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BIRDS IN LATE MESOLITHIC BURIALS AT YUZHNIY OLENIY OSTROV (LAKE ONEGA, WESTERN RUSSIA) – WHAT DO THEY TELL ABOUT HUMANS AND THE ENVIRONMENT?

Abstract

Yuzhniy Oleniy Ostrov in Karelia, northwestern Russia, is the largest known Mesolithic cemetery in northern Europe. Most of the graves are well preserved, and a wealth of materials, including human skeletal remains and a variety of grave goods, has been documented during the excavations in 1937 and 1938. Animal bones, both unmodified and in the form of artifacts were found in the graves. Mammalian bones were analyzed soon after the excavation and the interpretations published in Nina Gurina's monograph of 1956. However, bird bones found in the graves were not identified as to species. In this paper, we present fresh results of our analysis of bird bones from graves on Yuzhniy Oleniy Ostrov. The most common bird species in the cemetery was the osprey (*Pandion haliaetus*). By studying the location of bird bones in burials as well as the distribution of anatomical elements, we interpret the roles of birds in burial practices. The behaviour and ecology of the identified species are used for investigating and estimating why these species may have been placed in graves and what kind of significance or value these species may have had for the Late Mesolithic people who used the cemetery.

Keywords: Mesolithic, Graves, Yuzhniy Oleniy Ostrov, Bird bones, Burial practices

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INTRODUCTION

Ideally, animal bones in burials can provide information about many aspects of prehistoric life: ideology, environment, economy, social hierarchy and the relationship between humans and animals. Relevant archaeological data are obtained through a detailed contextual and osteological research. In order to gain insights into the ideological or economical roles of animals, or the ideas behind the practices of placing animal bones in graves, it is necessary to know the location of the bones vis-á-vis the human skeletal remains. Usually all animal bones that have been found in direct association with human remains can be interpreted as part of grave goods. This is especially true when animal bones bear evidence of anthropogenic modifications (e.g., artifacts such as pendants, hunting gear, tools, etc.). However, sometimes unmodified animal bones are of different age than the human skeleton and do not belong to the grave (Mannermaa et al. 2007). In order to avoid misinterpretation, it is important to establish that all of the animal bones in the graves really were meant as grave goods. The methods of estimating this include contextual and taphonomic studies and radiocarbon dating.

In this paper, we discuss the bird bones found in Late Mesolithic graves on Yuzhniy Oleniy

Ostrov (Lake Onega, western Russia) from the viewpoint of their material and potential symbolic significances. We attempt to discover why birds or parts of birds were placed in graves and what kind of relationships existed between these bird species and the Late Mesolithic people. The behavioral and environmental requirements of bird species are also used in drawing inferences about cultural and environmental conditions. Two bird bones were radiocarbon dated in order to assure their association with the burials and to establish the chronology of the cemetery.

Burial practices may implicitly reflect the special treatment and the symbolic roles of animals. Every grave gift, ornament, or feature such as body position or body treatment in graves is a potential active representation of burial practices and could be carefully interpreted as a "message" concerning the ideology of the dead individual and/or those who buried him/her. Archaeological data from other contexts indicates that animals have played significant roles in the ideology of prehistoric people (e.g., Carpelan 1975; Ryan & Crabtree 1995; Jones 1998; Jennbert 2003; Jones O'Day et al. 2004). This is also supported by ethnographic data (e.g., Okladnikov 1950; Karsten 1955; Napolskikh 1992). Unmodified animal remains found in burials have been frequently interpreted as the remains of meals intended for the dead or for spirits (Larsson 1989; 1990; Burenhult 1997: 60). Oshibkina (1983) has also suggested that fragments of animal bones in Mesolithic Popovo (western Russia) might be the remains of meals. The meals took place at the funeral site or in some other location, and only parts, symbols, of the animals were brought to and placed in the grave.

It is also possible that parts or depictions of totem animals were placed in graves. Indications of animal totemism (brown bear *Ursus arctos*, European elk *Alces alces*, beaver *Castor fiber*, whooper swan *Cygnus cygnus*, grass snake *Natrix natrix* etc.) are known from a number of prehistoric and historic sites in northern Europe (e.g., Tilley 1991; Ernits 1992: 116; Zvelebil 1997: 45; Loze 2003). The jay (*Garrulus glandarius*) may have been a totem animal for the Middle Neolithic people at Zvejnieki, northern Latvia (Fig. 1.), as parts of their wings were found in several burials (Mannermaa 2006; 2008).

Bird bones have been found in a number of Mesolithic and Neolithic burials in northern Europe, but they are seldom studied in a wider perspective (Gurina 1956; Jaanits 1957; Guminski 2005; Mannermaa 2006; 2008). A famous and often cited archaeological find is the grave from the Late Mesolithic Vedbæk Bøgebakken site in Denmark (Fig. 1) that contained the remains of a young woman and a newborn baby who was buried on a whooper swan wing (Albrethsen & Brinch Petersen 1976).

Interesting examples of the use of birds in Neolithic burial practices are, for instance, bird bone beads at the Middle Neolithic Ajvide site (about 4000 BP) on Gotland, Sweden and the Middle Neolithic (about 4900 BP) burials at Tamula in southwestern Estonia (Fig. 1). Beads have been put in graves of both children, females and males, and they most likely represent the decoration of the body or burial costumes. Practically all bone beads at Ajvide were made of radii and ulnae (wing bones) of aquatic birds (Mannermaa 2008). Another example is burial VII (5760 ± 45 BP [Hela-1335]) at Tamula which belongs to a 8 ± 2-year-old child buried on his/her back, with unmodified common crane (Grus grus) ulnae near the hands (Jaanits 1954; Ots 2006; Kriiska et al. 2007).

Furthermore, at Neolithic Tamula, an adult male in burial XIV had a golden eagle (Aquila chrysaetos) radius in a find cluster between his vertebrae and left hand, and another adult, ca. 18–25 years old female (burial VIII, 5370 ± 45 BP [Hela-1336]) had a capercaillie (*Tetrao urogallus*) radius near the head (Jaanits 1957: 81, 86; Ots 2006; Kriiska et al. 2007). Bird bones have also been found in the Mesolithic cemetery of Popovo, situated relatively close to Lake Onega (Fig. 1), but they have not been identified as to species (Oshibkina 1982).

Such graves where bird wings or parts of wings have been deposited near the hands strongly suggest that these birds may have played a role as carriers between different places or states of being. Moving between different states of being has been an important component of, for example, shamanism in northern regions (Siikala 2002).

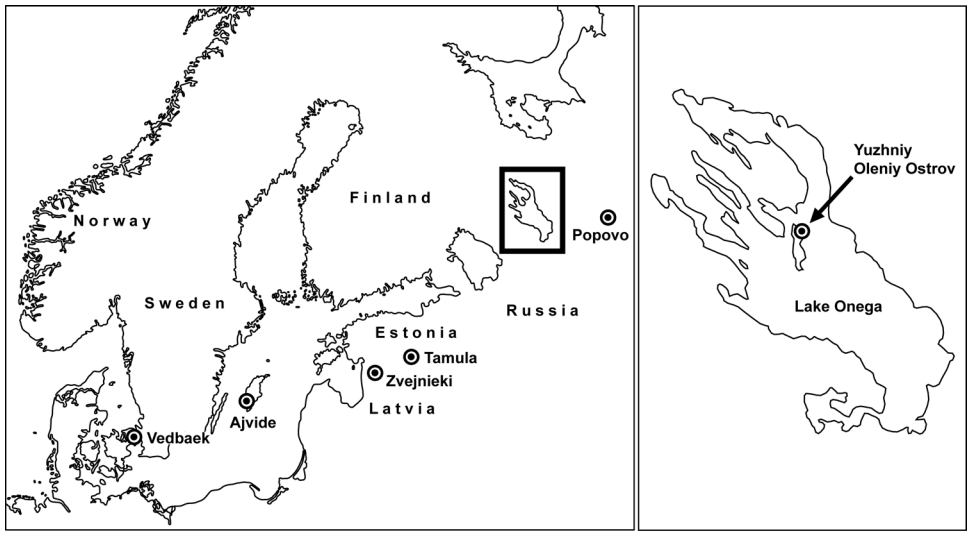

Fig. 1. The location of the cemeteries Yuzhniy Oleniy Ostrov and Popovo (Russia), Tamula (Estonia), Zvejnieki (Latvia), Ajvide (Gotland, Sweden) and Vedbæk Bøgebakken (Denmark).

MATERIAL AND METHODS

The cemetery

The cemetery island of Yuzhniy Oleniy Ostrov is located on an island of Lake Onega, Karelia in western Russia (Fig. 1). Bones analyzed in this study were collected during the excavations made by V.I. Ravdonikas in 1937 and 1938. Excavations were carried out at the site also in 1936, but the bones recovered that year were not available for analysis. The cemetery on Yuzhniy Oleniy Ostrov is the largest known Mesolithic cemetery in northern Europe. At least 170 burials were identified in the archaeological excavations of 1936–38 (Gurina 1956). Excavations revealed 49 skeletons in 1936, 105 skeletons in 1937, and 16 skeletons in 1938. However, the site was already partly disturbed when the first excavation took place, and the original number of burials may have exceeded 400–500 (Gurina 1956; Jacobs 1995). During the three field seasons, an area of 2700 m² was excavated. About 2350 m² were excavated using a 2 x 2 meter square grid, while the rest of the area was investigated by digging irregular or intuitive trenches (Jacobs 1995: 365).

Two separate burial areas were detected on the island. The southern group consists of 41 and the northern group of 150 burials (Gurina 1956: figure 9). The whole burial area is marked by relatively similar burial practices. The orientation of the long axis in all determinable burial pits was roughly from east to west (Gurina 1956). Red ochre surrounded almost all skeletons. The selection of grave goods varied between the graves, but animal tooth pendants were found in most of the graves. Other grave goods include, for example, bone, stone and antler utensils (e.g., arrowheads, spearheads, knives and scrapers), zoomorphic (mainly brown bear, European elk, and snakes), and anthropomorphic figurines, and unmodified animal bones (Gurina 1956; O'Shea & Zvelebil 1984).

