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Zygmunt BOCHEŃSKI

Middle Pleistocene remains of birds from Kozi Grzbiet in the Świętokrzyskie Mts. (Holy Cross Mts. — Central Poland)

[with plate XI and 5 text-figs.]

Środkowoplejstoceńskie szczątki ptaków z Koziego Grzbietu w Górach Świętokrzyskich (Środkowa Polska)*

Abstract. Five fragmentary bones of birds have been found among very abundant bony remains contained in the breccia filling of a karst fissure in Kozi Grzbiet in the Świętokrzyskie Mts. and referred to the Mindel I/Mindel II interglacial. They have been assigned to *Tetrao* cf. *praeurogallus*, *Lagopus lagopus*, *Tetrastes* cf. *praebonasia*, *Falco tinnunculus atavus* and *Turdus* sp. It may be assumed that these birds lived in forests of the temperate zone.

Five fragmentary bones of birds have been found among very numerous bony remains of animals in the breccia filling of a karst fissure in Kozi Grzbiet in the Świętokrzyskie Mts. (Holy Cross Mts. — 20° 22' 13"E and 50° 51' 16"N). The age of the breccia is considered to be the Mindel I/Mindel II interglacial (GŁAZEK et al., 1976, 1977 a, b). It contained a particularly abundant fauna of amphibians and reptiles (MŁYNARSKI, 1977; SZYNDLAR, 1981; SANCHÍZ and SZYNDLAR, in press) and, besides, shells of molluscs (STWORZEWICZ, 1982) and remains of mammals (KOWALSKI, 1977; RZEBIK-KOWALSKA, 1976).

In the course of this study on bird remains I was given some valuable advice by Prof. D. JÁNOSSY, who also granted me access to comparative materials in the Museum of Natural History in Budapest; I wish to thank him sincerely for both.

Tetrao cf. *praeurogallus* JÁNOSSY 1969.

Material. Kozi Grzbiet, layer 2c: coracoideum dex.

Description. The parascapular half of the bone with a part of the acro-

* Praca wykonana w ramach Problemu MR.II.3.

coracoid crumbled is preserved. The general proportions and also the curvatures and size indicate a big member of the *Tetraonidae*. In the members of the *Phasianidae* (e.g. *Pavo, Tetraogallus* and *Phasianus*), *Craciidae* and *Meleagridae* this bone is clearly different; among other things, it differs in the position of the planes of the shaft relative to each other. The fragment under study is hard to measure. The manner of measuring of it is shown in Fig. 1 and the measurements obtained are compared with those of recent species of similar size in Table I. Unfortunately the bone studied cannot be compared with corresponding fragments of the fossil Capercaillie species. No coracoid of *Tetrao praeurogallus* has been preserved, while in *T. conjugens* the corresponding fragment from the locality Csarnota in Hungary is still more damaged and it is only possible to find that in general it is of similar size. The parascapular fragment from Węże is small and immeasurable, but this

Table I

Measurements (in mm) of the parascapular part of the coracoid of the fossil Capercaillie from Kozi Grzbiet and some recent species of the *Tetraonidae*. The places of measurements are shown in Fig. 1

Species		a	b	c
Fossil:				
Tetrao cf. *praeurogallus* (Kozi Grzbiet)		18.8	11.3	7.8×5.6
Tetrao conjugens (Csarnota)		15.5	—	—
Recent:				
Tetrao urogallus	♂	24.2	13.3	9.9×6.9
	♀	18.2	10.0	7.2×5.3
	♀	17.9	9.9	6.9×4.6
	♀	16.9	10.7	7.8×4.9
	♀	17.3	11.0	7.3×5.3
Tetrao parvirostris	♀	17.0	10.1	7.7×4.7
	♀	18.0	10.5	7.8×4.8
Lyrurus tetrix	♂	14.6	8.9	6.7×4.9
	♂	14.5	9.3	6.6×4.9
	♂	15.4	8.9	6.4×4.5
	♀	13.3	7.6	5.0×3.8
Lyrurus mlokosiewiczi	♂	12.8	7.5	5.2×4.3

