The MNHN taxonomic referential: state and ongoing developments

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The relational database of taxonomic references developed in the Muséum National d’Histoire Naturelle (MNHN), in Paris, has been greatly improved. New names, principally synonyms, have been added to the database following four lines: (1) The referential has been improved taxonomically: type-species of genera have been defined; species names renamed by nomina nova have been searched and entered as well as the source(s) of conflict of the species homonym(s); also, combinatio nova or new combinations of species names given by authors of new genera have been databased. (2) The names which were found written on the labels of the specimens of the MNHN collection have been databased. The computerization of the MNHN collection has started with the Suboscines, thus, handbooks covering these have been checked for names, including new combinations of original species names. (3) Synonyms have been entered for as far they are listed in catalogues of types published by different museums. About 16,000 types specimens covering 9,500 species or subspecies are now listed in the MNHN database, including their catalogue number and the museum where they are preserved. (4) The computerization of all names created by Statius Müller (1776), Boddaert (1783), Gmelin (1788-89), and Latham (1790; 1801), is going on. These four authors based a lot of new scientific names on vernacular names used in earlier ornithological works, e.g. on Brisson (1760) or Buffon (1770-83). All these references to common names (about 10 000) have been entered and linked with the scientific names introduced, following the synonymies presented by these authors.

Introduction

For the past three years, we have been developing a taxonomic referential database for the class Aves, in the form of an electronic catalogue of the names of birds of the world providing synonyms and multiple classifications (Bruckert, 2003).

The term “taxonomic referential” may be understood in two ways. First it includes a dictionary of scientific bird names with their bibliographic references. Secondly, it is a vademecum in which one can get a correct and full answer to any taxonomic question. To meet this second purpose, a true referential should contain any published name since the beginning of ornithology as a science, thus since 1758, the publishing date of the Systema Naturae, editio decima by Linné in Stockholm, the publication fixed as starting date by the International Code for Zoological Nomenclature.

To fulfill the requirements set by this ambitious and exhaustive project, we followed a systematic approach. The first step was to database all names used in the standard work initiated by James Lee Peters in 1931 and finished in 1986 by a team of experts under the direction of Ernst Mayr. About 26,000 valid names and 9,000 synonyms from this source were digitized. The second step was to computerize the names used in the
Classification of Birds (Sibley & Monroe, 1990, updated 1993). This work was the first to be partially based on biomolecular results and included many important novelties in ornithological systematics. About 11,000 names of species and a few well-marked subspecies are listed in this classification as well as about 100 synonyms and were all data-based. Finally, the names contained in the second edition of the Complete Check-list of Birds of the World (Howard & Moore, 1991) were added to the referential database. The latter publication was based mainly on the Peters’ Check-list but included taxa described as new since the appearance of the various volumes of this check-list.

These three classifications together include about 36,000 species names and 5,500 genus names. However, the MNHN database includes at present about 47,000 species names and 8,000 genus names. Below we describe the four methods we followed to enrich our taxonomic referential database, principally with synonyms.

1. Taxonomic improvement

We improved the taxonomic quality of data already entered in the database by systematic search for the following items:

   for each nomen novum: the name of the taxon preoccupied and the name of the senior name in conflict (cf. example 1),
   for each genus name: the name of its type species (cf. example 2),
   for each genus name: the list of new combinations proposed and cited by the author of the genus (cf. example 3).

This results in a number of extra names to be added to the database. In the three examples given below (possibly) extra names added to the database are written in bold.

Example 1: Nomen novum.

*Turdoides rubiginosus schnitzeri* Deignan, 1964
Check-list of Birds of the World, vol. 10, p. 337

nomen novum pro *Argya rubiginosa emini* Reichenow, 1907
   nec *Crateropus plebeius* (sic) *emini* Neumann, 1904

[cf. Peters et al., vol. 10, p. 337 = idem]
[not in Sibley & Monroe]
[cf. Howard & Moore, p. 345, right col. = *Turdoides rubiginosus schnitzeri*]

Example 2: Type-species of a genus name.

*Aenigmatolimnas* J.L. Peters, 1932 (Dec. 19)
“Two new genera and a new subspecies of Rails”

Type species by original designation and monotypy: *Porzana marginalis* Hartlaub, 1857

Example 3: Combinatio novum or new combination.

