PLIO-PLEISTOCENE BIRD REMAINS FROM THE CARPATHIAN BASIN III.
STRIGIFORMES, FALCONIFORMES, CAPRIMULGIFORMES, APODIFORMES

Dénes Jánossy

In two previous papers I dealt with the Galliform birds of the corresponding territory and age. Among the Plio-Pleistocene bird remains of the Carpathian Basin no other order of birds has the same systematico-stratigraphical significance as the chikenlike birds. While the remains of the latter order occur regularly and often in large quantities in faunas which contain birds at all, the bones originating from other orders are generally sporadical and occasional.

I chose for the next chapter the description of the remains of birds of four different orders; three of them are in the opinion of recent zoologists strongly related on the basis of etological-phenological arguments the owls (Strigiformes), the nightjars (Caprimulgiformes) and the swifts (Apodiformes). Against a series of anatomical and ethological resemblances these relation-

Fig. 1. Scatter diagram showing the ratio of length (perpendicular axis) and width of diaphysis (horizontal axis) of the tarso-
metatarsi of fossil and recent Surnia species
1. Surnia ulula, Upper Pleisto-
cene ans recent; 2. Surnia ro-
uesta n. sp., Loc. 3. Villány,
Lower Pleistocene

1. ábra. A csoonthossz (füg-
gőleges tengely) és diaph-
ysis-szélesség (vizesintes-
tengely) adatainak szórásdia-
gramja (mm) fosszilis és recens karvalybaglyok láb-
középcsontján
1. Surnia ulula, felsőpleisztocén
és recens; 2. Surnia robusta n.
sp., Villány 3, alsó-pleisztocén
ships are not supported osteologically. On the other hand, the (diurnal) birds of prey (Falconiformes) and the owls (Strigiformes) are despite numerous anatomical and ethological differences, osteologically related, moreover there are in some groups „transitional” features: e.g. in the osprey (Pandion haliaetus) which has no framen on the anterior surface of the femur but possesses a bony bridge over the extensor groove in the tarsometatarsus and the fourth digit of the pes is reversible, all typical features of the owls. These facts speak on the one hand for a very old (Lowest Tertiary) but in their roots strong relationship of the two latter orders and on the other for a mosaic-like evolution of different details of the body of all orders under discussion. Therefore I agree with Dementiew (1951) who emphasizes (not on the basis of osteological investigations!) the numerous characteristics of owls in common with diurnal raptors with those of e.g. the goatsuckers being only convergencies.

In other respects the owls, the birds of prey, as well as the swifts and the nightjars are osteologically well circumscribed groups and the determination of the members of these orders is quite unambiguous.

Order: Strigiformes
Family: Strigidae
Genus: Surnia
Surnia robusta n. sp.
(Fig. 1-2-3. and 5/9-10-11)

Fig. 2. Surnia robusta n. sp., right tarsometatarsus from Loc. 3. Villány, type of the species
a) dorsal; b) ventral; c) proximal; d) distal view. Pinxit I. Richter
2. ábra. Surnia robusta n. sp., jobb oldali lábközépsontja Villány 3. lelőhelyről (a faj típusa)
a) dorzáis; b) ventráis; c) proximális; d) distális nézetben.
Richter Ilona grafikusművész rajza

Fig. 3. Surnia robusta n. sp., right humerus, medial view, Loc. 3. Villány.
Pinxit I. Richter
3. ábra. Surnia robusta n. sp., jobb oldali felkarcsont mediális nézetben, Villány 3. lelőhely
Richter Ilona grafikusművész rajza
Derivatio nominis: robusta, named after the Latin: robustus = strong, large, due to the huge dimensions.

Diagnosis: A large Surnia species, larger than the hitherto known recent and fossil forms of the genus.

Type-locality: Karst fissure of the Locality Villány 3., mts Villány, Southern Hungary.

Type-level: Lower Pleistocene („Middle Villafranchian”, „Upper Villányian”).


Paratype: Proximally and distally slightly damaged right humerus, from the same locality.

Further material:
Loc. Villány 3 („Villány-Kalkberg” „Villány-Süd” in older literature); besides the type and paratype:

Three dist. fragments of tibiotarsi; five fragments of tarsometatarsi; one mt₃, three phalanx I digit 1 posterior; two phal. 1. digit 2. post., 4 phal. 2. dig. 2. post; 2 phal. 1 dig. 3; 2 phal. 2 dig. 2; three phal. 3 dig. 3, three phal. 4. dig. 4; nine ungual phalanges.

Loc. „Villány-Nagyharsány-hegy”, leg. Kormos (according to literary data, it is undeduced from which one of the hither known four fissures of the eastern quarry of the Nagyharsány-hegy the material originates; see Kretzoi, 1956): Cranial fragment of the coracoideum; three scapularfragm., two dist. fragm. of humeri: three proximal and one distal fragm. of carpometacarp; two phalanx 1 digit. 2 anterior; dist. fragm. of femur; five dist. fragm. of tibiotarsi; four different fragm. of tarsometatarsi; three phalanges 2 dig. 2 posterior; phal. 2 dig. 3 posterior; phal. 3 dig. 3 post.;


This rich material, containing nearly seventy bones of nearly all anatomical regions, allows a satisfactory analysis and description of the new form.

For a detailed analysis, the type-specimen, the intact tarsometatarsus, is the most convenient. I compared it in detail with the same bone of all European Strigiformes as well as with extra-European ones available in the collections of the British Museum (Nat. Hist.), London and in the Humboldt Museum, Berlin.

A comparison with the corresponding bone of the following species was possible: Otus scopus and brucei, Bubo virginianus, Nyctea nyctea, Surnia ulula, Glaucidium passerinum & brasillianum, Athene noctua, Strix aluco, wralensis and nebulosa, Aegolius funereus, Asio otus and accipitrinus, Pulsatrix perspicillata, Ninox novaeselandiae, Gymnoglaux lawrencii, Speotyto cunicularia, Ciccaba virgata, Rheoptyns clamator, Ketupa ketupu, Scotopelia peli, Jubula letti, Minimuku gurney, Pseudoptynx philippensis, Lophostrix cristata, Micathene whitney, Uroglaux dimorpha, Seioglaux albifacies, Pseudoscops grammicus and Nesasio solomonensis.

The stout form and size of the bone delimits it from most recent and fossil species. Although there are some morphological resemblances with certain
Table 1.

Measurements of the tarsometatarsi of middle-sized owls [only extra-European species, measured in the collection of the British Museum (Natural History)]

<table>
<thead>
<tr>
<th>Owls</th>
<th>Length</th>
<th>Proximal width (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ketupa ketupu</td>
<td>67</td>
<td>14</td>
</tr>
<tr>
<td>Pulsatrix perspicillata 1</td>
<td>56</td>
<td>14</td>
</tr>
<tr>
<td>Pulsatrix perspicillata 2</td>
<td>53</td>
<td>14</td>
</tr>
<tr>
<td>Ninox novaeseelandiae</td>
<td>35</td>
<td>7</td>
</tr>
<tr>
<td>Gymnoglaux lawrencii</td>
<td>38</td>
<td>6</td>
</tr>
<tr>
<td>Speotyto curiculata</td>
<td>49</td>
<td>8</td>
</tr>
<tr>
<td>Cicaba virgata</td>
<td>46</td>
<td>9</td>
</tr>
<tr>
<td>Rhiophtyxx clamator</td>
<td>55</td>
<td>13</td>
</tr>
<tr>
<td>Scopofelia peli 1.</td>
<td>70</td>
<td>15</td>
</tr>
<tr>
<td>Scopofelia peli 2.</td>
<td>75</td>
<td>13</td>
</tr>
<tr>
<td>Jubula letitii 1.</td>
<td>42</td>
<td>4</td>
</tr>
<tr>
<td>Jubula letitii 2.</td>
<td>40</td>
<td>6</td>
</tr>
<tr>
<td>Mimizuuku gurney</td>
<td>58</td>
<td>8</td>
</tr>
<tr>
<td>Pseudoptyxx philipensis</td>
<td>78</td>
<td>10</td>
</tr>
</tbody>
</table>

genera, e.g. with the Palearctic Nyctea (viz. metrical-proportional relations) and with some other ones, e.g. the Neotropical Pul-satrix (former Cicaba) perspicillata and Rhi-optyxx (former ,,Asio") clamator, the morphological relations seems closest with the tarsometat-arsus of the monotypical species Surnia ulula.

I submit in table 1, for orientation, the length and the width on the narrowest point of the tarsometatarsi of the owl species in the size category of our fossil specimens.

