

The Ornithological Collections of the National Museum of Natural History of the Bulgarian Academy of Sciences: their History and Scientific Value

Zlatozar BOEV

National Museum of Natural History, I, Tsar Osvooboditel Blvd, 1000 Sofia, Bulgaria

Abstract. The National Museum of Natural History in Sofia (NMNHS) was founded in 1889 by the Bulgarian king Ferdinand I. From 1889 to 1892 he personally identified and arranged the bird specimens of the collections. Between 1918 and 1943 his son Tzar Boris III worked in the collections and he was himself an expert ornithologist. In total, ten curators of birds have cared for the NMNHS's avian collections since 1889. Today, the collections contain 30,192 specimens of about 1980 recent and fossil taxa: 12,154 fossil and subfossil bones in 349 taxa, 1,995 partial and complete skeletons in 358 taxa; 11,237 stuffed skins in 1,298 taxa, 4,271 mounted skins in 1,116 taxa, 129 feather sets in 97 taxa; 259 eggs in 70 taxa, 1 fossil egg shell in one species, 122 nests in 56 taxa, and 25 fluid preserved specimens in 14 taxa. More than 340 specimens (stuffed and mounted skins) in 56 species belong to extinct, endangered and vulnerable species and subspecies.

Key words. Bulgarian bird collections, National Museum of Natural History in Sofia, NMNHS

1. HISTORY

The ornithological collections are the oldest nature collections kept at the National Museum of Natural History in Sofia (NMNHS). This paper will present data on the history of the collection, the amounts in different collection categories and on various aspects of the scientific value of the largest avian collection in Bulgaria.

Some of the specimens were collected 140 years ago (BOEV 1991a and in press). The oldest specimen is a mounted Channel-billed Toucan (*Ramphastos vitellinus*), shot in Brazil in 1860. In the period of the foundation of the NMNHS in 1889, several dozens of birds were collected by COUNT AMEDE ALLEON (1838-1904), a French ornithologist and traveller. Most of his specimens originate from the European part of Turkey. Several specimens of Glossy Ibis (*Plegadis falcinellus*) and Ruddy Shelduck (*Tadorna ferruginea*) are the oldest of the Alleon's specimens, collected in 1881 and 1885 in what is now Bulgaria. About 900 well prepared specimens of Alleon's collection bought in 1892 were the first considerable acquisition for the NMNHS's collection.

From 1889 to 1892 the Bulgarian Tzar FERDINAND I, founder of the Museum and a good ornithologist, identified and arranged the bird specimens of the collections. Many exotic specimens of cage birds (mainly Psittacidae, Loriidae, Emberizidae, Estrildidae, Ploceidae, Fringillidae) were bred by FERDINAND before he came to Bulgaria (RUSS 1878). Later, most of the specimens came from the Royal Zoological Gardens in Sofia (KORN 1999). From 1918 to 1943 his son, the Bulgarian Tzar BORIS III, replaced him. BORIS III was also a sound avian expert.

Table 1: List of the curators of avian collections of the National Museum of Natural History in Sofia.

Curators of Birds	From	To	Duration
<i>FERDINAND I Sax Coburg-Gotha*</i>	1889	1892	4
Paul LEVERKÜHN	1893	1900	8
Knut ANDERSEN	1901	1904	4
Paul LEVERKÜHN	1904	1905	2
<i>Hermann GRAETZER</i>	1905	1907	3
Henrich JULIUS	1907	19XX	XX
Pavel Patel	1928	1948	21
Nikolay BOEV	1962	1968	7
Stefan DONCHEV	1969	1974	6
Krasimir KUMANSKI**	1976	1986	11
Zlatozar BOEV	1986	-	16

* Names in italic indicate that the person was both director of the whole Museum and curator of birds

** Dr. K. Kumanski as an entomologist was only a formal curator of the bird collections

In 1893 a small part of the famous zoological and ethnological collection of the Czech traveller and naturalist, Dr. Emil HOLUB (1847-1903), collected from S Africa was purchased for the Museum. It numbered over 30,900 specimens (including 2,000 birds), but only 300 of them are still kept in the NMNHS (BOEV & STANEVA in prep.). Another considerable addition to the avian collections was the purchase of the some 2,100 bird skins of the collection of Stuart BAKER - a famous British ornithologist. His important collection from Hindustan and Indochina was divided into three parts that went to Lord ROTHSCHILD, to the Bombay Natural History Society and (the largest part) to the

Bulgarian Tzar FERDINAND I. At the end of the 19th century the bird collection of Emil WERNER, a German collector, came via Paul LEVERKUHN to FERDINAND I. In an extra paper in this issue we report on this valuable collection (BOEV 2003). In 1907 H. JULIUS was employed as a curator of birds and mammals. Being a good hunter and taxidermist, in the next six years he considerably enriched the avian and mammalian collections.

In 1904 the bird collections occupied four halls of the second storey of the old two-storey building. In 1905 Hermann GRAETZER became curator for all zoological collections. GRAETZER was the second court physician but together with Heinrich JULIUS, a talented taxidermist, he started the first arrangement of zoological exhibits, of which birds represented the largest part. In 1907 the first exhibition was opened for the public.

In the same year the first (and last!) complete catalogue of the NMNHS was published (ANONYMOUS 1907). It contains data for 8,229 bird specimens of at least 1,538 species and subspecies. During that time the ornithological collection contained 2,210 bird eggs, 45 bird nests and several dozens of fluid-preserved specimens, most of them morphological abnormalities or juveniles. It is worth mentioning that these two collections, the oological and the nidological, made no progress until recently. Even worse, most of their specimens suffered from the large fire in March 1944 during the World War II (see below). In 2001 the avian collections contain 122 nests in 56 taxa and 259 eggs in 70 taxa.

During two decades from about 1910 to 1930 (and in some sense during the whole history of the NMNHS), birds in the collections, through research and in the exhibitions, played the most important role in the museum. Furthermore, they were an excellent basis for ornithology in the Balkans. In 1927 the Bulgarian Ringing Centre was founded at the NMNHS. In 1935 the NMNHS was considered one of the richest natural history museums of Europe.

Dr. Pavel PATEV (1889-1950) was the first Bulgarian ornithologist and he became curator of the avian collections of the museum in 1928. Between 1928 and 1938 he enriched the bird skins collections by up to 9,000 specimens. Some of them were collected during joint field trips with the British ornithologist Dr. James HARRISON through Bulgaria, Greece, etc. In expeditions in NE Bulgarian swamps along the Danube river (Srebarna lake, now a Biosphere nature Reserve, Popina, Malak Preslavets, etc.) PATEV and Alexi POPOV, an eminent Bulgarian naturalist and collector, collected 166 bird skins at least, most of them of water birds – herons, spoonbills, waders, cormorants, ducks, etc. Between 1942 and 1950 PATEV

added at least 5400 new specimens to the collections (BOEV 1991 a, b). Thus, by the end of his life PATEV enriched the NMNHS's bird collection by up to 11,000 skins. He also organized specimen exchanges with the British Museum (Natural History) and some other museums of Europe. He was especially interested in the subspecies living in Bulgaria for which purpose he collected good samples of skins.

Occasionally some Bulgarians, travelling abroad, offered to the NMNHS their small bird collections or single specimens. One of them was Nenko RADEV who donated a series of valuable bird specimens from Abyssinia (Ethiopia).

The disaster of World War II came with five heavy bombs dropped over the museum's buildings on 30 March 1940. Some of the laboratories, offices, the taxidermist's laboratory and the library were completely or partially destroyed. A large fire burnt down parts of the bird (and other zoological) collections, the rich archive of the Bulgarian Ringing Centre, and parts of the most valuable library on ornithology and zoology of the Balkans.

In 1945-1947 an accelerated rebuilding of the whole museum was started. In that period 161 mounted birds and mammals were prepared for the collection. Between 1949 and 1957 another 1,100 birds and mammals came into the collections. In 1950 the Zoological Department numbered 42,000 preserved specimens, of which 15,380 were birds (BURESH 1951).

In 1960, 111 mounted specimens of birds and mammals were shown at the International Game Exposition in Florence, where they won a collective golden medal and 31 other medals (15 of them in gold), which gave the NMNHS exhibits second place in Europe. Several other participations (London 1968, Budapest 1968, Plovdiv 1981 etc) of the NMNHS with bird specimens also confirmed the high quality of its avian collections.

As the Sofia Zoological Gardens and the NMNH were two subdivisions of the Bulgarian Academy of Sciences until 1950, many exotic interesting and rare bird specimens entered the museum's halls and cabinets. When in 1950 the Sofia Zoological Gardens came under the guidance of the Sofia Municipality this beneficial collaboration was lost.

In the 1950s we observed an increasing interest in the natural resources of the country. All collections of the museum, and especially those of birds, were visited and used by numerous students, teachers and artists. Nevertheless, from 1962 to 1968 the NMNHS was closed to the public because of the severe restrictions of funds. In this time the NMNHS was reduced to a section of the Institute of Zoology of the Bulgarian

Academy of Sciences. In 1968 the museum exhibition halls opened their doors for visitors again. The newly arranged bird display was now overcrowded because it was necessary to host as many specimens as possible in the exposition cabinets. The same happened with the scientific collections in the stores. The cabinets with the study skins were stored in three and even four layers – one above the other. The drastic lack of free space for additional offices for the enlarged staff of the Institute of Zoology was the main reason for this packed arrangement of all avian specimens.

2. PRESENT STATE

In 1995, after a new division of the NMNHS was established, all avian collections were transferred to the new „Fossil and Recent Birds Department“. Since then its staff has consisted of two persons – a scientist (senior research associate) and a technical assistant.

An updated inventory of the whole bird collection is available from the author as a data file where all specimens are listed, following the systematics of PETERS (1931, 1934, 1937, 1940, 1945), DEL HOYO et al. (1992, 1994, 1996, 1997, 1999, 2001) and HOWARD & MOORE (1980). In this inventory the number of specimens are given in the categories: study skins, mounted birds, feather sets, skeletons, fossil/subfossil bones, eggs, nests, and preserved in fluid.

No catalogue of the bird collections has been published since 1907. Exceptions are several papers of BOEV (1990) on the collection of mounted parrots (Psittaciformes) and BOEV (1997a) on the mounted skins of the Stuart BAKER collection. A catalogue of the osteological abnormalities in herons, egrets and bitterns (Ardeidae) has also been published by BOEV (1986 b).

A complete catalogue of the mounted birds of extinct, endangered and vulnerable species and species of the Appendix I of CITES has been prepared by BOEV (in press). It will include 222 specimens of 51 avian species of 14 orders. At the moment it is not possible to do the same for the study skins because their number is much larger. The donation of a portable computer by Kansas University in 2001 will facilitate the work of building a database.

3. EXAMINATIONS OF THE NMNHS'S AVIAN COLLECTIONS

Most of the collections of recent birds remained almost completely unexamined in taxonomical, morphological, pathological, and other aspects. An exception is a comparative study on the morphology of bitterns, herons, and egrets (BOEV 1986 a). BOCHENSKI (1994) examined the skeletons of grebes for a comparative osteology of Podicipediformes. In addition

BOEV (1999) examined the Neogene and Quaternary birds from Bulgaria, based on the collection of fossil and subfossil remains of birds from Bulgaria, now numbering 12,153 specimens of at least 349 taxa.

Whereas the bird faunas of Bulgaria of PATEV (1950) and BOEV (1962) were based on the collections in the NMNHS, later research on Bulgarian birds (SIMEONOV et al. 1990; SIMEONOV & MICHEV 1991; NANKINOV et al. 1997) was carried out mostly without using the specimens and the collection data of the museum. However, several papers have appeared on single specimens – *Mitu mitu* (BOEV 1997 b), a hybrid of *Falco cherrug* and *F. biarmicus* (BOEV & DIMITROV 1995).

4. THE ORNITHOLOGICAL COLLECTIONS (s. table 2)

4.1. Study skins

The collection of stuffed skins contains 11,248 specimens in 1,298 species representing 37.26 % of all bird specimens. There are good series of recent species, eg: 191 *Sturnus vulgaris*, 147 *Acanthis cannabina*, 144 *Perdix perdix*, 119 *Parus major*, 109 *Alectoris graeca*, 108 *Motacilla flava*, 102 *Accipiter nisus*, 101 *Emberiza citrinella*, 100 *Fringilla coelebs*, 99 *Alauda arvensis*, 97 *Garrulus glandarius*, 87 *Turdus merula*, 85 *Picus viridis*, 85 *Picoides major*, 83 *Aegithalos caudatus*, 81 *Corvus monedula*, etc.

4.2. Mounted birds

This collection now numbers 4,270 specimens in 1,116 species. The Count Amede ALLEON, Stuart BAKER, Emil HOLUB and their taxidermists made the best examples in the last decades of the 19th century (see above). Most of the specimens are mounted on wooden stands, sometimes on a modelled specific ground, or on the nest.

4.3. Feather sets

This collection is also a new one for the NMNHS, started in 1981 and it was only occasionally completed, but by October 2001 it contains 129 sets of 97 species (Table 2). All feather sets are kept unmounted in plastic bags. All sets came from birds collected from Bulgaria, but no collection data are given on the labels.

4.4. Skeleton collection

This collection contains mainly species that live in Bulgaria and was started in 1980. Before that time the museum possessed only 18 mounted skeletons (BOEV 1993) of species, which in part are extinct now in Bul-

Table 2: Summary of quantitative data of the avian collections of the NMNHS in 2001.

Collections	Species		Specimens	
	Number	Percentage of the world's avifauna*	Number	Percentage of NMNHS avian collection
Study skins	1,298	14.3	11,237	37.26
Mounted skins	1,116	12.30	4,271	14.14
Feather sets	97	1.06	129	0.42
Skeletons	358	3.94	1,995	6.60
Fossil and subfossil bones	349	23.26	12,154	40.25
Eggs	70	0.77	259	0.85
Nests	56	0.61	122	0.40
Fluid-preserved	14	0.15	25	0.08
Total	2,006	22.11	30,192	100

*Percentage of the World's total recent and fossil avifauna – 9,072 recent species (MONROE & SIBLEY 1993) and ca. 1,500 species, known by their fossil and subfossil remains (DEL HOYO et al. 1992).

garia. At present the NMNHS osteological collection contains 1995 specimens in 358 species. Twenty-one species are represented by more than 20 specimens (partial or complete skeletons): *Accipiter nisus*, *Anas platyrhynchos*, *Ardea purpurea*, *A. cinerea*, *Asio otus*, *Athene noctua*, *Bubo bubo*, *Buteo buteo*, *Coturnix coturnix*, *Egretta garzetta*, *Fulica atra*, *Gallus gallus domestica*, *Ixobrychus minutus*, *Lanius collurio*, *Larus ridibundus*, *Nycticorax nycticorax*, *Phasianus colchicus*, *Sturnus vulgaris*, *Tadorna tadorna* and *Tyto alba*. During the last two decades skeletons from the NMNHS collection were exchanged with various corresponding institutions in France, Georgia, Hungary, Poland, Spain, Sweden, United Kingdom, etc.

4.5. Collection of fossil and subfossil bones (and egg-shells)

Within the avian collection this part is the largest; it covers 40.25 % of all avian specimens of the NMNHS. The greater part of this collection consists of subfossil and fossil bird bones and bone fragments from Bulgarian Quaternary and Tertiary deposits. Only single specimens came from abroad, e.g. from Azerbaijan, Namibia, New Zealand. Fossil eggshells are represented by a single fragment of a Pliocene *Struthio* sp. from Namibia. The collections keeps holotypes of 17 fossil species (*Phalacrocorax serdi-*

censis BURCHAK-ABRAMOVICH & NIKOLOV, 1984; *Anser thraceiensis* BURCHAK-ABRAMOVICH & NIKOLOV, 1984; *Geronticus balcanicus* BOEV, 1998; *Balcanaas pliocaenica* BOEV, 1998; *Tetrao rhodopensis* BOEV, 1998; *Cygnus verae* BOEV, 2000; *Buteo spassovi* BOEV, 1998; *Falco bakalovi* BOEV, 1998; *Tetrao rhodopensis*, *Lagopus balcanicus* BOEV, 1995; *Chauvireria balcanica* BOEV, 1997; *Gallinula balcanica* BOEV, 1999; *Actitis balcanica* BOEV, 1998; *Regulus bulgaricus* BOEV, 1999; *Coccothraustes siueonovi* BOEV, 1998; *Coccothraustes balcanicus* BOEV, 1998; and *Loxia patevi* BOEV, 1999), and two fossil genera (*Chauvireria* and *Balcanaas*), described from Bulgarian localities. In addition seven fossil species (*Tetrao partium* (KRETZOI, 1962), *Lagopus* aff. *atavus* JANOSSY, 1974, *Perdix palaeoperdix* (MOURER-CHAUVIRÉ, 1975), *Pavo bravardi* (GERVAIS, 1849), *Otis* aff. *khosatzkii* BOCHENSKI & KUROCHKIN, 1987, *Apus baranensis* JANOSSY, 1977, and *Corvus* aff. *praecorax* (DEPERET, 1890)) and one fossil subspecies (*Pyrrhocorax* cf. *graculus vetus* KRETZOI, 1962), known from the localities of other European countries, were determined with fossil bird remains of the NMNHS collection. Now it is one of the largest collections of this kind in the Balkans and in SE Europe.

4.6. Nests

The nest collection is very small (0.40 % of all bird items). Some of the nests are mounted on wooden stands and shown as exhibits. Most of them are kept in carton boxes and plastic bags at the depots. The nests of some hummingbirds (Trochilidae) are among the most curious exhibits. They are not included in the nests of table 2.

4.7. Eggs

As mentioned above, the egg collection in 1907 numbered a total of 2,210 items. Most of them were damaged during the bomb attack in 1944. The number of 259 eggs in table 2 are those with labels. Additionally, an unknown number of eggs (over 120) without labels are also part of the collection.

4.8. Fluid-preserved birds

This is the smallest collection of the „Fossil and Recent Birds Department“ of the NMNHS. Though the number is small it contains some valuable specimens, as nestlings of *Lophophorus impeyanus*, *Bambuscicola thoracica* and *Passer domesticus italiae*.

Table 3: Representation of threatened species of birds in the collection of the NMNHS (according to HOWARD & MOORE (1991) and BIRDLIFE INTERNATIONAL (2001)).

Taxon	Number of specimens								
	Study skins	Mounted skins	Feather sets	Skeletons	Fossil and subfossil bones	Eggs	Nests	Fluid-preserved	Total
<i>Casuaris casuaris</i>		2							2
<i>Apteryx owenii</i>		1							1
<i>Spheniscus demersus</i>	1	3							4
<i>Eudypetes chrysolophus</i>		2							2
<i>Diomedea exulans</i>		1							1
<i>Pelecanus crispus</i>		3		9					12
<i>Geronticus eremita</i>	2	2							4
<i>Phoenicopterus jamesi</i>		1							1
<i>Anser erythropus</i>	1	3	1	9	3				17
<i>Branta ruficollis</i>	3	9		6	2				20
<i>Branta sandvicensis</i>				1					1
<i>Cairina scutulata</i>	3								3
<i>Dendrocygna arborea</i>		1							1
<i>Aythya nyroca</i>	26	3	1	4	14				48
<i>Oxyura leucocephala</i>	3	14		3	2				22
<i>Gymnogyps californianus</i>	1	1				1			3
<i>Aquila clanga</i>	5	19			2				26
<i>Falco naumanni</i>	30	15							45
<i>Mitu mitu</i>	1								1
<i>Fringilla vulgaris</i>	2								2
<i>Syrnaticus ellioti</i>		5							5
<i>Syrnaticus reevesii</i>		22		6					28
<i>Tragopan caboti</i>		2							2
<i>Crossoptilon mantchuricum</i>		3							3
<i>Catreus wallichii</i>		4							4
<i>Pavo muticus</i>		2							2
<i>Anthropoides paradisea</i>		1							1
<i>Grus antigone</i>		2							2
<i>Grus japonensis</i>		1							1
<i>Otis tarda</i>		5		2	14				21
<i>Numenius tenuirostris</i>	4	7							11
<i>Columba inornata</i>		1							1
<i>Columba punicea</i>	2								2
<i>Goura cristata</i>		4							4
<i>Loriculus amabilis [catamene]</i>		2							2
<i>Cacatua moluccensis</i>		1							1
<i>Cacatua sulphurea [parvula]</i>	1	1							2
<i>Agapornis nigrigenis</i>	7						3		10
<i>Amazona barbadensis</i>		1							1
<i>Amazona leucocephala</i>		3							3
<i>Amazona pretrei</i>	4	1							5
<i>Anodorhynchus hyacinthinus</i>		1							1
<i>Anodorhynchus laeri</i>		1							1
<i>Strigops habroptilus</i>		1							1
<i>Lathamus discolor</i>	2	1							3
? <i>Gymnomyza samoensis</i>	3	2							5
? <i>Molio braccatus</i>	3								3
<i>Tangara fastuosa</i>		1							1
<i>Gubernatrix cristata</i>	9	4		1					14
? <i>Sporophila melanops</i>	1								1
<i>Loxops coccinea</i>	1								1
<i>Carduelis cucullata</i>	3	1							4
<i>Chloebia gouldiae</i>	36	2							38
<i>Foudia flavicans</i>		1							1
<i>Padda oryzivora</i>	22	5							27
<i>Sporopipes frontalis</i>		1							1
Total	176	171	2	41	37	1	3	-	431

5. SCIENTIFIC VALUE OF THE COLLECTIONS

This general review shows that NMNHS's avian collection is of great scientific and cultural value, due to the following facts:

- it is a historical collection from eminent collectors and from localities which in part have since been devastated or have disappeared;
- it contains taxa which now rarely reach collections as they are either fossil, extinct, rare or now protected under CITES;
- it contains curious specimens: unique and famous specimens, avian bones worked by prehistoric humans, plumage colouration abnormalities, pathological abnormalities;
- it contains large samples of several species and has a broad representation of taxa.

The Carolina Parakeet (*Conuropsis carolinensis*) has been extinct since early 20th century (DAY 1981; DEL HOYO 1994) and the Alagoas Curassow (*Mitu mitu*) does no longer occur in the wild. The NMNHS avian collection contains at least 56 species which are now threatened with global extinction (WORLD CONSERVATION MONITORING CENTRE 1993). Their 431 specimens (table 3) represent a valuable source for examination of taxonomy, external and internal morphology, adaptations, former distribution, etc.

Ten subspecies, described from specimens of south-east European populations, are represented as skins in the collection: *Erithacus rubecula balcanicus*, *Picoides syriacus balcanicus*, *Picoides major candidus*, *Picus viridis dofleini*, *Picus canus perspicuus*, *Picoides minor serbicus*, *Galerida cristata meridionalis*, *Eremophila alpestris balcanica*, *Sitta neumayer neumayer*, *Parus montanus montanus*, *Primella collaris subalpina*, *Carduelis carduelis balcanica*, and *Corvus corone sardonius*. All these taxa are considered as valid by HOWARD & MOORE (1980). Some taxa, now synonymised, have been described with material of the NHMNS: for example *Phasianus colchicus europaens* HACHISUKA (1937). Despite the synonymy, they reflect the former stage of the development of avian taxonomy and have a valuable historical significance. The type was part of the ornithological collection, but meanwhile its whereabouts is unknown.

Acknowledgments

The author thanks Dr. Anita GAMAUF (Museum of Natural History, Vienna) for providing sources on the King Ferdinand's bird collection, Dr. Alexi POPOV (National Museum of Natural History, Sofia) for translation of some papers, written in German, and Ms Vera HRISTOVA (National Museum of Natural History, Sofia) for processing the avian collections data.

Literature

- BIRDLIFE INTERNATIONAL (2001): Threatened Birds of the World. Barcelona. Lynx Edicions and BirdLife International, Barcelona & Cambridge, UK: 1-852.
- ANONYMOUS [H. GRAETZER] (1907): Collections du Musée d'Histoire Naturelle de Son Altesse Royale Ferdinand I – Prince de Bulgarie. Sofia, Impr. de l'Etat. 1-484.
- BOCHENSKI, Z., Jr. (1994): The comparative osteology of grebes (Aves: Podicipediformes) and its systematic implications. Acta zool. Cracov., 37: 191-346.
- BOEV, N. (1962): Birds. – In: PESHEV, T. & BOEV, N.: Fauna of Bulgaria. A Short Field-Guide. Narodna Prosveta Publ. House, Sofia, 106-454 (In Bulgarian).
- BOEV, Z. (1986a): Comparative morphological studies of the herons (Family Ardeidae – Aves) from Bulgaria. National Museum of Natural History. Bulgarian Academy of Sciences. Sofia. Ph. D. thesis. 193 pp. + 288 pp. supplements (in Bulgarian).
- BOEV, