a, fig. 2/1-2.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Mourer-Chauviré 1989a); and late Eocene (MP 16) of Lavergne, France (Mourer-Chauviré 1989a).

Remarks: Described in the Podargidae (Mourer-Chauviré 1989a). Mayr (1999c: 524-525) indicated, that the species does not belong to this family. *Quercypodargus olsoni* Mourer-Chauviré, 1989a is type by original designation of the genus *Quercypodargus* Mourer-Chauviré, 1989a: 2048.

Rallus adelus Oberholser

Rallus intermedius Milne-Edwards, 1869: 144 [Holotype from Montmartre: associated skull, cervical vertebrae and crushed pectoral bones in slab; MNHN 7995. Figured by Milne-Edwards 1869-1871, pl. 103, fig. 17, Brunet 1970, pl. C above, Cracraft 1973, fig. 9. This is a junior primary homonym of *Rallus intermedius* Hermann, 1804.]

Rallus adelus Oberholser, 1917. [New name for *Rallus intermedius* Milne-Edwards, 1869; hence its junior objective synonym.]

Quercyrallus intermedius (Milne-Edwards): Lambrecht 1933: 461 [New combination; *Quercyrallus* was nomen nudum at this point.]

Quercyrallus ludianus Brodkorb, 1963a: 542 [New name for *Rallus intermedius* Milne-Edwards, 1869; hence its junior objective synonym.]

Ludiortyx adelus (Oberholser): Olson 1977: 344 [New combination.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Milne-Edwards 1869-1871, Lambrecht 1933, Brunet 1970, Cracraft 1973, Olson 1977).

Remarks: My brief reexamination of the holotype in MNHN showed that the holotypical skull of this species differs in general morphology (particularly in the position of the foramen magnum and in the insertion of the bill) from the Rallidae, and should be removed from the family (Mlíkovský, orig.). It is here relegated to Aves incertae sedis, pending further study.

Rallus richmondi Olson

Rallus dubius Portis, 1887: 183 [Holotype from Senigallia: sternum impression in slab; MCI. Figured by Portis 1887, pl. 1, fig. 2. This is a junior primary homonym of *Rallus dubius* Piller & Mitterpacher, 1783.]

Rallus richmondi Olson, 1977: 349 [New name for *Rallus dubius* Portis, 1887; hence its junior objective synonym.]

Distribution: Late Miocene (MN 13) of Senigallia, Italy (Portis 1887).

Remarks: Described as a rail (family Rallidae). The species is best relegated to Aves incertae sedis until its holotype is located and restudied (see also Olson 1977: 349).

Remiornis heberti Lemoine

Remiornis heberti Lemoine, 1881a: 158 [Lectotype from Cernay-les-Reims (selected by Martin 1992: 102): partial crushed left tarsometatarsus composed from at least 15 fragments (Mlíkovský, orig.); MNHN CRL-2481. Figured by Lemoine 1881a, pl. 9, fig. 13a, and Martin 1992, fig. 7b, 8a-c. Paralectotypes from Cernay-les-Reims: mandibular symphysis (lost?), "left coracoid" = indeterminate scrap of bone (MNHN CRL-2476), thoracic vertebra (MNHN CRL-2482), another thoracic vertebra (lost?), "proximal end of a humerus" = indeterminate scrap of bone (MNHN CRL-2473), distal end of a humerus (lost?), and "proximal end of an ulna" (MNHN CRL-2474). Figured by Lemoine 1881a, pl. 8, fig. 21-22 ("proximal end of humerus"), 23 ("distal end of humerus"), and 24-25 ("ulna"), and pl. 9, fig. 7-8 (mandibular symphysis), 9 (lost vertebra), 10-12 (preserved vertebra), 13 ("coracoid"), and 13a (tarsometatarsus). The mandibular symphysis belongs to a tryonychid turtle, the distal end of the humerus probably also belongs to a turtle, the "coracoid" is probably referable to *Gastornis*, and the preserved vertebra is indeterminate within the Aves according to Martin (1992: 102-103).

Distribution: Late Paleocene (MP 6) of Cernay-les-Reims, France (Lemoine 1881a,b, Martin 1992).

Remarks: *Remiornis heberti* Lemoine was included in the synonymy of *Gastornis minor* Lemoine by Paris (1912: 290) and Lambrecht (1921: 9, 1933: 578). Brodkorb (1967: 141) erroneously believed, that *Remiornis heberti* Lemoine is a new name for *Gastornis minor* Lemoine. Accordingly, all these authors believed that *Remiornis heberti* is a gastornithid. Martin (1992) showed that *Remiornis heberti* Lemoine was based on different type materials than *Gastornis minor* Lemoine, and separated the species at the family and order levels. *Remiornis heberti* Lemoine, 1881a is type by monotypy of the genus *Remiornis* Lemoine, 1881a: 158. *Remiornis* Lemoine, 1881a is type of the family Remiornithidae Martin, 1992: 102, and order Remiornithiformes Martin, 1992: 102.

Rupelornis definitus Beneden

Rupelornis definitus Beneden, 1871: 260 [Holotype from Rupelmonde: distal end of a tibiotarsus; IRScNB or ULg. Figured by Beneden 1871, unnumbered pl., fig. 7.]

Distribution: Middle Oligocene (MP 23-24) of Rupelmonde, Belgium (Beneden 1871), and Espenhain, Germany (Fischer 1983a sub ?*Rupelornis*).

Remarks: Described as a shorebird, but also compared to owls in the original description (Beneden 1871). Lambrecht (1933: 548) and Brodkorb (1967: 205) included the bird in the family Laridae. I relegate here *Rupelornis definitus* Beneden, 1871 to the category of Aves incertae sedis until its holotype is located and restudied. *Rupelornis definitus* Beneden, 1871 is type by monotypy of the genus *Rupelornis* Beneden, 1871: 260.

Salmila robusta Mayr

Salmila robusta Mayr, 2000b: 188 [Holotype from Messel: almost complete skeleton in slab; SMF ME-3014. Figured by Mayr 2000b, fig. 1, 3, 5 and 6.]

Distribution: Middle Eocene (MP 11) of Messel, Germany (Mayr 2000b).

Remarks: Tentatively included in suborder Cariamae by Mayr (2000b). *Salmila robusta* Mayr is type by original designation of the genus *Salmila* Mayr, 2000b: 188.

Scaniornis lundgreni Dames

Scaniornis Lundgreni Dames, 1890: 4 [Holotype from Limnhamn: associated right coracoid, right scapula and right humerus; NRM. Figured by Dames 1890, pl. 1, and Lierl 1993, fig. 4.]

Distribution: Early Paleocene (MP 1-5) of Limnhamn, Sweden (Dames 1890, Lambrecht 1933, Olson & Feduccia 1980a: 44, Tyrberg & Erickson 1996), and Selk, Germany (Lierl 1993 sub *Scaniornis*?).

Remarks: The fossil was originally thought to be related to the Phoenicopteridae. It does not show any characters linking it to flamingos, however, but its taxonomic position within the neornithine birds is not clarified yet (Tyrberg & Erickson 1996). *Scaniornis lundgreni* Dames is type by monotypy of the genus *Scaniornis* Dames, 1890: 4. *Scaniornis* Dames, 1890 is type of the family Scaniornithidae Lambrecht, 1933: 334.

Sitta cuvieri Gervais

Sitta? *Cuvieri* Gervais, 1848-1852: 228 [Holotype from Montmartre: partial skeleton imprint in slab and conter-slab; MNHN 7975 and 7976. Figured by Gervais, 1848-1852, pl. 50, fig. 2a-b, Milne-Edwards 1869-1871, pl. 161, fig. 2-3, Brunet 1970, pl. A, fig. f-g, and Mayr 1998c, pl. 16 fig. upper right.]

Palaegithalus Cuvieri (Gervais): Milne-Edwards, 1871: 378 [New combination.]

Distribution: Late Eocene (MP 19) of Montmartre, France (Gervais 1848-1852, Milne-Edwards 1869-1871, Brunet 1970, Harrison 1979b, Mayr 1998c).

Remarks: Described as a nuthatch. Lambrecht (1933: 640) transferred the species to the Paridae, while Brunet (1970: 48) to the Motacillidae. Mayr (1998c: 52) observed, that the species is similar to the *Sylviornis* Mourer-Chauviré, and hypothesized that *Sylviornis* Mourer-Chauviré could be synonymous with *Palaegithalus* Milne-Edwards. This is obviously an Avis incertae sedis until its holotype is restudied (see also Brodkorb 1978: 217). *Sitta cuvierii* Milne-Edwards, 1871 is type by monotypy of the genus *Palaegithalus* Milne-Edwards, 1871: 378. *Palaegithalus* Milne-Edwards, 1871 is type of the family Palaegithalidae Harrison, 1979: 108.

Stintonornis mitchelli Harrison

Stintonornis mitchelli Harrison, 1984a: 182 [Holotype from Sheppey: distal end of right tarsometatarsus, England; BMNH A-5284. Figured by Harrison 1984a, fig. 1b-c, 2a-f.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (Harrison 1984a).

Remarks: Described in the Falconidae. Here relegated to the category of Aves incertae sedis. *Stintonornis mitchelli* Harrison, 1984a is type by original designation of the genus *Stintonornis* Harrison, 1984a: 182.

Strigogyps dubius Gaillard

Strigogyps dubius Gaillard, 1908: 39 [Holotype from Quercy: distal end of left tibiotarsus; BSP 2, apparently destroyed during the World War II – Mlíkovský, orig. Cast in ML PQ-1073. Figured by Gaillard 1908, text-fig. 5, pl. 2, fig. 1-4.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Gaillard 1908, Mourer-Chauviré 1987).

Remarks: Described as an owl. Transferred to Aves incertae sedis by Mourer-Chauviré (1987: 119-123). *Strigogyps dubius* Gaillard is type by monotypy of the genus *Strigogyps* Gaillard, 1908: 39.

Sylphornis bretouensis Mourer-Chauviré

Sylphornis bretouensis Mourer-Chauviré, 1988a: 41 [Holotype from Bretou: distal end of right tarsometatarsus; USTL BRT-1025. Figured by Mourer-Chauviré 1988a, pl. 3, fig. 3-4, and text-fig. 3.]