On the other hand, a metrical comparison of the tarsometatarsus of Villány with that of 34 Upper Pleistocene and of recent specimens of the Hawk-Owl, given in a scatter diagram (see Fig. 1), proves unambiguously a statistically supported absolute difference in size (27% larger than the largest plusvariant of the recent form). In other respects the morphological resemblance of the tarsometatarsus of the new species and of Surnia ulula is in all details very close. The shape of the bone, from all details of the proximal and distal epiphysis to the form and width of the bony bridge over the extensor groove etc., shows such a close resemblance that there is no problem of a generic assignment.

The humerus — the most complete bone beside the tarsometatarsus — shows also unambiguously the generic features of Surnia; the strongly curved diaphysis, the elongated crista pectoralis, the widening of the distal epiphysis etc. speak all for this relegation.

The measurements of phalanges (see table 2.) evince that these bones are of the size of those of Strix uralsis, but with a stouter form, characteristic for the phalangeal of the hawk owl (Surnia ulula) with smaller dimensions.

Although the generical characters of some other bones are not so pronounced, one relegate them to the same form owing to the near size category and proportions. As shown in table 2, all remains of the fossil form are absolutely larger than those of typical recent species. However, the differences in size as well as the proportions are not in each case the same. The humerus of the fossil species is larger only by 23% than that of the recent form, the phalanx 1. digit 2 anterior by 32%, the phalanx 1. digit 1 posterior by 40% etc. Thus the differences are mosaic-like and their proportions different.

Hitherto only one fossil species of the genus was described: Surnia capeki Jánossy, 1972, in the same size category as the recent birds, differing only in proportions and originating from the Middle Pleistocene (Stránská Škála).
with the *Coea* (viz., *portional* and with ones, e.g., *Pul- 

*Carpoetacarpus*:
Surnia robusta n.sp. 11.0–11.5 8.8
(n = 2) 

Surnia ulula, recent

Phal. 1, digiti 2. anterior:
Surnia robusta n.sp. 21.3–22.6 12.6–15.0
12.6–15.0
(n = 36)

Phalax 1, digiti 1. posterior:
Surnia robusta n.sp. 12.9–14.0 12.6–15.0
(n = 4)

Surnia ulula recent
Phal. 1, dig. 2. post.:
Surnia robusta n.sp. 8.5–9.0 9.0–10.5
6.6
(n = 2)

Surnia ulula recent
Phal. 2, dig. 2. post.:
Surnia robusta n.sp. 15.0–15.6 9.0–10.5
(n = 6)

Surnia ulula recent
Phalax 1, dig. 3. post.:
Surnia robusta n.sp. 7.5–7.8 4.0–4.3
(n = 2)

Surnia ulula recent
Phal. 2, dig. 3. post.:
Surnia robusta n.sp. 5.2
7.5–9.0
(n = 3)

Surnia ulula recent
Phal. 3, dig. 3. post.:
Surnia robusta n.sp. 14.6–18.0 12.6–16.0
(n = 2)

Surnia ulula recent
Phal. 4, dig. 4. post.:
Surnia robusta n.sp. 12.1–12.6 4.0(2×)
(n = 3)

Surnia ulula recent

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Length</th>
<th>Prox. width</th>
<th>Dist. width</th>
<th>Width of diaphysis (middle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humerus:</td>
<td>± 100</td>
<td>18</td>
<td>15.5–16.0</td>
<td>6.7</td>
</tr>
<tr>
<td>Surnia robusta n.sp.</td>
<td>67–72</td>
<td>12</td>
<td>11</td>
<td>4.8</td>
</tr>
<tr>
<td>Surnia ulula, recent</td>
<td>11.0–11.5</td>
<td>8.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surnia ulula, recent</td>
<td>21.3–22.6</td>
<td>12.6–15.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>14.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>37.2</td>
<td>12.6</td>
<td>12.6–15.0</td>
<td>7.3</td>
</tr>
<tr>
<td>Surnia ulula, Upper Pleistocene</td>
<td>23–27</td>
<td>9–10</td>
<td>9.0–10.5</td>
<td>5.0–6.5</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>12.9–14.0</td>
<td></td>
<td></td>
<td>2.5–3.8</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>10.0</td>
<td></td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td>Sturnia ulula recent</td>
<td>8.5–9.0</td>
<td></td>
<td></td>
<td>4.6–4.8</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>6.6</td>
<td></td>
<td></td>
<td>3.5</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>15.0–15.6</td>
<td></td>
<td></td>
<td>4.0–4.3</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>12.0</td>
<td></td>
<td></td>
<td>2.8</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>7.5–7.8</td>
<td></td>
<td></td>
<td>4.8–5.1</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>5.2</td>
<td></td>
<td></td>
<td>4.9</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>7.5–9.0</td>
<td></td>
<td></td>
<td>4.5–5.0</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>5.7</td>
<td></td>
<td></td>
<td>3.3</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>14.6–18.0</td>
<td></td>
<td></td>
<td>4.0(2×)</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>12.2</td>
<td></td>
<td></td>
<td>2.9</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>12.1–12.6</td>
<td></td>
<td></td>
<td>2.8–3.6</td>
</tr>
<tr>
<td>Surnia ulula recent</td>
<td>9.0</td>
<td></td>
<td></td>
<td>2.1</td>
</tr>
</tbody>
</table>
The above described material of the new species (*Surnia robusta*) is strictly confined to the Lower Viz. Lowest Pleistocene of our area.

From an ecological point of view it may be of interest that the recent monotypical species lives today in the northern forest zone (taiga zone) of Eurasia and North America and in the mountain zone (mountain forest subzone) of especially central Asia. Migrations to the south are very limited.

It is a question whether the Upper Pleistocene form had the same ecological significance, in view of the fact that most of the remains originate — as we have seen — from the Submediterranean region of the Villány Mountains.

Genus: *Bubo*  
*Bubo aff. bubo* Linné  
(Fig. 5/4—5—6—7 and —8).


Osztramos 7, age: Lowerest Pleistocene, leg. JÁNOSZY, 1971:

Phala Csákvar  
Accor conventional owl. The recent eagle group Collektic Budapest, the piece geologic

Genus *Asio*  
Mater (Betilia...
Püsöpkfürdő 2 (=Befia 2), age: Middle Pleistocene, leg.: KORMOS: prox. fragm. of coracoideum; prox. fr. of phal. 2 dig. 2 posterior, phalanx 1 digit 2 posterior.


Most of the enumerated fragmentary bones are not sufficient for a further taxonomical relegation. The measurements of the fragmentary bones and chiefly phalanges prove in any case the presence of a large owl of the size of the eagle owl (see Table 3) in the upper Pliocene, the Lower and Middle Pleistocene also in Hungary.

Some differences in the proportions of the phalanges are observable, but it is a question whether these features would have a taxonomical significance. The same is the case with some size differences. Concerning the fact that, some distinct geographical subspecies of the recent eagle owl display absolute differences in size (e.g. the variation in size of Bubo bubo bubo and of Bubo bubo omissus is not contiguous) — not to mention sexual dimorphism, — no inferences should be drawn on size. To analyse only briefly the fragment of the coracoideum originating from Püsöpkfürdő II: the size agrees with that of the snowy owl (Nyctea nyctea), but the proportions and the morphological details (chiefly the high position of the foramen supracoracoideum) speak unambiguously for a small specimen of the eagle owl. Exact measurements cannot be taken on this fragment.

The same is the case with the broken mandible fragment (Csarnóta) on which the position of the foramina nutricia indicates an owl and the size of a Bubo.

Owing to the fragmentary condition of the bones, there is no possibility to compare them with remains described from the Lower-Middle Pleistocene of Europe as Bubo bubo (Forest Bed, England, NEWTON, 1887) Bubo sp. (Séné, France, STEHLIN, 1923), Bubo bubo davidii Chauviré (Saint Estève Janson, France, 1975) and Bubo binagadensis Burchak-Abramovich (Binagady, Cau- casus, 1965).

_Bubo? florianaee_ KRETZIOI, 1958

Phalanx 2 digit 2 from the Lower Pliocene Locality („Csákvárium” of Csákvár, com. Féjér Western Hungary (see KRETZIOI, 1958).

According to KRETZIOI’s description and figures the phalangeal bone is not convenient for further inferences than that, it originates from a very large owl. The dimensions of the bone do not overstep essentially those of the recent eagle owl. The length of the corresponding phalanx of the largest specimen of the recent collection (Budapest) is 30.3 mm, but I measured in the Collection of Milne Edwards the bones of ca 14% larger than the mentioned Budapest specimen the phalanges of which must have been about 33 mm and the piece of Csákvár is 34.7 mm. Of course we must suppose due to the high geological age being a taxonomical quite different form from the recent one.