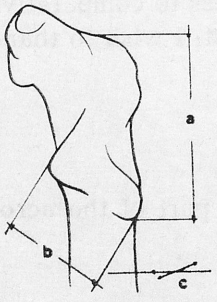

Fig. 1. The places of measurements of the coracoid in the Capercaillie (concerns Table I): a — length of the parascapular portion (from fovea articularis scapularis to tuberositas humeralis), b — length of fovea articularis scapularis (up to scapular process), c — width of the bone shaft (crosswise)

notwithstanding it may be stated on the whole that it belonged to a somewhat smaller bird. In spite of a general similarity there are also some differences in morphology, which together with a marked difference in geological age (decline of the Pliocene) evidence against the membership of the specimen being discussed in *T. conjugens*. At the same time, its greatest resemblance to the bone of a female Capercaillie (with certain small differences) inclines us to assign it to *T. praeurogallus*, which, according to JÁNOSSY (1976, Fig. 6), is the initial form of the recent Capercaillie.

Discussion. *Tetrao praeurogallus* is known from the lower part of the Middle Pleistocene of Tarkö in Hungary and Méhész (=Včelare) in the south of Slovakia and from Villány-Nagyharsány-hegy (Hungary, Lower Pleistocene). The inclusion of one bone from Rębielice Królewskie I in this species (JÁNOSSY, 1974b) is uncertain.

Lagopus lagopus (LINNAEUS, 1758)

Material. Kozi Grzbiet, layer 2b: phalanx I digiti alae 2.

Description. The bone is almost undamaged and its state of preservation made it possible to take several measurements (Fig. 2). In shape and

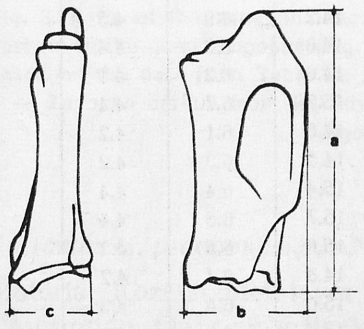

Fig. 2. The places of measurements of phalanx I digiti alae 2 in the Grouse (concerns Table II): a — total length of bone, b — the largest width, c — thickness of proximal articular portion

size it agrees entirely with the genus *Lagopus*. Its dimensions are presented against these of a series of recent specimens and some fossil forms from the territory of Poland in Table II. The data from this table have been used to construct diagrams (Fig. 3 A, B), illustrating the relations between particular dimensions. In its general shape and all its dimensions the bone under study lies within the limits fixed for the recent members of *Lagopus lagopus* and somewhat outside the range of *L. mutus*.

Discussion. The bone of *L. lagopus* from Kozi Grzbiet is similar in proportions to the bone of *Lagopus atavus* JÁNOSSY 1974, described from Rębielice Królewskie I (Middle Villafranchian) but is slightly larger than this last. This is particularly well seen in Fig. 3, in which the line connecting the points which represent these two fossil specimens is nearly parallel to the imaginary mean line representing the recent

Table II

Measurements (in mm) of phalanx I digiti alae 2 of the fossil Grouse from Kozi Grzbiet and recent continental Grouse. The places of measurements are shown in Fig. 2

Species		a	b	c
Fossil:				
Lagopus lagopus (Kozi Grzbiet)		14.4	6.8	4.6
Recent:				
Lagopus lagopus	1	15.2	6.8	4.6
	2	15.0	6.8	4.4
	3	14.2	6.5	4.2
	4	15.0	6.8	4.6
	5	15.4	7.1	4.6
	6	14.3	6.3	4.0
	7	15.4	6.7	4.7
	8	14.5	6.4	4.2
	9	16.0	7.5	5.0
	10	15.2	6.6	4.4
	11	14.7	6.7	4.4
	12	14.1	6.8	4.5
	13	15.2	6.9	4.8
	14	15.0	7.0	4.6
	15	14.2	6.9	4.5
	16	14.8	6.2	4.4
Lagopus mutus	1	14.6	6.2	4.1
	2	15.2	6.7	4.4
	3	14.8	6.1	4.2
	4	14.5	6.3	4.2
	5	15.4	6.4	4.4
	6	15.7	6.5	4.4
	7	15.6	6.5	4.3
	8	14.8	6.4	4.2
	9	15.0	6.4	4.3
	10	14.7	6.6	4.6
	11	15.2	6.7	4.5
	12	14.9	6.7	4.5
	13	15.7	6.7	4.6
	14	15.9	6.8	4.4
	15	15.4	6.8	4.1
	16	15.3	6.9	4.2