Original assumptions about the dating of the cemetery to the Neolithic were based on the large size of the cemetery and the rich mortuary deposits (Gurina 1956; Ravdonikas 1956). The precise study of the artifacts revealed that the finds, for example arrowheads and other utensils, have strong similarities with Mesolithic Suomusjärvi and Kunda types in Finland and the Baltic area, and that the cemetery should be dated to the Mesolithic (Pankrushev 1978). This was further supported by shore displacement studies (Siiriäinen 1974). In 1990, the first radiocarbon dates from Yuzhniy Oleniy Ostrov burials confirmed that the cemetery clearly be-

Table 1. Bird bones connected to a certain grave in Yuzhniy Oleniy Ostrov (Lake Onega, Russia).

Grave	Find	Bone element	Taxon	Red ochre	Cutmarks	Notes
55	25	diaph indet fr	Aves	x	--	--
56	50	Tibiotarsus sin dist fr	Pandion haliaetus	x	--	--
56	49	Tibiotarsus dex prox+diaph fr	Pandion haliaetus	--	--	--
56	56	Tibiotarsus sin prox+diaph fr	Pandion haliaetus	x	--	--
56	47	Femur dex	Pandion haliaetus	x	--	--
56	57	Fibula sin (excl dist fr)	Pandion haliaetus	x	--	--
56	58	Carpometacarpus dex dist fr	Strix nebulosa	x, filled with	--	--
61	102	diaph indet	Aves	x	--	--
61	101	dig II, phal 1 fr	Cygnus cygnus	x	--	--
64	103	diaph indet	Aves sp.	x	--	--
65	120	Carpometacarpus dex excl mc III+prox fr	Cygnus cygnus	x	--	--
69	131	Carpometacarpus dex dist fr	Anas querquedula	--	--	--
116	189	Scapula dex prox fr	Pandion haliaetus	--	x	--
116	184	Coracoid dex (excl dist+prox fr)	Pandion haliaetus	x	--	--
119	195	diaph indet fr	Aves	--	--	large bird
125	197,2	Tarsometatarsus sin dist fr	Gavia arctica	x, light	--	In two pieces ^{14}C
125	199	Tarsometatarsus sin dist fr	Gavia arctica	x, light	--	--
130	203	Coracoid sin	Tetrao urogallus	--	--	In two pieces
138	227	Ulna sin dist fr	Larus argentatus	x	--	--
138	228	Ulna sin dist fr	Larus argentatus	x	--	--
138	229	Humerus dex fr	Aves	x	--	--

*Fig. 2. The left proximal part of the tibiotarsus of the osprey (*Pandion haliaetus*) was found in the thoractic or vertebral region of the male in grave 56 Yuzhniy Oleniy Ostrov. The radiocarbon date of the specimen is 7570 ± 60 BP (Hela-1374).*

longs to the Mesolithic Period (Price & Jacobs 1990). Radiocarbon dates on human skeletal samples from five burials date the cemetery to approximately 7700–7300 BP, which is about 7000–6200 cal BC (Price & Jacobs 1990).

The mammalian animal remains were analyzed soon after the excavations and published in Gurina's volume (1956), which also included sex and age identifications of the human skeletons. Anatomical or taxonomic identification of the bird bones from Yuzhniy Oleniy Ostrov burials have not been carried out before our analysis. Unmodified bird bones from Yuzhniy Oleniy Ostrov burials are deposited in the Zoological Institute, Ornithological Section, St. Petersburg. All artifacts made of bird or mammal bones are deposited at the Museum of Anthropology and Ethnography (MAE) in St. Petersburg. During this stage of research we have been able to investigate only the material deposited at the Zoological Institute. In this article, we discuss only unmodified bird bones. Artifacts made of bird bones have been omitted from further analysis.

*Fig. 3. The left distal part of tarsometatarsus of the black throated diver (*Gavia arctica*) was found by the left foot in the male grave 125 in Yuzhniy Oleniy Ostrov. The radiocarbon date of the specimen is 7950 ± 60 BP (Hela-1375).*

Osteological analysis

The bird bones were analyzed by AP and KM at the Zoological Institute in St. Petersburg. At the Zoological Institute, bird bones from Yuzhniy Oleniy Ostrov graves are stored in a wooden box marked "Oleniy Ostrov, excavated by Ravdonikas 1937 (and 1938)". A small paper label with find data (the site, the number of the grave, the number of the find) was originally attached to each bone specimen. However, most specimens (113) have lost their label and thus the find data, including the grave number has disappeared. In other words, the majority of the bird bones have lost their precise archaeological context.

Our study material consists of 132 bird bone specimens of which 21 can be connected to a particular grave (Table 1). Gurina (1956) mentions bird bones in 22 graves (Table 2). According to Gurina (1956), two graves in the southern burial group contained unmodified bird bones. All the remaining 19 graves with unmodified bird bones belong to the northern group. The precise location of each bird bone, as well as other animal bones, is shown in the illustrations and described in the text of Gurina's volume (1956). We can use this information only for the specimens with a grave number still attached.

The majority of the bird bones are covered with red ochre, which indicates that they can be confidently interpreted as grave goods. 16 bird bone specimens have cutmarks which supports our assumption that the material really is anthropogenic. Cutmarks are present in 14 specimens of the osprey (*Pandion haliaetus*): thirteen distal part of *tibiotarsi* (leg bone) and one proximal part of *scapula* (shoulder blade) and in two specimens of white-tailed sea eagle (*Haliaeetus albicilla*), both of which are proximal parts of *coracoid* (shoulder blade). A detailed study of the cutmarks has not yet been carried out, but the location of the cutmarks indicates several activities. The cutmarks on the *distal tibiotarsi* may have been caused by the separation of the lower legs from the body, and cutmarks in *scapulae* from the separation of the wings or breast meat. Practically all long bones of birds are broken at the diaphysis, probably due to post-depositional processes.

AMS datings

Two bird bones were chosen for radiocarbon (AMS) dating: one from an osprey from male burial 56 and another of black-throated diver (*Gavia arctica*) from male burial 125 (Figs. 2–3).

Table 2. Late Mesolithic graves with unmodified bird bones in Yuzhniy Oleniy Ostrov (Lake Onega, Russia). Sex and age assessments have been taken from Gurina

Grave	Bird bones	Sex	Location of bones	Reference
5	4 Aves indet.	Mature male	At right scapula	Gurina 1956
14	2 Aves indet.	Adult	At thorax	Gurina 1956
55	13 bird bone (indet.)	Adult female	At right hand	Gurina 1956
56	5 Pandion haliaetus 1 Strix nebulosa	Mature (?) male	At thorax	Gurina 1956
58	Aves indet.	Mature (?) male	At elbow	Gurina 1956
61	1 Cygnus Cygnus, 1 Aves indet.	Adult	At thorax	Gurina 1956
64	Aves indet.	Juvenile	Near the skull	Gurina 1956
65	Cygnus cygnus	Mature male	At left arm/thorax	Gurina 1956
66	Aves indet.	Adult female	At right tibia	Gurina 1956, Grünberg 2000
69	1 Anas querquedula	Adult male	At right knee	Gurina 1956, Grünberg 2000
82	Aves indet.	Mature male	Near the skull	Gurina 1956, Grünberg 2000
87	Aves indet.	Adult female	At waist	Gurina 1956, Grünberg 2000
92	Aves indet.	Child (5-6 years)	At waist?	Gurina 1956, Grünberg 2000
99	Aves indet.	Mature female	At waist	Gurina 1956, Grünberg 2000
100	Aves indet.	Adult male	?	Gurina 1956, Grünberg 2000
116	2 Pandion haliaeetus	Juvenile	At waist	Gurina 1956, Grünberg 2000
119	1 Aves indet	Adult male	Near the skull	Gurina 1956, Grünberg 2000
125	2 Gavia arctica	Mature male	Near the left foot	Gurina 1956, Grünberg 2000
130	Tetrao urogallus (coracoid)	Adult male	Near the skull	Gurina 1956, Grünberg 2000
138	2 Larus argentatus (ulnae) 1 Aves indet.	Female (?)	Near the head At right hand	Gurina 1956, Grünberg 2000
144	Aves indet.	Mature female	At stomach area	Gurina 1956, Grünberg 2000
146	Aves indet.	Mature female	At grave group	Gurina 1956, Grünberg 2000

Samples were prepared at the Dating Laboratory of the University of Helsinki, Finland, and dated at the Ångstrom Accelerator Mass Spectrometry Facility in Uppsala, Sweden. Before collagen extraction according to the method proposed by Longin (1971), the sample was treated with sodium hydroxide in order to remove humic contaminants. Collagen samples used for radiocarbon dating were also subjected to stable carbon isotope analysis. The obtained stable carbon isotope value (δ13 C) for both species indicates proportion of marine and freshwater or terrestrial protein input in the diet. The obtained values are given relative to the international VPDB standard, and the precision is better than 0.1 ‰. The aim was to date the particular graves and to guarantee the Mesolithic origin of the bone specimens.

RESULTS

Identified taxa

The list of the identified bird bones is given in Table 3. It includes all identified bird bones, not only those connected to particular graves. The most common species is the osprey (72 bone specimens, at least 14 individuals). The white-

Table 3. Bird taxa in graves at Yuzhniy Oleniy Ostrov, Lake Onega.

Taxon	NISP	MNI
Black-throated diver *Gavia arctica*	2	2
Great-crested grebe *Podiceps cristatus*	1	1
Whooper swan *Cygnus cygnus*	5	1
Long-tailed duck *Clangula hyemalis*	1	1
Garganey Anas querquedula	1	1
Mallard *Anas platyrhynchos*	4	1
Wigeon *Anas penelope*	1	1
Indet. duck *Anas* sp.	1	--
Red-breasted merganser *Mergus serrator*	1	1
Indet. duck Anatidae	2	--
White-tailed sea eagle *Haliaeetus albicilla*	14	4
Osprey *Pandion haliaetus*	72	14
Black grouse *Tetrao tetrix*	3	2
Capercaillie *Tetrao urogallus*	2	1
Herring gull *Larus argentatus*	2	2
Great grey owl *Strix nebulosa*	1	1
Indet.birds Aves	19	--
Total	132	33

NISP= Number of identified specimens, MNI= Minimum number of individuals

tailed sea eagle, the whooper swan, the mallard (*Anas platyrhynchos*) and the black grouse (*Tetrao tetrix*) are represented by several specimens. All other taxa are represented by only one or two specimens. Bird bones are present in both female and male burials, and the ratio is more or less the same (six female, eight male burials). Three of the graves with bird bones belong to adults, but the sex cannot be determined with certainty. One of the graves with bird bones belongs to a juvenile individual whose age or sex cannot be estimated, and one belongs to a child of 5–6 years.

