

Tertiary Avian Localities of Europe: An Introduction

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Abstract: Scope and arrangement of the catalogue of the Tertiary avian localities of Europe are detailed. Particular attention is given to linguistic, stratigraphical, and taxonomical problems.

Key-words: Aves, Tertiary, Europe.

INTRODUCTION

Almost three centuries elapsed since the first remains of European Tertiary birds were mentioned in literature (Scheuchzer 1708). Enormous amount of the data has been accumulated since that time, but their last comprehensive summary was published more than 60 years ago (Lambrecht 1933, see also Lambrecht 1921). In general, the contemporary situation in the European Tertiary palaeornithology is complex and intricate. The reasons are as follows:

- Original data were published in a large number of journals and books, many of which have been distributed only locally, and are thus difficult to locate in libraries.
- Many different languages were used in describing or mentioning avian remains from the Tertiary deposits of Europe. Hence, it might be difficult for concerned researchers to understand all of them.
- In early papers, geographical position of localities was often mentioned in general terms only. Hence, it might be very difficult to locate such localities without access to local maps and knowledge of local geological situation.
- Since the 1930s, many European countries changed their borders, so that data on the geographical position of many classic localities are out-of-date.

- Stratigraphical terms applied in earlier papers are often general and/or confusing. Moreover, recent increase in understanding of the European Tertiary chronology resulted in frequent changes of stratigraphical position of the localities. They can easily be overlooked without the knowledge of local stratigraphical literature.
- In many cases, what is commonly listed as a single locality is in fact a complex of geographically close localities, which may be of rather different age (e.g. Geiseltal). This confusing approach can be retrieved only after a study of local literature.
- Remains of European Tertiary birds, including type materials, are deposited in a large number of museum, university and private collections. They are often difficult to locate. Moreover, some collections were moved from one institution to another one, or were destroyed due to war disasters or accidents.
- Many remains of Tertiary birds from the territory of Europe were excavated, but remained undescribed. They are difficult to discover in the collections without specific search.
- Due to the difficulties mentioned above, palaeornithologists often rely on the data published in Lambrecht's (1933) catalogue, do not check their correctness, and do not up-date them appropriately. Alternatively, they refer to the more recent Brodkorb's catalogue (1963, 1964, 1967, 1971, 1978). Unfortunately, Brodkorb himself took many data on European fossil birds from Lambrecht's (1933) catalogue, without checking their correctness in original papers.

In view of this, I decided to organize a catalogue of the Tertiary avian localities of Europe (TALE). Its main aims are as follows:

- to provide a comprehensive list of the Tertiary localities of Europe,
- to provide up-dated information on the geographical position of the localities,
- to provide up-dated information on the stratigraphical position of the localities,
- to provide a full list of palaeornithological references, related to each of the localities,
- to provide up-dated information on the collections, where the remains are deposited,
- to provide exact data on the origins of type materials of birds, described from the European Tertiary, and
- to remove from literature inaccurate data, related to the Tertiary birds of Europe.

This goal could not have been achieved without the assistance of colleagues from many scientific institutions in many European countries. Some of them were kind enough to devote their time and efforts to preparing chapter(s) for the present volume.

They include Zygmunt Bocheński (Kraków), Zlatozar Boev (Sofija), Jacques Cheneval (Lyon), Laura Delle Cave (Firenze), Per Ericsson (Stockholm), Angelika Hesse (Dessau), Eugen Kessler (Cluj-Napoca), Cécile Mourer-Chauviré (Lyon), Antonio Sanchez Marco (Madrid), and Tommy Tyrberg (Kimstad). I thank them all.

It is acknowledged, that the resulting catalogue cannot be absolutely complete and entirely free of minor errors and misprints. However, an up-dated version of the catalogue will be published in future, so that I will be much obliged to the catalogue's readers for any additions and corrections.