Oreothlypis Stejneger, 1884 (Apr.)
“Anelecta ornithologica”
Auk, 1 (2), p. 169 (in text)

Type species by original designation: Compsothlypis gutturalis Cabanis, 1860

1. Oreothlypis superciliosa Stejneger, 1884 (Apr.)
“Anelecta ornithologica”
Auk, 1 (2), p. 169 (in text)

combinatio novum pro Conirostrum superciliosum Hartlaub, 1844

2. Oreothlypis gutturalis Stejneger, 1884 (Apr.)
“Anelecta ornithologica”
Auk, 1 (2), p. 169 (in text)

combinatio novum pro Compsothlypis gutturalis Cabanis, 1860

2. Computerisation of the MNHN bird collection

The second method for adding new names to the database is linked with one of the two main uses of the taxonomic referential: the identification of specimens in a collection.
On top right of fig. 1, we show the six tables (cited further in brackets and little capitals) required for the computerisation of the MNHN collection. This collection is a set of specimens (Specimens), each specimen being of a certain kind (skin, skeleton, mounted specimen,...), identified with a catalogue number, having a sex and an age possibly determined, collected at a given date and at a given place or locality. As several specimens may have been collected at a same place, localities are recorded in a different table (Localities). A specimen has been generally collected by one or several collectors (Collectors) whose names are stored in another table (Authors, so called because already used to store the authors' names of the taxa).

One or several labels are generally tied to a specimen, each label bearing one identification name (Identifications) given at a possibly known date: genus name, species name and, possibly, subspecies name and authors’ names. An identification may have been done by one or several identificators (Identificators) whose name are stored in the same table used for collectors (Authors).

A «good» taxonomic referential (on left of fig. 1) should include each name (or new combination of original name) found on a specimen label. However, when we started
in the summer 2002 the computerisation of the MNHN collection with the Suboscines, only about half of the computerised names on the labels corresponded with a name in the taxonomic referential, showing the lack of synonyms in the latter. Therefore, we began to computerise the names cited in the two volumes of the Sharpe’s Catalogue of Birds in the British Museum dealing with Suboscines (Sclater, 1888 & 1890) and in the four Suboscines’ volumes of the Catalogue of Birds of the Americas (Hellmayr, 1924, 1925, 1927 & 1929). When these were added, more than 90% of the label names could be found in the referential.

3. Checking of published type catalogues

The third method for adding new names to the database is linked with an important goal of use of the taxonomic referential: the managing of bird types.

On bottom left of fig. 1, we show the four additional tables required for the computerisation of bird types. A bird type (TYPES) has a certain status (syntype, holotype,…), concerns a particular specimen preserved generally in a museum (MUSEUMS) in which it is identified with a catalogue number, has generally been the object of one or several revisions (REVISIONS) published in types catalogues (REFERENCES), has been collected at a given place or type-locality. The type-localities are stored in the same table (LOCALITIES) as used for the specimens without type status. Each record of the TYPES table is linked - by type definition - with a name of a species or subspecies in the taxonomic referential.

The screening of the type catalogues (cf. References part 3) led to a great number of additions to the referential. In the four examples given below extracted from the database, bird type data are written in bold.

Example 1: syntypes.

Chlorostilbon osberti Gould, 1860 (July)
“Descriptions of twenty-two New Species of Humming-Birds”

syntype BMNH 1888.7.25.93
syntype AMNH 38805
syntype USNM A20499
For type revision, see:

[not in Sibley & Monroe]
[cf. Howard & Moore, p. 149, right col. = Chlorostilbon canivetii osberti]
Example 2: holotype and paratypes.

*Megapodius cumingii talautensis* Roselaar, 1994
“Systematic notes on *Megapodiidae* (Aves, Galliformes), including the description of five new subspecies”

holotype SMTD C13098
paratype BMNH 97.5.12.22
paratype BMNH 97.5.12.23
paratype BMNH 98.4.29.24
paratype BMNH 1930.2.15.1
paratype MNHU 32283
paratype SMTD C13099
paratype SMTD C15419
paratype SMTD C15421
paratype SMTD C15422
For type revision, see:
Roselaar & Prins, 2000 (Nov. 23), Beaufortia, 50 (5): 95-126, see p. 100

[not in Peters et al.]
[not in Sibley & Monroe]

Example 3: lectotype and paralectotypes.