Element distribution

The element distribution for different bird taxa is presented in Table 4. All bird bone specimens derive from shoulders, wings or legs. Parts of the cranium, sternum, pelvis, vertebrae and toes are completely lacking. Leg elements dominate the assemblage, but there are clear variations in the skeletal element distribution for different species or taxa. Osprey bones derive from shoulders, wings and legs, although there is a clear dominance of tibiotarsus, a leg bone (almost half of all osprey bones). However, all white-tailed sea eagle bones derive from shoulders. The whooper swan is represented by elements from shoulder and distal wing. All three bone fragments from the black grouse are from humeri. The black-throated diver is represented by two left distal parts of tarsometatarsi (both from grave 125) and herring gull (*Larus argentatus*) by two left distal parts of ulnae (both from the grave 138). Duck bones derive from shoulders, wings and legs.

The location of the identified bird specimens in the graves

In the following, we describe the contexts of the bird bones in the ten graves where the specimens can be confidently linked to a particular burial (Table 1).

Collective grave 55, 56, 57

This collective grave includes the burials of three adults (Fig. 4). An older man was placed at the center on his back (number 56), and burials of two adult women (numbers 55 and 57) were placed on both sides (Gurina 1956; Grünberg 2000). No bird bones have been reported from burial 57. Thirteen bird bones were reported at the right hand of the female in burial 55 (Gurina 1956: 302). However, only one bird bone in our material, a diaphysis of an unspecified bird, had this burial number. The other grave goods are two bone artifacts, a bone point and a tooth pendant made of elk incisor by the right femur, and tooth pendants of beaver incisors at the area of the thorax (Grünberg 2000). Burial

56 was richly adorned (Fig. 4). Gurina (1956: 302) mentions that bird bones were found at the thoractic and vertebral regions, together with tooth pendants made of the wild reindeer (*Rangifer tarandus*). We identified six bird bones belonging to grave 56. Five of them are from the osprey and one from the great gray owl (*Strix nebulosa*). Four of the osprey bones are covered with red ochre, and the owl bone is filled with it. A bone of the wolf (*Canis lupus*) was found at the right clavicle. Tooth pendants made of wild reindeer, elk and beaver incisors were found at skull and shoulders, at the upper arms and at the upper legs. A large mace made of reindeer antler depicting elk head was found on the left side of the skull. A fragmentary slate knife, a flint artifact, and a fragment of a stone knife were found at the region of the head, and a bone artifact was found at the left elbow (Gurina 1956: 302).

Grave 61

Grave number 61 contained the skeletal remains of an adult. The sex cannot be determined. An unspecified number of bird bones were found in the thoractic region (Gurina 1956: 306–8). We identified two bird bones that could be linked to the grave 61. One is a distal wing bone (a finger bone) of the whooper swan and the other is an unspecified bird bone. Both specimens are covered with red ochre. The grave is rich in grave goods (Fig. 5). Teeth from at least three wild reindeer individuals were found at the knees, and tooth pendants of elk and beaver were found in all regions of the skeleton. A large bone dagger with the figure of an elk was found in the thoractic region and bone spearheads, at least one of which is blunted, near the feet. Fragments of bone artifacts were found in the shoulder region and near the legs. A slate knife was found near the left lower arm, together with a pierced bear canine.

Grave 64

The deceased is a juvenile but the sex cannot be determined. An unspecified number of bird bones were found near the skull, together with a wild reindeer long bone and beaver teeth (Gurina 1956: 308). One bird bone, a diaphysis of an unspecified bird could be linked to this grave. A

Table 4. Skeletal element distribution for different bird taxa in Yuzhniy Oleni Ostrov graves.

Taxa	Scapula	Coracoid	Humerus	Ulna	Carpometacarpus	Digiti manus	Femur	Tibiotarsus	Fibula	Tarsometatarsus	Indet
Gavia arctica	--	--	--	--	--	--	--	--	--	1	--
Podiceps cristatus	--	--	--	--	1	--	--	--	--	--	--
Cygnus cygnus	1	1	--	--	2	1	--	--	--		--
Anas platyrhynchos	--	1	1	1	--	--	--	--	--	1	--
Anas penelope	--	--	--	--	--	--	--	--	--	1	--
Anas querquedula	--	--	--	--	1	--	--	--	--	--	--
Clangula hyemalis	--	--	--	--	--	--	--	--	--	1	--
Mergus serrator	--	--	--	--	--	--	--	--	--	1	--
Anas sp.	--	--	--	1	--	--	--	--	--	--	--
Anatidae	1	--	--	--	--	--	--	--	--	1	--
Haliaeetus albicilla	4	10	--	--	--	--	--	--	--	--	--
Pandion haliaetus	1	1	14	--	--	--	17	35	4	--	--
Tetrao urogallus	--	1	--	--	--	--	1	--	--	--	--
Tetrao tetrix	--	--	3	--	--	--	--	--	--	--	--
Strix nebulosa	--	--	--	--	1	--	--	--	--	--	--
Larus argentatus	--	--	--	2	--	--	--	--	--	--	--
Aves indet.	--	--	3	1	--	2	3	1	--	--	9
Total	7	14	21	5	5	3	21	36	4	6	9

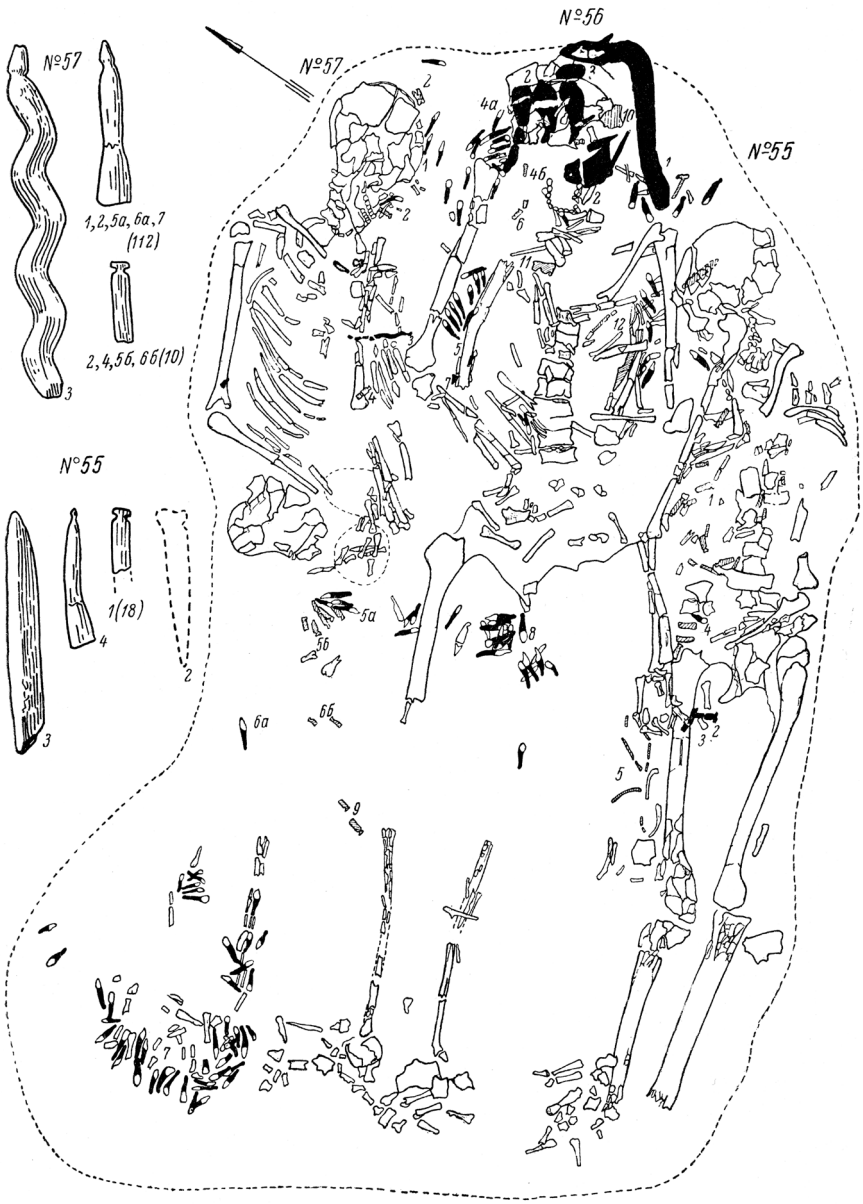

*Fig. 4. The collective grave 55–57 at Yuzhniy Oleniy Ostrov. Thirteen bird bones were found by the right hand of the adult female in burial 55 (number 5). Bones of the osprey (*Pandion haliaetus*) and the great gray owl (*Strix nebulosa*) were found in the thoractic and vertebral region of adult male in burial 56 (find number 12). Adapted from Gurina 1956.*

bone of an unspecified animal was found in the vertebral region and one elk tooth at the right femur. Tooth pendants made of beaver incisors were found in the head region, and six bear canines below the skull and at thorax. Elk incisor pendants were found in the pelvic area and the legs. Bone and stone pendants were found in the region of the legs and knees. Stone and bone tools were found in the head region and at feet. A fragmentary elk figurine was found near the skull (Fig. 6). The grave was intensively covered with red ochre.

Grave 65–66

Collective grave 65–66 contained two adults, an elderly male (grave 65) and an adult female (grave 66), both placed on their right side (Fig. 7). Gurina (1956: 312) mentions that small bird bones were found at the frontal part of the skull and in the thoractic region in the male burial 65.

Fig. 5. The grave 61 at Yuzhniy Oleniy Ostrov. The deceased is an adult but the sex has not been determined. A number of bird bones were found in the thoractic region (find number 17). Adapted from Gurina 1956.