SCOPE OF THE CATALOGUE

The present catalogue will cover all Tertiary localities of Europe, in which avian remains were collected. Europe is here understood in the geographical sense. Its northern, western, and southern borders are defined by the sea (all Greek islands are included). Its eastern border lays on Eurasian continent. It tracks eastern foot of Ural mountains, and the Ural river, which enters in the Caspian Sea. Between the Caspian and Black Seas, the border between Europe and Asia tracks the Kuma-Manyč depression, and lower Don river, which enters in the Azov Sea. The area of Europe is ca. 10 527 000 km². The Tertiary is understood here as a period between ca. 65-1.8 Ma BP.

For each locality, the following data are given, when available:

- Name, including different spellings and synonyms.
- Exact geographical position, using administrative (political) divisioning of Europe (state on 1 November 1995) and individual countries. Where available, geographic coordinates are given here, following the Greenwich system.
- Exact stratigraphical position, using standard geostatigraphic chronology, Paleogene mammal zones (MP's) of Schmidt-Kittler (1987), and Neogene mammal zones (MN's) of Mein (1976).
- List of avian taxa identified. Families and genera are listed, using revised results where possible. Where appropriate, the kind of remains is specified.
- Full palaeornithological bibliography, related to each locality. Catalogue entries, which bring no new information, are usually not included here.
- List of collections, where the remains are deposited.
- List of species-group names, given to birds excavated from each locality. Original binomina and trinomina are given, subsequent combinations are not included.

Tertiary avian localities of Europe are arranged according to the country, where they are situated. The sequence of countries in the Catalogue is alphabetical. Short English names are used.

I am not aware of any Tertiary avian record from the following European countries: Albania, Bosnia, Byelorussia, Estonia, Ireland, Island, Kazakhstan (European part), Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Norway, San Marino, Slovenia, Turkey (European part), and Vatikan.

It should be remembered, that since the publication of Lambrecht's (1933) catalogue, many European states considerably changed their borders, particularly following the World War II, and the 1989 revolutions. These changes influenced administrative position of some localities.

LANGUAGES AND ALPHABETS

References mentioned in this volume were originally published in 17 languages. Assuming that knowledge of minor languages is less widespread, titles of non-congress languages (i.e. other than English, French, German, and Spanish) are given both in the original language, plus in an English translation (in parentheses).

Three different alphabets are in current official use in Europe: Roman (Latin), Cyrillic ("Russian", "azbuka"), and Greek ones. In converting the latter two alphabets into the Latin one, either transcription or transliteration can be applied. In transcription, original spelling of words is changed, so that pronouciation remains approximately the same. Hence, the same word has different spellings in different languages. For example, the Russian grapheme <ч> is transcribed as <ç> in Romanian, <č> in Czech or Slovak, <ch> in English or Spanish, <cs> in Hungarian, <cz> in Polish, <tch> in French, <tj> in Swedish, <tsch> in German, etc. This system has been widely applied in early writings (up to the early 20th century), but, as evident from the example given here, is useless for librarian purposes.

On the other hand, transliteration is a system, where non-Roman graphemes are unequivocally related to Roman ones. Consequently, the spelling is the same in all languages. In the first ("London") version related to the conversion of the Cyrillic alphabet, diacritical marks were not used. Instead, compound graphemes were widely applied, selected mainly to match pronouciation in English. For example, the Russian grapheme <ч> is invariantly spelled <ch> in this version. This version is widespread today. Nonetheless, even this version was confusing in some cases, so that it was superceded by the new ("Berlin") version. The latter one, internationally adopted in 1978

Table 1. Transliteration of Cyrillic alphabet.