*Centropus celebensis* Quoy & Gaimard, 1830
Voy. Astrolabe, Zool., 1, p. 230, Atlas, Ois., pl. 20

lectotype MNHN 1997-1193
paralectotype RMNH 88168
paralectotype RMNH 88169
For type revision, see:

[cf. Peters et al., vol. 4, p. 76 = *Centropus celebensis celebensis* Quoy & Gaimard, 1830]
[cf. Sibley & Monroe, 1990, p. 104 = *Centropus (celebensis) celebensis* Quoy & Gaimard, 1830]
[cf. Howard & Moore, p. 121, right col. = *Centropus celebensis celebensis*]

Example 4: neotype.

*Turdus viscivorus* Linné, 1758 (Jan. 1)
Systema Naturae, Editio Decima, Tomus I, p. 168, gen. 95, sp. 1
neotype NMSZ 1956.065.3770
For type revision, see:

[cf. Peters et al., vol. 10, p. 206 = Turdus viscivorus viscivorus Linné, 1758]
[cf. Howard & Moore, p. 332, right col. = Turdus viscivorus viscivorus]

Table 1 gives the present amount of types databased for each museum.

<table>
<thead>
<tr>
<th>Museum</th>
<th>Country</th>
<th>Acronym</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Museum of Natural History</td>
<td>USA</td>
<td>AMNH</td>
<td>6741</td>
</tr>
<tr>
<td>United States National Museum</td>
<td>USA</td>
<td>USNM</td>
<td>4003</td>
</tr>
<tr>
<td>Museum of Comparative Zoology, Harvard University</td>
<td>USA</td>
<td>MCZ</td>
<td>1686</td>
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<tr>
<td>Nationaal Natuurhistorisch Museum Naturalis (ex Rijksmuseum van Natuurlijke Historie)</td>
<td>NL</td>
<td>RMNH</td>
<td>1235</td>
</tr>
<tr>
<td>Zool. Forschungsinstitut und Museum Alexander Koenig</td>
<td>D</td>
<td>ZFMK</td>
<td>1178</td>
</tr>
<tr>
<td>Museum National d’Histoire Naturelle</td>
<td>F</td>
<td>MNHN</td>
<td>595</td>
</tr>
<tr>
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<td>Russia</td>
<td>ZMMU</td>
<td>346</td>
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<td>NHM</td>
<td>298</td>
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<td>Zoölogisch Museum, Universiteit van Amsterdam</td>
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<td>ZMA</td>
<td>153</td>
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<tr>
<td>National Museum of Scotland</td>
<td>UK</td>
<td>NMSZ</td>
<td>105</td>
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<td>AU</td>
<td>ANWC</td>
<td>66</td>
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<td>Museum Zoologicum Bogoriense</td>
<td>Indonesia</td>
<td>MZB</td>
<td>38</td>
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<td>USA</td>
<td>FMNH</td>
<td>30</td>
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<td>AU</td>
<td>NMV</td>
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<td>WAM</td>
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<td>QM</td>
<td>13</td>
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<td>DK</td>
<td>ZMUC</td>
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<td>10</td>
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<td>Staatliches Museum für Tierkunde, Dresden</td>
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<td>SMTD</td>
<td>9</td>
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<td>Naturhistorisches Museum in Wien</td>
<td>O</td>
<td>NMW</td>
<td>7</td>
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<tr>
<td>Zool. Institut Rossiiskoi Akademii Nauk Sankt Peterburg</td>
<td>Russia</td>
<td>ZISP</td>
<td>4</td>
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<td>USA</td>
<td>CMNH</td>
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<td>AM</td>
<td>4</td>
</tr>
<tr>
<td>Museum für Naturkunde der Humboldt-Universität</td>
<td>D</td>
<td>MNHU</td>
<td>3</td>
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<tr>
<td>Queen Victoria Museum and Art Gallery</td>
<td>AU</td>
<td>QVM</td>
<td>2</td>
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<tr>
<td>Forschungsinstitut und Naturmuseum Senckenberg</td>
<td>D</td>
<td>SMF</td>
<td>2</td>
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<tr>
<td>Museo Civico di Storia Naturale Giacomo Doria</td>
<td>I</td>
<td>MCSNG</td>
<td>2</td>
</tr>
<tr>
<td>Liverpool Museum, National Museums and Galleries on Merseydide</td>
<td>UK</td>
<td>NML</td>
<td>1</td>
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<tr>
<td>Zoologische Staatsammlung München</td>
<td>D</td>
<td>ZSM</td>
<td>1</td>
</tr>
<tr>
<td>Musée Royal de l’Afrique Centrale</td>
<td>B</td>
<td>MRAC</td>
<td>1</td>
</tr>
<tr>
<td>Colección Ornitológica Phelps</td>
<td>V</td>
<td>COP</td>
<td>1</td>
</tr>
</tbody>
</table>
The following list gives the number of types localized but not databased until confirmation:

