The Ogygoptyngidae, a new family of owls from the Paleocene of North America

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When *Ogygoptynx wetmorei* was reported by Rich & Bohaska (1976), it appeared to represent a unique and new avian group. Detailed comparisons of this Early Paleocene form from Colorado (USA) have clearly demonstrated that it is distinct from North American protostrigids and all European Palaeogene owls and that it is intermediate between the modern typical owls (Strigidae) and barn owls (Tytonidae). A new monotypic family of owls, the Ogygoptyngidae, is proposed to include this form.

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WHEN *Ogygoptynx wetmorei* was reported from sediments of Tiffanian (mid-Paleocene) age in southwestern Colorado, it was recognized as a mosaic intermediate between the two extant families of owls (Rich & Bohaska, 1976), sharing some character-states with the Strigidae, others with the Tytonidae, while retaining some unique character-states of its own. Rich & Bohaska (1976) reserved judgement on setting up a new family for *Ogygoptynx* until the Early Tertiary owl material from Europe (see Fig. 1) could be examined in order to determine to what strigiform group that material should be allied, and if in fact it had any relationship to *Ogygoptynx*. In this paper that Early Tertiary European owl material is examined and its affinities to *Ogygoptynx*, known only from the tarsometatarsus of the holotype (Fig. 2, AMNH 2653), are determined. As a result of this study, a new avian family, the Ogygoptyngidae, is proposed and diagnosed.

Abbreviations used include: AMNH, American Museum of Natural History, Department of Vertebrate Paleontology, New York; PM and PMQu, Muséum National d'Histoire Naturelle, Paris. Terminology follows that in Howard (1929).

The Early Tertiary record of owls in Europe

Although Rich & Bohaska (1976) compared *Ogygoptynx* in detail with all of the North American fossil owls (Protostrigidae, Strigidae, and Tytonidae), they were unable to complete comparisons with the Palaeogene European owls (placed in the Strigidae), a step necessary in order to determine whether *Ogygoptynx* rated a distinct family.

Brodkorb's summary (1971) reports a number of Palaeogene owls from Europe (see Fig. 1) but only the following are known from tarsometatarsi and thus are directly comparable to *Ogygoptynx: Necrobyas harpax; N. rossignoli; N. edwardsi;* and *Asio* (originally placed in the genus *Otus*) *henrici*. All are from the Late Eocene or Early Oligocene of France and were originally described by Gaillard (1939) and Milne-Edwards (1892). Also represented by tarsometatarsi are the Early Miocene (Aquitanian) *Paratyto* (originally placed in *Bubo*) *arvernensis* and *Prosbybris antiqua* from France. Although of Neogene age, their mosaic nature (Brodkorb, 1970) makes a comparison with *Ogygoptynx* necessary.

Tables 1 and 2 compare all of the European forms known from tarsometatarsi with *Ogygoptynx*, both qualitatively and quantitatively, and it is clear that *Ogygoptynx* is distinct from these European species. This information, added to the analysis presented by Rich & Bohaska (1976), indicates that *Ogygoptynx* merits family-level distinction.