continental forms of *L. lagopus*. It may be considered that the Grouse from Kozi Grzbiet is an intermediate link between the earliest known form of the genus *Lagopus* from the Middle Villafranchian and the Upper Pleistocene members of the recent species. *L.* cf. *lagopus* of somewhat younger age than the specimen under study is known from Vértesszölós and Uppony in Hungary (JÁNOSSY, 1976) and from Stránská Skála in Czechoslovakia (JÁNOSSY, 1972).

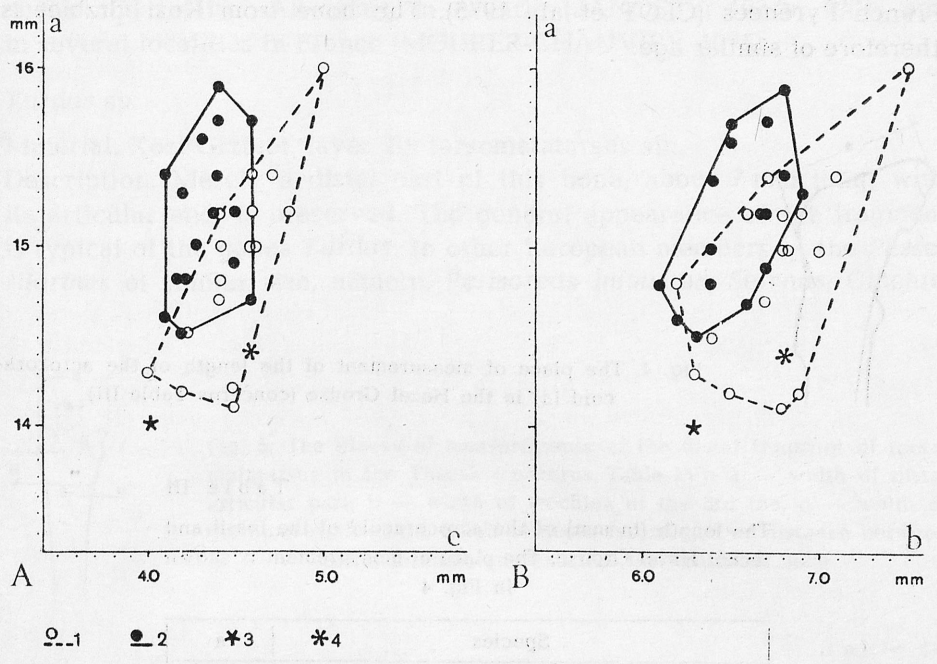

Fig. 3. Ratio of the wing phalangue length (a) to the thickness of proximal articular part (c) in the genus *Lagopus* (Fig. A) and to the largest width (b) of the bone (Fig. B), based on the data from Table II: 1 — recent *Lagopus lagopus*, 2 — recent *L. mutus*, 3 — *Lagopus atavus* from Rębielice Królewskie I (oldest Pleistocene), 4 — *Lagopus lagopus* from Kozi Grzbiet

Tetrastes cf. *praebonasia* JÁNOSSY 1974

Material. Kozi Grzbiet, layer 2b: coracoideum sin.

Description. Only an articular fragment of the acrocoracoid, typical of small *Tetraonidae,* is preserved. The bones of the *Phasianidae* (*Perdix, Ammoperdix* and *Alectoris*), corresponding in size, used for comparison, differ distinctly in structural details. The extant fragments is hard to measure; the only measurement it was possible to take was that of the acrocoracoid length. Its value has been presented for the specimen studied (Fig. 4) against the values in recent members of *Tetrastes bonasia* and fossil ones of *T. praebonasia* from the Museum of Natural History in Budapest in Table III. In our specimen this value is intermediate between the recent Hazel Grouse and *T. praebonasia* from Tarkö in Hungary. However, the shape of the tuberositas humeralis seems to be more similar to that in *T. praebonasia.* This fact and the geological age of the specimen suggest that it should be assigned to this last species.