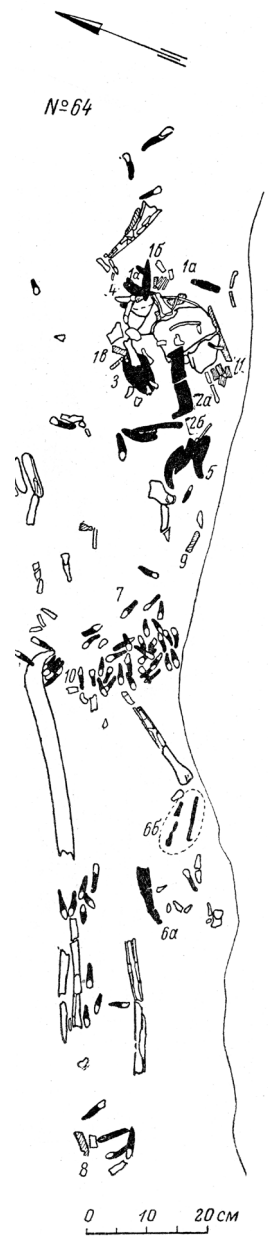

*Fig. 6. The grave 64 of juvenile individual at Yuzhniy Oleniy Ostrov. The sex cannot be determined. Bird bones were found near the skull, together with a long bone of the reindeer (*Rangifer tarandus*) and beaver (*Castor fiber*) teeth (find number 11). Adapted from Gurina 1956.*

We identified one bird bone, a whooper swan carpometacarpus (distal wing) which can be connected to burial 65. The specimen is covered with red ochre. Elk tooth pendants were found in the neck region, and they definitely formed some kind of necklace. Elk tooth pendants were also found in the pelvic region. A bird bone was reported near the right tibia in burial 66 (Gurina 1956: 312), but we did not find this specimen.

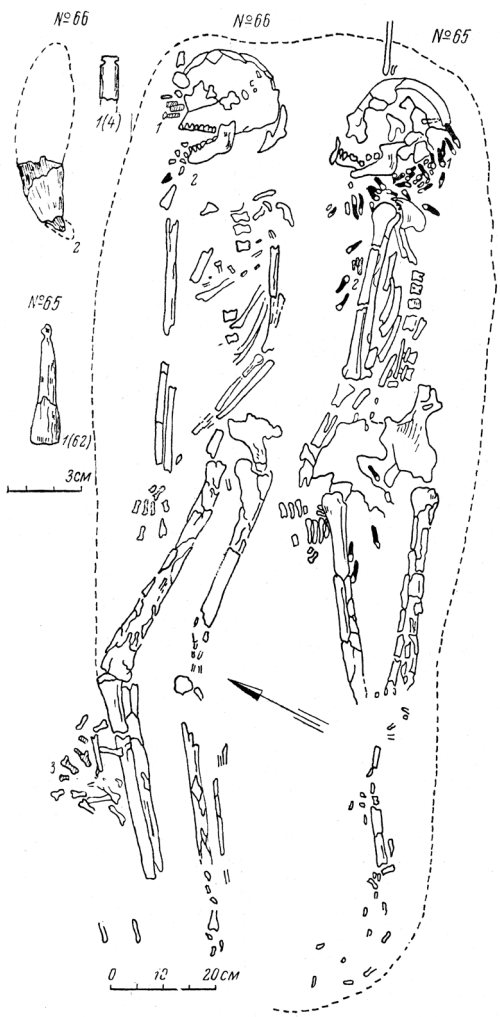

Fig. 7. The collective grave 65–66 of two adults, a female and a male, at Yuzhniy Oleniy Ostrov. Bird bones were found by the skull and in the thoractic region of the female 65 (find number 2) and by the left tibia of the male 66 (find number 3). Adapted from Gurina 1956.

Other grave goods are a fragmentary bear canine under the lower jaw and beaver incisor pendants near the eyes. The grave was covered with an intensive layer of red ochre.

Grave 69

The grave number 69 contained an adult female placed on her back. Bird bones were found at the right knee (Gurina 1956: 316). One bird

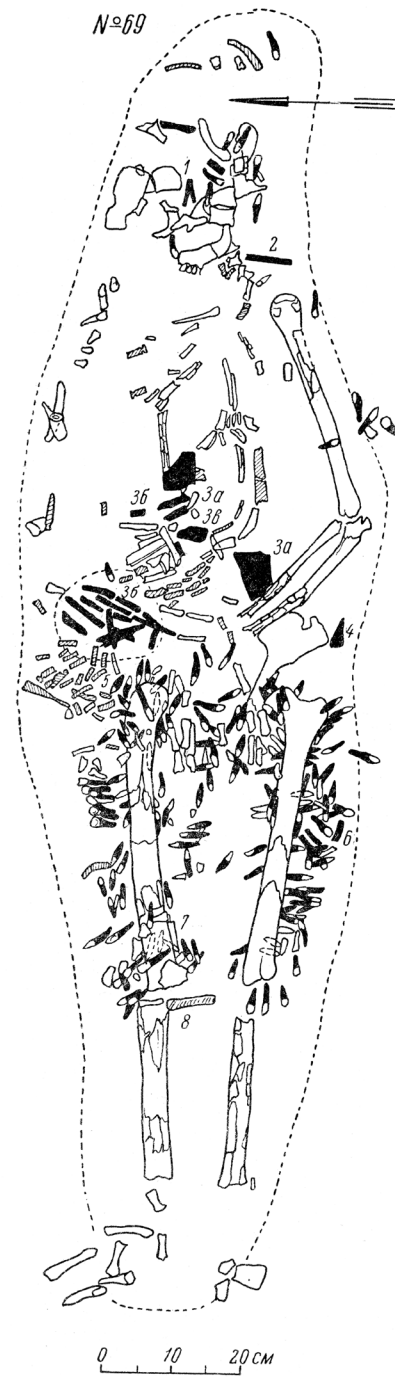

Fig. 8. The grave 69 of an adult female at Yuzhniy Oleniy Ostrov. Bird bones were found near the right knee and close to the lower jaw (find numbers 2 and 8). Adapted from Gurina 1956.

bone was found and identified in our analysis, a carpometacarpus of the garganey (Anas querquedula). The large number of tooth and bone pendants (beaver and elk) was found in the area of the upper legs, and scattered tooth pendants near the left humerus (upper arm) (Fig. 8). A slate tool was found in the stomach region. Bone artifacts, for example fragments of a fish hook of bone, were found in the head region, and bone spearheads at the right hip. A thick layer of red ochre covered the grave.

Grave 116

Fragments of bird bones were found in the waist or stomach area of the deceased in the grave 116 (Gurina 1956: 352). The skeleton of this juvenile person was poorly preserved. A beaver mandible, fragmentary beaver bones and a wolf tooth were found in the same area with bird bones (Fig. 9). Two bird bones from grave 116 were found in our analysis and identified as a scapula and coracoid (both from the shoulder) of an osprey. The coracoid is covered with red ochre and cutmarks are present on the scapula. Other grave goods are scarce: a fragment of a bone pendant and a bone brooch were found near the beaver mandible and bird bones, a bear canine at the right knee and an elk incisor at the right foot. Red ochre covered the grave.

Grave 119

The grave contained the poorly preserved skeletal remains of an adult male (Fig 10). One of the bird bones, reported in Gurina's volume (1956), was found in our material but could not be identified. Bird bones were found near the skull. Other grave goods consisted of elk teeth and slate tools near the skull and flint fragments and bone pendants in the pelvic area. Red ochre surrounded the skeleton.

Grave 125

The skeleton in grave 125 was well preserved but disarticulated (Fig. 11), and it belonged to an elderly male (Grünberg 2000). Burial 125 is one of the few so-called vertical burials in the cemetery area – the deceased has been buried in a vertical (or sitting) position (Gurina 1956; Stoliar 2001). According to Gurina (1956: 362)

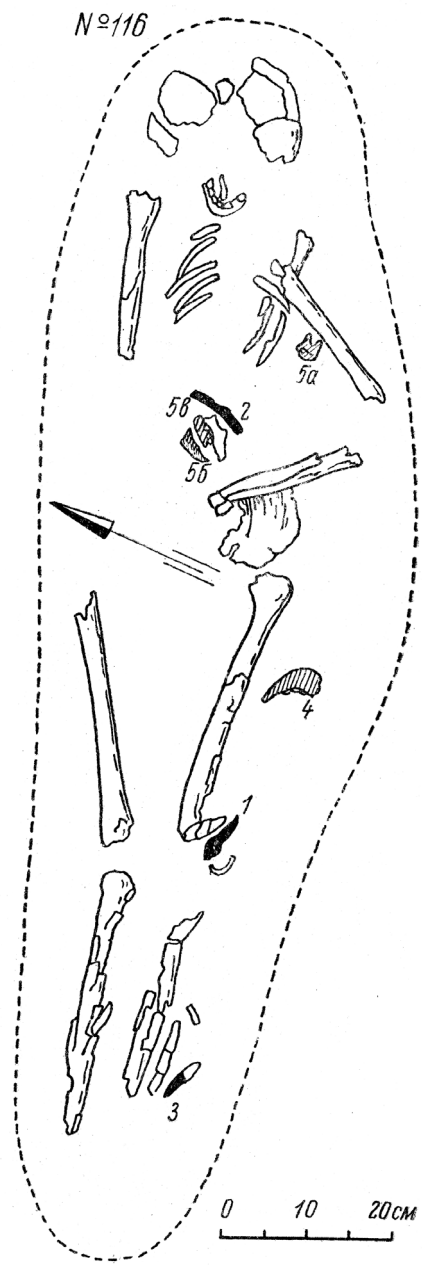

Fig. 9. The grave 116 had poorly preserved remains of a juvenile individual. The sex cannot be determined. Fragments of bird bones were found at the waist or in the abdominal area of the deceased (find number 5b). Adapted from Gurina 1956.