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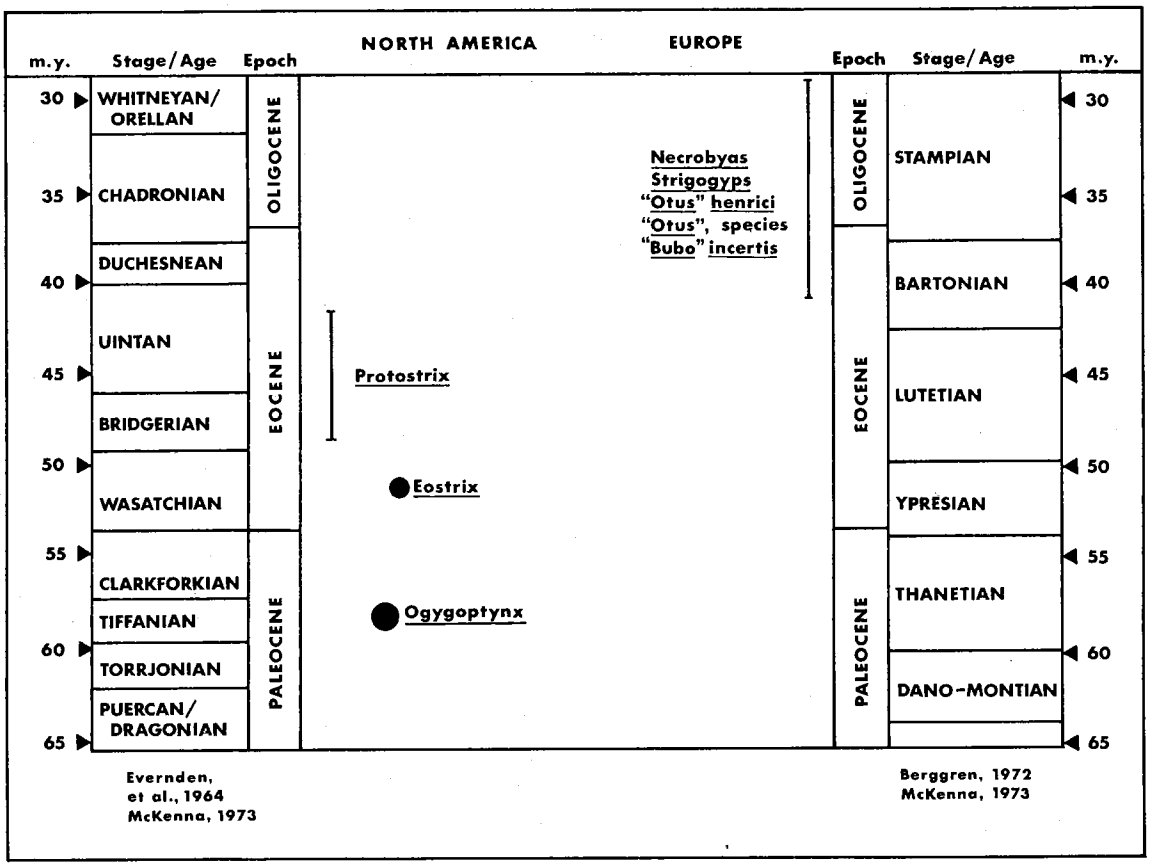

Fig. 1. Stratigraphic distribution of Paleogene owls. Modified after Rich & Bohaska (1976).

Systematics

Class AVES

Order STRIGIFORMES

Family OGYGOPTYNGIDAE nov.

Type genus. Ogygoptynx Rich & Bohaska 1976.

Diagnosis. (Characters of the single referred species, *O. wetmorei* Rich & Bohaska 1976). Resembles species in the Tytonidae (including the Phodilinae) and differs from those of the Strigidae in that tarsometatarsus lacks a supratendinal bridge on the proximal end; three known living strigids also lack this bridge (Ford, 1967); posterior metatarsal groove not separated from the proximal articular surface by a bony ledge; the anterior metatarsal groove is deep across entire width of shaft at the proximal end.

Differs from species in the Phodilinae and Strigidae but resembles those in the Tytonidae in that tarsometatarsus is elongate and slender; posterior metatarsal groove is only slightly excavated, lacking lateral wall near proximal end.

Resembles species in the Phodilinae and is intermediate between those in the Strigidae and Tytonidae in having a shallow groove developed slightly lateral to the intercotylar prominence.

Resembles species of the Strigidae and differs from those in the Tytonidae in that the intercotylar area is shallow anteroposteriorly, in part due to the intercotylar prominence not protruding anterior to cotylar margins; the distal margin of outer trochlea (viewed laterally) is flattened and only slightly rounded, not grooved; and the outer trochlea (viewed laterally) is only slightly curved.