Discussion. This species has been described from the Mindel glaciation of Tarkö in Hungary. It is also known from the same geological period from Hundsheim in Austria (JÁNOSSY, 1974a) and Montoussé in the

French Pyrénees (CLOT et al., 1976). The bone from Kozi Grzbiet is therefore of similar age.

Fig. 4. The place of measurement of the length of the acrocoracoid (a) in the Hazel Grouse (concerns Table III)

Table III

The length (in mm) of the acrocoracoid of the fossil and recent Hazel Grouse. The place of measurement is shown in Fig. 4

Species		a
Fossil:		
Tetrastes cf. *praebonasia* (Kozi Grzbiet)		8.6
Tetrastes praebonasia (Tarkö, Hungary)		9.2
Recent:		
Tetrastes bonasia	1	8.1
	2	8.2
	3	8.4

Falco tinnunculus atavus JÁNOSSY 1972

Material. Kozi Grzbiet, layer 2b: phalanx II digiti 3 pedis.

Description. The phalanax is, as a rule, complete and typical of small *Falconidae*. In the details of its structure it differs distinctly from its counterpart in the *Accipitridae* (*Accipiter nisus*). Its articular ends are, however, somewhat worn by grit which does not permit accurate measurements. Out of the recent Falcons (*Falco tinnunculus, F. subbuteo* and *F. columbarius*) used in comparisons, the bone under study most resembles the corresponding bone of *F. tinnunculus* in morphology but is somewhat larger. The series of bones from Stránská Skála (Mindel glaciation) on the basis of which JÁNOSSY (1972) described this subspecies are also larger than the bones of the recent Kestrel. This fact and the geological age assign the bone under study to this form.

Discussion. In the Lower and Middle Pleistocene *Falco tinnunculus atavus* was widely distributed in Europe. In addition to the locality at Stránská Skála in Czechoslovakia, from where it has been described, it was found in three localities in Hungary (JÁNOSSY, 1978), at Hund-

sheim and Deutsch-Altenburg in Austria (JÁNOSSY, 1974a, 1981) and in several localities in France (MOURER-CHAUVIRÉ, 1975).

Turdus sp.

Material. Kozi Grzbiet, layer 2b: tarsometatarsus sin.

Description. Merely a distal part of this bone, about 7 mm long, with its articular end, is preserved. The general appearance of the fragment is typical of the genus *Turdus*. In other European members of the *Passeriformes* of similar size, namely, *Perisoreus infaustus, Sturnus, Cinclus,*

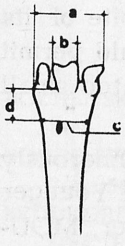

Fig. 5. The places of measurements of the distal fragment of tarsometatarsus in the Thrush (concerns Table IV): a — width of distal articular part, b — width of trochlea of the 3rd toe, c — width of the bone shaft at the heigh of distal foramen, d — distance between distal foramen and external intertrochlear noch

Table IV

Measurements (in mm) of the distal articular end of the tarsometatarsus of the fossil Thrush from Kozi Grzbiet and recent Thrushes of similar size. The places of measurements are shown in Fig. 5

Species		a	b	c	d
Fossil:					
Turdus sp. (Kozi Grzbiet)		3.7	1.2	2.5	2.4
Recent:					
Turdus philomelos	1	3.6	1.1	2.3	1.9
	2	3.6	1.1	2.8	1.6
	3	3.4	1.1	2.5	1.7
	4	3.6	1.2	2.5	1.8
	5	3.4	1.1	2.6	1.5
	6	3.5	1.0	2.6	1.5
	7	3.2	1.1	2.3	1.6
Turdus n. naumanii	1	3.4	1.1	2.5	1.9
	2	3.4	1.1	2.5	1.6
Turdus n. eunomus	1	3.4	1.1	2.4	1.7
Turdus merula	1	4.1	1.3	3.1	1.9
	2	3.6	1.2	2.8	1.9
	3	3.8	1.1	3.1	1.5
	4	3.9	1.2	2.8	2.0
	5	3.8	1.2	2.5	(2.7)
Turdus torquatus	1	3.8	1.2	3.1	1.9
Turdus pilaris	1	3.9	1.2	2.6	2.0
Turdus viscivorus	1	4.0	1.3	2.7	2.0

The figure in brackets refers to the specimen in which instead of the vascular foramen there was only a depression.

Oriolus, Melanocorypha, Acrocephalus arundinaceus, Lanius and *Pycnonotus,* the structure of the articular end as a whole, that of the particular articular trochleae for toes and their arrangement in relation to each other are different to such a degree that they rule out the membership of the bone examined in any of these genera. On the other hand, all these characters correspond to the morphology of this bone in the genus *Turdus,* the only difference being the position of the vascular foramen (Fig. 5, dimension d). A similar position has been found only in one specimen of the Blackbird (Table IV), whose bone was, besides, not quite typical, since it had a porous depression instead of the distinct vascular foramen. All the other dimensions indicate that the bone examined belonged to a bird equal to the Song-thrush or Blackbird in size. In spite of its somewhat different appearance and geological age, which would permit the erection of a new form, the fragment under study seems too small to be used as the basis for this.

Discussion. The recent members of the genus *Turdus* are very numerously represented in fossil faunas of Europe (BRODKORB, 1978) in the Younger Quaternary also in Poland (BOCHEŃSKI, 1974, 1981). However, MOURER-CHAUVIRÉ (1975) does not mention them from periods preceding the Middle Pleistocene and neither does JÁNOSSY (1981) from Hungary. Remains of a nondescript Thrush have been found also in the fauna from Rębielice Królewskie I (JÁNOSSY, 1974a) and so on the boundary between the Pliocene and the Pleistocene.

Five avian fossils, even though they belong to five different species, form too poor a basis to permit fairly detailed palaeoecological conclusions, the more so, since at least three of these species are extinct forms. It is however unquestionable that the birds found in the material from Kozi Grzbiet were associated with forest environment. The occurrence of the Kestrel may suggest also the existence of open areas in that region, where this bird could hunt. The set of the genera represented indicates a temperate climate, which would agree with the characteristics of layer 2c given in a paper by GŁAZEK et al. (1977a); there are however no decidedly thermophilous forms.

The Grouse identified in the material from Kozi Grzbiet in the forest environment of the temperate zone and already showing characters of *Lagopus lagopus,* which now occurs in the boreal and arctic zones, is the oldest find of this species in Poland and probably also in the world. As I have mentioned above, this bird resembles the primary form from the Middle Villafranchian, which was *Lagopus atavus* JÁNOSSY 1974 from Rębielice Królewskie, in some respects. This fact may also suggest the continuous inhabitation of this Grouse in the territory of Poland in the Pleistocene. All the palaeontological data from Europe (JÁNOSSY, 1975) indicate that although the *Tetraonidae* are of American origin, the

genus *Lagopus* has evolved in Eurasia, perhaps in northern Europe. They also contradict HÖHN's (1969) opinion as to the American origin of the Grouse and its colonization of Europe in the Upper Pleistocene.

Translated into English
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STRESZCZENIE

Wśród bardzo licznych szczątków kręgowców (płazy, gady i ssaki) występujących w brekcji, wypełniającej krasową szczelinę w Kozim Grzbiecie w Górach Świętokrzyskich, znaleziono 5 fragmentów kostnych ptaków. Wspomniana brekcja datowana jest na interglacjał Mindel I/ /Mindel II. Szczątki ptaków reprezentują 5 następujących form: *Tetrao* cf. *praeurogallus, Lagopus lagopus, Tetrastes* cf. *praebonasia, Falco tinnunculus atavus* i *Turdus* sp. (o wielkości zbliżonej do drozda śpiewaka lub kosa). Ptaki te związane były z lasami strefy umiarkowanej.