Genus: _Asio_

_Asio aff. flavmeus_ Pontoppidan

Material: Befia (formerly Püsöpkfürdő), Loc. 2, age: Middle Pleistocene (Befia Phase), leg. JURCSÁK, 1958: distal two thirds of the tarsometatarsus.
Table 3.

Measurements of different bones of fossil and recent forms of Bubo bubo (in mm)

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Length</th>
<th>Prox. width</th>
<th>Dist. width</th>
<th>Width of diaphysis (middle)</th>
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<tr>
<td>Tibiotarsus:</td>
<td></td>
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<tr>
<td>Fossil, Vértesszőlős II.</td>
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<tr>
<td>Fossil, Saint Estève Janson</td>
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<td></td>
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<tr>
<td>n = 4, mean acc. Chauviré, 1975</td>
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<td></td>
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<td></td>
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<tr>
<td>Recent, n = 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phalanx 1, digitii 2 post.:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fossil, Betfia (Püspökfürdő) 2.</td>
<td></td>
<td></td>
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<tr>
<td>Recent, n = 4</td>
<td>15.0 - 16.7</td>
<td>10.0</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>Phal. 2. dig. 2. post.:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fossil, Osztramos 7</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Recent, n = 4</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Phal. 2. dig. 3. post.:</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fossil, Osztramos 7</td>
<td>16.0</td>
<td>8.4</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>Recent, n = 4</td>
<td>14.3 - 15.8</td>
<td>7.4 - 9.3</td>
<td>6.9 - 8.0</td>
<td></td>
</tr>
<tr>
<td>Phal. 3. 2. digitii post.:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fossil, Villány 3</td>
<td>26.0</td>
<td>7.0</td>
<td>5.5</td>
<td>6.0</td>
</tr>
<tr>
<td>Recent, n = 4</td>
<td>26.0 - 29.4</td>
<td>6.8 - 8.2</td>
<td>5.4 - 6.6</td>
<td>5.0 - 6.4</td>
</tr>
</tbody>
</table>

Fig. 5. 1. Milvus brachypterus n. sp., Loc. „Nagyharsány-hegy”, prox. fragm. of left carpometacarpus, medial view; 2. Idem, dorsal view; 3. Aquila cf. chrysaetos Linné, Villány Loc. 3., phalanx 2 digitii 2 dorsal view; 4. Bubo aff. bubo Linné, Püspökfürdő (= Betfia, Loc. 2.) ventral toothbears of the left coracoid; oral view; 5. Idem, Villány, Loc. 3. phalanx 3 digitii 3, lateral view; 6. Idem, Osztramos Loc. 7., phalanx 2 digitii 3, dorsal view; 7. The same phalanx, lateral view; 8. Idem, Püspökfürdő (= Betfia, Loc. 2.), phalanx 1 digitii 2, dorsal view; 9. Surnia robusta n. sp., Villány Loc. 3., right humerus, medial view; 10. Idem. Ibiden. left tarsometatarsus, dorsal view; 11. Idem. Ibiden. Phalanx 2 digitii 2, dorsal view; 12. Apus baranensis n. sp., Beremend Loc. 5., left ulna, dorsal view; 13. Chasitera baconica n. sp., Sümeg, right ulna, dorsal view. All figures enlarged (the figures 1., 2., 3., 8., 10. and 11. caa. one and a half times, the figures 4. and 9. caa. 1.2 times, fig. 5. and 6. caa. 1.7 times fig. 12. 3 times, fig. 13. 2 times enlarged). For exact measurements see the text.

Uppony, Loc. 1, age: Later Middle Pleistocene (Uppony Phase); Leg. D. Jánossy, 1963: Layer 1: prox. fragm. of the femur; phalanx 4, digit 3 posterior; Layer 3: tarsometatarsus.

Among the enumerated remains the tarsometatarsi from Betfia and Uppony are the most convenient for a detailed analysis. We can compare the bone with that of the two morphologically nearest recent species, *Asio flammeus* and *Asio otus*. The difference in size between the tarsometatarsi of these two species is only statistical, the overlapping of variations makes a distinction in several cases impossible: I measured in *Asio flammeus* a length of 40—53 mm (*n* = 23) and in *Asio otus* 36—43 mm (*n* = 32) on materials of different European Museums (London, Paris, Berlin, Kraków, Budapest). However, there are some morphological differences between these two forms. In the first place concerning the contours of the bone in dorsal view, the proximal and distal widening of the bone is more expressed in the Long-eared Owl (*A. otus*) than in the Short-eared Owl (*A. flammeus*). In addition, the position of the tuberosity of musculus tibialis anterioris is lower in the former, and the bony bridge over the extensor groove is (on the average) broader in the latter.

These specific features cannot be observed unambiguously in the fossil material: we have rather a mosaic-like mixture of characters before us. The size of the fossil tarsometatarsi fall just in the range between the two species (the length of the Betfia-specimen may be estimated as 43—44 mm, that of the Uppony-specimen measures 42.4 mm), the whole shape of both bones (the proximal and distal widening in dorsal view) show the features of *Asio flammeus*, but, in contrast, the lowest point of the tuberosity of musculus tibialis anterioris is lower than in *A. otus*, and the bony bridge is narrower than in the latter species (the distance between the distal point of the middle trochlea and the lowest point of the tuberosity varies in *Asio flammeus* between 29.0 and 31.5 mm, the same measurement in the Betfia-specimen is 28.5 and in the Uppony-specimen 28.0 mm (with the length of 42.5 viz. 43—44 mm, this distance measures only at one minus-variant of the recent form 28.0 mm, but with a whole length of bone of 41.0 mm).

The preceding features simply that we have to do with a common ancestor of the short-eared and long-eared owls, although the morphological arguments are insufficient to establish this as a fact.

This hypothesis is supported by the fact that hitherto we do not know remains from the Older Pleistocene unambiguously determinable as *Asio otus*. On the other hand and from an ecological point of view, all remains of *Asio* originate from the onset of the Oldest Pleistocene, from boreal associations, characteristic for the recent *Asio flammeus*. Thus e.g. Rébielice Poland, Lowest Pleistocene, together with Lemmings; Osztramos 8, Lower Pleistocene, with the same; Vértesszőlős II. and Uppony, Middle Pleistocene, together with ptarmigans and Lemmings let alone numerous localities from the Upper Pleistocene.
At the same time I have shown in another place (Jánossy, 1974) that care should be taken as to climatological conclusions based on this species, because it is cosmopolitan today and breeds also in South Africa and South America.

Genus: \textit{Otus}

\textit{Otus scops} Linné

Material: Locality Püspöfkürtő, fragment of the proximal epiphysis of an ulna (Čapek, 1917).

The ulna fragment originates without doubt from a small owl, and I compared it with the same bone of all smaller European members of the order \textit{(Glaucidium passerinum}, \textit{Aegolius funereus}, \textit{Otus scops}, \textit{Athene noctua}) as well as with that one of the Asian species \textit{Otus brucei}. However, the characteristic parts are broken and not even the generic assignment appears to be sure, a relegation to \textit{Aegolius} can not be excluded. The scops owl's bone is morphologically nearest to our specimen.

The fragment is not convenient for further conclusions.

Genus: \textit{Aegolius}

\textit{Aegolius cf. funereus} Linné

Material: Rockshelter Tarkó (Middle Pleistocene), Layer 3: anterior fragment of the Mandible, ungual phalanx (cf. phal. 4. digit 3 posterior); Layer 10: prox. fragm. of the carpometacarpus; Layer 12: phal. 2 digit 2 alae; dist. fragm. of the radius; dist. fr. of the femur, ungual phalanx.

The material agrees morphologically in all details with the corresponding bones of the recent Tengmalm's owl. Exact measures cannot be taken on the broken remains.

Besides some Upper Pleistocene materials (see list in this paper), I found \textit{Aegolius} bones in the Middle Pleistocene of Stránká Skálá and Konieprusy (Czechoslovakia). Mourer-Chauviré (1975) discussed some remains from the somewhat younger French Localities: La Fage, Orgnac 3 and Lazaret.

Genus: \textit{Athene}

\textit{Athene veta} Jánossy 1974

Material: Locality Osztaramos 7; age: Lowest Pleistocene („Lower Villafanchian“): phalanx 2 posterior (pedis).