Distribution: Late Eocene (MP 16) of Bretou, France (Mourer-Chauviré 1988a). The alleged record of the family Sylphornithidae from the middle Eocene (MP 11) of Messel, Germany (Peters 1991) was reidentified as belonging to *Messelirrisor parvus* Mayr by Mayr (1998c: 25).

Remarks: Described in the Coraciiformes. The holotypical tarsometatarsus of this species markedly differs from the same element of both the Eocene (see Mayr & Mourer-Chauviré 2000 for figures) and modern coraciiforms (Mlíkovský orig.) in the configuration of trochleae. I relegate thus *Sylphornis bretouensis* Mourer-Chauviré to the category of Aves incertae sedis until the holotype is restudied. *Sylphornis bretouensis* Mourer-Chauviré, 1988a is type by original designation of the genus *Sylphornis* Mourer-Chauviré, 1988a: 41. *Sylphornis* Mourer-Chauviré, 1988a os type of the family Sylphornithidae Mourer-Chauviré, 1988a: 41.

Mourer-Chauviré (1999b: 88) indicated that *Eutreptodactylus itaboraiensis* Baird & Vickers-Rich, 1997 from the Paleocene of Itaboraí, Brazil, belongs to the Sylphornithidae (but see Mayr 2001c).

Tapinopus ellioti Milne-Edwards

Tapinopus Ellioti Milne-Edwards, 1892: 79 [Holotype from Quercy: right tarsometatarsus; MNHN QU-3040. Figured by Gaillard 1908, pl. 2, fig. 9-12, Cracraft & Rich 1972, fig. 2a-d.]

Diatropornis ellioti (Milne-Edwards): Oberholser 1899: 203 [New combination.]

Distribution: Eocene or Oligocene (MP 16-28) of Quercy, France (Milne-Edwards 1892, Gaillard 1908, Cracraft & Rich 1972); and late Eocene (MP 16) of Bretou, France (Mourer-Chauviré 1988).

Remarks: As judged from figures, the holotypical tarsometatarsus of *Tapinopus ellioti* Milne-Edwards differs from the same element of the Cathartidae in being slender, somewhat curved antero-posteriorly, and in having much less protruding intercotylar prominence. Hence, I relegate here *Tapinopus* (= *Diatropornis*) *ellioti* Milne-Edwards to the category of Aves incertae sedis. *Diatropornis ellioti* Milne-Edwards, 1892 is type by monotypy of the genus *Tapinopus* Milne-Edwards, 1892: 79, which is a junior homonym of *Tapinopus* Saussure (see Oberholser 1899). *Diatropornis* Oberholser, 1899: 203 is a new name for *Tapinopus* Milne-Edwards, 1892.

Teracus littoralis Milne-Edwards

Ieracus littoralis Aymard, 1856: 233 [Nomen nudum; no description or indication.]

Teracus littoralis Aymard: Milne-Edwards, 1863: 154 [Generic name misspelled, but it continued to be nomen nudum, lacking description or indication.]

Teracus littoralis Milne-Edwards, 1871: 453 [Holotype from Ronzon: femur in a slab; formerly in coll. Aymard, present location unknown. Figured by Milne-Edwards 1869-1871, pl. 185 (not pl. 135 as stated by Milne-Edwards 1871: 453), fig. 20-22. Lydekker (1891a: 28) correctly recognized that this specimen is the holotype of the species, while Lambrecht (1933: 405), Brodkorb (1964: 252), Cracraft & Rich (1972: 281) and Olson (1978: 448) included in the alleged syntypical series also a coracoid in another slab, figured by Milne-Edwards (1869-1871) on pl. 185, fig. 23. However, the caption to the latter figure reads "Coracoid ... que M. Aymard consideré comme appartenant au *Teracus littoralis*", i.e. "coracoid, believed by Mr. Aymard to belong to *Teracus littoralis*" (my translation), which clearly disqualifies the specimen as a possible syntype.]

Distribution: Early Oligocene (MP 21) of Ronzon, France (Aymard 1856, Milne-Edwards 1869-1871, Olson 1978).

Remarks: Aymard (1856), Paris (1912), Milne-Edwards (1969-1871) and Lambrecht (1933:

405) considered this species a raptor of some sort. Brodkorb (1964: 252) listed it in the Vulturidae without explanation. Cracraft & Rich (1972: 281) and Olson (1978: 447) excluded *Teracus littoralis* Milne-Edwards from both the Vulturidae (= Cathartidae) and the Falconiformes. The species is best included in the category of the Aves incertae sedis until its holotype is located and restudied. *Teracus littoralis* Milne-Edwards, 1871 is type by monotypy of the genus *Teracus* Milne-Edwards, 1871: 453. *Ieracus* Aymard, 1856: 233 is nomen nudum (no definition).

Totanus praecursor Laube

Totanus praecursor Laube, 1901: 66 [Holotype from Břešťany: pelvic impression in slab and counter-slab; present location unknown – see Mlíkovský 1992b: 442. Figured by Laube 1901, fig. 14.]

