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The birds of the Late Quaternary of the Altai Mts

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Abstract. 21 bird species were identified in the material excavated from Upper Palaeolithic and Neolithic deposits in 3 karstic caves in the Altai Mts: Strashnaya Cave, Logovo Gieny Cave and Mamatka Cave. Moreover, birds identified from Ust'-Kanskaya Cave were also included in the general review of species. All these species have recently bred in the area investigated or not very far from it. The bone of *Falco altaicus* is the most interesting of these finds.

Key-words: Subfossil birds, Altai Mts., Late Pleistocene, Upper Palaeolithic, Neolithic.

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I. INTRODUCTION

The birds of the Late Quaternary of Siberia are poorly known. They have been reported from about a dozen localities dispersed in the very large territory of Siberia – between the Ural Mts and Kamchatka Peninsula. In all but several papers birds are mentioned only occasionally among the descriptions of other materials (among others GROMOV 1948, RAEVSKII et al. 1964, VERESHCHAGIN 1971, VERESHCHAGIN & NIKOLAEV 1978). The exceptions are the papers concerned with bird remains from several localities in the surroundings of Krasnoyarsk (TUGARINOV 1932), the birds of the Neolithic locality Kullaty near Yakutsk (GUREEV 1950), Dyuktai Cave on the Aldan river (MOCHANOV 1970), Kokorevo II (ABRAMOVA et al. 1975) and Tashtyk I (ABRAMOVA et al. 1991) on the Yenisey and Krasniy Yar on the Angara (TSEITLIN 1979).

The first records of animal and human bones in the Altai Mts come from the times of PALLAS who travelled in Siberia and visited some caves on the Charysh River in the Altai Mts in the 18th century. The caves on the Charysh and Khanshara rivers were later visited by GEBLER in 1831 and the bones collected by him were deposited at the Academy of Sciences in St. Petersburg. Some of those bones were then listed by FISCHER (1834). He mentioned indetermined birds only in addition to more than a dozen mammalian genera. In 1834 HELMERZEN collected bones in the Altai caves in more or less the same places, and these bones were also handed over the above institution in St. Petersburg. The collection contained many bones of rodents and birds. Mammalian remains were described by BRANDT (1870). The fate of bird remains is unknown. They have never been described and most probably are still stored at the Zoological Institute of the Russian Academy of Sciences in St. Petersburg. During the last few decades some bird remains have been found in three Altai caves (DEREVYANKO et al.1990). The remains from two of them (i.e. Denisovaya C. and Kaminnaya C.)

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are mentioned as "Aves" only. Twelve bird species were identified in the Palaeolithic material from the Ust'-Kanskaya Cave, situated on the Charysh River, 160 km up stream from the caves explored in the 19th century (RUDENKO 1960; DEREVYANKO et al.1990). Therefore, the bird remains from the three new karstic caves in the Altai Mts. described in the present paper are a significant contribution to the knowledge of the past avifauna in this area.

II. MATERIALS

The material comes from the following three localities situated in karstic caves in the Western Altai Mts. (Fig. 1):

Strashnaya Cave – situated on the left bank of the Inya River (left tributary of the Charysh River), was discovered in 1966 and explored by archaeologists (ABRAMOVA 1984). Palaeolithic layers 3-4 m under the cave floor are dated back to about 25000 years BP, whereas the layers 4-6 m under the surface are dated to 40-45 KA BP. Mammal remains consist of bones of 40 species including *Crocuta spelaea, Ursus spelaeus, Mammuthus, Coelodonta* and *Bison* (DEREVYANKO et al., after OBODOV 1975). There are no data indicating the layer the bird remains were found in.

Logovo Gieny Cave – situated about 4 km from the Strashnaya Cave, was explored in 1969-70. Three layers of sediments were distinguished: the upper layer contained Holocene pottery and ani-