A detailed comparison of the phalanx with the corresponding one of \textit{Otus scops}, \textit{Glaucidium}, \textit{Aegolius} and \textit{Athene noctua} proves a close morphological resemblance with that of the last species. However, the bone differs in size and in the proportions absolutely from a series of the recent Little Owl the length measures 8.8 mm (in recent material, \(n = 10): 9.3—10.6\ mm), the width of the middle of the diaphysis 1.8 mm (in recent material, \(n = 10): 2.0—2.4\ mm).

Since the reexamination of the coracoid, originally described from the practically contemporaneous locality Rębielice (Poland) as \textit{Athene noctua veta} (Jánossy, 1974) proved that it is distinctly smaller than that of my recent minus—variant, I propose here elevate this clearly extinct form to specific rank. I have to do this the more as the subspecies described as \textit{Athene noctua lunellensis} (Mas Rambault, Terra Amata, Orgnac 3, Lazaret 8) from the Middle Pleistocene of France by Mourer-Chauviré (1975) is characterised, in contrast to our form, by larger dimensions than the recent species.
To my knowledge, the enumerated localities are the heretofore known data of the Little Owl from the Older Pleistocene of Europe. In another place (Jánossy, 1974), I mentioned that the *Athene noctua* described from Püspökfürdő 2, was founded on a mistake (Čapek, 1917).

The rarity of the remains of the Little Owl in the Pleistocene can be interpreted as a sensitivity of this form against colder conditions, beginning with the Lowest Pleistocene.

**Genus: Glaucidium**

*Glaucidium cf. passerinum* Linné

**Material:** Loc. Püspökfürdő 2, Middle Pleistocene, coll. Kormos (Čapek, 1917): very scanty fragments of two tarsometatarsi and of a coracoid.

The pieces agree in all details with the recent material. The fragmentary condition of the bones do not allow any measurements and thus no further inferences.

I found a very near form in the Oldest Pleistocene material of Rębielice and Kadzielnia (Poland) and in the material from the Middle Pleistocene of Hundsheim (Austria) (Jánossy, 1974; 1975).

All remains found hitherto from the Older Pleistocene imply that the Pygmy Owls of that time were close related to the recent Eurasian species considered by zoologists as a purely taiga-alpine element.

**Genus: Strix**

*Strix intermedia* Jánossy, 1972


Layer 11: Cervical and thoracic vertebrae, fragment of the phal. 1 digiti 2 alae, oral fragm. of scapula, 6 diaphysis fragments of tibiotarsi, 2 phal. 1 dig. 2 pedis, phal. 2 dig. 2 and phal. 3 dig. 3 pedis, ungual phalanx.

**Table 4.**

*Measurements of the phalanges of middle sized recent and fossil members of the genus Strix (in mm)*

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Length</th>
<th>Width of diaphysis (middle)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phalanx 1 digiti 1 pedis:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strix intermedia, Tarkó, layer 13</td>
<td>13.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Strix aluco, recent</td>
<td>13.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Strix uralensis, recent</td>
<td>14.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Phal. 1. dig. 2 pedis:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strix intermedia, Tarkó, layer 11</td>
<td>9.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Strix aluco, recent</td>
<td>10.3</td>
<td>3.7</td>
</tr>
<tr>
<td>Strix uralensis, recent</td>
<td>11.0</td>
<td>4.4</td>
</tr>
<tr>
<td>Phal. 2 dig. 2 pedis:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strix intermedia, Tarkó, layer 11</td>
<td>17.8</td>
<td>3.5</td>
</tr>
<tr>
<td>Strix aluco, recent</td>
<td>17.8</td>
<td>3.4</td>
</tr>
<tr>
<td>Strix uralensis, recent</td>
<td>20.5</td>
<td>3.8</td>
</tr>
<tr>
<td>Phal. 3 dig. 3 pedis:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strix intermedia, Tarkó, layer 11</td>
<td>15.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Strix aluco, recent</td>
<td>14.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Strix uralensis, recent</td>
<td>18.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>

20
Layer 12: 2 cervical vertebrae, phal. 1 dig. 1 and phal. 1 dig. 2 alae, prox. frgm. of ulna, 2 fragments of radii, prox. frgm. (half) of humerus, (entire) coracoideum (type-specimen) about 15 small fragments of radii, tarsometatarsi etc.

Layer 13: Thoracic vertebra, dist. frgm. of the radius, prox. frgm. of the femur, phal. 1 dig. 1 pedis, 2 diaphysisfragments of tibiotarsi.

In the course of the description of this species I discussed the mosaic-like transitional osteological features between Strix aluco and Strix uralensis as well as the measurements of the Tarkó coracoideum it being the sole measurable one among the larger bones (Jánossy, 1972). In addition I submit here measurements of some phalanges in Table 4. To avoid unnecessary repetitions, I refer to this description.

Since the identification of this extinct form from Hungary (Tarkó) and from Czechoslovakia (Konieprusy, Stránka Skálá), it was proved as widespread during the Middle Pleistocene in Europe (Austria: Hunsdorf; Jánossy, 1974; France: Saint Étève Janson: MOURER-CHAUVRÉ, 1975).

Strix aff. brevis Ballmann, 1969

Material: Loc. Rudabánya, age: Lower Pliocene, Lower Pannonian: proximal, fragment of a scapula and phalanx 1 digit 2 posterior (pedis).

A thorough comparison of both bones proved them to be representatives of the genus Strix.

The scapula approximates in size that of a larger specimen of the recent Strix aluco, but the phalangeal bone is of a smaller size than the minus-variants of this species in the Collection of the Natural History Museum, Budapest.

The measurements are as follows: length of the phal. 1 dig. 2 posterior of the fossil is 7.9 mm (in the recent minus-variant 9.1 mm) the width of the diaphysis 3.4 mm (in the mentioned small specimen: 3.9 mm).

In view of the fact that, the species Strix brevis was characterised by BALLMANN (1969) as a form closely allied to Strix aluco but having different proportions, we can identify the geologically considerably younger Rudabánya-remains with some probability, against the difference in age, as those from Wintershof West. Unfortunately, in the latter locality there are absent the anatomical units of the former one, thus we cannot compare them immediately.

Though we have in our present material two remains of different size categories we may suppose them to represent one species exhibiting great variations in size, because the presence of two closely related contemporaneous forms relegated to one genus (Strix) seems improbable.

Order: Caprimulgiformes
Family: Caprimulgidae
Genus: Caprimulgus
Caprimulgus capeki n. sp.

Derivatio nominis: Dedicated to WALAW ČAPEK (Brno, Czechoslovakia), who first discussed this form.

Diagnosis: Middle-sized species, with the coracoideum more robust than in Caprimulgus europaeus.
Type-locality: Karst fissure of the Locality Püspökfürdő 2 (= Betfia 2), near Nagyvárad (Oradea), Rumania.
Type-level: Middle Pleistocene, Biharian (Betfia-Phase).
Paratype: Phalanx 1. digit 2 anterior, from the same locality.
Description: pAPÉK (1917) described the remains of Püspökfürdő 2 and identified them as Caprimulhus europaeus. He took note also of the robust form of the coracoid and proposed to designate it — if an identity with Caprimulhus europaeus meridionalis cannot be proved — as Caprimulhus europaeus „fossilis”.

A comparison of the coracoid of seven recent specimens with the remain proves unambiguously the stouter form of our fossil piece. The length of the coracoid (from the top of the acrocoracid to the angulus internus) of the new form measures 19 mm, the thickness of the middle of the diaphysis 2.5 mm. The same measurements vary in my recent comparative material between 18.6—20.0 mm, viz. 1.9—2.3 mm. The robustness of the fossil remain is observable also in the whole distal (cranial) part of the bone, although it is not possible to take exact measurements in this region of the coracoid.

Mention must be made in this place of the fact that recent systematics distinguish about forty species of goatsuckers (Genus Caprimulhus) living in Europe, Asia, Africa, Australia, North and South America. However there is no reason to compare our fossil remains with the same anatomical unit of other species than of Caprimulhus europaeus. The zoogeographically nearly related species Caprimulhus ruficollis and indicus are larger, and C. aegyptius has a smaller body and a longer wing than the European species. Other species of the same size-category, as C. rufigena (South Africa), C. batesi (tropical Africa), C. macrurus (Indonesia, Northern Australia), or C. rufus (tropical South America), are zoogeographically not comparable with our remains. Other forms have quite different dimensions.