| Cyrillic | Russian | Ukrainian | Byelorussian | Serbocroatian | Bulgarian | Macedonian |
|----------|---------|-----------|--------------|---------------|-----------|------------|
| Аа | a | a | a | a | a | a |
| Бб | b | b | b | b | b | b |
| Вв | v | v | v | v | v | v |
| Гг | g | h | h | g | g | g |
| Дд | d | d | d | d | d | d |
| Ђ | — | — | dj | — | — | — |
| Ѓ | — | — | — | — | — | g |
| Ее | e | e | e | e | e | e |
| Жж | ž | ž | ž | ž | ž | ž |
| Зз | z | z | z | z | z | z |
| Сс | — | — | — | — | — | dz |
| Ии | i | y | — | — | i | i |
| Іі | — | i | i | — | — | — |
| Її | — | ji | — | i | — | — |
| Јј | — | — | — | j | — | j |
| Йй | j | j | j | — | j | — |
| Кк | k | k | k | k | k | k |
| Лл | l | l | l | l | l | l |
| Љљ | — | — | — | lj | — | lj |
| Мм | m | m | m | m | m | m |
| Нн | n | n | n | n | n | n |
| Њњ | — | — | — | nj | — | nj |
| Єє | — | je | — | — | — | — |
| Оо | o | o | o | o | o | o |
| Пп | p | p | p | p | p | p |
| Рр | r | r | r | r | r | r |
| Сс | s | s | s | s | s | s |
| Тт | t | t | t | t | t | t |
| Ћћ | — | — | — | ć | — | — |
| Кќ | — | — | — | — | — | k |
| Уу | u | u | u | u | u | u |
| Ўў | — | — | ú | — | — | — |
| Фф | f | f | f | f | f | f |
| Хх | ch | ch | ch | ch | ch | ch |
| Цц | c | c | c | c | c | c |
| Чч | č | č | č | č | č | č |
| Џџ | — | — | — | dž | — | — |
| Шш | š | š | š | š | š | š |
| Щщ | šč | šč | — | — | št | — |
| Ыы | y | — | y | — | — | — |
| Ээ | è | — | è | — | — | — |
| Юю | ju | ju | ju | — | ju | — |
| Яя | ja | ja | ja | — | ja | — |
| Ьь | ' | ' | ' | — | ' | — |
| Ъъ | " | — | — | — | ä | — |

(European standard 1362-78), uses diacritical marks and limits the use of compound phonemes to such cases only, where a single grapheme in the Cyrillic alphabet stands for a cluster of phonemes. For example, Russian grapheme <ч> is here transliterated as <č>, while <щ> as <šč>. The “Berlin” system of transliteration is consistently applied in the present volume.

Cyrillic alphabet is used in the following European languages: Bulgarian, Byelorussian, Macedonian, Russian, Serbocroatian (partim), and Ukrainian. Also, Moldavian (which is an eastern dialect of the Romanian in fact) was written using Russian alphabet in the 1940-1990s, when Moldavia was part of the then Soviet Union. Note that Cyrillic alphabet slightly differs from language to language, and that transcriptions are in common use when coming from one of these languages to another one. For example, name of the Ukrainian paleontologist <Вojinstvens’kyj> is written <Voinstvenskij> in the Russian version of the Cyrillic alphabet (here presented in the transliterated form). In the present volume, original spellings are used in the text, while derived variants are listed in the index of authors only. Note also, that transliteration system is not applicable for converting Roman alphabet to the Cyrillic one, because of limited flexibility of the latter alphabet. Instead, a complicated, though standartized system of transcription is used (Giljarevskij and Starostin 1985).

In converting the Greek alphabet to the Roman one, official transliteration system adopted in zoological nomenclature (ICZN 1985) is applied here.

Roman alphabet itself has many versions according to languages. The notable difference from the most distributed English version is the frequent use of diacritical marks. In earlier writings, these diacritical marks were often omitted. For example, <č> was printed as <c>. In many languages, however, diacritical marks have distinguishing function, so that their correct use can be of crucial importance. Hence, original diacritical marks of all involved languages are used in the present book.

Many internationally known places have, in addition to their local name, also names in other languages. For example, the German city <München> is called <Munich> in English, <Mnichov> in Czech, and <Mjunich> in Russian. In this catalogue, native names are applied to all places, with the exception of the countries. Nevertheless, well known variant spellings and names are listed in the index of collections.

STRATIGRAPHY

In early writings (incl. Lambrecht 1933), the stratigraphic position of avian finds was described using geochronological periods (e.g. Lower Pliocene), formations (e.g. Pontian, Sarmatian), or local geological units, defined either by the occurrence of some dominant animals or plants (e.g. *Corbula* beds, *Paludina* calcs), or by their geographical

position (e.g. phosphorites of Quercy). The delimitation of these units was generally fuzzy, and different authors often used these terms in different sense.