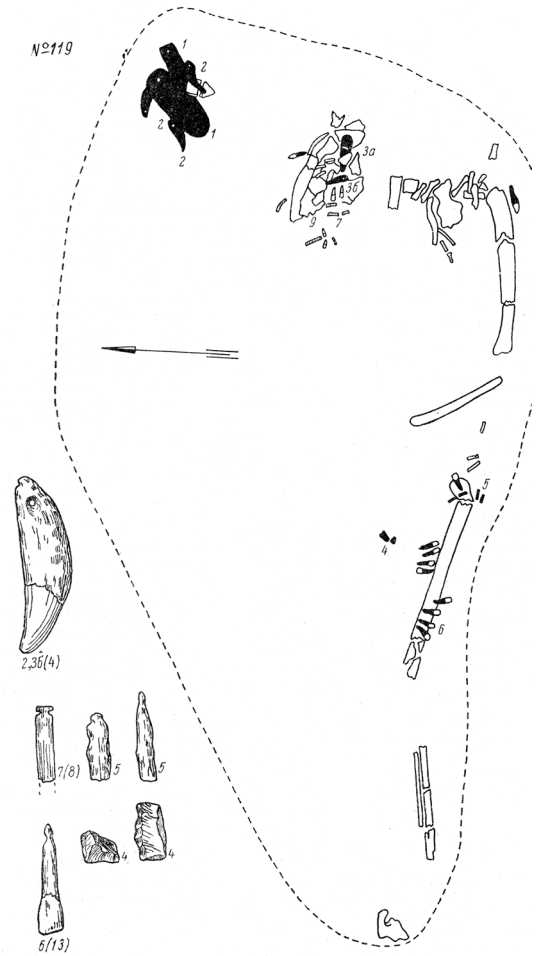

Fig. 10. The grave 119 at Yuzhniy Oleniy Ostrov has the poorly preserved skeletal remains of an adult male. One unidentified bird bone was found by the skull (find number 9). Adapted from Gurina 1956.

bird bones were found by the left foot. We found and identified two bird bones, one of which had been broken in two pieces. Both bones are distal parts of the left tarsometatarsus (lower foot) of the black-throated diver and, thus, originate from two individuals. Both specimens are covered with red ochre. A beaver mandible and fragments of bone artifacts were found in the pelvic region, and a fragment of a bone artifact near the distal tibia. Elk incisor pendants were found near the thorax and the upper and lower legs, and a pendant made from a bear phalanx was found

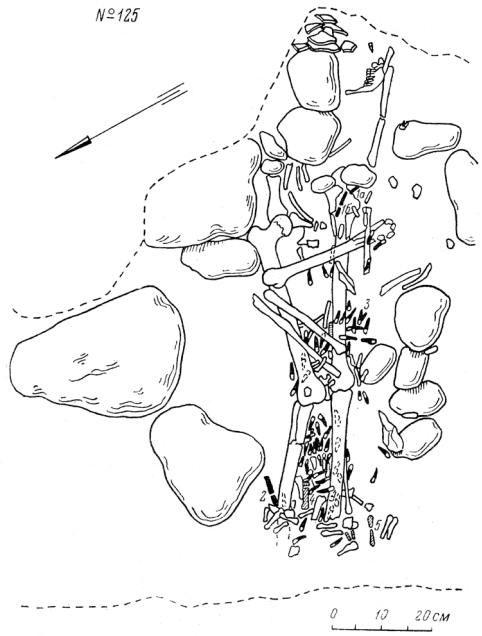

Fig. 11. The grave 125 of an elderly male at Yuzhniy Oleniy Ostrov. The skeleton is well preserved but disarticulated. Grave 125 is one of the so-called vertical graves at the cemetery. Bird bones were found by the left foot (find number 5). Adapted from Gurina 1956.

between the distal tibiae (Gurina 1956; Grünberg 2000). Red ochre surrounded the skeleton: the thickest layer was on the head and the upper part of the skeleton.

Grave 130

The grave contained an adult male, buried on his back, with face turned to the right (Fig. 12). Bird bones were found near the frontal part of the skull (Gurina 1956: 366). We identified one bird bone from grave 130, the left coracoid of the capercaillie. The bone was broken into two pieces. One fragment of a stone artifact was found at the left shoulder and a fragment of bone artifact together with a beaver tooth at the right shoulder. An elk incisor pendant was found at the distal part of the right tibia. An anthropomorphic figurine was found at the right proximal femur. A thick layer of red ochre covered the skeleton.

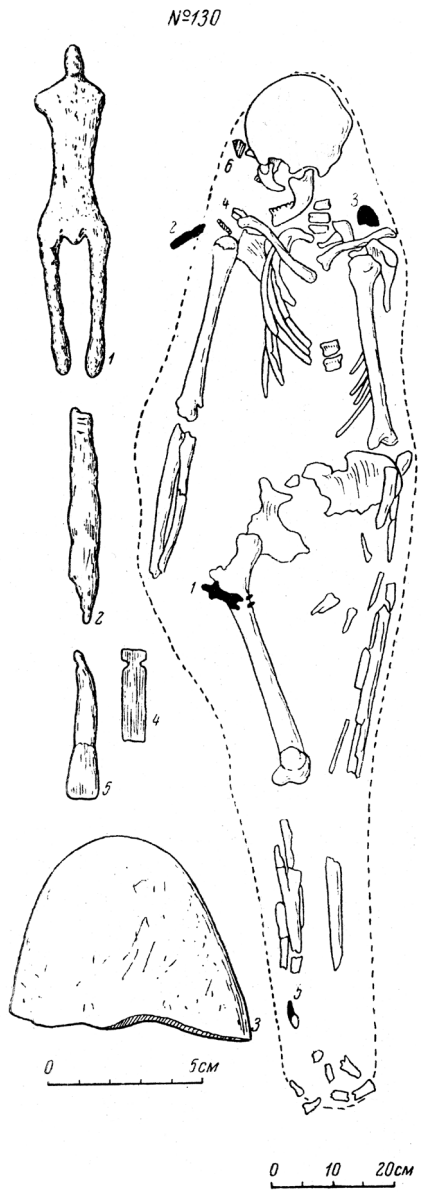

Fig. 12. The grave 130 of an adult male at Yuzhniy Oleniy Ostrov. Bird bones were found near the skull. Anthropomorphic figurine was found by the upper part of the right femur (find number 1), bone artifacts and animal teeth at shoulders and near the right foot (find numbers 2–5), and a fragment of a stone object near the left shoulder (find number 3). Adapted from Gurina 1956.

Grave 138

The skeleton is only partially preserved (Fig. 13). The deceased, probably an adult female, was placed on her back, with the face turned to the right side. Small long bones of birds were found around the skull (above) and at the right hand (Gurina 1956: 372; Grünberg 2000). We found and identified three bird bones belonging to this grave: one is an indeterminate bird bone and two belong to herring gulls. Both gull bones are distal parts of the left ulnae, and they belong to two individuals. Other grave goods are 18 reindeer teeth at the right arm, a slate blade and two bear canine pendants in front of the facial part of the skull, a fragment of a bone artifact and three elk incisor pendants near the right arm, and 12 fragments of beaver teeth in the pelvic region (Gurina 1956: 368, 372). A light layer of red ochre covered the skeleton.

Ecology of the bird species

The great gray owl is the second largest owl species in northern Europe. It occupies a wide variety of forest habitats (Hildén & Helo 1981: 161) which makes it unsuitable for detailed ecological reconstruction. This impressive bird lives in old coniferous and mixed forests by hunting small rodents and other small animals. Nests are mostly in old trees. Great gray owls are mainly nocturnal but may also hunt in the daylight. They are local birds but may sometimes wander long distances (Hildén & Helo 1981: 160; Cramp 1985). Great gray owl has two different ways of hunting. In the altitude of 10–15 m, the flying owl hears the vole under the snow. With great accuracy it attacks and catches the invisible prey. The other way is that the owl sits silently at the observation place and uses its amazing hearing in localizing the prey. All owls have well developed sense of hearing which is attained by an asymmetrical position of the ear holes (Peterson 2002: 145).

The osprey and the white-tailed sea eagle are large birds of prey. The osprey eats exclusively freshwater fish. White-tailed sea eagles are less specialized in their diet, although fish is an important part of it (Cramp 1987: 52–3). The osprey and the white-tailed sea eagle are

dependent on the water environment: the osprey inhabits mostly lake areas, while the white-tailed sea eagle lives both by the lakes and seashores. Both species, which nest in the upper branches of large trees, are present in the modern lake Onega area (Zachos & Schmölcke 2006).

The osprey needs clear-watered lakes for fishing. Large feet are perfectly adapted to catch living fish: it haunts fish near the water surface and attacks it from an altitude of 10–30 m (Peterson 2002: 78). The sight of the osprey is special: polarization filters in the eyes remove reflections from the water surface, and it can see fish under the water (Peterson 2002: 13). Its nasal apertures are closed in order to restrain the water to enter respiratory organs while it is under the water, and it can dive up to one meter of depth (Peterson 2002: 78–80). Ospreys leave the northern latitudes in September, winter in Africa and return back to nesting areas in May (Cramp 1987).

The white-tailed sea eagle needs a large territory and prefers old forest as these provide suitable trees for nest instruction. It has two ways of hunting. Either it flies in the air observing the prey, or sits in the observation place and waits the prey to appear. It catches fish from clear water near the water surface, and ducks and other waterbirds by attacking escaping and diving birds as long as these give up (Peterson 2002: 35–7). The white-tailed sea eagles pair for a lifetime. Old birds are local and stay in their territory year round. Young white-tailed sea eagles of northern Russia winter currently mostly on the shores of the Baltic Sea (Cramp 1987).

The black-throated diver is a relatively large, fish-eating water bird. The appearance is impressive: the throat is striped with black and white, and the swimming bird typically keeps the head in an upward position. Black-throated divers take their food from both marine (winter, autumn, spring and summer) and freshwater (summer) environments (Cramp 1986). The body morphology is specialized in diving and feet are wide. The vocalizations of the black-throated divers are powerful and easily recognizable. Black-throated divers are migrating birds. They nest in the lake areas of northern Europe. Black-throated divers prefer large and clear-watered

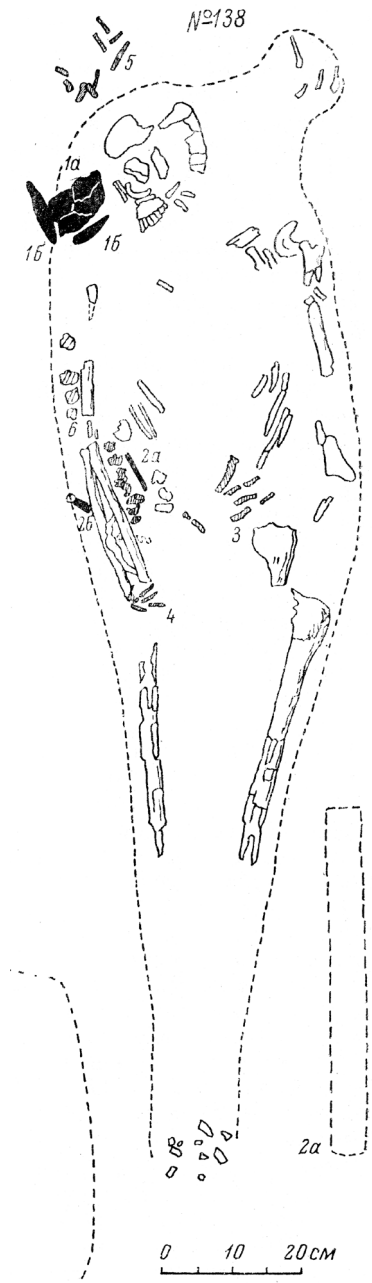

Fig. 13. The skeleton (probably a female) in grave 138 at Yuzhniy Oleniy Ostrov is only partially preserved. Bird bones were found above the skull and at right hand (find numbers 4–5). Adapted from Gurina 1956.

lakes where it is easy to see the fish. The main wintering areas of Fennoscandian and Siberian black-throated divers are in the Black Sea and the Mediterranean (Cramp 1986).