Among the heretofore known fossil goatsuckers from the Older Pleistocene of Europe, the remain designated as „aff. Caprimulhus europaeus” from Stráná Skála (JáNOSsY, 1972) belongs unambiguously to the form described in this paper. The systematic position of the remains from France (La Pâge, Orgnac, Lazaret 8), described by C. MOURER-CHAUVIRÉ (1975), must remain an open question.

Order: Apodiformes
Family: Cypselidae
Genus: Chaetura
Chaetura baconica n. sp.
(Fig. 5./13)

Derivatio nominis: „baconica” = Latinized and adjectival form of the Mountains Bakony (Western Hungary) in which the locality Sümeg lies.
Diagnosis: Middle-sized form of swifts; in the ulna and ungual phalanges morphologically nearer to Chaetura than to Apus.
Type-locality: 2 km South from Sümeg, Western Hungary, leg.: M. Kretzoi, 1971.
Type level: Lower Pliocene, „Sümegian”.

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Holotype: Complete right ulna; Inv. Nr. Geol. Inst. Vt. 64.
Further material: proximal fragment of a posterior phalanx, three ungual phalanges.

Description and comparisons: The order of Swifts (Apodiformes) comprises an extremely large number of species (according to different authors, about 100 to 400 recent forms), widespread in the whole world.

According to a recent revision (Brodkorb, 1971), the following fossil species of this group have hitherto been described: Cypselaxus gallicus Gaillard, Cypselaxus intermedius Gaillard (Upper Eocene — Lower Miocene, France), Apus ignotus (Milne-Edwards), Apus gaillardi (Ennouchi) (Lower — Middle Miocene, France) and Collocalia incerta Milne-Edwards (Lower Miocene, France). (According to Collin's (1970) revision are ignotus, incerta and intermedius the same species!) The taxonomical status and the relationships of the family Aegialornithidae, chiefly with the swifts are so much disputed in the literature that, we have to wait for the moment of the discussion of this problem (see Harrison, 1975; Collins, 1976b etc.).

A detailed analysis and comparison of the ulna from Sümeg with the same bone of the recent Eurasian members of swifts available for study (Apus apus, Apus melba, Apus affinis, Hemiprocne comata, Collocalia brevirostris, Chaetura leucopygialis* and Chaetura pelagica, this latter one an American species approaching the Eastern Asiatic form) resulted in the followings:

The whole shape of the bone as well as the rate of torsion suggest Chaetura, and they differ from those of all the other members of the genera compared. All features of the proximal epiphysis agree in detail with this genus: the form and shape of the olecranon, the ratio of surfaces of the facies glenoidealis interna and externa, the shape of thefacies ligamenti externi as well as a pneumatic foramen in cranial and caudal views. The distal elongation of the troclea carpalis differs from that of Apus and agrees with that of Chaetura. The length is 18.8 mm long, the diaphysis 2.1 mm wide. The value concerning the systematical relegation of the described features of the ulna is confirmed by the morphology of the ungual phalanges: there is a longitudinal groove on both sides (as in Chaetura) but lacking entirely in Apus, and the „plantarproximal” tuberosity of this phalanx is quite similar in Chaetura. The proportions of these phalanges („robustness”) fall between Apus and Chaetura.

The morphological conformity with Chaetura is so significant that I assign the remains to this genus. In view of the fact that, there are no known fossil members of the „needle-tailed” swifts (Chaetura) we have to compare our fossils, as regards size, with that of the (about) 30 recent forms of the genus.

If we estimate, on the basis of the length of the fossil ulna, a wing length of 130—150 mm, no such size category appears in the Eurasian forms; in the SE Asiatic Chaetura caudacuta Latham we find 191—212 mm, in the Indian Ch. indica (Hume) 200 mm, in the Indian-Indonesian Ch. gigantea (Temm.) 200 mm (average), and in the Indonesian Ch. leucopygialis (Blyth) 120 mm (average). Only some zoogeographically highly removed form approach this size variation, although with a different variation span. Such forms are the South American Chaetura rutilla (wing: 129—135), or the Subsafrican-African Ch. ussherii Sclater (wing: 141—152), or Ch. cassini Sclater (wing: 143—164).

* I received skeletons of the latter three species for comparison by courtesy of Graham S. Cowles British Museum (Natural History); I express my gratitude also in this place.
An immediate comparison of our Sümeg-remain (ulna) with the same bone of "Apus" ignotus Milne Edwards in the same size-category proves at the first glance on the basis of the drawings, the quite different proportions and morphology of the bones.

Genus: *Apus*

*Apus baranensis* n. sp.

(Fig. 5.12)

Derivatio nominis: From the comitat Baranya, Southern Hungary, in which the locality lies.

Diagnosis: The hitherto known smallest member of the genus.


Type-level: Lowest Pleistocene, Lower Villanovian, "Lower Villafranchian".

Holotype: Complete left ulna; Inv Nr. Geol. Inst. Vt. 65.

Further material: Proximally incomplete right humerus.

Description and comparisons: In the description of the preceeding species (*Chaetura baconica*), I gave an account of the systematical units of swifts as well as of the osteological differences between the members of the genera *Chaetura* and *Apus*. Accordingly, the bones from Beremend belong unambiguously to the genus *Apus*. The measurements of the bones are as follows: length of the ulna 13.0 mm, median width of the bone 1.8 mm, length of the humerus 9.5 mm, distal width of the same 3.8 mm. If we calculate, similarly as in *Chaetura*, on the basis of these bones the approximate wing length of the fossil form, we can estimate for this measurement a variation-span between 115—125 mm.

According to literature data the wing length lies between 130—230 mm in the about 30 species of the genus *Apus*, widespread in whole of Eurasia and chiefly in Africa. This measurement ranges only in the wing length of the species *Apus affinis* (Gray) between 122—147 mm, widespread in suitable places in Africa, Southern Asia and Indonesia. Thus even the largest part of the variation-span of this smallest recent species is also considerably larger than the estimated variation of our fossil form.

*Apus submelba* Jánossy, 1972

Material: Rockshelter Tarkő, Middle Pleistocene, „Tarkő-Phase”; leg.: Jánossy, 1960—1965: Layer 2: Two fragments of the carpometacarpi (in one only the diaphysis), fragm. of Phalanx 2 digit 2 alae (anterior) two ungual phalanges; layer 3: fragm. of phal. 2 dig. 2 alae, prox. fragm. of the ulna; layer 4: entire ulna (type — specimen: Inv. number: V. 64. 435). Without layer-indication: tibiotarsus dist. fragm. and fragm. of tarsometatarsus.


I described this form in detail when discussing the similar remains of Stránská Skála and describing the new species (Jánossy, 1972). To avoid unnecessary repetitions, I refer in this place only to the massiveness of nearly all bones of this form in contrast to the corresponding anatomical units of the nearest recent species, *Apus melba*. To supplement these data, I submit...
here the measurements of the tibiotalus, not included in the known material.

Width of diaphysis of the tibiotalus in the fossil material 2.3 mm, in the recent one 1.8 mm. Distal width of the same bone in the fossil material 4.2 mm, in the recent one 3.9 mm.

In view of the fact that we have no proximal phalanges from the type-locality Tarkó we cannot compare the Uppony-material immediately with the former one and therefore the systematical relegation of the latter one must remain uncertain.

At the time of the description of this form it was known only from Stránská Skála and Tarkó. Subsequently it was recorded also from France, from the geologically contemporaneous layers at Saint Estève Janson (C. Moure, Chauviré, 1975); this datum proves the wide distribution of this form in the Middle Pleistocene of Europe.

*Apus apus cf. palapus* Jánossy, 1974.


These remains are too fragmentary to allow further investigations, we may state that we have before us remains from the size category of the recent species *Apus apus*. I assign them to the subspecies described from hundsheim only by stratigraphical arguments: both are in a wider sense geologically contemporaneous.

- Order: *Falconiformes*
- Family: *Accipitridae*
- Genus: *Gyps*
- *Gyps cf. melitensis* Lydekker, 1890


As I was able to show in other places (Jánossy, 1960; 1961), the phalangeal bones of birds of prey are especially convenient for a taxonomic identification. The phalanx 2 digit. 2 from Vértesszőlős shows the characteristics of raptorial birds at the first glance. In addition the compressed form of the distal epiphysis is essentially a vulturoid feature. After detailed comparisons, the fossil phalanx reveals a close resemblance to the corresponding bone of *Aegypius monachus*. As is to be seen from the table of measurements, the Vértesszőlős specimen differs from the recent bone in proportions more than in size (see table 5.).

