

## Subfossil Vertebrate Fauna from *Forum Serdica* (Sofia, Bulgaria), 16-18<sup>th</sup> Century A.D.

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**Abstract.** Kitchen debris from central Sofia (the 16-18<sup>th</sup> century A.D.), deposited over the Roman *Forum Serdica* were examined. They contained 10,375 bone finds of at least 56 animal species: three ray-finned fish, 22 birds and 31 mammals. Among them 14 or 82.2% of the identified remains were domesticated forms (birds and mammals). The wild fauna included 42 taxa, from which one globally extinct (*Bos primigenius*), and four extinct from the recent fauna of Bulgaria (*Aegypius monachus*, *Tetrax tetrax*, *Falco cherrug*, *Phasianus colchicus colchicus*). Diurnal raptors (*A. monachus*, *Gyps fulvus*, *Aquila heliaca*, *A. chrysaetos*, *Clanga pomarina*, *Accipiter gentilis*, and *F. cherrug*) made up 60.7% of all wild birds remains. This study presents the first data on subfossil fauna of Sofia City. From a total of 24 (26) species, one is globally extinct, and five other are extinct from the country. Thus, 1/10 of the recorded species are extinct, but they all (except the Aurochs) have survived in the Bulgarian nature until the 20<sup>th</sup> century. Most of the remains (93.1%) of griffon and cinereous vultures belonged to skeleton of wings, which suggests use by humans of their wing feathers in the past.

**Key words:** Medieval animal husbandry and hunting, Last aurochs on the Balkans, Vultures and eagles past distribution, Late-medieval poultry, Little bustard, Means of livelihood in the Ottoman period of Sofia

### Introduction

The *Forum Serdica* Project (Archaeological excavations and exploration of St Nedeya Circus) has been launched by the Sofia Municipality (15 June – 15 December 2015). The excavations have been carried out by a team of the National Archaeological Institute and the Museum of the Bulgarian Academy of Sciences (NAIM-BAS) led by Dr. Veselka Katsarova. In the Roman Empire the city forum is the most important place for the civil society. The traces of habitation in the “*Forum Serdica*” from the Late Middle Ages have been damaged significantly during several lowering of the level of the place around the “St. Nedelya” Church. The surviving structures are deeply embedded in layers with destroyed ancient buildings. Remnants of adobe buildings, numerous pits and pipelines from the Ottoman and Renaissance periods of Sofia have been revealed (NAIM-BAS 2015).

A number of magnificent finds of imported glassware and works of local masters of table ceramics are indicative of the standard of living in the 15-18<sup>th</sup> century. In the 18<sup>th</sup> century Sofia continues to be one of the most important towns on the territory of the Bulgarian lands. In the 16<sup>th</sup> century the excavated area is inhabited by Muslims, but in the 18<sup>th</sup> century the population is mainly Christian. Muslim houses have been built during the 16<sup>th</sup> century in the Sungurlare Neighbourhood, where the examined animal bones originate from. Between the 16<sup>th</sup> and the 18<sup>th</sup> centuries the population has been replaced gradually by Bulgarian Christians (Dimitrov 1989). They were the main productive force in the artisan production. In the 18<sup>th</sup> century, Sofia commerce has been growing beyond the local market and is aimed at the general imperial market and foreign markets. It is known that the 18<sup>th</sup> century is a very peace-

ful century in the Ottoman-Austrian relations, and all crafts (and trade) have flourished significantly (Dimitrov 1989). After Tsanev (1976), many travellers and chroniclers recognise Sofia as an important trade centre. In the 15-18<sup>th</sup> centuries the main market place of the town has been located in the excavated area. The present research deals with all kitchen debris, collected from the numerous waste pits.

Medieval (and Late Medieval) subfossil fauna of Sofia is still completely unexamined, and the only data for the City of Sofia originate from the Neolithic settlement in the Slatina Quarter (Boev 2009), ca. 6 km NE from the *Forum Serdica*.

## Material and Methods

The *Forum Serdica* is situated under the northern half of the St Nedelya Circus. The study area is located in the very centre of the Sofia City and lies between the Hotel Balkan – Sofia and the St Nedelya Church. So far, this part of the city centre has not been explored, although it has been a main city place since the Liberation (1878) until the present. All excavated ruins are preserved and exposed for public visits as an open museum.

The examined archaeozoological material was provided in September-October 2015. A total of 10,375 bones, bone fragments and teeth from the layers of the Ottoman Period (the 16<sup>th</sup>-18<sup>th</sup> century A.D.) were found. It was determined using comparative osteological collections of the Vertebrate Animals Department, National Museum of Natural History, Bulgarian Academy of Sciences (NMNHS-BAS).

The numerous (774) incompletely determined bone fragments or complete bones and milk teeth of juvenile individuals of small ruminants (listed as “Ovicaprinae”, i. e., sheep/goat: Table 1) were placed in this group because of their general bone morphology and dimensions.

A considerable part of the collected bone remains remained undetermined taxonomically, because of their deposition and bad state of preservation. A total of 4704 fragments (45.3%) represented unidentifiable bone pieces (s. c. bone splinters) without any preserved diagnostic features.

## Results and Discussion

### General composition of the recorded wild and domestic vertebrates

The examined material revealed a surprising variety of wild birds and mammals, as well as domestic mammals and birds. A total of 56 vertebrates (ray-

finned fishes, birds and mammals) were identified through six remains of Actynopterygians (two orders), 669 of birds (nine orders) and 9700 of mammals (seven orders) (Table 1).

The archaeozoological material indicated the practicing of at least three major means of livelihood: fishing (and/or fish trading), hunting and animal husbandry. The last one was represented by poultry farming, livestock breeding, pig farming, horse breeding, cuniculture, etc. The ratio between finds of wild and domestic animals was 1012 : 4652, i. e. animal husbandry provided circa 4.6 times more animal sources than hunting (or 82.2% from the 5664 species determined animal remains).

### Fishes and fishing

The presence of sheatfish (*Silurus glanis* Linnaeus, 1758) possibly suggests a fish market in the former centre of Sofia, as this species could not had been fished in the small rivers of the Sofia Valley and the neighbouring areas. It occurs in the lower and middle reaches of large rivers (KARAPETKOVA, ZHIVKOV 1995). Similarly, at present in Bulgaria the common bream, *Abramis brama* (Linnaeus, 1758), is spread in the Danube River and the lowermost reaches of its larger tributaries (KARAPETKOVA, ZHIVKOV 1995). Therefore, a record of common bream in the Blato River of Sofia Valley (ORESHAKOV, NISHKOV 1959) appears unlikely.

In the past DRENSKI (1948) recorded the sheatfish from Iskar River up to the region of Lakatnik village, i. e. over 50 km NE of Sofia City. On the other hand, older sources state that the sheatfish could reach the Sofia City section of Iskar River (SHISHKOV 1939; BULGURKOV 1958).

It is likely that fish were underrepresented in the examined samples as the collected fish remains were collected selectively by hand (without washing of sediments). This applies also for all smaller vertebrates.

### Domestic animals and animal husbandry

The composition of the farmed domestic animals (mammals and birds) was rather varied. The domestic animals were represented by 14 taxa: cattle, water buffalo, goat, sheep, pig, horse, donkey rabbit, dog, cat, along with chicken, goose, duck, and ?pigeon. Domestic chicken dominated (464 finds), followed by domestic goose (103).

*Gallus gallus domestica* was represented by at least three breeds, which could be separated by their size. At least 13.2% of the finds belonged to the s. c. bantam fowl: small non-meat sooner decorative (?) breeds, slightly larger (0.450-0.900 kg; BOEV 1986) than large domestic pigeons. Very large-sized meat

**Table 1.** Animal representation in the collected archaeozoological material from *Forum Serdica* (Sofia City)

№	Taxa	English name	Total number of finds	Number of worked finds	Number of burnt finds
<b>ACTYNOPTERYGII (Ray-finned fishes)</b>					
<b>Siluriformes G. Cuvier, 1817</b>					
1	<i>Silurus glanis</i> Linnaeus, 1758	Sheatfish	4		
	Total siluriforms		4		
<b>Cypriniformes Bleeker, 1859</b>					
2	Cyprinidae gen. indet. ? <i>Abramis</i> sp.	?Bream	1		
3	Cyprinidae gen.	Cyprinid carp-like fish	1		
	Total cypriniforms		2		
	Total ray-finned fishes		6		
<b>AVES (Birds)</b>					
<b>Anseriformes Wagler, 1831</b>					
4	<i>Anas platyrhynchos domestica</i>	Domestic duck	18	5	
5	<i>Anas platyrhynchos</i> Linnaeus, 1758	Mallard	8		
6	<i>Anser anser domestica</i>	Domestic goose	103	11	3
7	<i>Tadorna tadorna</i> Linnaeus, 1758)	Common shelduck	1		1
8	<i>Anas crecca</i> Linnaeus, 1758	Eurasian teal	1		
	Total anseriforms		131	16	4
<b>Galliformes Temminck, 1820</b>					
9	<i>Gallus gallus domestica</i>	Domestic chicken	464 (bantam – 61)	9	38
10	<i>Phasianus colchicus</i> Linnaeus, 1758	Common pheasant	3		
11	<i>Gallus/Phasianus</i>	Fowl/pheasant	1		
12	<i>Tetrao urogallus</i> Linnaeus, 1758	Western capercaillie	1		
	Total galliforms		469	9	38
<b>Columbiformes Latham, 1790</b>					
13	<i>Columba livia</i> Gmelin, 1789/ <i>C. l. domestica</i>	Rock dove/ domestic pigeon	1		1
14	<i>Columba palumbus</i> Linnaeus, 1758	Common wood pigeon	1		
	Total columbiforms		2		
<b>Otidiformes Wagler, 1830</b>					
15	<i>Tetrax tetrax</i> Linnaeus, 1758)	Little bustard	1		
	Total otidiforms		1		
<b>Ciconiiformes Bonaparte, 1854</b>					
16	<i>Ciconia ciconia</i> (Linnaeus, 1758)	White stork	9		
	Total ciconiiforms		9		
<b>Pelecaniformes Sharpe, 1891</b>					
17	cf. <i>Pelecanus onocrotalus</i> Linnaeus, 1758	Great white pelican	1		
	Total pelecaniforms		1		
<b>Accipitriformes Vieillot, 1816</b>					
18	<i>Aegypius monachus</i> (Linnaeus, 1766)	Cinereous vulture	18		
19	<i>Gyps fulvus</i> (Hablizl, 1783)	Griffon vulture	11		
20	<i>Aquila chrysaetos</i> (Linnaeus, 1758)	Golden eagle	4		
21	<i>Aquila heliaca</i> Savigny, 1809	Eastern imperial eagle	6		
22	<i>Clanga pomarina</i> Brehm, 1831	Lesser spotted eagle	9		
23	<i>Accipiter gentilis</i> Linnaeus, 1758)	Northern goshawk	1		
	Total accipitriforms		49		
<b>Falconiformes Sharpe, 1874</b>					
24	<i>Falco cherrug</i> Gray, 1834	Saker falcon	2		
	Total falconiforms		2		
<b>Passeriformes Linnaeus, 1758</b>					
25	<i>Corvus monedula</i> (Linnaeus, 1758)	Western jackdaw	1		
	Total passeriforms		1		
	Total birds		669	25	43

Table 1. Continued

№	Taxa	English name	Total number of finds	Number of worked finds	Number of burnt finds
<b>MAMMALIA (Mammals)</b>					
<b>Erinaceomorpha Gregory, 1910</b>					
26	<i>Erinaceus concolor</i> Martin, 1837	Southern white-breasted hedgehog	1		
	Total erinaceomorphs		1		
<b>Rodentia Bowdich, 1821</b>					
27	<i>Rattus cf. norvegicus</i> (Berkenhout, 1769)	Brown rat	1		
	Total rodents		1		
<b>Lagomorpha Brandt, 1855</b>					
28	<i>Lepus europaeus</i> Pallas, 1778	European hare	7		
29	<i>Oryctolagus cuniculus</i> (Linnaeus, 1758)	Domestic rabbit	5		
	Total lagomorphs		12		
<b>Carnivora Bowdich, 1821</b>					
30	<i>Ursus arctos</i> Linnaeus, 1758	Brown bear	2		
31	<i>Vulpes vulpes</i> (Linnaeus, 1758)	Red fox	28		
32	<i>Canis lupus</i> Linnaeus, 1758	Gray wolf	58		
33	<i>Canis lupus/familiaris</i>	Gray wolf/ domestic dog	40		
34	<i>Canis familiaris</i> Linnaeus, 1758	Domestic dog	111		
35	<i>Canis familiaris/aureus</i>	Domestic dog/golden jackal	1		
36	cf. Canidae indet.	canid	2		
37	<i>Meles meles</i> Linnaeus, 1758)	European badger	1		
38	<i>Felis silvestris</i> Schreber, 1777	Wildcat	18		
39	<i>Felis catus/silvestris</i>	Wildcat/domestic cat	11		
40	<i>Felis catus</i> Linnaeus, 1758	Domestic cat	29		
	Total carnivores		300		
<b>Artiodactyla Owen, 1848</b>					
41	<i>Sus scrofa</i> Linnaeus, 1758	Eurasian wild boar	42		
42	<i>Sus domesticus</i> Erxleben, 1777	Domestic pig	622	4	
43	<i>Capra hircus</i> Linnaeus, 1758	Domestic goat	923	2	
44	<i>Capra ibex/hircus</i>	Alpine Ibex/domestic goat	3		
45	<i>Ovis aries</i> Linnaeus, 1758	Domestic sheep	741	2	
46	Ovicaprinae	Small ruminants	774	8	
47	<i>Bos taurus</i> Linnaeus, 1758	Cattle	1141	4	20
48	<i>Bos primigenius</i> Bojanus, 1827)	Aurochs	6		
49	<i>Bos cf. primigenius</i> Bojanus, 1827)	Aurochs	24		
50	<i>Bos taurus/primigenius</i>	Cattle/aurochs	9		
1	<i>Bubalus bubalis</i> Linnaeus, 1758)	Domestic Asian water buffalo	1		
2	<i>Cervus elaphus</i> Linnaeus, 1758	Red deer	46	5	2
3	<i>Cervus dama</i> (Linnaeus, 1758)	Fallow deer	7		
4	<i>Capreolus capreolus</i> (Linnaeus, 1758)	Roe deer	56		
	Total artiodactyls		4395	25	22
<b>Perissodactyla</b>					
5	<i>Equus caballus</i> Linnaeus, 1758	Domestic horse	219		
6	<i>Equus asinus</i> Linnaeus, 1758	Donkey	61		
	Total perissodactyls		280		
<b>Primates</b>					
7	<i>Homo sapiens</i> Linnaeus, 1758	Modern man	7		
	Total primates		7		
	Mammals	Bone splinters	4704		9
	Total eutherian mammals		9700	26	
	Total vertebrates		10375	51	74

breeds were extremely rare. Most often the chickens were medium-sized, which could belong to one or more breeds of similar size.

The single bone of a rock dove/ domestic pigeon could have belonged also to a domestic bird.

Usually the bones of the domestic geese are slightly larger than these of recent wild Greylag goose (*Anser anser* (Linnaeus, 1758)). The same is valid also for the bones of domestic ducks and Mallards. The domestic turkey *Meleagris gallopavo domestica* (Linnaeus, 1758) was not recorded, regardless that this bird was widely bred throughout Bulgaria as domestic in the last 350 years. I did not find remains of the domestic peafowl (*Pavo cristatus domestica* Linnaeus, 1758), even though it is known to have been a valuable decorative garden bird in the Orient at that time.

Dogs represented a particular interest and a considerable share of their bones were referred to one (or more) small-sized breed of very short-legged Dachshund-like breeds (Figs. 1a-e). There were remains of larger (? herding) dogs along with the short-legged ones.

The majority of the farmed cattle were of the s. c. brachycere type with very short horns (Figs. 1f-g). The most numerous were the remains of cattle (1141 finds), followed by goat (923), sheep (741) and pig (622). The donkey was 3.5 times less represented than the horse.

I recorded a single find of water buffalo: a cranial fragment with a preserved horn on it. After (ISHIRKOV 1921 the Water Buffalo was mentioned in Bulgaria first in 1206. This animal became widely spread in the country during the Ottoman rule (IVANOV, ZAHARIEV 1961).

Only five bones of the domestic rabbit (*Oryctolagus cuniculus*) were collected. It is likely that the cuniculture was not so limited but the smaller rabbit bones were not collected in the samples.

### Wild animals, hunting and environment

As already mentioned, circa 18% of the remains belonged to wild animals. Such a high share of hunted animals suggests a comparatively rich and varied environment and diversified nature in the surrounding regions. One of the best examples of such bounty and diversity of nature is the coexistence of the little bustard (found in open steppe grassy habitats; Fig. 1h) and the western capercaillie (inhabiting mixed or pure coniferous forests; Fig. 1i). Other examples of such coexistence were two other species pairs: the lesser spotted eagle (inhabiting broad-leaved mixed forests; Fig. 1j) and the saker falcon (found in open areas, grass and tree steppes), or the griffon vulture (inhabiting drier, open areas, open rocky cliffs; Fig.

2k) and the wood pigeon (in broad-leaved and mixed forests; Fig. 2l) (HARRISON 1982).

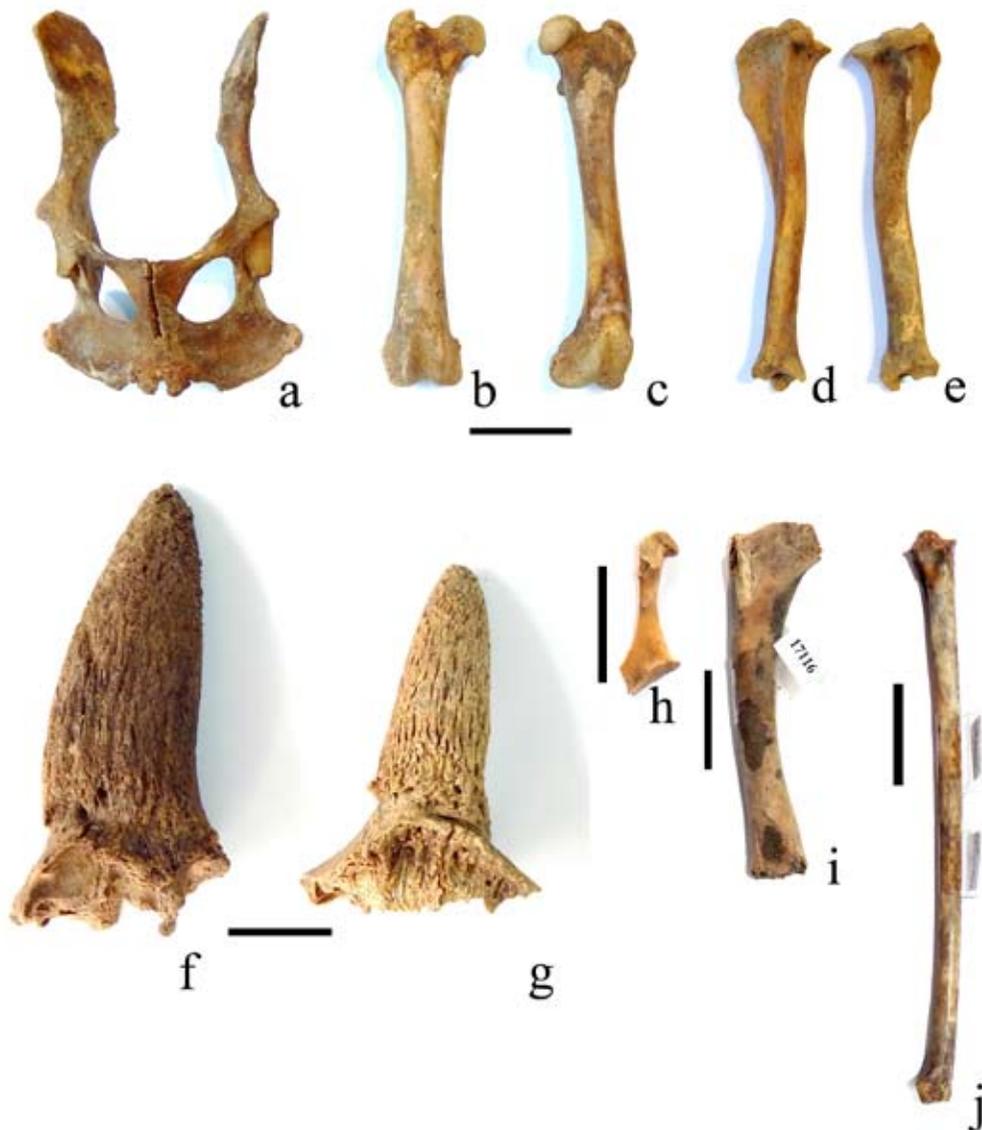
The wild fauna composition was undoubtedly very diverse. It included 41 taxa, among them one extinct (aurochs), and four disappeared from the recent fauna of Bulgaria: the cinereous vulture (Figs. 2m-n), common pheasant (local autochthonous subspecies *Phasianus c. colchicus*), little bustard, and the fallow deer. It is well documented that all foreign subspecies of *Ph. colchicus* have been introduced in Bulgaria after 1895: *Ph. c. torquatus* (1895), *Ph. c. mongolicus* (1962), *Ph. c. var. tenebrosus* (1933), and *Ph. c. karpowi* (1974). The following process of hybridisation led to the extinction of the autochthonic subspecies (BOEV *et al.* 2007.).

In the period of the Roman Empire the fallow deer was acclimatised throughout all Southern Europe (Peshev *et al.* 2004). The species is considered an element of the Mediterranean faunal complex in Bulgaria (POPOV *et al.* 2007). It is believed (SPASSOV, ILIEV 1994) that Bulgarian autochthonous population of fallow deer declined and disappeared after the 9-10<sup>th</sup> century. At present the fallow deer is reintroduced in the country.

The last extinct aurochs survived in Poland until the early 17<sup>th</sup> century A.D. (LUKASZEWICZ 1959), its record from Sofia (although widely dated 16-18<sup>th</sup> century A.D.) could be one of the last indication of the existing of aurochs on the Balkans (Fig. 3o). This corresponds to data of VAN VUURE (2005), stating that aurochs disappeared from Hungary, Germany and Russia in the 13<sup>th</sup> century, and from East Prussia around 1500. So far, the remains of the last known aurochs from Bulgaria (Veliki Preslav) were dated to the 16-17<sup>th</sup> century (IVANOV 1959), i. e. the Sofia finds were contemporary to these of the medieval capital of Veliki Preslav. The coexistence of aurochs in two regions of Bulgaria during the 16-17<sup>th</sup> century), east (Eastern Pre-Balkan) and west (Sofia Valley), is an important data on the late history of that species on the Balkans.

Nine species/forms combined or 6.2% (311 finds) of the identified mammal remains belonged to the brown hare, gray wolf (Fig. 3p), red fox, wildcat, European badger, brown bear, domestic cat, rabbit, and the dog. All of these mammals are with valued fur, which could be their major exploitation by the late-medieval population of Sofia.

The recorded wild fauna of hunted mammals (for meat-exploitation), besides the aurochs, included also red deer, fallow deer, roe deer, and wild boar (Fig. 3q). However, in addition the wild fauna contained some species of uncertain utilisation, as the brown rat and the white-breasted hedgehog. They may be considered synanthropic commensals in the cities. At least



**Fig. 1.** Subfossil animal bone remains from *Forum Serdica* (Sofia City, Bulgaria; 16-18<sup>th</sup> century A.D.): *Canis familiaris*: a – pelvis; b – femur dex., c – femur sin. ad., d – tibia dex., e – tibia sin.; *Bos taurus*: f, g – processus cornualis; *Tetrax tetrax*: h – coracoid sin.; *Tetrao urogallus*: i – humerus dex.; *Clanga pomarina*: j – ulna dex. Scale bar = 3 cm. (Photo: Z. Boev)

two species, may be referred undoubtedly as synanthropic in the *Forum Serdica*, the white stork and the brown rat. *Ciconia ciconia* is an ordinary synanthropic species on the Balkans since the ancient times. Its bones were found previously at two sites in Bulgaria: the large Hellenic and Roman town of Kabyle and in the Roman villa of Armira (SE Bulgaria; BOEV 1993) and Baba Vida Fortress (Vidin, 8-17<sup>th</sup> century)

The share of diurnal raptors in the examined material was very high. The seven recorded species (two vultures, three eagles, one goshawk and falcon) represented 60.7% of all wild birds. This could be explained with both the open exposition of the animal food debris in the pits, and the intended secondary utilisation of the wing feathers (chiefly primaries, secondaries and rectrices) of raptors for the produc-

tion of fletchings (stabilisers) of the hunting arrows. The firearm appeared in Europe in the 14-15<sup>th</sup> century, but its development accelerated in the 19<sup>th</sup> century. Therefore, mass utilisation of arrows for hunting was very common in the 16-18<sup>th</sup> century throughout Europe. Large bird feathers were commonly used in the production of arrows (YUHAS 1983). Only two bones of the total 29 bone remains of griffon vulture and cinereous vulture were bones of the hind limbs skeletons and all other 27 came from the skeleton of wings. So far cinereous vultures were not recorded from the Holocene sites of Bulgaria (BOEV 1999). On the contrary, griffon vultures were recorded at five sites – Bagachina (Late Iron Age, Rasovo village), Kabile (1<sup>st</sup> millennium BC – 6<sup>th</sup> century), Ratiaria (2-4<sup>th</sup> century), Veliki Preslav (9-10<sup>th</sup> century), and

Hisarlaka (Sliven, 10-12<sup>th</sup> century) (BOEV 1999). At present, the cinereous vulture is extinct (MARIN *et al.* 2011), while the griffon vulture is endangered (IANKOV *et al.* 2011) in the country.

Subfossil records of the imperial eagle exist from two medieval sites in Eastern Bulgaria: Hisarlaka (Sliven) and Durankulak (BOEV 1999). The species nests on trees and prefers lowland areas, forest edges, open forests, open grasslands and plains with scattered trees.. The remains from *Forum Serdica* were its third record for the country (Figs. 3r-s).

Previously the golden Eagle was established at 4 subfossil (Neolithic to Chalcolithic) sites: Malak Preslavets, Kazanlak, Galabovo, and Telish (BOEV 1999). The habitat requirements include rocky mountain areas which could be found in Vitosha Mountain. The last records of golden and lesser spotted eagles from the mountain date back to the 1960s (DONCHEV 1961). Earlier data indicate that the cinereous and griffon vultures, and the golden, imperial and lesser spotted eagles were common species for Sofia Valley even at the end of the 19<sup>th</sup> century (HRISTOVICH 1890).

The capercaillie was widely spread in the past. It is known also from 12 Holocene archaeological sites – Golyamo Delchevo, Ezero, Ovcharovo, Golyamata Cave, Dolnoslav, Hisarlaka, Yagodinska Cave, Baba Vida fortress, Madara, Omurtag, Kozarska Cave, Kazanlak (BOEV 1999). It is the largest recent woodland bird of Europe, being one of the most valuable game fowl since prehistoric times. Now it is an endangered species in Bulgaria (BOEV, NIKOLOV 2011). The Capercaillie's nearest recent locality (possibly survived until the early 21<sup>st</sup> century) was at 10 km from Sofia City in Vitosha Mountain (BOEV 2014).

The wood pigeon inhabits broad-leaved forests and forest edges. HARRISON (1982) demonstrates that it has adapted to farmlands and cultivations, and more recently to urban areas. Other subfossil records of wood pigeon include Nicopolis-ad-Istum, Ratiaria, and Kabyle (BOEV 1999; BOEV, BEECH 2007), and the Neolithic settlement in the Slatina quarter of Sofia (BOEV 2009).

Although listed as a “critically endangered”, the saker falcon is already extinct from Bulgaria. Other subfossil remains were found from Kabile (1<sup>st</sup> millennium B.C.-6<sup>th</sup> century; BOEV, RIBAROV 1993).

The little bustard occurs in very open flat or undulating grasslands and could occupy more hilly habitats than the great bustard. It prefers open fields, short-grass steppe, and even open stony semiarid landscapes (HARRISON 1982). The species is extinct in Bulgaria (BOEV 2011) but it has been established at three Holocene sites: Nicopolis-ad-Istrum (1-6<sup>th</sup> century), Malak Preslavets (6000 B.C.) (BOEV 2003),



**Fig. 2.** Subfossil animal bone remains from *Forum Serdica* (Sofia City, Bulgaria; 16-18<sup>th</sup> century A.D.): *Gyps fulvus*: k – radius dex.; *Columba palumbus*: l – ulna dex.; *Aegypius monachus*: m – ulna sin., n – carpometacarpus dex. Scale bar = 3 cm. (Photo: Z. Boev)

and the Neolithic settlement in the Slatina quarter of Sofia (BOEV 2009). *Forum Serdica* is its second subfossil record from the Sofia City region. It is a rare find which proves the Sofia Valley was a favourable ground in the past for this now disappeared species.

Other ten species are now endangered or vulnerable in the Bulgarian nature. They have been listed in the country's Red Data Book: imperial, golden and lesser spotted eagles; ? great white pelican; red deer; western capercaillie; common shelduck (Fig. 3t); brown bear; gray wolf; wildcat; etc.

Two semi-mandibles of an adult individual of brown bear were found (Fig. 3u). They had unusu-



**Fig. 3.** Subfossil animal bone remains from *Forum Serdica* (Sofia City, Bulgaria; 16-18<sup>th</sup> century A.D.): *Bos primigenius*: o – processus cornualis sin.; *Canis lupus*: p – cranium, mandibula sin.; *Sus scrofa scrofa*: dens caninus; *Aquila heliaca*: r – carpometacarpus dex., s – ulna dex, dist.; *Tadorna tadorna*: t – coracoid dex.; *Ursus arctos*: u – mandibula sin.; Cutmarks: v – fragment of a long tubular bone; *Cervus elaphus*: w – cut antler processus cornualis. Scale bar = 3 cm. (Photo: Z. Boev)

ally small size, suggesting a skull of leopard-size. Possibly the bear had been kept as a pet and was permanently underfed. The recorded individual may have belonged to the autochthonous native population of brown bear, which still exists in the neighbouring Vitosha, Plana and Verila Mountains (POPOV *et al.* 2007; SPIRIDONOV, SPASSOV 2011).