Differs from species in the Protostrigidae with a known tarsometatarsus (Rich, 1980) in that the distal margin of the outer trochlea (viewed laterally) is flattened rather than gently rounded; inner trochlea extends much farther distal than middle; in distal view, trochlea IV is waisted near

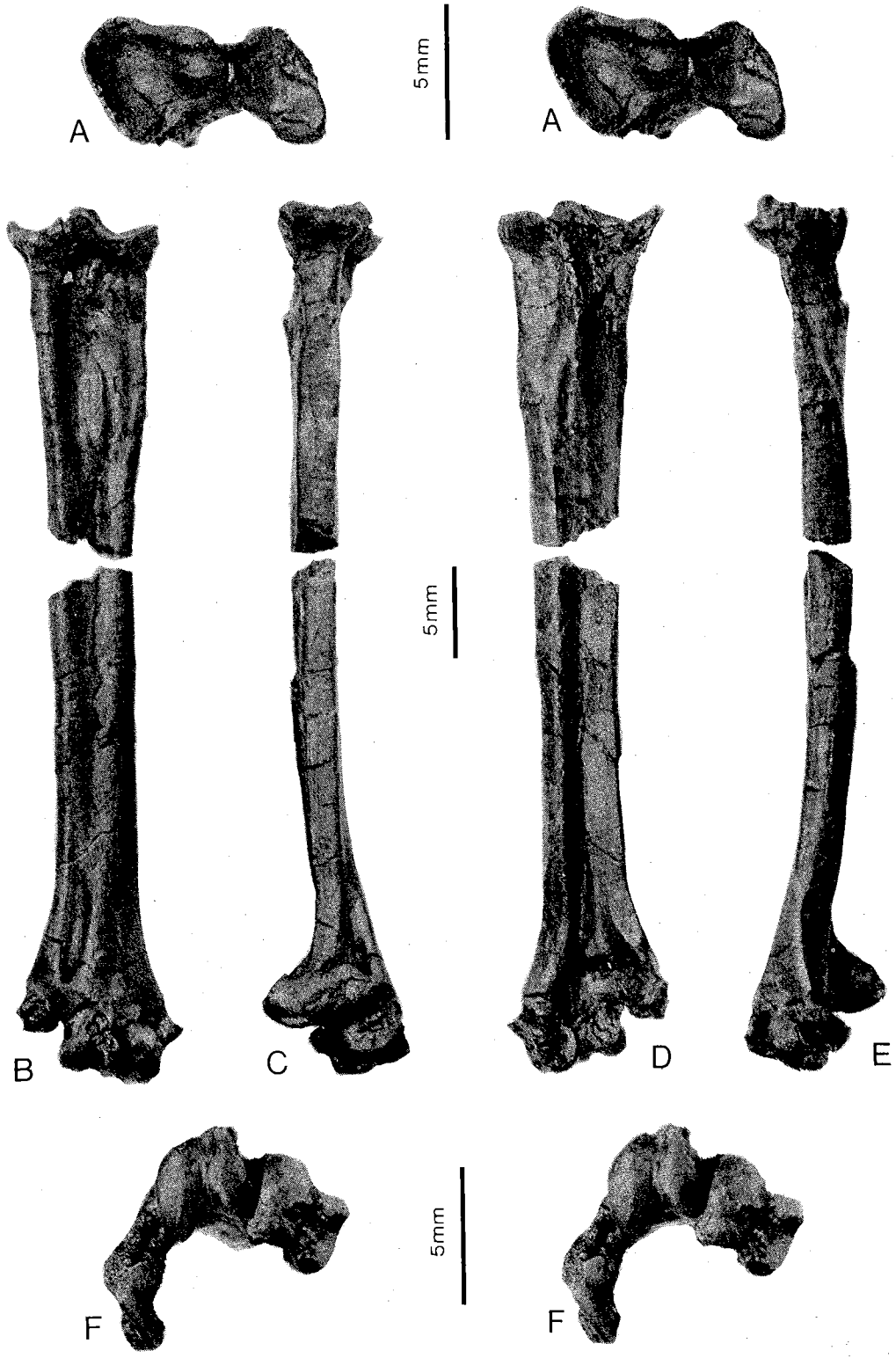

Fig. 2. Ogygoptynx wetmorei (AMNH 2653), holotype left tarsometatarsus, from Mason Pocket, 6.5-8 km north of Tiffany, La Plata County, southwestern Colorado; Tiffanian, mid-Paleocene; North America. A, proximal (stereo); B, anterior; C, lateral; D, posterior; E, medial, and F, distal (stereo).

Character	*Ogygoptynx wetmorei* AMNH 2653	*Necrobyas harpax*
PROXIMAL END		
1. Intercotylar prominence	Occupies anterior margin of proximal end; not protruding anterior to cotyla	Occupies most anterior part of proximal end; protrudes anterior to cotyla (T)
2. Anteroposterior 'width' across intercotylar area	Narrow (S)	Narrow (S)
3. Groove lateral to intercotylar prominence	Indicated moderately, intermediate between Strigidae and Phodilinae	Indistinct (T)
4. Supratendinal bridge	Not ossified (T, S)	?Possibly not ossified (T, S)
5. Width of calcaneal canal	Wide? (S)	Of moderate width (S)
6. Orientation of external cotyla	Directed laterally	Directed posteriorly (T)
7. Degree of excavation of posterior metatarsal groove	Slightly excavated (T)	Slightly excavated (T)
8. Degree of separation of posterior metatarsal groove and proximal articular surface	No bony ledge present (T)	No bony ledge present (T)
9. Depth of anterior metatarsal groove near proximal end of tarsometatarsus	Deep across full width of proximal end, undercuts cotylar area (T)	Deep across full width of proximal end, undercuts cotylar area (T)