We might have considered this remain some years ago, without further ado, as the corresponding bone of the recent Black Vulture. However, after the revision of the rich Middle Pleistocene vulture material of hundsheim identifiable unambiguously as *Gyps melitensis*, — the phalangeal bones of which are rather Aegypius — like — the situation became different. Despite the fact that, I did not find in the Hundsheim-material the same phalanx as in Vértesszőlős, the relegation of it to *Gyps melitensis* seems analogically very likely.
Table 5
Measurements of the Phalanx 2 digit 2 pedis of different European vultures (in mm)

<table>
<thead>
<tr>
<th></th>
<th>Length</th>
<th>Width of the diaphysis (middle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vértesszőlős II, fossil</td>
<td>26.5</td>
<td>7.3</td>
</tr>
<tr>
<td>Aegypius monachus, recent 1.</td>
<td>28.0</td>
<td>7.4</td>
</tr>
<tr>
<td></td>
<td>29.6</td>
<td>7.9</td>
</tr>
<tr>
<td>Gypaetus barbatus, recent 1.</td>
<td>30.3</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>33.0</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>34.3</td>
<td>7.5</td>
</tr>
<tr>
<td>Gyps fulvus, recent 1.</td>
<td>28.2</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>28.6</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Although the phalanx from Vértesszőlős represents the only known remain of the fossil vulture (*Gyps melitensis*) of our territory in the earlier Middle Pleistocene, some geologically considerably younger remains speak for a survival of this form apparently until the threshold of the Upper Pleistocene. The first indication was very uncertain: a proximal fragment of a phalanx 2 digit 2 from the Lambrecht Cave, Oldest „würm” (Jánossy, 1964). I found in the type-material of the Maltese-collection of the British Museum (Natural History) a similar proximal fragment of the same phalanx of *Gyps melitensis* which is of the same size, but more robust than the piece of the Lambrecht Cave (height × thickness of the former 11.0 × 11.5 mm, that of the latter 11.0 × 11.0 mm). However, the inference of the survival of *Gyps melitensis* in the region under discussion was strengthened by a distal fragment of a tarsometatarsus and by an ungual phalanx which I found in the (not published) material of the Repolust Cave — nearly contemporaneous with that of the Lambrecht Cave — stored in the Collection of the Museum Joanneum, Graz, Austria. The dimensions of this tarsometatarsus speak also for the presence of the extinct form.

C. Möurer—Chauviré (1975) recorded the same form also from the Upper Pleistocene of France (Grimaldi, Soulabé).

**Genus:** Milvus

*Milvus brachypterus* n. sp.

(Fig. 5/1—2).

Derivatio nominis: from the Greek *brachys* = short, small, and *pterōn* = wing, due to the shorter wing as indicated by the proportions of the type.

Diagnosis: Middle-sized species with a relatively broad and short carpometacarpus.


Holotype: Proximal half of the left carpometacarpus.

Description and comparisons: Lambrecht (1916, 1933) recorded this bone without a detailed description as „Archibuteo lagopus”, but pointed out the necessity of *Milvus*

I compared the figure with *Milvus* and found that the species is stouter, also with...
necessity of a thorough analysis of this and of other remains from the Older Pleistocene.

I compared the Nagyharsány-hegy fragment in detail with the corresponding bone of all European birds of prey, and found close relations only with Milvus, Hieraetus (pennatus) and with Buteo (Archibuteo). The following arguments speak for an assignment to Milvus against the two other genera: the shape of the trochlea of the proximal epiphysis is in the proximal view rather more elongated then in Buteo, but lesser curved; the processus metacarpalis I. appears to be thicker in the anterior view, as in Milvus, but contrary in Buteo and Hieraetus; the region of the facies ligamentalis interna is stouter, like in Milvus, and the shape of the facies articularis interna agrees also with that of the latter genus.

Whereas we have a bone with the typical features of a Milvus before us, the position of the tuberositas muscularis is quite different from that in the two recent species of the genus: in Milvus migrans and Milvus milvus. This element lies proximally considerably nearer in the fossil form than in the recent ones. Accordingly the carpometacarpus of the Lower Pleistocene form must have been shorter than in the recent material. This absolute difference supports the taxonomical distinction of this form from the recent ones. In another respect, the Nagyharsány-hegy fossil falls in the same size category as the two recent species: the proximal width of the carpometacarpus measures 16.2 mm.

Hitherto only one fossil species of the genus has been described, from the Upper Oligocene of France (Langy), which is, independently from the high geological age, so much smaller than our fossil that a comparison is meaningless.

Genus: Aquila
Aquila cf. chrysaetos Linné
(Fig. 4. and 5/3)


The large phalanx (length 32 mm, width of the diaphysis 7.7 mm) agrees in all morphological details with the same anatomical unit of the diurnal birds of prey and among them with that of the large eagles. A comparison of the measurements of our fossil with 18 phal. 2 dig. 2 with recent and fossil specimens of Aquila chrysaetos (including 4 specimens of A. chrysaetos bonifaci Moure Chauviré from Saint Estève Janson) failed to show differences in size or proportions. The fossil specimen falls in the middle of the variation of the recent species.

I also compared the Villány fossil with the corresponding bone of the large Eurasian eagle species, with Aquila heliaca Savigny and Aquila rapax (Temminck), but I found them to be absolutely smaller (see diagram, Fig. 4.). The same phalangeal bone of other larger, but zoogeographically more distinct eagles available in the collection of the British Museum (Natural History) like the African Polemaetus bellicosus (Daudin) and Spizaetus coronatus (Linné), the Southern Asiatic (Philippine Islands) Pithhecophaga jeffreyi (Grant) or the Southern American Harpia harpyia (Linné) and Geranoaetus melanoleucus (Vielliot), are morphologically unambiguously different. Some resem-
blances appear concerning the Australian *Aquila (Uroaetus) audax* (Latham) as well as with the African *Aquila verreauxi* Lesson, but the metrical-morphological similarity with *Aquila chrysaetos* is unequivocal.

Thus we can establish the presence of the specific array of the golden eagle at first in the Lower Pleistocene of Europe. In view of the fact that a form, allometrically different from the recent species, lived in the Middle Pleistocene of Europe (*Aquila chrysaetos bonifaci* Mourer-Chauvire), we have to suppose the presence of an extinct species in the considerable older Lower Pleistocene. However since not even the phalanx 2 digit II pedis of the Middle Pleistocene and also of the Lower Pleistocene form was submitted to the transformation of the evolution, we cannot draw further conclusions from them.

**Genus:** *Circus*

*Circus sp.* (array of *C. macrourus*)

**Material:** Osztromos Loc. 2. Uppermost Lower Pleistocene, Betfia phase; leg.: Jánossy, Phalanx 1 digit. 2 anterior (alae).

The phalanx, showing the morphological features of a small bird of prey especially that of the genus *Circus*, represents a typical example of the mixture of characteristics of the different recent species. The phalangeal bone 23 mm long and 6 mm broad, agrees morphologically more with that *Circus macrourus* and *aeruginosus* (the latter one considerably larger than the former one), but metrically with that of *Circus cyaneus*; *C. pygargus* lacks in my recent comparative collection. Thus no further conclusions can be drawn on this remain.

**Family:** *Falconidae*

**Genus:** *Falco*

*Falco aff. atavus*, M. Chauvire, 1975

**Material:** Rockshelter Hórvölgy; age: Late Middle Pleistocene „Riss”, Castellum-Phase; leg.: Jánossy, 1964; Proximal fragment of phalanx 1. digit II 2 anterior (alae).

Despite the fact that there is only a fragment of a phalangeal bone available, we can compare it with some recent falcons in the strict sense (larger species of the genus *Falco*). I compared it with the same anatomical unit of 6 specimens of *Falco peregrinus*, 4 specimens of *F. cherrug*, 1 specimen of *F. jugger* and 1 specimen of *F. rusticolus*. According to literary data, the two *Falco* species of the same size category besides the listed ones (*F. melanogenys* and *F. eleonorae*) are on the average smaller. The fossil specimen seems to lie in size between *F. cherrug*, *F. peregrinus* and *F. rusticolus*. However, the fragment reveals that it was more robust than the same element in all of the recent species drawn into comparison.

In view of the fact of the approximately geological contemporaneity we may therefore infer the presence of a falcon which was described by MOURENCHAUVIRE (1975) from La Fage. It is an extinct species, transitional between *Falco cherrug* and *rusticolus*, allometrically different from both forms and also more robust in their bones than each one.
Falco tinnunculus atavus Jánossy, 1972

Material: Püspökfürdő 2. (Betfia 2.); age: Middle Pleistocene, Uppermost Villafranchian Betfia Phase; leg.: KORMOS T.: 1 spec. juv. and 1 spec. ad. coracoidem, one prox. and three dist. fragments of the humerus two prox. fragm. of carpometacarpi, tarsometatarsus.