Distribution: Early Miocene (MN 3) of Břešťany, Czechia (Laube 1901, Mlíkovský 1992b, 1999c).

Remarks: Described in the Scolopacidae. The figure of the holotype indeed shows a pelvis generally similar to that of the Scolopacidae, but the species was relegated to Aves incertae sedis until its holotype is found and restudied (Mlíkovský 1992b: 442, 1999c).

Tynskya eocaena Mayr

Tynskya eocaena Mayr, 2000d: 60 [Holotype from Tynsky quarry: almost complete skeleton in slab; BSP 1997-I-6. Figured by Mayr 2000d, fig. 1-5.]

Distribution: Early Eocene (MP 8) of Walton-on-the-Naze, England (Mayr 2000d, tentatively referred). Extralimital record is from the early Eocene (Green River Formation) of the Tynsky quarry, Wyoming (Mayr 2000d).

Remarks: Described in family and order incertae sedis, but daid to be raptor-like (Mayr 2000d). *Tynskya eocaena* Mayr, 2000d is type by original designation of the genus *Tynskya* Mayr, 2000d: 60.

Vanellus Selysii Beneden

Vanellus Selysii Beneden, 1871: 259 [Holotype from Rupelmonde: distal end of a humerus; IRScNB. Figured by Beneden 1871, pl. 1, fig. 2.]

Distribution: Middle Oligocene (MP 23-24) of Rupelmonde, Belgium (Beneden 1871, 1872: 287).

Remarks: Described as a lapwing. The name is meaningless until the holotype of the species is located and restudied (see also Olson 1985a: 175).

Villetus grandis Harrison & Walker

Villetus grandis Harrison & Walker, 1976a: 346 [Holotype from Highcliffe: distal end of right tibiotarsus; BMNH A-4354. Figured by Harrison & Walker 1976a, pl. 6, fig. l-p.]

Distribution: Late Eocene (MP 14-16) of Highcliffe, England (Harrison & Walker 1976a).

Remarks: Described in the Scolopacidae. Here transferred to the Aves incertae sedis. *Villetus grandis* Harrison & Walker, 1976a is type by original designation of the genus *Villetus* Harrison & Walker, 1976a: 346.

Villetus waltoni Harrison & Walker

Villetus waltoni Harrison & Walker, 1976a: 347 [Holotype from Barton: distal end of left tibiotarsus; IGS GSM-113108. Figured by Harrison & Walker 1976a, pl. 7, fig. a-e.]

Distribution: Late Eocene (MP 14-16) of Barton, England (Harrison & Walker 1976a).

Remarks: Described in the Scolopacidae. Here transferred to the Aves incertae sedis.

Vultur fossilis Keferstein

Vultur fossilis Keferstein, 1834: 243 [Holotype from Westeregeln: proximal end of a femur (see Germar 1826: 612); formerly in coll. Keferstein, present location unknown. Not figured.]

Vultur fossilis Giebel, 1847: 9 [Same holotype as for *Vultur fossilis* Keferstein. This is both a junior homonym and a junior objective synonym of *Vultur fossilis* Keferstein, 1834 (see Mlíkovský 1998g: 24).]

Distribution: Late Pleistocene (MQ 2C) of Westeregeln, Germany (Germar 1826 sub *Vultur*, Keferstein 1834, Giebel 1847).

Remarks: Both *Vultur fossilis* Keferstein and *Vultur fossilis* Giebel are meaningless names until their holotype is located and restudied. Lydekker (1891a: 32, tentatively) and Brodkorb (1964: 286) synonymized these species (with inaccurate citations – see Mlíkovský 1998g: 24) with the modern *Aegypius monachus* (Linnaeus, 1766), which is not substantiated (Mlíkovský 1998g: 24).

Ichnotaxa

Anatipeda anas Panin & Avram

Anatipeda anas Panin & Avram, 1962: 467 [Syntypes from Putna: series of footprints of several individuals; present location unknown. Figured by Panin & Avram 1962, pl. 10, fig. 31-32; and Panin 1964, fig. 4.]

Distribution: Early Miocene (MN 3-4) of Putna, Romania (Panin & Avram 1962).

Remarks: *Anatipeda anas* Panin & Avram, 1962 is type by monotypy of the genus *Anatipeda* Panin & Avram, 1962: 467. *Anatipeda* Panin & Avram, 1962 is type of the family Anatipedae Panin & Avram, 1962: 478 (spelling emended to Anatipedidae by Panin 1964: 343 and Mlíkovský 2000d: 78).

Anatipeda sp.

Distribution: Early Miocene (MN 3-4) of Piatra Neamț, Romania (Panin 1964).

Ardeipeda egretta Panin & Avram

Ardeipeda egretta Panin & Avram, 1962: 463 [Holotype from Putna: two footprints (right and left) of a single individual; present location unknown. Figured by Panin & Avram 1962, pl. 5, fig. 21.]

Distribution: Early Miocene (MN 3-4) of Putna, Romania (Panin & Avram 1962).

Remarks: *Ardeipeda egretta* Panin & Avram, 1962 is type (by present designation) of the genus *Ardeipeda* Panin & Avram, 1962: 363. *Ardeipeda* Panin & Avram, 1962 is type of the family Ardeipedae Panin & Avram, 1962: 478 (spelling corrected to Ardeipedidae by Mlíkovský 2000d: 79).