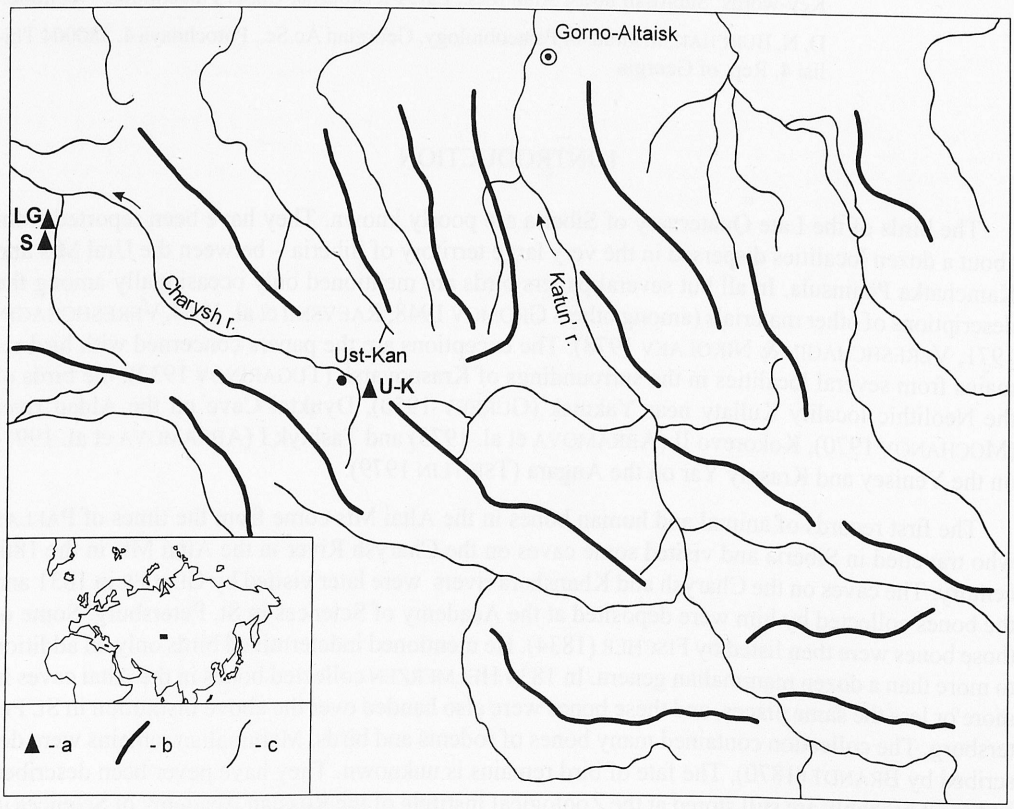

Fig. 1. Sketch map of the Altai Mts. (Acc. to DEREVYANKO et al. 1990); a – caves (from which the presented materials come from), b – main mountain ridges, c – rivers, LG – Logovo Gieny Cave, S – Strashnaya Cave, U-K – Ust'-Kanskaya Cave.

mal remains; the middle layer was of Pleistocene origin – radiocarbon dating of a bison bone: 32700 ±2800 years BP; more than 3000 bones of large- and middle-sized mammals were identified there (DEREVYANKO et al., after OBODOV 1975). Bird bones were collected from the upper layer.

Mamatka Cave – Location of this cave is kept in secret.

A total of 53 bird bones or bone fragments were identified. They represent 21 species (Table I). Their recent distribution (FLINT et al. 1968) indicates that the Altai Mts. lie (at least partly) within the limits of their breeding areas. The same is true of the birds mentioned from the Ust'-Kanskaya Cave. Not having enough comparative skeletons of Siberian Passeriformes – especially those living

Table I

List of fossil and subfossil bird species identified in three karstic caves in the Altai Mts. Numbers of remains and minimal numbers of individuals (MNI) are given

Bird species	Strashnaya Cave Up. Pleistocene		Logovo Gieny C. Holocene		Mamatka Cave Holocene	
	No of remains	MNI	No of remains	MNI	No of remains	MNI
Anas crecca	–		1	1	–	
cf. *Anas penelope*	1	1	–		–	
Anas acuta	–		1	1	–	
Anas querquedula	1	1	–		–	
Aythya ferina	1	1	1	1	–	
Bucephala clangula	–		–		1	1
Falco altaicus	1	1	–		–	
Lagopus lagopus	3	1	–		–	
Lagopus mutus	3	2	1	1	–	
Tetrao tetrix	15	3	–		–	
Tetrao urogallus	1	1	–		–	
Alectoris chukar	3	1	–		1	1
Perdix perdix	1	1	–		–	
Coturnix coturnix	3	2	1	1	–	
Cuculus cf. *canorus*	1	1	–		–	
Apus apus	–		2	2	–	
Perisoreus infaustus	2	2	–		–	
Garrulus glandarius	1	1	–		–	
Pica pica	1	1	–		–	
Pyrrhocorax graculus	2	1	–		–	
Corvus cf. *monedula*	4	1	–		–	
Total	44	22	7	7	2	2

in the Altai Mts. – we have omitted the bones of small passerines here, the identification of which would be difficult and doubtful.