Recent progress in both geostatigraphy and biostratigraphy, as well as application of new methods (e.g. magnetostratigraphy), resulted in a much refined (and re-defined) stratigraphical classification of the European Tertiary. For the purposes of this catalogue, I selected the biostratigraphical classification based on micromammals, as proposed for the Paleogene by Schmidt-Kittler (1987), and for the Neogene by Mein (1976), and improved by subsequent authors (Fahlbusch 1976, 1991, Mein 1979, 1990, Steiniger *et al.* 1987, Bruijn *et al.* 1992, and many others). The correlation with geostatigraphical units is as follows: Paleocene = MP 1-6, Early Eocene = MP 7-10, Middle Eocene = MP 11-13, Late Eocene = MP 14-20, Early Oligocene = MP 21-24, Late Oligocene = 25-30, Early Miocene = MN 1-4, Middle Miocene = MN 5-8, Late Miocene = MN 9-13, Early Pliocene = MN 14-15, and Late Pliocene = MN 16-17.

In addition, in the description of the avian faunas of the European Tertiary (Mlíkovský, this volume) I used micromammal biozones of Fahlbusch (1976), which do not always exactly correspond to the geostatigraphic units, but are more appropriate for a chronological faunistic summary. Their correlation with MP and MN zones is as follows: Paleocene = MP 1-6, Ypresian = MP 7-10, Lutetian = MP 11-13, Bartonian = MP 14-16, Priboian = MP 17-20, Stampian = MP 21-24, Chattian = MP 25-30, Agenian = MN 1-2, Orleanian = MP 3-5, Astaracian = MN 6-8, Vallesian = MN 9-10, Turolian = MN 11-13, Ruscinian = MN 14-15, and Villanyian = MN 16-17.

When studying data on the stratigraphical position of the localities, special attention must be given to the stratigraphical system applied in the respective paper. For example, localities which Lambrecht (1933) referred accordings to the standards of his time to the "Unterpliozän" (= Lower Pliocene) are now considered late Miocene in age, although the local stratigraphical unit (Sarmatian) is still the same, and corresponds mainly to the MN-zones 11-13. In modern understanding, early Pliocene corresponds to the MN-zones 14-15. A frequent confusion surrounds also the Plio-Pleistocene border. In the stratigraphical system adopted here, the idea of the "short" Pleistocene is accepted in agreement with the currently prevailing opinion of stratigraphers. However, some authors (e.g. Jánossy 1986) continue to use the concept of the "long" Pleistocene, which includes also MN-zones 16-17. Hence, what is called here "late Pliocene", is termed "early Pleistocene" by Jánossy and some other, especially earlier authors.

Finally, it should be stressed, that studies in the biostratigraphy of the European Cenozoic are continuing. This will undoubtedly result in revised versions of the stratigraphical arrangement of Europe. Also, new data may lead to a re-assignment of individual localities to stratigraphical units.

Absolute chronology is not discussed here. The reader should refer to respective publications (e.g., Berggren *et al.* 1985, Harland *et al.* 1982, 1990).

AVIAN TAXONOMY

The sequence of avian families follows approximately Wetmore (1960), where appropriate. Although this classification is clearly out-of-date, none of the more recently proposed classifications has been widely adopted (Wolters 1975-1982, Cracraft 1981, Mlíkovský 1985, Olson 1985, Sibley *et al.* 1988, Sibley and Ahlquist 1990), and their use in the present catalogue could lower the lucidity of its arrangement. Also, numerous new families of Tertiary birds were described recently.

Limits of avian families are not consistently understood by ornithologists, and differences exist even among the contributors to this catalogue. I left the decision on particular authors, but I followed my opinions in the faunistic summary (Mlíkovský, this volume). Hence, some avian genera may be listed in different chapters in different families. For example, some authors give the barn owls status of a full family (Tytonidae), while I rank them as a subfamily (Tytoninae) within the family Strigidae.

Lists of avian faunas of individual localities were based, where possible, on revised results. Admittedly, by far not all Tertiary birds of Europe have been adequately described so far. Consequently, many changes in taxonomic position of mentioned birds have to be expected with ongoing revisions, even in near future. Nevertheless, taxonomic revision of the European Tertiary birds has not been the aim of the present catalogue.

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