Adelaide 1; Amsterdam 2; Ann Arbor 21; Bélem 16; Berkeley 89; Berlin 436; Bogor 27; Bogota 2; Bonn 27; Bordeaux 37; Bremen 26; Brisbane 2; Brünswick 5; Bruxelles 48; Budapest 5; Buenos Aires 7; Bulawayo 5; Cambridge, UK 88; Cambridge, US 23; Charleston 3; Chicago 161; Cleveland 14; Coll. A. de W. Bertoni 34; Copenhagen 26; Darmstadt 6; Denver 7; Dresden 19; Dublin 1; Durban 1; Edinburgh 5; Firenze 1; Frankfurt 113; Geneva 1; Genova 6; Glasgow 2; Habana 11; Halberstadt 47; Halle 26; Hamburg 5; Hanoi 5; Harrison Mus. 3; Ithaca 4; Kingston 1; Lawrence 2; Leipzig 1; Leningrad 51; Leverian Mus. 10; Leiden 240; Lima 15; Liverpool 244; Los Angeles 32; Lost ? 275; Madrid 1; Manchester 2; Melbourne 1; Mexico 11; Miami 2; Montreal 1; Moscow 6; München 222; Neuchâtel 61; New York 676; Ottawa 4; Paris 808; Palo Alto 9; Pasadena 51; Perth 1; Perugia 3; Philadelphia 405; Pittsburgh 237; Port Moresby 3; Princeton 5; Rio de Janeiro 20; Rochefort 9; Roma 1; San Diego 9; San Francisco 17; San José 2; Santiago 49; São Paulo 12; Stockholm 291; Strasbourg 1; Stuttgart 4; Sydney 230; Tervuren 8; Toronto 5; Tring 7929; Turin 27; Upsala 10; Varsaw 43; Victoria, BC 2; Washington 53; Wien 165; Wisconsin Nat. Hist. Assoc. 1; Yale 1; Zürich 1.

4. Historical approach

Finally, the historical approach is the last method we follow to add new names to our referential. To achieve this, we went back to the start: the year 1758. The screening of early ornithological works results in a lot of synonyms to be added which are rarely mentioned in the literature. This bottom-up method (opposite to the top-down method provided by the systematic approach) allowed us also in databasing references of pre-Linnean works.

The five works of Linné published from 1758 contains the following numbers of genera and species names:

1. Linné, 1758. Systema Naturae, Editio Decima, Reformata
   Genera: 63 (+ 3 nom. emend.); Species: 554 (454 valid)
2. Linné, 1761. Fauna Svecica, Editio Altera, Auctior
   Genera: 0 new (+ 1 nom. emend.); Species: 221 (21 new; 3 valid)
3. Linné, 1764. Museum Adolphi Friderici, Tomi secvndi Prodromvs
   Genera: 3 new; Species: 31 (9 new; 2 valid)
4. Linné, 1766-1767. Systema Naturae, Editio Duodecima
   Genera: 75 (8 new; + 5 nom. emend.); Species: 936 (454 new; 273 valid)
   Genera: 0 new; Species: 20 (17 new; 9 valid)

For most of the species listed in these books, Linné also indicated the sources on which he based his descriptions. For example, his _Loxia caerulea_ scientifically described in 1758 was entirely based on plate 39 published by Catesby in 1731 (cf. example 1).
To account for all information given by these pre-Linnean sources, we extended the structure of our database with the three additional tables shown on right of fig. 3.

A source (Sources) is a Latin name and/or a vernacular name published in a book or an article of a journal (found in the tables Works & Articles, not shown on fig. 3) at a given date with references details (page, plate,…). Moreover, if this source is listed in the Sharpe’s Catalogue of Birds in the British Museum (CBBM), the volume and page of this catalogue where the source is mentioned, are also databased.

A scientific name of the referential (Taxonomic Referential) may be based on one or several sources (Sources) as well as on one or several others names of the referential (Taxonomic Referential), all listed in the table Taxon Sources. In the same way, a source (Sources) may be based itself on one or several sources (Sources) as well as on one or several names of the referential (Taxonomic Referential), all listed in the table Source Sources (cf. example 2).

**Example 1:** A scientific name and its source.

*Loxia caerulea* “Catesby” Linné, 1758 (Jan. 1)
Systema Naturae, Editio Decima, Tomus I, p. 175, gen. 96, sp. 29
Based on:
*Coccothraustes caerulea*, “The Blue Gross-beak - Gros-Bec bleu”

[cf. Peters et al., vol. 13, p. 241 = *Passerina caerulea caerulea* (Linné, 1758)]
[cf. Sibley & Monroe, 1990, p. 774 = *Guiraca caerulea* (Linné, 1758)]
[cf. Howard & Moore, p. 466, left col. = *Guiraca caerulea caerulea*]
Example 2: A vernacular name and its sources.

“Common Stare”
Based on:
“Storno” / Sturnus
Olina, 1622 Uccelliera, p. 18, pl. col.
“A Stare, or Starling” / Sturnus Aldrov. & aliorum
Ray, 1713 Syn. Meth. Avium Piscium, Sturni & congeneres, sp. 1, p. 67-68
“The Starling”
Sturnus vulgaris Linné, 1758 (Jan. 1)
Systema Naturae, Editio Decima, Tomus I, p. 167, gen. 94, sp. 1
“L’Étourneau” / Sturnus
Brisson, 1760 Ornithologie, vol. 2, gen. 26, sp. 1, p. 439
“Le Sansonnet ou Étourneau de France”
Daubenton, 1770 Planches enluminées, vol. 3, p. 212, pl. [71] 75
“L’Étourneau”

We generalized the concept of source for the books published after 1758 (post-Linnean) in which bird descriptions and plates are given without corresponding valid scientific Linnean binomina. These works provide actually all the keys to understand and establish synonymies as these first post-Linnean authors often described birds and gave scientific names with the same descriptions and plates as base as those published in the older works which do not accord the International Code of Nomenclature. For example, Daubenton’s 923 «planches enluminées» and the 1,159 corresponding vernacular names largely formed the basis of the scientific names published in the books written by Statius Müller (1776), Boddaert (1783), Gmelin (1788-89), and Latham (1790, 1801) (cf. example 3). In part 4.1 of the References, we list the books of which the contents have been databased.

Example 3: Synonyms based on same sources.

1. Turdus sordidus Statius Müller, 1776
   Linné Natursyst., Suppl., p. 143, sp. 51
Based on:
1. “Le Merle des Philippines”
   Daubenton, 1770 Planches enluminées, vol. 4, p. 130, pl. [45] 89
2. “La Brève des Philippines”

[cf. Peters et al., vol. 8, p. 321 = Pitta sordida sordida (Statius Müller, 1776)]
[cf. Sibley & Monroe, 1990, p. 331 = Pitta (sordida) sordida sordida (Statius Müller, 1776)]
[cf. Howard & Moore, p. 265, left col. = Pitta sordida sordida]
2. **Turdus brevicauda** Boddaert, 1783  
   Table Planches Enluminées, p. 6, sp. 89

Based on:
1. “Le Merle verd à teste noire des Moluques” / *Merula viridis atricapilla Moluccensis*  
   Brisson, 1760 Ornithologie, vol. 2, gen. 22, sp. 57, p. 319, pl. 32, fig. 2
2. “Le Merle des Philippines”  
   Daubenton, 1770 Planches enluminées, vol. 4, p. 130, pl. [45] 89
3. “La Brève des Philippines”  
4. “Short-tailed Crow, Var. A”  