III. SYSTEMATIC REVIEW

To present a complete list of bird species so far known from the excavations in the Altai Mts. in this section we mention also the birds listed by RUDENKO (1960) from Ust'-Kanskaya Cave. His data are, however, not so detailed as ours: individual bones are not named and it is not quite clear whether the numbers given by RUDENKO (1960) indicate the number of bones or that of individuals, though, according to DEREVYANKO et al. (1990), they represent the MNI. The animal remains are not provided with stratigraphic documentation, nevertheless it seems that at least the majority of them come from various stages of the Palaeolithic (DEREVYANKO et al. 1990). If the remains of given species are identified also in materials from other places in Siberia, these localities are listed at the end.

The order of species and their systematics are applied after VAURIE (1959, 1967).

Anser anser (LINNAEUS, 1758)

Recorded by RUDENKO (1960) from Ust'-Kanskaya Cave.

Other Siberian locality: Dyuktai Cave in Yakutia (MOCHANOV 1970)

Tadorna ferruginea (PALLAS, 1764)

Recorded by RUDENKO (1960) from Ust'-Kanskaya Cave.

Anas platyrhynchos LINNAEUS, 1758

Recorded by RUDENKO (1960) from Ust'-Kanskaya Cave.

Anas crecca LINNEAUS, 1758

M a t e r i a l: Logovo Gieny Cave, Holocene: coracoideum – 1 (sin.) of adult bird.

Ust'-Kanskaya Cave: listed by RUDENKO (1960).

Other Siberian locality: the cave Peshchernyi Log near Krasnoyarsk (TUGARINOV 1932).

Anas strepera LINNEAUS, 1758

Recorded by RUDENKO (1960) from Ust'-Kanskaya Cave only.

Other Siberian locality: Dyuktai Cave in Yakutia (MOCHANOV 1970)

cf. *Anas penelope* LINNEAUS, 1758

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: ulna – 1 (sin., proximal part) of adult bird. The majority of morphological details are typical of the Wigeon, however the impressio musculi brachialis inferioris being generally similar to that of the Wigeon specimen compared does not end distally as in the Wigeon but only narrows and reaches the ventral side of the bone.

Other Siberian locality: the cave Peshchernyi Log (Upper Pleistocene) near Krasnoyarsk – a bone most probably of a juvenile Wigeon (TUGARINOV 1932).

Anas acuta LINNEAUS, 1758

M a t e r i a l: Logovo Gieny Cave, Holocene: coracoideum – 1 (dex., parascapular part) of adult bird. Measurements: width of the diaphysis – 5 mm, fossa scapularis (top to bottom) – 8.4 mm x width – 6 mm.

Other Siberian locality: Kullaty (Neolithic) near Yakutsk (GUREEV 1950).

Anas querquedula LINNEAUS, 1758

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: carpometacarpus – 1 (dex.) of adult bird.

Aythya ferina (LINNEAUS, 1758)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: tarsometatarsus – 1 (dex. damaged) of adult bird; the bone has both its endings cut off.

Logovo Gieny Cave, Holocene: humerus – 1 (dex. proximal part) of adult bird; the largest width of its head is 17 mm.

Bucephala clangula (LINNEAUS, 1758)

M a t e r i a l: Mamatka Cave, Holocene: humerus – 1 (sin.) of adult bird.

Other Siberian locality: Kullaty (Neolithic) near Yakutsk (GUREEV 1950).

Falco altaicus (MENZBIR, 1891)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: carpometacarpus – 1 (dex.) of adult bird. There are two articular fragments of the same bone.

Falco cf. *rusticolus* LINNEAUS, 1758, was identified in the Upper Paleolithic fauna from Afontova Gora II and III by TUGARINOV (1932) and later from Afontova Gora II by GROMOV (1948).

The systematic position of *Falco altaicus* (MENZBIER, 1891) is not quite clear. It is described as the valid species *Falco altaicus* in the monograph "The birds of USSR" (IVANOV et al. 1951). On the other hand, some ornithologists of the former Soviet Union include it in the Gyr Falcon, whereas others in the Saker Falcon. And so DEMENTEV et al. (1951) writes about the Altai Falcon as a subspecies of *F. gyrfalco* (= *rusticolus*) LINNEAUS, 1758. In a monograph of the birds of Kazakhstan (GAVRIN et al. 1962) the names *Gennaia altaica* and *G. lorenzi* are synonimized with *Falco cherrug* GRAY, 1833. According to FLINT et al. (1968), dark individuals of *F. cherrug* can be rarely met with in the Altai Mts and Central Asia, and IVANOV & STEGMAN (1978) write that "so called Altai Gyr Falcon" should be treated as a dark phase of the Saker Falcon *F. cherrug*. Of West European systematicians, HARTERT (1912-1921) and VAURIE (1965) treat the Altai Falcon as a separate species. In the Checklist of HOWARD and MOORE (1991) it is listed as a subspecies of *F. cherrug*, whereas, according to AMADON and BULL (1988), "the form *altaicus* of the mountains of central Asia is apparently an altitudinal race or color morph of *F. cherrug*."