Ardeipeda gigantea Panin & Avram

Ardeipeda gigantea Panin & Avram, 1962: 463 [Holotype from Putna: a footprint; present location unknown. Figured by Panin & Avram 1962, pl. 5, fig. 22.]

Distribution: Early Miocene (MN 3-4) of Putna, Romania (Panin & Avram 1962).

Ardeipeda incerta Panin & Avram

Ardeipeda incerta Panin & Avram, 1962: 464 [Syntypes from Putna: series of footprints in a slab, and a footprint in another slab; present location unknown. Figured by Panin & Avram 1962, pl. 6, fig. 23-24.]

Distribution: Early Miocene (MN 3-4) of Putna, Romania (Panin & Avram 1962).

Aviadactyla media Kordos

Aviadactyla media Kordos, 1983: 276 [Holotype from Ipolytarnóc: two footprints (left and right) of a single individual; GIB V-12729. Figured by Kordos 1983, fig. 6.]

Distribution: Early Miocene (MN 3) of Ipolytarnóc, Hungary (Kordos 1983).

Remarks: *Aviadactyla media* Kordos, 1983 is type by monotypy of the genus *Aviadactyla* Kordos, 1983: 276.

Avipeda filiportatis Vjalov

Avipeda filiportatis Vjalov, 1965: 112 [Holotype from Deljatin: series of three footprints; IGGL. Figured by Vjalov 1965, pl. 15, and Vjalov 1966, pl. 33 and pl. 34, fig. 1.]

Distribution: Early Miocene (MN 3) of Deljatin, Ukraine (Vjalov & Flerov 1952, Vjalov 1965, 1966: 124); and early Miocene (MN 3-4) of Schitu Frumoasa, Romania (Grozescu 1914:

143, pl. 12 sub unidentified avian footprint – tentatively identified by Vjalov 1966: 124-126).

Avipeda phoenix Vjalov

Avipeda phoenix Vjalov, 1965: 112 [Holotype from Deljatin: series of 10 footprints in a slab; IGGL. Figured by Vjalov 1965, pl. 14, fig. 2.]

Distribution: Early Miocene (MN 3) of Deljatin, Ukraine (Vjalov 1965, 1966: 121).

Remarks: *Avipeda phoenix* Vjalov, 1965 is type (by present designation) of the genus *Avipeda* Vjalov, 1965: 112.

Avipeda sirin Vjalov

Avipeda sirin Vjalov, 1965: 112 [Holotype from Nižnij Strutyn': a footprint; IGGL. Figured by Vjalov 1960, fig. 1, and Vjalov 1966, pl. 31, fig. 1.]

Distribution: Early Miocene (MN 3) of Nižnij Strutyn', Ukraine (Vjalov 1960, 1965, 1966: 123).

Charadriipeda becassi Panin & Avram

Charadriipeda becassi Panin & Avram, 1962: 467 [Holotype from Putna: series of footprints of a single individual; present location unknown. Figured by Panin & Avram 1962, pl. 9, fig. 30.]

Distribution: Early Miocene (MN 3-4) of Putna, Romania (Panin & Avram 1962), and Cuejdi, Romania (Panin 1964).

Charadriipeda disjuncta Panin & Avram

Charadriipeda disjuncta Panin & Avram, 1962: 467 [Holotype from Putna: series of footprints of a single individual; present location unknown. Figured by Panin & Avram 1962, pl. 9, fig. 29.]

Distribution: Early Miocene (MN 3-4) of Putna, Romania (Panin & Avram 1962), and Călugăr, Romania (Panin 1964).

Charadriipeda limosa Rădan & Brustur

Charadriipeda limosa Rădan & Brustur, 1993: 74. [Holotype from Câmpu lui Neag: footprint; IGGB P-18.592. Figured by Rădan & Brustur 1993, pl. 1, fig. 1c, 2.]

Distribution: Late Oligocene (MP 25-30) of Romania (Rădan & Brustur 1993).

Charadriipeda minima Panin & Avram

Charadriipeda minima Panin & Avram, 1962: 466 [Syntypes from Putna: series of footprints of at least two individuals; present location unknown. Figured by Panin & Avram 1962, pl. 8, fig. 28.]

Distribution: Early Miocene (MN 3-4) of Putna, Romania (Panin & Avram 1962), and Cuejdi, Romania (Panin 1964).

Charadriipeda minor Panin

Charadriipeda minor Panin, 1964: 346. [Syntypes from Cuejdi: series of footprints in three (?) plates; present location unknown. Figured by Panin 1964, fig. 2, 6b, 7, and 8b.]

Distribution: Early Miocene (MN 3-4) of Cuejdi, Romania (Panin 1964).

Remarks: *Charadriipeda minor* Panin & Avram, 1962 it type (by present designation) of the genus *Charadriipeda* Panin & Avram, 1962: 466. *Charadriipeda* Panin & Avram, 1962 is type of the family Charadriipedae Panin & Avram, 1962: 478 (spelling corrected to Charadriipedidae by Panin 1964: 343 and Mlíkovský 2000d: 79).