Méhész (Myhiska, Vécelare); Middle Pleistocene, Templomhegy Phase; fragm. of a coracoidem.

When describing the new subspecies (Jánossy, 1972), I indicated some data which spoke for some metrical, viz. allometrical differences in different bones of the fossil and recent forms.

The proximal two-thirds of the humerus from Püspökfürdő 2. especially emphasize this difference. The proximal epiphysis is too fragmentary for taking measurements, however the width of the diaphysis of the bone is 5.4 mm. In the humeri of 19 recent specimens of the kestrel the length varies between 50–58 mm and the diaphysis of the same bone between 4.0–4.8 mm. This fact may in itself prove an absolute allometrical difference in the humerus of the two forms.

The identification of this form in the material of Stránská Skála, Hundsheim (Jánossy, 1972, 1974), as well as in six different localities in France (Chauvire, 1975) proves its wide distribution during the Middle Pleistocene in Europe.

Fossil and subfossil occurrences of neospecies

The following localities of neospecies, assigned to orders discussed in this paper lie in the Carpathian Basin (remains not included in the lists by Lambrecht, 1933, and Brodkorb, 1964; citation only at the first mention of a locality, materials without quotations on the evidence of newly identified pieces in the collection of the Natural History Museum, Budapest):

Order: Strigiformes

Surnia ulula (Linné)

„Prewürmian”: Lambrecht Cave (Layer IV.) (Jánossy, 1964).
Lower Würmian: Genesapáti.

Nyctea nyctea (Linné)

„Prewürmian”: Lambrecht Cave (Layer IV.).
Upper Würmian: Bivak Cave (Yellowishgray Layer): Jankovich Cave (Collection Jánossy, 1955); Buják.

Asio flammeus (Pontoppidan)

? Upper Würmian: Jankovich Cave (Coll. 1955); Szelim Cave (Layer B); Hóman Cave (Bajót, Üregkö); Ripa (= Rippa, near Nagyszalonta = Salonta, Hamar M. – Csák K., 1969 det. JÁNOSSY).

*Aegolius funereus* (Linné)

Upper Würmian: Szelim Cave (Layer B).

*Bubo bubo* (Linné)

„Prewürmian”? Lambrecht Cave (Lay. IV.).
Lower Würmian: Tokod-Nagyberek.

*Athene noctua* (Linné)

Holocene: Rockshelter Pilisszántó II.

*Strix aluco* (Linné)

Holocene: Rockshelter Petényi (Layer H₁–H₂): Rocksh. Mélyvölgy (Mecsek Mountains); Cave of Csev (JÁNOSSY, 1959); Legény Cave.
Neolithic: Vlassac, Iron Gate, Danube (Yugoslavia)

*Strix nebulosa* (Forster)

Lower Würmian: Curata Cave.

*Strix uralensis* Pallas

Holocene, Neolithic: Aggtelek Cave.

Order: *Apodiformes:*

*Apus apus* (Linné)

Besides the above mentioned Middle Pleistocene remains of the subspecies, also palapus from Kövesvárad and Tarkő, Layer 1:
Upper Würmian and Holocene: Petényi Cave (Layer P₁ and „mixed Holocene”).

*Apus melba* (Linné)

Lower Würmian: Subalyuk Cave (Layer 3, newly collected in 1964, former published material, JÁNOSSY, 1961, originating from older collections labeled as „Lower Layer-Group”).
Order: *Falconiformes*

*Aegypius monachus* (Linné)

Lower Würmian: Subalyuk Cave (uncertain identification Jánossy, 1961; rectified recently); Beremend, loessic sediment (Coll. Geol. Inst. det. Jánossy); Curata Cave.

*Aquila chrysaetos* Linné

(Besides the Lower Pleistocene find Villány 3): Upper Würmian: Rockshelter Pilisszántó I. (Jánossy, 1960, but not Subalyuk, as erroneously listed by Brodkorb, 1964 page 283).
Holocene: Bronze Age: Tápiószele Tőzköves.

*Aquila heliaca* (Savigny)

„Prewürmian”: Lambrecht Cave, Layer V.
Holocene: Neolithic: Vlassac, Iron. Gate, Danube (Yugoslavia)

*Aquila cf. clanga* Pallas

Lower Würmian: Curata Cave

*Haliaeetus albicilla* (Linné)

Lower Würmian: Except for the hitherto known loc. Krapina (Lambrecht, 1933, p. 746), the Curata Cave.

*Milvus cf. migrans* Bodd


*Buteo buteo* (Linné)

„Prewürmian”-Lower Würmian: (cf.) Lambrecht Cave (Layer IV): Diósgyőr Cave (leg. Kordos, det. Jánossy, 1975);
? Upper Würmian: Buják
Holocene: Bronze-La Tène Age: Budapest-Gellérthegy, 15—17. century: Gyula-Vár

*Buteo cf. lagopus*

Lower Würmian: Curata Cave.
Upper Würmian: Bivak Cave (Yellowish Layer).
*Circus aeruginosus* Linné

Holocene: Roman: Tác-Fövénypuszta.

*Circus cf. macrourus* Gmelin


**Accipiter gentilis** Linné

Lower Würmian: Lambrecht Cave (Layer IV).
Holocene: Roman: Tác-Fövénypuszta.

**Accipiter nisus** Linné

Middle Pleistocene: (extinct form?) Rockshelter Tarkő (Layer?)

*Pernis apivorus* Linné

Lower Würmian: Lambrecht Cave (Layer IV); Curata Cave.

*Falco peregrinus* Tunstall

Upper Würmian: Bivak Cave (Yellowest Layer); Jankovich Cave. Hóman Cave (Bajót, Óregkő, new identifications, Jánossy, 1975).

*Falco rusticolus* Linné

Upper Würmian: Szelim Cave (Layer B).

*Falco columbarius* Linné

Lower Würmian: Lambrecht Cave (Layer V.).
Upper Würmian: Szelim Cave (Layer B); Petényi Cave (Layer P₂).

*Falco subbuteo* Linné

Upper Würmian: Szelim Cave (Layer B); Bivak Cave (Yellow and yellowish grey Layers).

*Falco vespertinus* Linné

Middle Pleistocene: (cf.) Uppony (Layer 6).
Upper Würmian: Hóman Cave.

*Falco tinnunculus* Linné

Besides the preceding Middle Pleistocene remains of the subspecies atavus:

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Middle Pleistocene: Rockshelter Hőrvölgy
Lower Würmian: Subalyuk (Layer 3, leg.: JÁNOSY, 1964); Curata Cave, Érd (KRETZOI, 1968).
Upper Würmian: Szelim Cave (Layer B); Petényi Cave (Layer P₁); Remete Cave (Layer 11); Ripa (=Rippa near Nagyszalonta=Salonta, Hamar-Csák, 1969; det.: JÁNOSY).

Conclusions

Despite the fact that all remains, excepting those of Galliformes are not convenient for establishing evolutionary lines, some inferences can be drawn on the mosaic-like, sporadic finds in also other orders.

1. According to the hitherto known paleontological data, it may be established that an ancient form of a middle-sized member of the genus Strix was present from the beginning of the Neogene in Europe (Middle Miocene; Wintershof-West; Lower Pliocene; Rudabánya). The divergence of the two European forms, Strix aluco and uralensis, may supposedly begin with the Middle Pleistocene form Strix intermedia. Large forms of the array of Strix nebulosa appear from the beginning of the Pleistocene (Rebielice, Poland), through the Middle Pleistocene (Stránská Skála, Czechoslovakia) outside of the Carpathian Belt and reached at the level of our present knowledge, the Southern part of the Carpathian Basin (Curata Cave, Roumania) only in the Upper Pleistocene.

2. The traces of the presence of a large owl of the size of the present eagle owl (Bubo spp.) are known from beginning of the Neogene in the region; they lived practically continuously until recent times.

3. We have the first proof for the appearance of a representative of the hawk owls, of the genus Surnia, in the Lower Pleistocene, yet only south from Northern Carpathian Belt (Surnia robusta n. sp. from the Villány Mountains and Osztramos 7). The „modern” form of the hawk owls appears only north from the region under discussion (Surnia capeki); it was later widespread chiefly in the eastern parts of our continent (see the lists by LAMBERCHT and BRODKORB on the Upper Pleistocene remains).