10. Lateral wall of posterior metatarsal groove (near proximal end)	Absent (T)	?
11. Lateral margin of external cotyla (in lateral view)	Tilted dorsally towards posterior (S)	Tilted only slightly dorsally towards posterior (T)
DISTAL END		
12. Relative distal extension of trochlea	Inner trochlea extends much further distal than middle	Inner trochlea extends slightly further distally than middle (T)
13. Groove on middle trochlea	Anterior part not noticeably grooved, blends smoothly into shaft (T, P)	Anterior part not noticeably grooved (T, P)
14. Shape of outer trochlea in lateral view	Distal margin moderately rounded	Distal margin flattened (S)
15. Curvature across trochleae in distal view	Moderately curved; channel created by such curvature deep; outer trochlea only slightly curved	Very highly arched; outer trochleae highly curved (T)
16. Depth of trochlea IV relative to II (in distal view)	Trochlea IV deeper than II, of moderate depth	Trochlea II and IV of nearly equal depth, but IV slightly deeper (unique among T, S)
17. Length and proportions of wing on trochlea II (in distal view)	Of moderate length but very broad, not slender	Wing elongate and slender (T, S)
GENERAL		
18. Proportions of tarsometatarsus	Elongate, slender (T)	Short, stout (S)

Table 1. Comparison of the tarsometatarsi of the Palaeogene owls of Europe with the holotype tarsometatarsus of *Ogygoptynx wetmorei.* Abbreviations indicate familial similarity: O, *Ogygoptynx;* P, Protostrigidae; S, Strigidae; T, Tytonidae. Where these abbreviations are used, similarity to those groups is indicated. Rich & Bohaska (1976) have similarly summarized North American and living Strigiformes.