The finding of five aquatic birds (?great white pelican, white stork, mallard, common shelduck, and Eurasian teal) suggested the existence of a large water body with open surface in the vicinities. There are no any historic evidences for such lakes or large

swamps, but at present the Perlovska and Suhodolska Rivers lie at a distance of about 2 km away. Their floods could have provided such habitats in the last 400 years. Sofia Valley is drained by the Iskar River and its main tributaries: Lesnovska and Blato Rivers. Both rivers often flooded the flat lands of agricultural fields along their banks in the past (GALABOV 1988). In addition, Vladayska, Slatinska, Bistishka and Bankyanska Rivers also flow through the valley.

The great white pelican has been recorded so far in the Sofia Valley (in Kostinbrod, 16 km NW of Sofia City) in a Roman villa of the Emperor

Constantine the Great (3-4<sup>th</sup> century); from Eastern Bulgaria – Krivnya (9-10<sup>th</sup> century, near Krivnya village), and Urdoviza (3000-2000 B.C., pr. Kiten; BOEV 1999). In the past the species was widely spread in the inner water bodies of the country. At present the great white pelican is an extinct species in Bulgaria (MICHEV, PROFIROV 2011).

Other records of the common shelduck include Nicopolis-ad-Istum, Veliki Preslav, Malak Preslavets and Urdoviza, while the Eurasian teal has been found from Nicopolis-ad-Istum and Urdoviza (BOEV 1999). Common Shelduck and Eurasian teal have been among the valuable hunting waterfowl in the past. At present the common shelduck is a vulnerable species in Bulgaria (PROFIROV 2011) and is not spread as breeding species in Western Bulgaria. The only record (1979) came from the Aldomirovsko Swamp, 28 km NW of Sofia City (PROFIROV, DIMCHEV 2007). It is still commonly recorded in the Sofia Region during the spring/autumn migrations and in winter. An important role for the waterfowl and the aquatic birds has played the former Kumanishko Swamp (near the present Kubratovo village), completely drained in the early 20<sup>th</sup> century.

### Traces on bones

The trace analysis showed that 44 bones bear cutmarks (complete cuts) or only traces of cutmarks (Fig. 3v). Seven other bones had holes of drilling. The drilled bones belonged to chicken, sheep, goat and cattle (horn).

In addition, 74 bones had evident traces of burning, i. e. they were completely or partially burnt.

Most often burning traces were found on chicken bones (38), but the meat of some wild birds, e. g. capercaillies, had also been roasted. Other burnt bone remains belonged to red deer and wood pigeon. Sometimes I recorded cut antlers of red deer, some adult rams and he-goats (Fig. 3w). In total 125 bones (1.25% of the finds) had traces left by man.

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## Conclusions

After the archaeozoological data from Bulgaria, within the examined period (16-18<sup>th</sup> century) only 2 species (Aurochs and Beaver) disappeared from the country. The last one was not recorded in the material, but its former distribution along the Iskar River and its tributaries is very probable.

From a total of 24 (26) species, one is globally extinct, and five other are extinct from the country. Thus, 1/10 of the recorded species are extinct, but they all (except for the aurochs) survived in the Bulgarian nature until the 20<sup>th</sup> century.

The results indicate that animal husbandry provided circa 4.6 times more animal sources than hunting. It is unclear why the diurnal raptors remains were over-represented among the collected bone material. The share of large raptor species (vultures, eagles) was 7.2% of all avian remains. On the other hand, the seven species (two vultures, three eagles, one goshawk and falcon each) represented 60.7% of all wild birds. The majority (93.1%) of the remains of griffon and cinereous vultures belonged to skeleton of wings, possibly indicating a wing feather utilisation of these species in the past.

The obtained data contribute to the scanty available information on the wildlife in Bulgaria 500 years ago. To a certain extent, they also provide details on the everyday lifestyle of the inhabitants of the Sofia City.

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