Like divers, also grebes have a body well adapted for diving. We do not know if the grebe species identified in the Yuzhniy Oleniy Ostrov material is the great crested grebe (*Podiceps cristatus*) or red-necked grebe (*Podiceps grisegena*), but both species have similar living demands. They are mainly fish-eating birds which nest on bays of lakes and sea shores. Both species migrate to their wintering areas in September–November and return to breeding area in April–May (Cramp 1986).

The whooper swan is one of the largest bird species in northern Europe. Whooper swans nest on small islets and shores of lakes. They are early spring arrivers and late autumn travelers. Whooper swans may arrive to the nesting areas already in late February and leave in November (Cramp 1986).

The mallard, the garganey, the long-tailed duck *(Clangula hyemalis*) and the red-breasted merganser (*Mergus serrator*) are small or medium-sized ducks which nest by the lakes and feed on water plants. All these species migrate – they leave the northern nesting areas in October–November and return from the wintering areas in March–May. All ducks species identified in the material, with the exception of the long-tailed duck, breed in the Lake Onega area today, and are present mainly in spring, summer and autumn. Long-tailed ducks are present at the Lake Onega region only during in spring and autumn transits. One migration route of the long-tailed ducks breeding in northern parts of northwest Russia goes between White Sea and Gulf of Finland (Cramp 1986: 628). The closest breeding areas of the long-tailed duck are in the Kola Peninsula (Cramp 1986). The most important wintering area of the European long-tailed-ducks is the Baltic Sea.

The herring gull is one of the largest gulls in northern Europe. The distribution area today covers the coasts of the Baltic Sea, lake and bog areas of most of Finland, Karelian Isthmus and part of the Kola Peninsula (Cramp 1993: 817–8). It is mainly migratory, but in mild winters it can be observed in the area year round. Herring gulls live mostly in large colonies on small islands. They eat all kinds of food of suitable size, texture etc. available, often young birds and fish (Cramp 1993: 821).

The black grouse (*Tetrao tetrix*) is a local bird. It lives in coniferous and mixed forests. The distribution area covers vast areas of northern and central Europe, excluding the northernmost parts. Like other Tetraonidae-species, black grouses usually fly only short distances.

Radiocarbon (AMS) dates and stable carbon isotopes

The two radiocarbon dates of bird bone samples from Yuzhniy Oleniy Ostrov are very much in accordance with our expectations. The black-throated diver bone from grave 125 has the radiocarbon age of 7950 ± 60 (Hela-1375) (about 7050–6680 cal. BC) and the osprey bone in grave 56 the radiocarbon age of 7570 ± 60 (Hela-1374) (about 6570–6256 cal. BC); calibrations were performed by using a program OxCal 4.0. Both date to the Late Mesolithic and are in accordance with earlier radiocarbon dates taken from human samples (Price & Jacobs 1990). The date of a diver bone is surprisingly old, about 200–900 radiocarbon years older, compared to the dates measured from other graves in the cemetery (Oshibkina 1989; Price & Jacobs 1990; Zaytseva et al. 1997; Carpelan 1999).

Human bones from burials 56 and 125 have not been dated with the radiocarbon method, but it is likely that bird bones dated here give an approximate date for the graves. The burial 56 is a part of the collective grave 55–57. Two samples taken from the human skeleton in burial 57 have given dates of 7280 ± 80 BP (Oxa-1665) and 7350 ± 90 BP (Oxa-2266); calibration with OxCal 4.0 gives dates about 6357–6004 cal. BC and about 6412–6053 cal. BC (Price & Jacobs 1990: 851). The calibrated age of the osprey in burial 56 and the human in burial 57 do overlap, which indicates that at least burials 56 and 57 are with high certainty contemporary.

The stable carbon isotope values of two measured specimens reflect well the supposed diet of the identified species. The specimen from

the osprey in grave 56 gave a δ13 C value -21.4 which fits to a diet based on freshwater fish. The diver in burial 125 has clearly had more marine components in the diet, as the δ13 C value is less negative (-18.1). This suits well with the eating habits of the black-throated diver as it consumes food from the marine environment during a part of the year and the freshwater environment during other. The δ13 C value of the diver bone may indicate marine or freshwater reservoir effect, which may produce too old radiocarbon dates (Stuiver & Braziunas 1993; Lanting & van der Plicht 1998).

The reservoir effect is caused by the upwelling of water from lower depths in oceans, seas and larger lakes, and mixing with surface water (Eriksson 2003). The water from deeper layers has not had the same carbon exchange with the atmosphere, and it contains lower amount of carbon-14 (radiocarbon) than the surface water. Because of the varying history of the Baltic, the extent of this effect has fluctuated with time and the discrepancy caused by reservoir effect has to be established separately for any given period (Eriksson 2003). In order to investigate the possible age-offset affected by reservoir effect, more radiocarbon dates from burial 125 are needed, and the ages of the samples indicating different δ13 C values should be compared.

DISCUSSION

It is evident that the osprey had a special place in the ideology of the people who used the cemetery. Even though we do not know in which graves osprey bones were deposited, the minimum number of bird individuals in the whole cemetery, 14, is impressive. It is not easy to estimate the significance that ospreys had in burial practices. Shoulder bones, humeri and femora could be remains of food offerings (meat from the breast and the leg). A relatively large number of humeri might also indicate that wings, probably with feathers still attached, could have been deposited in the grave. However, this does not seem likely because other wing bones (radii and ulnae) are totally lacking. The deposition of foot elements and especially the high number of tibiotarsi is striking. There are no taphonomical reasons which could explain its abundance, as this bone is not among the bird bones which are typically preserved well (e.g., Higgins 1999). It is possible that the legs of ospreys were perceived particularly important because they have a prominent role in the method of fishing: ospreys take fish with their feet from the shallow water and carry it in their talons to the nest for dismemberment and consumption.

The great gray owl bone in a male burial 56 is from the distal wing. We do not know whether the owl bone was deposited with feathers still attached to it, or if only the bone was deposited. Unmodified animal bones in burials have often been interpreted as food remains (e.g., Zagorska & Lõugas 2000; Popova 2001; Fahlander 2003: 109), but in this case no meat is involved. Therefore, it is more likely that the specimen, whether a part of the wing with feathers or just a bare bone, was important for reasons other than food.

Certain birds are perceived as helping or guardian spirits in Saami religion (Karsten 1955; Hultkrantz 1987; Schanche 2000). Animal bones in Saami graves and offering places may represent the dead animal's spirit (Schanche 2000: 299). Bones hold a metaphorical relation to power and the spirit of the animal. By putting the bones of a spirit animal in a grave, its power accompanied the dead person (Schanche 2000: 296). Wing bones have perhaps symbolized complete wings or a living bird. This might indicate that animal body parts used in burial rituals referred to those elements that were important in the animal's relation with humans (see Schanche 2000: 295; Fowler 2004: 136–7).

It is also possible that parts of important animals were fastened to the death costumes as decorations and symbols. The use of parts of totem animals or implements depicting them in dress decoration is a common practice among recent hunter-gatherer societies in Siberia. For example, a Yakut shaman (Altai) wore a costume which resembles a golden eagle, a leader (Lönnquist 1986: 84; Siikala 2002: 44). The Nganasan shaman's costume had motifs of the most powerful birds (Taksami 1998: 21). In general, the most helpful animals (helping spirits) were depicted in shamanic dresses and headgear (Prokofyeva

1963; Taksami 1998).

The white-tailed sea eagle has a different element distribution from the osprey: exclusively bones from shoulders (*coracoid* and *scapula*) were identified. This is in contradiction with data from many other archaeological sites, where bones from legs and feet (*phalanges*) of eagles are most common (Mannermaa 2003; Guminski 2005). *Coracoidii* and *scapulae* can be hard to remove when a bird is filleted and the breast muscles are taken off. The deposition of *scapulae* and *coracoidii* may indicate that breast muscles of white-tailed sea eagles were deposited in graves as food offerings. Possibly meat was also consumed during the funeral. None of the white-tailed sea eagle bones could be related to a particular grave, and we do not know for sure, whether both scapulae and coracoidii are found in the same burials. However, we consider it likely.

It is not difficult to imagine why these birds of prey would have been considered as particularly significant birds. The features shared by osprey, white-tailed sea eagle and great gray owl are the large size and excellent specified skills of hunting. It is also interesting that all these species have different and specialized ways of hunting. The excellence in hunting may have made these species important for the people who used the cemetery. The characters seen in these birds, for example visual capability, force and the sheer power, must have been valued also in humans.

One interesting question is how ospreys, white-tailed sea eagles and great gray owl were captured. The easiest way to catch these species, like birds of prey in general, would be to climb up to the nest and capture young animals. White-tailed sea eagles have been kept in capture, for example, in the Early Iron Age site of Ust' Poluisk in northwestern Siberia (Potapova & Panteleyev 1999). However, the bone specimens of the great gray owl, the osprey and the white-tailed sea eagle found in the cemetery belong to fully grown animals. None of the bones derive from young individuals, and no marks of keeping birds in captivity were recognized. The lack of these traces does, of course, not exclude the possibility that birds of prey had been raised for offering or other purposes. Ospreys, owls and eagles could have been captured with traps or shot with arrows, but it was not an easy task. Blunted arrow heads, present also in some of the burials at Yuzhniy Oleniy Ostrov, have traditionally been used in hunting small game animals like birds.

An interesting feature in Ýuzhniy Oleniy Ostrov graves is that ducks are not dominating the assemblage. Ducks are the most common species identified in graves in some other cemeteries in northern Europe (e.g., Neolithic cemeteries Ajvide on Gotland and Zvejnieki in northern Latvia) (Mannermaa 2008). Several duck species have been identified in Yuzhniy Oleniy Ostrov burials, but the number of bone specimens is low. These finds represent medium-sized ducks which are common in the area today. Most of these species also breed in the area. The only species which most likely have not bred in the Lake Onega area is the long-tailed duck. The individual found in the cemetery was most likely caught during the migration in spring or autumn.

The whooper swan is presented only by wing bones. Only one of the bones, a carpometacarpus in burial 65, can be related to a particular grave. Without having contextual data it is impossible to interpret the bones precisely. However, it is possible that the whooper swan bones are from the deposition of complete wings or parts of them in one or more of the burials. The anatomical distribution indicates that whooper swan bones derive from at least two wings (left and right). A case of deposition of swan wings in graves is known from Mesolithic Denmark, as mentioned earlier. The whooper swan is rare in Yuzhniy Oleniy Ostrov burials, which indicates that it did not have common role in the Late Mesolithic death practices. This is interesting because this species have had special roles for the people of the area in later periods, as evidenced, for example, by the rock carvings of swans in the Onega region (Poikalainen 1999).

Some indications of the importance of swans are present in prehistoric settlement contexts from Finland. Most of the bird decoration patterns on Neolithic pottery from settlement sites in Finland and western Russia resemble swans (Pesonen 1996). Swan bones are not common

in Finnish Stone Age osteological materials (Mannermaa 2003). The scarcity of this species in all osteological material covering the settlement samples from the Mesolithic, Neolithic and Early Metal Period in Finland may be due to some common aspect that restricted the hunting of swans (Mannermaa 2003, see also Kelly 1993 cited in Zimmermann Holt 1996: 92).

An interesting find is in burial 125 where two left side tarsometatarsi of the black-throated diver were placed by the left leg of the deceased male. It could indicate that the leg(s) of diver and the leg(s) of the deceased were somehow perceived in the similar manner. Could such deposition indicate that the man buried in the grave 125 was a good swimmer or diver, or was he connected to divers in some other way? Quite similar questions could be asked when estimating the significance or function of the two distal fragments of left *ulnae* (middle wing bones) of herring gulls found near the skull or by the right hand of the deceased female in grave 138. It is possible that the ulnae had feathers attached when they were deposited. White wings could have had carried some special symbolic significance. The same symbolism related with (parts of) white wings could be connected to the whooper swan bones in Yuzhniy Oleniy Ostrov burial(s).

One common feature concerning all bird bones from in Yuzhniy Oleniy Ostrov graves is that practically all bones are broken. We have not yet made detailed fracture analysis of the bird bones on graves on Yuzhniy Oleniy Ostrov, so it is impossible in this state of research to determine why bones are broken. Sometimes important artifacts or other objects are intentionally broken before they are deposited in graves or other contexts (Chapman 2000), but bones may break also during the later taphonomic processes. The other common feature is that skulls, vertebrae and the bones from the trunk (*sternum, synsacrum*) are totally missing. Only parts of long bones and occasional phalanges are present. It seems that only some parts of the hunted birds were perceived suitable as grave goods.

The osprey has been placed in several graves, but it seems that other species are present only in singular graves. This indicates that the species and the symbolism/ideas connected to them were significant for the buried person – his/her personality, skills or manners. Our data is scattered, and it is evident that the interpretation of the roles of birds in burial practices or ideology would need more investigations and precise contextual data. For example, the possible connection of certain groups of people with certain bird species (e.g., clans with totem birds) seems to be a plausible idea but more evidence is needed. Investigations of the pathological condition and the genetic markers of humans buried at Yuzhniy Oleniy Ostrov indicate the existence of several family plots and even the existence of different archaeological cultures at the cemetery area (Bushilova 2006). In order to have a better picture about the different aspects in the relationship between birds and other animals, and certain groups of people, more investigations, for example osteological analyses from settlement sites in the Onega region are needed.

Birds found in archaeological contexts can give information, not only about economic and cultural aspects, but also about the environment. Some bird species have very special habitat requirements and their presence in archaeological contexts reveals much of the surrounding landscape. It has to be remembered that animal bones or artifacts made of them may have been transported long distances and not all species necessary were caught near the cemetery. In the case of Yuzhniy Oleniy Ostrov cemetery this aspect is probably of special relevance because it is likely that people who buried their dead here had their settlements in other areas (Stoliar 2001: 85). People have probably gathered to the Lake Onega region during the summer for hunting, fishing and fowling – and burying the dead (O'Shea & Zvelebil 1984: 29–30).

If we assume that the great gray owl, ospreys and white-tailed sea eagles were caught near the cemetery, then their appearance in the grave material indicates that the area around the Lake Onega was forested with old mixed or coniferous trees. The Lake Onega must have been clear-watered because so many fish-eating species are present in the material.

CONCLUSIONS

Birds of prey dominate the sample from Yuzhniy Oleniy Ostrov burials. One species, the osprey is most common and clearly had prominent roles in the burial practices. The abundance of the birds of prey is not typical in other Stone Age cemeteries in northern Europe. All bird bones derive from adult individuals, and young birds were not used in burial practices. White-tailed sea eagle finds (shoulder bones) and some of the osprey finds may indicate that meat offerings were given, but there may be other explanations as well. Consumption of meat of birds of prey would not be surprising, but indications of meat offerings of birds are rare in northern European archaeological contexts (Mannermaa 2008). Eagle bones from other prehistoric burials or sites typically derive from the wings and feet (toes), and indicate other kinds of significances. The remains of the birds of prey at Yuzhniy Oleniy Ostrov burial may be connected to the need to symbolize the power and the hunting skills of these species.

Another untypical feature in the bird assemblage of Yuzhniy Oleniy Ostrov, compared to other Stone Age cemeteries, is that ducks are not dominating the assemblage. Just like none of the artefacts in the inventory from Yuzhniy Oleniy Ostrov cemetery appear to represent real exotics (Jacobs 1995: 395), also none of the bird species is rare or occasional for the area. Indeed, all the bird species could have been caught near the island. The great gray owl, the black grouse and the capercaillie could have been caught during any season of the year. All the other bird species indicate hunting during the spring, summer or autumn.

It is likely that bird remains were chosen precisely for particular graves depending on the motives connected to the deceased person, and not because of some special roles of these birds in the ideology or the death rituals of the whole community. The contexts of the bird bones at Yuzhniy Oleniy Ostrov do not give any direct indications of using them in the decoration of burial costumes. But this is, of course, possible.

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REFERENCES

Albrethsen, S.E. & Brinch Petersen, E. 1976. Excavation of a Mesolithic cemetery at Vedbæk, Denmark. *Acta archaeologica* 47: 1–28.

Burenhult, G. 1997. Gravarnas vittnesbörd. In G. Burenhult (ed.), *Ajvide och den moderna arkeologin*: 52–70. Natur och kultur, Falköping.

Bushilova, A.P. 2006. The analyses of social structure of Stone Age population by antropological data of Yuzhny Oleniy Island. In A. Ya. Marty-nov (chief ed.), *Prehistoric and Medieval History and Culture of European North: Problems of Studying and Reconstruction* (In Russian, with English summaries): 382–8. Solovetsky Historical-Architectural and Natural Museum Reserve, Institute of Archaeology, Russian Academy of Sciences. Pomor State University, Solovy.

Carpelan, C. 1975. Älg- och björnhuvudföremål från Europas nordliga delar. *Finskt Museum* 1974: 5–67.

Carpelan, C. 1999. On the postglacial colonisation of Eastern Fennoscandia. In M. Huurre (ed.), *Dig It All: Papers Dedicated to Ari Siiriäinen*: 151–72. The Finnish Antiquarian Society, The Archaeological Society of Finland, Helsinki.

Chapman, J. 2000. *Fragmentation in Archaeology.* Routledge, London & New York.

Cramp, S. (chief ed.) 1985. Handbook of the Birds of Europe, the Middle East and North Africa: *The Birds of the Western Palearctic, Vol.* 4: *Terns to Woodpeckers*. Oxford University Press, Oxford.

Cramp, S. (chief ed.) 1986. Handbook of the Birds of Europe, the Middle East and North Africa: *The Birds of the Western Palearctic, Vol.* 1: *Ostrich to Ducks*. Oxford University Press, Oxford.

Cramp, S. (chief ed.) 1987. Handbook of the Birds of Europe, the Middle East and North Africa: *The*

Birds of the Western Palearctic, Vol. 2: *Hawks to Bustards*. Oxford University Press, Oxford.

Cramp, S. (chief ed.) 1993. Handbook of the Birds of Europe, the Middle East and North Africa: *The Birds of the Western Palearctic, Vol.* 3: *Waders to Gulls*. Oxford University Press, Oxford.

Eriksson, G. 2003. *Norm and Difference: Stone Age Dietary Practice in the Baltic Region.* The ses and Papers in Scientific Archaeology 5. Stockholms universitet, Stockholm.

Ernits, E. 1992. The purpose and content of the petroglyfs in the Onega region. In M. Hoppal & J. Pentikäinen (eds.), *Northern Religions and Shamanism*: 115–24. Akadémiai kiadó, Budapest.

Fahlander, F. 2003. *The Materiality of Serial Practice: A Microarchaeology of Burial.* Gotarc serie B, No. 23. Göteborg University, Göteborg.

Fowler, C. 2004. *The Archaeology of Personhood.* Routledge, London.

Grünberg, J.M. 2000. *Mesolithische Bestattungen in Europa. Ein Beitrag zur vergleichenden Gräberkunde, Teil.* 1–2. Internationale Archäeologie Band 40. Verlag Marie Leidorf GmbH, Raahden/ Westf.

Gumiński, W. 2005. Bird for dinner: Stone Age hunters of Dudka and Szczepanki, Masurian Lakeland, NE-Poland. *Acta Archaeologica* 76(2): 111 –47.

Gurina, N. 1956. *Oleneostrovskij mogilnik.* Materialy i issledovanija po archeologiji SSSR 47. Moskva-Leningrad.

Higgins, J. 1999. Tunel: a case study of avian zooarchaeology and taphonomy. *Journal of Archaeological Science* 26: 1449–57.

Hildén, O. & Helo, P. 1981. The great gray owl Strix nebulosa – a bird of the northern taiga. *Ornis Fenica* 58: 159–66.