Necrobyas rossignoli Cast of type PMQu 3198	*Necrobyas edwardsii* (Based on Gaillard, 1939)	*Asio (Otus) henrici* PMQu 3117-3118
Same as *Otus henrici* (T, S)	Occupies most anterior part of proximal end; protrudes only very slightly, if at all anterior to cotyla (T)	Occupies anterior margin as well as middle part of mid-line of proximal end; protrudes as far anteriorly as internal cotyla; intermediate (T, S)
Narrow (S)	Narrow (S)	Narrow (S)
Distinct, but shallow (S)	?	Distinct, but shallow (S)
Probably not ossified (T, S)	?Probably not ossified (T, S)	Probably not ossified (T, S)
Wide and deep (S)	Of moderate width (S)	Wide and deep (S)
Directed posteriorly (T)	Directed posteromedially	Directed posteriorly (T)
Moderately excavated Intermediate between S and T/O	?	Moderately excavated Intermediate between S and T/O
No bony ledge present (T)	?	No bony ledge present (T)
Of moderate depth across most of width, undercuts cotylar surface (T)	Appears to be deep across at least ¾ of proximal end (T)	Of moderate depth across most of width, undercuts cotylar surface (T)
Not well defined; intermediate between S and T/O	?	Not well defined; intermediate between T-S
Tilted only slightly dorsally towards posterior (T)	Tilted only slightly dorsally towards posterior (T)	Tilted only slightly or markedly dorsally towards posterior (T, S)
Inner trochlea extends slightly further distally than middle (T)	Trochlea II and III nearly same length or II only very slightly longer than III (T)	Inner trochlea extends slightly further distally than middle (T)
—	?	Anterior part not noticeably grooved (T, P)
Distal margin with slight groove	?	Distal margin with distinct groove (T)
Highly arched; outer trochlea moderately curved (T)	Highly arched; outer trochlea moderately curved (T)	Highly arched (T, P); outer trochlea slightly curved (T)
—	Trochlea IV distinctly deeper than II	Trochlea IV deeper than II, both are extremely deep
—	Wing elongate and slender (T, S)	Wing elongate and slender (T, S)
Short, stout (S)	Short, stout (S)	Short, stout (S)

Table 1 — continued

Measurement	*Ogygoptynx wetmorei* AMNH 2653	*Necrobyas harpax* Milne-Edwards 1892	*Necrobyas rossignoli* Milne-Edwards 1892	*Necrobyas edwardsii* Gaillard 1939	*Asio (Otus) henrici* PMQu 3117	PMQu 3118
1. Total length	@48.2	(37)	(32.0)	(41)	34.4 (34)	33.7
2. Proximal width	9.0	(8.5)	(9.0)	(10)	8.0 (8.)	8.2
3. Depth internal cotyla	5.1	–	–	(5.7)	5.0	5.1
4. Depth external cotyla	4.9	–	–	(4.2)	5.4	5.2
5. Maximum depth proximal end (including calcaneal ridge)	–	–	–	–	7.9	–
6. Depth across intercotylar prominence	@3.0 (cast)	–	–	(@3.4)	3.4	3.6
7. Width distal end	9.4	(10.0)	(9.3)	(11)	9.1 (9.)	8.8
8. Maximum depth						
Trochlea II	3.6	–	–	–	5.4	5.6
Trochlea III						
Internal	3.5	–	–	–	3.1	3.1
External	3.9	–	–	–	4.2	4.1
Trochlea IV	4.0	–	–	–	–	4.3
9. Width trochlea III	@3.4 (cast)	–	–	–	3.7	3.6

Table 2. Measurements (in mm) of tarsometatarsi of *Ogygoptynx wetmorei* and European Palaeogene owls. Measurements in parentheses are those given by Milne-Edwards (1892) or Gaillard (1939) or taken on figures in those publications.

anteroposterior midpoint, not remaining much the same width throughout; lacks well-developed and narrowed wing on trochlea II (see Rich & Bohaska, 1976, for broad comparative summary of these characters, especially pointing out the similarities of the species of protostrigids to *Ogygoptynx wetmorei*).

Differs from *Asio henrici* and *Necrobyas rossignoli* in that trochlea II extends beyond trochlea III distally; anterior shaft surface just proximal to trochleae II and III planar, flattened, not rounded; distal foramen (viewed anteriorly) is displaced farther laterally; in lateral view, trochlea IV lacks distal groove; in distal view, trochleae II and IV (IV not preserved in *N. rossignoli*) are neither as deep, nor as mediolaterally compressed and trochleae not as highly arched; trochlea IV waisted significantly and not concave medially; trochlea III of similar depth both medially and laterally, not decidedly deeper laterally (see Table 1).

Further differs from *Asio henrici* in that in medial view, wing of trochlea II apparently relatively shorter.

Differs from *Necrobyas edwardsi* and *N. harpax* in having a broader medial trochlea (II); trochlea II protrudes farther internally, and internal border of trochlea II is deeply concave, not straight; trochlea II extends distal to III instead of being of about equal length; trochlea II not narrowed posteriorly into a wing but broad throughout; in lateral view, trochlea IV arises more abruptly posteriorly from shaft; in distal view, trochleae not as highly arched, and thus distal end not as deep.

Differs from all species of *Necrobyas* and *Asio henrici* in being elongate and slender, not short and robust.

Differs from *Paratyto arvernensis* (Milne-Edwards, 1869-1871, pl. 192) from the Aquitanian of France in being more

gracile and elongate; in proximal view the proximal articular surfaces are shallower and the intercotylar prominence is displaced farther posteriorly, not protruding anterior to articular surfaces; in anterior view, trochlea II is more elongate than trochlea III, not shorter; in distal view, trochlea II is much broader and does not extend as far posteriorly, not narrowing posteriorly to a distinct wing; channel formed by posterior extensions of trochleae II and IV not as enclosed, trochleae not as highly arched.

In addition to the Palaeogene European material and *Paratyto,* Rich & Bohaska (1976) also noted some similarities of *Ogygoptynx* to the early Neogene *Prosbybris antiqua* (=*Strix antiqua*; Milne-Edwards, 1869-1971) from France. Further comparisons have shown that *Prosbybris antiqua* is distinct from *Ogygoptynx wetmorei* in having a decidedly deeper proximal end that is more mediolaterally compressed; a distal end that is more highly curved (in distal view); a shallower but deeper trochlea II; and in anterior view, a trochlea II that is neither as elongate as nor as broad as trochlea III.

Discussion and conclusions

As Rich & Bohaska (1976) pointed out, *Ogygoptynx* appears to be an owl distinct from the Strigidae, Tytonidae and North American Protostrigidae. Comparisons in this paper have shown it additionally to be clearly distinct from or incomparable with other Palaeogene owls of Europe: *Bubo incertus, Asio henrici,* and species of *Necrobyas* and *Strigogyps*. Furthermore, it is distinct from both *Prosbybris antiqua* and *Paratyto arvernensis,* two European Neogene owls now placed close to the Phodilinae (or Phodilidae of Brodkorb, 1971) and Tytonidae.

Although *Ogygoptynx* is morphologically more similar to members of the Strigiformes than to any other avian group, it shows a unique combination of characters within this group that are a mixture of tytonid, strigid and protostrigid features. It also possesses some unique characters of its own. Because it is not clearly allied to any of the known owl families, it appears best at this point to acknowledge this fact by setting up a new family of birds, the Ogygoptyngidae, to include this form. Because *O. wetmorei* is represented by only a tarsometatarsus, it is presently impossible to determine the phylogenetic position of *Ogygoptynx* within the Strigiformes. Besides needing more complete material of *O. wetmorei,* a thorough review is needed of all the families of owls, both fossil and recent, especially the Palaeogene European material. Our study has been based on an examination of the European type material only, and a more thorough look at all of the referred and unstudied European fossil owl material would be worthwhile. The European material, as Table I indicates, does not clearly fall into any one of the known owl families. Although not referable to the Ogygoptyngidae, this material has interesting implications for early evolutionary patterns within the Strigiformes.

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