Charadriipeda recurvirostrioidea Panin & Avram

Charadriipeda recurvirostrioidea Panin & Avram, 1962: 466 [Syntypes from Putna: series of footprints in three slabs; present location unknown. Figured by Panin & Avram 1962, pl. 7, fig. 26, and pl. 8, fig. 27.]

Charadriipeda recurvirostra Panin, 1964: 343 [New name for *Charadriipeda recurvirostrioidea* Panin & Avram, 1962; hence its junior objective synonym.]

Distribution: Early Miocene (MN 3-4) of Putna, Romania (Panin & Avram 1962), and Mîngălar, Romania (Panin 1964).

Gruipeda intermedia Panin

Gruipeda intermedia Panin, 1964: 347. [Holotype from Cuejdi: series of footprints; present location unknown. Figured by Panin 1964, fig. 3.]

Distribution: Early Miocene (MN 3-4) of Cuejdi, Romania (Panin 1964).

Gruipeda maxima Panin & Avram

Gruipeda maxima Panin & Avram, 1962: 465 [Holotype from Putna: a footprint; present location unknown. Figured by Panin & Avram 1962, pl. 7, fig. 25.]

Distribution: Early Miocene (MN 3-4) of Putna, Romania (Panin & Avram 1962).

Remarks: *Gruipeda maxima* Panin & Avram, 1962 is type by monotypy of the genus *Gruipeda* Panin & Avram, 1962: 465. *Gruipeda* Panin & Avram, 1962 is type of the family Gruipedae Panin & Avram, 1962: 478 (spelling corrected to Gruipedidae by Panin 1964: 343 and Mlíkovský 2000d: 79).

Ornithotarnocia lambrechti Kordos

Ornithotarnocia lambrechti Kordos, 1983: 269 [Holotype from Ipolytarnóc: two footprints (left and right) of a single individual; GIB V-12721. Figured by Lambrecht 1912b, pl. 1, Lambrecht 1933, fig. 183, and Kordos 1983, fig. 1.]

Distribution: Early Miocene (MN 3) of Ipolytarnóc, Hungary (Lambrecht 1912b, Kordos 1983).

Remarks: *Ornithotarnocia lambrechti* Kordos, 1983 is type by monotypy of the genus *Ornithotarnocia* Kordos, 1983: 269.

Ornitichnites taurinus Portis

Ornitichnites [sic!] *taurinus* Portis, 1887: 201 [Holotype from Verrua Savoia: a series of at least 10 footprints in a slab, which was described but not named by Portis 1884: 381; present location unknown. Not figured.]

Distribution: Late Eocene (MP 17-20) of Verrua Savoia, Italy (Portis 1884: 381 sub "gli orniticniti di Verrua", Portis 1887).

Remarks: Note that citations of relevant Portis's papers in Lambrecht (1933: 659) and Brodkorb (1978: 221) are incorrect.

Passeripedia ipolyensis Kordos

Passeripedia ipolyensis Kordos, 1983: 280 [Holotype from Ipolytarnóc: a footprint (right?); GIB, uncatalogued. Figured by Kordos 1983, fig. 8.]

Distribution: Early Miocene (MN 3) of Ipolytarnóc, Hungary (Kordos 1983).

Remarks: *Passeripedia ipolyensis* Kordos, 1983 is type by monotypy of the genus *Passeripedia* Kordos, 1983: 280.

Pulchravipes magnificus Demathieu et al.

Pulchravipes magnificus Demathieu, Ginsburg, Guérin & Truc, 1984. [Holotype from Saignon: footprints.]

Distribution: Early Oligocene (MP 21) of Saignon, France (Demathieu et al. 1984).

Remarks: Not seen. *Pulchravipes magnificus* Demathieu et al., 1984 is type by monotypy of the genus *Pulchravipes* Demathieu, Ginsburg, Guérin & Truc, 1984.

Tetraornithopedia tasnadii Kordos

Tetraornithopedia tasnadii Kordos, 1983: 279 [Holotype from Ipolytarnóc: footprint (left?); CHI, uncatalogued. Figured by Kordos 1983, fig. 7.]

Distribution: Early Miocene (MN 3) of Ipolytarnóc, Hungary (Kordos 1983).

Remarks: *Tetraornithopedia tasnadii* Kordos is type by monotypy of the genus *Tetraornithopedia* Kordos, 1983: 279.

Taxa non avium

Bucklandium diluvii König

Bucklandium diluvii König, 1825: pl. 8, fig. 91. [Holotype from Sheppey: skull in a slab; BMNH. Figured by König 1825, fig. 91, and Woodward 1889, pl. 22, fig. 1-4.]

Distribution: Early Eocene (MP 8-9) of Sheppey, England (König 1825).

Remarks: Described as a bird. The species was transferred to Acanthopterygii by Morris (1843: 193), and Woodward (1889) recognized its affinities to silurid fishes.

Larus priscus Giebel

Larus priscus Giebel, 1847: 31 [Holotype from Seveckenberg: "distal end of right tibia" = distal end of a tarsus; MNHN, uncatalogued. Not figured.]