Redaktor pracy: prof. dr M. Młynarski

Plate XI

Bones of fossil birds from Kozi Grzbiet described in the present paper:

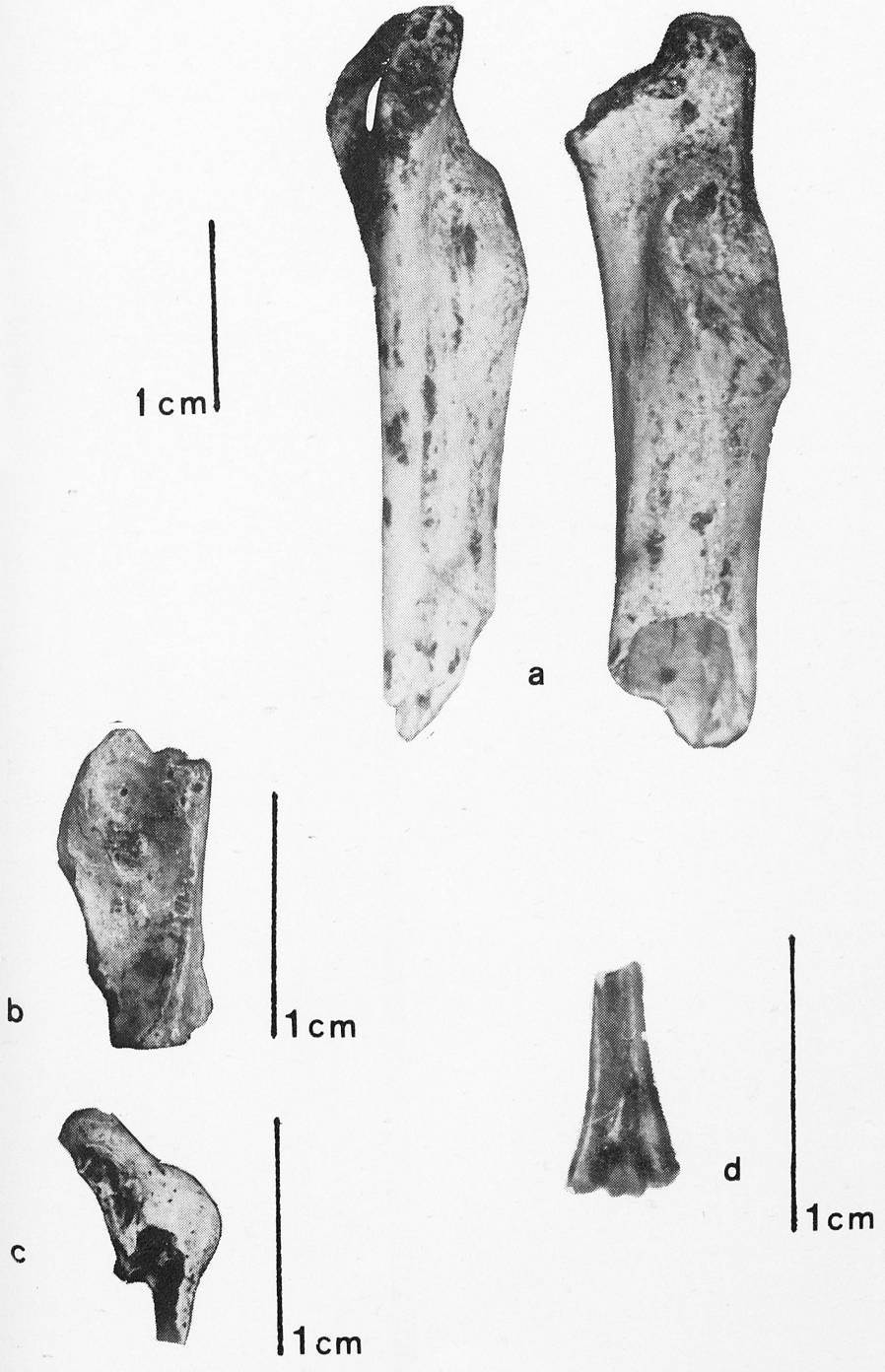
a — *Tetrao* cf. *praeurogallus*, 2 different views,

b — *Lagopus lagopus*,

c — *Tetrastes* cf. *praebonasia*,

d — *Turdus* sp.

Phot. Z. Bocheński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