[cf. Peters et al., vol. 8, p. 321, synonym = *Turdus sordidus* Statius Müller, 1776 = *Pitta sordida sordida* (Statius Müller, 1776)]  
[not in Sibley & Monroe]  
[not in Howard & Moore]  

3. **Corvus brachyurus** var. *philippensis* Gmelin, 1788  
   Systema Naturae, Editio decima tertia, Tomus I, pt. I, p. 375, gen. 50, sp. 15, ssp. 1

Based on:
1. “Le Merle verd à teste noire des Moluques” / *Merula viridis atricapilla Moluccensis*  
   Brisson, 1760 Ornithologie, vol. 2, gen. 22, sp. 57, p. 319, pl. 32, fig. 2
2. “Le Merle des Philippines”  
   Daubenton, 1770 Planches enluminées, vol. 4, p. 130, pl. [45] 89
3. “La Brève des Philippines”  

[cf. Peters et al., vol. 8, p. 322, synonym = *Turdus sordidus* Statius Müller, 1776 = *Pitta sordida sordida* (Statius Müller, 1776) ]  
[not in Sibley & Monroe]  
[not in Howard & Moore]  

We extended also the concept of bibliographic reference of a scientific name to its junior occurrences. We databased all the references of the names (or chresonyms) mentioned in the post-Linnean books listed in the bibliography part 4.2 (cf. example 4).

**Example 4:** Sources and chresonyms.

**Colymbus auritus** Linné, 1758 (Jan. 1)  
Systema Naturae, Editio Decima, Tomus I, p. 135-136, gen. 68, sp. 3

Based on:
1. “The Didapper or Dipper or Dobchick or Doucker or small Loon” / *Colymbus sive Podiceps minor*
Ray, 1713 Syn. Meth. Avium Piscium, Palmipedes Tetractylæ [...] Colymbi dictæ, sp. 3, p. 125
Sloane, 1725 Nat. Hist. Jamaica, Chap. III. Of Water-Fowl, or such as are Web-footed and Swim, vol. 2, sp. 4, p. 322-323, pl. 271, fig. 1
3. “The Dobchick” / *Colymbus minor*
Albin, 1734 Nat. Hist. Birds [Albin], vol. 2, p. 70, pl. 76
4. *Colymbus pedibus lobato-divisis; capite rufo*
Linné, 1746 Fauna Svecica, sp. 123, p. 45
5. “The Eared Dobchick” / *Podiceps, auritus*
Edwards, 1747 Nat. Hist. Birds [Edwards], pt. 2, p. 96, pl. 96, fig. left
6. “The Eared or Horned Dob-chick” / *Colymbus auritus & cornutus, minor, Canadensis*

Junior references:
2. Linné, 1761 Fauna Svecica, Editio Altera, Auctior, p. [xxiii & cf. p. 53-54], sp. 152
4. Linné, 1766 Systema Naturae, Editio Duodecima, Tomus I, p. 222-223, gen. 75, sp. 8
5. Scopoli, 1769 Annum I Hist.-Nat., p. 77, gen. 24, sp. 100
6. Boddaert, 1783 Table Planches Enluminéez, p. 24, sp. 404.2
7. Pallas, 1811 Zoographia Rosso-Asiatica, Tomus II, p. 356-357, sp. 410

[cf. Peters et al., vol. 1, p. 149 = *Podiceps auritus auritus* (Linné, 1758)]
[cf. Sibley & Monroe, 1990, p. 296 = *Podiceps auritus* (Linné, 1758)]
[cf. Howard & Moore, p. 6, right col. = *Podiceps auritus*]

Conclusion

We described four working methods to increase the quantity of bird names and the taxonomic quality of the MNHN referential. We intend to continue in the future applying the same methods. The continuing computerisation of the MNHN collection is a good reason to search for names corresponding to those written on the specimens labels. We will continue also to check other published bird type catalogues. We found a number of these already and adding them could supplement our database with 4,500 names. Finally, with our historical approach as basis, we plan to include all the names published before 1808, the birth date of the American ornithology, a goal to be reached by 2005.

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