Distribution: Late Pleistocene (MQ 2C) of Seveckenberg, Germany (Giebel 1847, 1850).

Remarks: This species was based on a partial tarsus of the dipodid rodent *Allactaga* Cuvier, 1836 (Nehring 1880: 436, Mlíkovský orig.).

Macrornis tanaupus Seeley

Macrornis tanaupus Seeley, 1866: 110 [Holotype from Hordle: "proximal end of tibiotarsus" = distal end of a femur; SMC C-20910. Not figured.]

Distribution: Late Eocene (MP 17) of Hordle, England (Seeley 1866).

Remarks: Harrison & Walker (1976a: 344) restudied the holotype of this species, showing that it is not tibiotarsus of a struthious bird, as believed by Seeley (1866), but a reptilian femur. *Macrornis* Seeley, 1866 is type by monotypy of the genus *Macrornis* Seeley, 1866: 110.

Ornithoidichnites badensis Böhm

Ornithoidichnites badensis Böhm, 1896: 238 [Holotype from Bellingen: two footprints (left and right) of a single individual (see Mlíkovský 1992b: 445); present location unknown. Figured by Böhm 1896, text-fig. 1, pl. 1.]

Ichnium badense (Böhm): Böhm 1898: 206 [New combination.]

Distribution: Late Oligocene (MP 25-30) of Bellingen, Germany (Böhm 1896, 1898).

Remarks: These footprints, originally described as avian, belong to a tapir (Böhm 1898, see also Abel 1935). Lambrecht (1921: 99, 1933: 665) and Brodkorb (1978: 221) overlooked Böhm's (1898) correction and continued to list this fossil as avian.

Ornitichnites argenterae Portis

Ornitichnites argenterae Portis, 1879: 221 [Holotype from Argentera: a footprint; MGPUB, cast in MPUT.

Ornithichnidium argenterae (Portis): Kuhn 1958: 382 [New generic name created for *Ornithichnites* Portis, 1879, but no specific name mentioned.]

Distribution: Late Eocene (MP 17-20) of Argentera, Italy (Portis 1879, 1884).

Remarks: Kuhn (1958, 1963) believed that the genus name *Ornithichnites* was created by Portis (1879), and that it is preoccupied by *Ornitichnites* King, "1844" = 1845. However, *Ornithichnites* was used for the first time by Hitchcock (1836) for alleged avian footprints from the Triassic of Massachusetts. The name is to be understood as a name for all avian footprints (see also Gervais 1844a: 7-9), i.e. for a collective group, which has no type (ICZN 1999, Art. 42.3.1). Kuhn (1958) thought that *Ornithichnites* Portis was based on *Ornithichnites argenterae* Portis, 1879. Although this is not true, *Ornithichnites argenterae* Portis, 1879 constitutes type by monotypy of the genus *Ornithichnidium* Kuhn, 1958: 382. The footprints were formed by a reptile (Kuhn 1958, 1963).

Saurornis matthesi **Fischer**

Saurornis matthesi Fischer, 1967: 603 [Holotype from Geiseltal XIV: "proximal end of tarsometatarsus" = distal end of coossified ulna and radius; GM Av-G1956/Dia.13. Figured by Fischer 1967, pl. 1, fig. a-c.]

Distribution: Middle Eocene (MP 11) of Geiseltal XIV, Germany (Fischer 1967).

Remarks: Described in the monotypic genus *Saurornis* Fischer, 1967: 603. Subsequently identified as identical with a perissodactyl mammal of the genus *Lophiodon* Cuvier, 1822 (Fischer 1987).

Nomina nuda

All types of unavailable names are listed under this heading.

Genus-group names

Aurorornis Panteleev, 1999: 20 [Eocene of Ukraine; unpublished. The only included species, *Aurorornis taurica* Panteleev, 1999, is nomen nudum.]

Camaskelus Aymard, 1856: 233 [Miocene of France; no definition. The only included species, *Camaskelus palustris* Aymard, 1856, is nomen nudum.]

Palaetus Milne-Edwards, 1871: 572 [Miocene of France; no definition. The only included species, *Palaetus rapax* Milne-Edwards, 1871, is nomen nudum.]

Procellornis Lucazeau, 1959: 21 [Miocene of France; unpublished. Three include species (*P. burdigalensis* Lucazeau, 1959, *P. antiquus* Lucazeau, 1959, and *P. dubius* Lucazeau, 1959) are nomina nuda.]

Protopelargus Reichenbach, 1852: xiv [Miocene of Germany; no definition. The only included species, *Protopelargus meyeri* Reichenbach, 1852, is nomen nudum.]

Suloides Lucazeau, 1959: 46 [Miocene of France; unpublished. The only included species, *Suloides rozieri* Lucazeau, 1959 is nomen nudum.]

Tantaleus Reichenbach, 1852: xiv [Pleistocene of Sardinia, Italy. The only included species, *Tantalus brecciensis* Giebel, 1847, is nomen nudum.]

Typhornis miocoenicus Lucazeau, 1959: 29 [Miocene of France; unpublished. The only included species, *Typhornis miocoenicus* Lucazeau, 1959, is nomen nudum.]