It is not the aim of this paper to decide the systematic position of the Altai Falcon but some of our data connected with identification of the carpometacarpus under study may be of interest. The bone from Strashnaya Cave was compared with the corresponding bones of the following falcons: Peregrine, Saker, Lanner, Altai and Eastern Siberian Gyr Falcon, and it was clear that the fossil belonged to the Altai Falcon. Moreover, the fossil and recent bones of the Altai Falcons (from Strashnaya Cave and from Eastern Kazakhstan) are similar to the bone of the Gyr Falcon and not to those of the

other species. In the os metacarpale alulare of the Altai Falcon the horizontal articular facet for the first phalangue is similar in length to that in the Saker Falcon but in the latter it is distinctly narrower than in Gyr and Altai Falcons. The length and width proportions of the facet are calculated as indices. The measurements and indices are shown in Table II. The indices of the relative width of the facet are very similar in fossil and recent Altai Falcons as well as in the East Sibirian Gyr Falcon, and much larger than in the Saker Falcon. We noted also some other small morphological differences in the carpometacarpus bones of these two falcons.

Table II

The length and width of horizontal articular facet of os metacarpale alulare for the first phalangue in carpometacarpus of the fossil falcon from Strashnaya Cave and recent large species of the Palaearctic falcons

Bird species	Measurements (in mm)		Index: $\frac{width \times 100}{length}$
	Length	Width	
Fossil falcon from Strashnaya Cave, Upper Pleistocene	8.0	3.1	38.7
Falco altaicus, recent, Eastern Kazakhstan	8.0	3.0	37.5
Falco rusticolus grebnitzki, recent	8.8	3.4	38.6
Falco cherrug, recent	8.0	2.5	31.2

Lagopus lagopus (LINNAEUS, 1758)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: tarsometatarsus – 1 (dex.), ulna – 1 (sin.); both bones of one adult bird. Tarsometatarsus – 1 (dex, distal part) of a youg bird (articular trochleas not completely formed, bone not completely ossified).

Ust'-Kanskaya Cave: listed by RUDENKO (1960).

Other Siberian localities: Kullaty (Neolithic) near Yakutsk (GUREEV 1950), Afontova Gora II and III (Upper Paleolithic) in Krasnoyarsk (TUGARINOV 1932), the cave Peshchernyi Log (Upper Pleistocene) near Krasnoyarsk (TUGARINOV 1932), Korekovo II (Upper Pleistocene) on the Yenisey (ABRAMOVA et al. 1975), Tashtyk I (Upper Pleistocene) on the Yenisey (ABRAMOVA et al. 1991), Dyuktai Cave (Late Pleistocene) in Yakutia (MOCHANOV 1970) and Krasniy Yar (Upper Pleistocene) on the Angara (TSEITLIN 1979).

Lagopus mutus (MONTIN, 1776)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: tarsometatarsi – 2 (dex. et sin.), ulna – 1 (sin.) of two adult birds.

Logovo Gieny Cave, Holocene: carpometacarpus – 1 (dex.), coracoideum – 1 (sin.) damaged; both bones of one adult bird.

Other Siberian localities: the Afontova Gora II and III (Upper Paleolithic) in Krasnoyarsk (TUGARINOV 1932) and Dyuktai Cave (Late Pleistocene) in Yakutia (MOCHANOV 1970).

Tetrao tetrix LINNAEUS, 1758

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: coracoidea – 2 (dex.), scapulae – 2 (dex.), humera – 2 (sin. and distal part of a right one), ulnae – 3 (sin.), carpometacarpi – 2 (sin.), femora – 2 (dex.), tarsometatarsi – 2 (dex.). Altogether 15 bones of adult birds (among them 2 males and 1 female).

Ust'-Kanskaya Cave: mentioned by RUDENKO (1960).

Other Siberian localities: the cave Peshchernyi Log (Upper Pleistocene) near Krasnoyarsk (TUGARINOV 1932) and Dyuktai Cave (Late Pleistocene) in Yakutia (MOCHANOV 1970).

Tetrao urogallus LINNAEUS, 1758

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: tibiotarsus – 1 (sin. distal part) of adult bird.

Tetraogallus altaicus (GEBLER, 1836)

Recorded by RUDENKO (1960) from the Ust'-Kanskaya Cave only.

Alectoris chukar (GRAY, 1830)
[syn.: *Alectoris kakelik* (FALK, 1786)]

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: tarsometatarsi – 2 (dex. et sin.), coracoideum – 1 (dex.) of one adult bird.

Mamatka Cave, Holocene: humerus – 1 (dex.) of adult bird.

Perdix perdix (LINNAEUS, 1758)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: tarsometatarsus – 1 (sin.) of adult bird. The bones of sympatric *P. dauuricae* are slender (Table III).

Ust'-Kanskaya Cave: mentioned by RUDENKO (1960).

Table III

The measurements (in mm) of fossil tarsometatarsus of the Partridge from Strashnaya Cave compared with those of the recent *Perdix perdix* (n = 54, after KRAFT 1972) and *Perdix dauuricae* (n = 2)

Measurement	Partridge from Strashnaya C.	Recent *Perdix perdix*	Recent *Perdix dauuricae*	
Total length	40.6	38.3 – 43.9	35.5	39.1
Width of proximal articular part	7.0	6.9 – 7.8	6.6	6.7
The smallest width of bone shaft	3.1	3.0 – 3.6	2.9	2.8
Width of distal articular part	7.0	6.9 – 8.5	6.9	7.0

Coturnix coturnix (LINNAEUS, 1758)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: tarsometatarsi – 2 (sin.), humerus – 1 (sin.) of two adult birds.

Logovo Gieny Cave, Holocene: tarsometatarsus – 1 (dex.).

Cuculus cf. *canorus* LINNAEUS, 1758

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: humerus – 1 (sin.) of adult bird.

The identification is not sure because the bones of *C. canorus* and *C. Saturatus* BLYTH, 1843, also living in the Altai Mts., are hardly separable

Asio flammeus (PONTOPPIDAN, 1763)

Recorded by RUDENKO (1960) from Ust'-Kanskaya Cave only.

Apus apus (LINNAEUS, 1758)

M a t e r i a l: Logovo Gieny Cave, Holocene: humera – 2 (dex.) of adult birds.

Apus pacificus (LATHAM, 1801), also living in the Altai Mts. and being of similar size, differs in the morphology of the proximal part of its humerus which is a little smaller (see Table IV).

Table IV

The measurements (in mm) of fossil humerus of the Swift from Logovo Gieny Cave compared with those of the recent *Apus apus* and *Apus pacificus*

Measurement	Swift from the Logovo Gieny Cave	Recent *Apus apus* (n = 5)	Recent *Apus pacificus*
Total length	12.0	11.9 – 12.3	11.6
Width of proximal articular part	7.0	6.4 – 7.3	6.3
Width of distal articular part	5.0	5.1 – 5.3	5.0

Perisoreus infaustus (LINNAEUS, 1758)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: humera – 2 (dex.) of two adult birds.

Garrulus glandarius (LINNAEUS, 1758)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: humerus – 1 (sin. both ends damaged) of one adult bird.

Pica pica (LINNAEUS, 1758)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: humerus – 1 (dex.) of adult bird.

Pyrrhocorax pyrrhocorax (LINNAEUS, 1758)

Recorded by RUDENKO (1960) from Ust'-Kanskaya Cave only.

Pyrrhocorax graculus (LINNAEUS, 1766)

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: tibiotarsus – 1 (dex.), tarsometatarsus – 1 (dex.); both may have belonged to one adult bird.

Corvus cf. *monedula* LINNAEUS, 1758

M a t e r i a l: Strashnaya Cave, Upper Pleistocene: humerus – 1 (dex. proximal head broken), carpometacarpus – 1 (sin.), ulna – 1 (sin.), coracoideum – 1 (sin.); all 4 bones may have belonged to one adult bird. The identification is not sure because the bones of *C. monedula* and *C. dauuricus* PALLAS, 1776, treated by some systematicians (i.a. DEMENTEV & GLADKOV 1954) as a subspecies of *monedula* are hardly separable.

Other Siberian localities: the Afontova Gora II (Upper Paleolithic) in Krasnoyarsk (TUGARINOV 1932; Gromov 1948), the cave Peshchernyi Log (Upper Pleistocene) near Krasnoyarsk (TUGARINOV 1932).]

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