4. The ancestor of the little Owl (genus Athene) was only present in the north in Lower Pleistocene times (Rebielice, Osztramos 7), surviving the Middle and Upper Pleistocene in the south (e.g. Southern France), it appeared newly in the Holocene in our territory (Pilisszántó II.).

5. Some recently northern forms appeared beginning with the Lowest Pleistocene (Asio cf. flammeus, geologically oldest remains from Rebielice) or with the Middle Pleistocene (Aegolius, Glaucomys, Middle Pleistocene of Tarkó, Betfia, Hundsheim etc.) only in slightly differing from their recent descendants.

6. The remains of the nightjars (Caprimulgiformes) and of the swifts (Apodiformes) are so scarce that they are not convenient for further conclusions. Only the presence of the recently partially American but chiefly Indomalayan-Ethiopian genus Chaerius in the Lower Pliocene of Sümeg is remarkable from a zoogeographical point of view.

7. The case is nearly the same with the remains of (diurnal) birds of prey: they may be considered chiefly as sporadic finds. We can only follow the
evolutionary line of the small falcons (kestrel, Falco tinnunculus atavus), beginning with the Lower Pleistocene; the first proof of the presence of the array of species of the golden eagle (Aquila chrysaetos), represented by the found from the Lower Pleistocene (Villány 3.), may yet be registred as a new results.

The enrichment of the fauna of birds of prey at the end of the Last Interglacial is remarkable (Lambrecht Cave, Subalyuk, Curata etc.).

References


Plío-pleistocén madármaradványok a Kárpát-medencéből III.

Strigiformes, Falconiformes, Caprimulgiformes, Apodiformes

Jánossy Dénés

A hasonló tárgyú előző két dolgozatban a megadott terület nyújható maradványai kerültek feldolgozásra (I—II. részek), amelyek a leletek mennyisége és időbeli folyamatos-sága révén együtt voltak alkalmazás arra, hogy segítségükkel megszakíthatják törzsféje-lődési sorokat is észszállíthatók.

A Kárpát-medence itt sorra kerülő madármaradványai már az előbbiekhez képest szóróványleleteknek tekintethetők, legfeljebb egy-egy lelőhelyen, izoláltan halmozódtak fel fossziliák nagyobb mennyiségben. Ennek ellenére ezek a maradványok is igen jelentős- sen egészítenek ki Európa madárfaunájának kialakulására vonatkozó mindennapig nagyon hiányos tárgyi ismereteinket.

A bagolyalkatukat revívíója igazolta, hogy a maekabagolyak csoportja (Strix nemzet-ség) nemcsak a nemeterzsés középső mőcönkből, hanem a hazai legalsó pliocènból is kimutathatók (a német literatúra középső mőcönKBól, Rüdahl, Rud(b)anyába.) Az eddigi leletek alapján való- színű, hogy a két jelenlegi Európai középső mőcönKBól származik (Strix intermedia Jánossy, típusanyaga a tartók közül, de Amszterdamból; Budisch ym Franciaországából: Saint-Léonard és Jansson is átkerült.) A maekabagoly (Strix aluco) a középső pliocènből második felében kialakult faj és a felső pliocènből hideghullámok idején a mőcséket évben hiányozott, amikor az uralkodó bagoly (Strix uralensis) ezen a területen jelen volt (Csehország, Magyarország: Certóva, Pálfy-barlang, Remed-kőföld.) A maekabagolyak harmadik, legnagyobb mérgető holarktikus alakjának, a szakállas bagolyok (Strix nebulosa) a maradványai az alsó és középső pliocènből már ismeretek, de csak a Kárpátok gyöntyűn kívüli területről (Lengyelország: Rebiek, Csehország: Stránská Škála, Brno mellett). A Kárpát-medencében belül eddig ismert egyetlen lelet az Erdélyi-medence déli részének felső pliocénből, ered (Curátht barlang, Vajdahunyad — Hunedoara mellől).

A mai újgi alakjának jelenítése területünkön már az alsó pliocénből kezdve igazolható (Bubon florianae Kretzoi, Csevkárii barlang). A legalsó (Ostramos 7), alsó (Vil-lány 7, középső (Bet ifia 2, Vértesszőlős 2) és felső pliocénből (Tokod — Nagyberek etb.) leletek bizonyítják ezenkívül állandó előfordulását a Kárpát-medencében a legújabb földérténeti időszakokban.

A kuvik égi alakja (Athene veta Jánossy) jelenlegi ismereteink szerint a legalsó pliocé- bőn északon fordult elő (Lengyelország: Rebiek, Ėszak-Magyarország: Osztramos 7), a középső és felső pliocénből a Déles, egyéb faunákban is hiányzik (bíztosan
fosszilis maradványai csak Dél-Franciaországból, Olaszországból ismertek), s ezután csak a holocénben jelenik meg újra területünkre (Pilisszántó I. és II. község).

A karvalybagolyoknak egy — a maiak csontjaiban 20—40%-kal nagyobb — kihalt faja eddig, a várakozásokkal ellentében, területünk délnél részein fordult elő az alsó pleisztocénben. A mai karvalybagolytól már kevésbé eltérő alak (Surnia caperok Jánossy) már évszakokra, a Kárpátok gyűrűjén kívül fordult elő (B. C. Stánzkő és Lába), míg a mai változó faj a felső pleisztocénben Európában szinte csak a tágabb értelemben vett Kárpát-medencére korlátozódott — az eddig ismert leletek alapján (beleértve a felső-észak-európai Kremst is, 9 lelőhelyről több mint 50 maradvány). Figyelemre méltó, hogy a Kárpát-medencében kívül Európa felső pleisztocénjéből mindössze három karvalybagoly-lelethely ismertes (Svájc egyetlen, Lengyelország 2 lelőhely), egyébként ebből az időszakból meg az Egyiptomi Múzeum miatt ismerünk ilyen maradványokat.

A karvalybagolyon kívüli többi, jelenleg főleg fajtája elterjedt és a lágos pleisztocénből (Asio cf. flammeus, a gyon völgyi legenda leletek a dél-lengyelországi Rébáldice-ból erednek, a későbbiek is mindig „glacialis” elemekkel együtt, ill. a középső pleisztocénből kezdve (Aegolius és Glauclidium Tarkó, Hetfia, Hundsheim stb. leletei) területünk szakadó részein fordulnak elő, és csontoszilággal alig különbözik a maiaktól.

A kacskosfajok és sarlósfejcsők eddigi leletei olyan szórakoztak, hogy további következtetésekre kevésbé alkalmazhatók. Becsímenk a pleisztocénből egy rendkívül kis termetű kihalt sarlósfejcsőfaj került elő (Apus barbatus a. n. sp.). A jelenleg mediterrán „kopolás” sarlósfejcső (Apus melba), valamint a hazánkban jelenleg is elő tét (Apus apus) és a lelőhelyek alakjai a középső pleisztocénből előfordultak területünkre (Apus submelba Jánossy és Apus apus palpebus Jánossy). Állatfajokat és szempontokat figyelemre méltó, hogy a kúszó alacsony pleisztocénből egy kihalt „viharfarkú” sarlósfejcső (Chaetura acquatica a. n. sp.), melynek rokonsági köre jelenleg fele részben indokolja — etiópiai —, csakre részben amerikai feszkölő.

A nappali ragadozók fosszilii is legnagyobb részt szórványoletek. Ezek közül a Nagyharcsány-hegyi alsó pleisztocénből egy kihalt kányafaj (Miusin brachypterus a. n. sp.) került leírásra. A villámv. szintén alsó pleisztocén szinti (Aguila chrysostos) lelet e nagyragadozó jelenlétének legnagyobb dokumentációnja Európában. Egyedül a vöröskét törzsfejlődési sora követethető az alsó (Nagyharcsány-hegy) és középső (Betfia, Mész) pleisztocén keresztül napjainkig. További szórványoleteket a kétszemű alakú középső pleisztocén középső kényéljáró (Gyps cf. melendens Lydekk.) és egy hasonló korú réthéja lelet Osztramos 2 lelőhelyről (Circus cf. macrourus Gm.).

Egy nagy természeti volt a pleisztocénkori jelenlétre utal a középső pleisztocén végéről származó hórvölgyi barlangi lelet (Falco aff. atus Chaviré). Az utolsó interglaciális lelőhelyek ragadozókban való viszonylagos gyakoriság figyelemre méltó.

A dolgozatot kiegészítő a tárgyal rendezetlen egységekbe sorolható mai fajok pleiszto- honó leleteinek jegyzéke, az elmúlt évtized újabb meghatározásai alapján (lásd 29-33. oldalak).

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