Species-group names

Anas arcensis Kretzoi, 1962: 168 [Pleistocene of Romania; no description or indication.]

Anas crassa Milne-Edwards, 1871: 573 [Miocene of France; no description or indication.]

Ardea effosa Meyer in Lepsius, 1883: 146 [Miocene of Germany; no description or indication.]

Ardea effosa Meyer in Lepsius, 1892: 623 [Miocene of Germany; no description or indication.]

Ardea latipes Meyer in Lepsius, 1883: 146 [Miocene of Germany; no description or indication.]

Ardea latipes Meyer in Lepsius, 1892: 623 [Miocene of Germany; no description or indication.]

Argala arvernensis Milne-Edwards, 1871: 572 [Miocene of France; no description or indication.]

Aurorornis taurica Panteleev, 1999: 20 [Eocene of Ukraine; unpublished.]

Camaskelus palustris Aymard, 1856: 233 [Oligocene of France; no description or indication – see Olson 1978.]

Carbo risgoviensis O. Fraas in Engel, 1908: 567 [Miocene of Germany; no description or indication.]

Gallus steinheimensis E. Fraas in Engel, 1908: 567 [Miocene of Germany; no description or indication.]

Himantopus brevipes Milne-Edwards, 1871: 572 [Miocene of France; no description or indication.]

Larus burdigalensis Lucazeau, 1959: 45 [Miocene of France; unpublished.]

Leptoptilus [sic!] *arvernensis* "(Milne-Edwards)" Lambrecht, 1921: 26 [New combination for *Argala arvernensis* Milne-Edwards, hence a nomen nudum attributable to Lambrecht (1921). See also Harrison (1974: 42), and Hill & Walker (1979: 217).]

Ornitholithes ralli Anonymous: Karg, 1805: 26 [Unpublished label name; specimen thought to have originated from the Miocene of Germany, but a forgery in fact, constructed from fish ribs – Pfannenstiel 1958: 854.]

Otis agilis Milne-Edwards, 1871: 572 [Miocene of France; no description or indication.]

Palaeortyx media Milne-Edwards, 1871: 571 [Miocene of France; no description or indication.]

Palaetus rapax Milne-Edwards, 1871: 571 [Miocene of France; no description or indication.]

Pelagornis Delfortrii Anonymous: Lambrecht 1933: 282 [Miocene of France; label name; unpublished.]

Phalacrocorax risgoviensis "Fraas" Lambrecht, 1921: 37 [New combination for *Carbo risgoviensis* Fraas in Engel, hence a nomen nudum attributable to Lambrecht (1921).]

Phasianus Nicheti "Gaillard" Bastin, 1933: 47, 53 [Pleistocene of France; no description or indication.]

Procellornis antiquus Lucazeau, 1959: 31 [Miocene of France; unpublished.]

Procellornis burdigalensis Lucazeau, 1959: 21 [Miocene of France; unpublished.]

Procellornis dubius Lucazeau, 1959: 42 [Miocene of France; unpublished.]

Protopelargus meyeri Reichenbach, 1852: xiv [Miocene of Germany; no description or indication – see Mlíkovský 1995a.]

Sula rozieri Lucazeau, 1959: 46 [Miocene of France; unpublished.]

Suloides miocoenicus Lucazeau, 1959: 48 [Miocene of France; unpublished.]

Tantaleus brecciensis Reichenbach, 1852: xiv [New combination for *Tantalus brecciensis* Giebel, 1847, hence a nomen nudum attributable to Reichenbach (1852) – see Mlíkovský 1995a.]

Tantalus brecciensis Giebel, 1847: 27 [Pleistocene of Sardinia; no description or indication – see Mlíkovský 1995a.]

Typhornis miocoenicus Lucazeau, 1959: 29 [Miocene of France; unpublished.]

Note: Cheneval (1996a: 538) listed Beneden (1871) as the author of two avian genera and species (*Ardeita gracilis* and *Uriopsis scaldicus*), reportedly described from the middle Oligocene (MP 23-24) of Rupelmonde, Belgium. These forms were not listed in previous catalogues of fossil birds (Lambrecht 1921, 1933, Brodkorb 1963c, 1964, 1967, 1971b, 1978), and I was not able to find them in any of Beneden's relevant papers (Beneden 1871, 1872, 1873a,b, 1883). The existence of these names thus remains unclear until their source is located.

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Index of authors

The authors are listed alphabetically without respect to diacritical marks. Authors of modern taxa and authors of all taxa cited without the year of publication are not listed here.

Index of countries

This list includes names of countries and their selected parts, especially archipelagos and islands

Index of localities

The localities are listed alphabetically without respect to diacritical marks. Extralimital localities are not included. Pages with type localities are underlined.

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Index of stratigraphical units

Only European localities are considered here. The 'Quercy', spanning MP 16-28, is not included here (see p. 382 for its occurrence). This index is arranged stratigraphically.

Index of family-group names

All names are listed with the ending -idae, without respect to taxonomic rank. Incorrect spellings are not considered. Only home-pages are listed.

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Index of species-group names

Trinominals are indexed as binominals. Diacritical marks are omitted. Home-pages of fossil species and subspecies are <u>underlined.</u>