Hultkrantz, Å. 1987. On beliefs in non-shamanic guardian spirits among the Saamis. In T. Ahlbäck (ed.), *Saami Religion: Scripti Institituti Donneriani Aboenses* XII: 110–23. Almqvist & Wiksell International, Stockholm.

Jaanits, L. 1954. Novye dannye po neolitu Pribaltiki. *Sovetskaya Arkheologiya* 19: 159–204.

Jaanits, L. 1957. Neue Gräberfunde auf dem spätneolithischen Wohnplats Tamula in Estland. *Suomen muinaismuistoyhdistyksen aikakauskirja* 58: 80–100.

Jacobs, K. 1995. Returning to Oleni' ostrov: social, economic, and skeletal dimensions of a Boreal forest Mesolithic cemetery. *Journal of Anthropological Archaeology* 14: 359–403.

Jennbert. K. 2003. Animal graves: dog, horse and bear. *Current Swedish Archaeology* 11: 139–52.

Jones, A. 1998. Where eagles dare: landscape, animals and the Neolithic of Orkney. *Journal of Material Culture* 3: 301–24.

Jones O'Day, S., Van Neer, W. & Erwynck, A. 2004. Introduction. In S. Jones O'Day, W. Van Neer & A. Erwynck (eds.), *Behaviour Behind Bones: The Zooarchaeology of Ritual, Religion, Status and Identity*: xi–xv. Proceedings of the 9th Conference of the International Council of Archaeozoology, Durham, August 2002. Oxbow Books, Oxford.

Karsten, R. 1955. *The Religion of the Samek: Ancient Beliefs and Cults of the Scandinavian and Finnish Lapps*. E.J. Brill, Leiden.

Kriiska, A., Lõugas, L., Lõhmus, M., Mannermaa, K. & Johanson, K. 2007. New AMS dates from Estonian Stone Age burial sites. *Estonian Journal of Archaeology* 11(2): 83–121.

Lanting, J.N. & van der Plicht, J. 1998. Reservoir ef fects and apparent ^{14}C-ages. *Journal of Irish Archaeology* 9: 151–65.

Larsson, L. 1989. Big dog and poor man: mortuary practices in Mesolithic societies in Southern Sweden. In T.B. Larsson & H. Lundmark (eds.), *Approaches to Swedish Prehistory: A Spectrum of Problems and Perspectives in Contemporary Research*: 211–23. BAR International Series 500. Archaeopress, Oxford.

Larsson, L. 1990. Dogs in fraction – symbols in action. In P.M. Vermeersch & P. Van Peer (eds.), Contribution to the Mesolithic in Europe. Papers presented at the Fourth International Symposium "The Mesolithic in Europe", Leuven 1990. *Studia Praehistorica Belgica* 5: 153–60.

Longin, R. 1971. New method of collagen extraction for radiocarbon dating. *Nature* 230: 241–2.

Loze, I.B. 2003. The theme of the grass snake in Neolithic material from Latvia. *Humanities and Social Sciences Latvia* 2: 48–59.

Lönnquist, B. 1986. Schamandräkter i Sibirien: former och funktioner, alder och ursprung. *Finskt Museum* 1985: 81–94.

Mannermaa, K. 2003. Birds in Finnish prehistory. *Fennoscandia archaeologica* 20: 3–39.

Mannermaa, K. 2006. Bird remains in the human burials at Zvejnieki, Latvia: introduction to bird finds and a proposal for interpretation. In L. Larsson & I. Zagorska (eds.), *Back to the Origin: New Research in the Mesolithic-Neolithic Zvejnieki Cemetery and Environment, Northern Latvia*: 289–99. Acta Archaeologica Lundensia Series in 8, no 52. Almqvist & Wiksell, Stockholm.

Mannermaa, K. 2008. Birds and burials at Ajvide (Gotland, Sweden) and Zvejnieki (Latvia) about 8000-3900 BP. *Journal of Anthropological Archaeology* 27: 201–25.

Mannermaa, K., Zagorska, I., Jungner, H. & Zarina,

G. 2007. New radiocarbon dates of human and bird bones from Zvejnieki Stone Age burialground in northern Latvia. *Before Farming* 1/2007.

Napolskikh, V. 1992. Proto-Uralic world picture: a reconstruction. In M. Hoppal & J. Pentikäinen (eds.), *Northern Religions and Shamanism*: 3–20. Akadémiai kiadó, Budapest.

Okladnikov, A.P. 1950. Kult medvedya u neolitischeskik plemen ostochnoi Sibiri. *Sovyetskaya Arkheologiya* 14: 7–19.

Oshibkina, S.V. 1982. Mezoliticheskiy mogil'nik Popovo na ryeke Kineme. S*ovyetskaya Arkheoologiya* 3: 122–38.

Oshibkina, S.V. 1983. *Mogilnik Popovo*. Akademi Nauk, Moskva.

Oshibkina, S.V. 1989. The material culture of the Veretye-type sites in the region to the East of the Lake Onega. In C. Bonsall (ed.), *The Mesolithic in Europe: Papers Presented at the Third International Symposium, Edinburgh* 1985: 402–13. Jon Donald Publishers, Edinburg.

Ots, M. 2006. Merevaiguleiud Baltimaade kivi- ja pronksiaja muististes. Unpublished MA dissertation. Manuscript in the Library of the University of Tartu.

Pankrushev, G.A. 1978. *Mezolit i neolit v Karelii. I. Mezolit*. Nauka, Leningrad.

Pesonen, P. 1996. Archaeology of the Jaamankangas area — with special reference to the Rääkkylä Pörrinmökki Stone Age settlement site. In T. Kirkinen (ed.), *Environmental Studies in Eastern Finland: Reports of the Ancient Lake Saimaa Project*: 93–117. Helsinki Papers in Archaeology 8. Department of Archaeology, University of Helsinki, Helsinki.

Peterson, D. 2002. *Pohjolan petolinnut ja pöllöt* (edited in Finnish by J. Lokki). Kustannus-Mäkelä, Karkkila.

Poikalainen, V. 1999. The diffusion of swan and whale motifs in Karelian rock art. In A. Gusafsson & H. Karlsson (eds.), *Glyfer och arkeologiska rum – en vänbok till Jan Nordblad*: 699–718. Gotarc Series A vol 3. Göteborg University, Göteborg.

Popova, T. 2001. New discoveries on the sculptures of Oleni island. *Folklore* 18 & 19. Electronic version available on http://haldjas.folklor.ee/folklore.

Potopova, O.R. & Panteleyev, A.V. 1999. Birds in the economy and culture of Iron Age inhabitants of Ust'Poluisk, lower Ob' River, North Western Siberia. In S.T. Olson (ed.), *Avian Paleontology at the Close of the 20th Century:* Proceedings of the 4th International Meeting of the Society of Avian Paleontology and evolution Washington D.C., 4-7 June 1996: 129–37. Smithsonian Institution Press, Washington.

Price, D.T. & Jacobs, K. 1990. Olenii ostrov: first radiocarbon dates from major Mesolithic cemetery in Karelia, USSR. *Antiquity* 64: 849–53.

Prokofyeva, Y.E.D. 1963. The costume of an Enets shaman. In H.N. Michael (ed.), Studies in Siberian Shamanism: Anthropology of the North: 124–56. *Translations from Russian Sources*, No. 4. University of Toronto Press, Toronto.

Ravdonikas, V.I. 1956. Neoliticheski mogil'nik na Yuzhnom Olen'em ostrove Onezhskogo ozera. *Materialy i issledovanija po archeologiji SSSR* 47: 7–24. Moskva-Leningrad.

Ryan, K. & Crabtree, P.J. (eds.) 1995. The Symbolic Role of Animals in Archaeology: 51–6. *MASCA Research Papers in Science and Archaeology* 12. MASCA University of Pennsylvania Museum of Archaeology and Anthropology, Pennsylvania.

Schanche, A. 2000. *Graver i ur og berg: samisk gravskikk og religion fra forhistorisk til nyere tid.* Davvi Girji OS, Karasjok.

O'Shea, J., Zvelebil, M., 1984. Oleneostrovski moginik: reconstructing the social and economic organization of prehistoric foragers in Northern Russia. *Journal of Anthropological Archaeology* 3: 1–40.

Siikala, A.-L. 2002. *Mythic Images and Shamanism: A Perspective on Kalevala Poetry.* Suomalainen tiedeakatemia, Helsinki.

Siiriäinen, A. 1974. Studies relating to shoreline displacement and Stone Age chronology in Finland. *Finskt Museum* 80: 5–22.

Stoliar, A.D. 2001. Milestones of spiritual evolution in prehistoric Karelia. *Folklore* 18 & 19: 81–126. Available on http://haldjas.folklore.ee/folklore.

Stuiver, M. & Braziunas, T.F. 1993. Modelling atmospheric ^{14}C influences and ^{14}C ages of marine samples to 10,000 BC. *Radiocarbon* 35:137–89.

Taksami, T.M. 1998. Siperian samaanit. In J. Pentikäinen, T. Jaatinen, L. Lehtinen & M.-R. Salonen (eds.), *Samaanit*: 11–28. Tampereen museoiden julkaisuja 44, Tampere.

Tilley, C. 1991. *Material Culture and Text: The Art of Ambiquity.* Routledge, London.

Zachos, F.E. & Schmölcke, U. 2006. Archaeozoo logical records and distribution history of the osprey (Pandion haliaetus) in Central Europe. *Journal of Ornithology* 147: 505–68.

Zagorska, I., & Lõugas, L. 2000. The tooth pendant head-dresses of Zvejnieki cemetery. In V. Lang & A. Kriiska (eds.), *De temporibus antiquissimis ad honorem Lembit Jaanits.* Muinasaja teadus 8: 223–44.

Zaytseva, G.I., Timofeyev, V.I., Zagorskaya, I. & Kovalyukh, N.N. 1997. *Radiouglerodniye dati pam-*

yatnikov mezolita Vostochnoy Evropy (with English summary). Arkheologischeshiye iziskanya 37: 117–27.

Zimmermann Holt, J. 1996. Beyond optimization: alternative ways of examining animal exploitation. *World Archaeology* 28: 89–109.

Zvelebil, M. 1997. Hunter-gatherer ritual landscapes: spatial organisation, social structure and ideology among hunter-gatherers of northern Europe and western Siberia. *Analecta praehistoria leidensia* 29: 33–50.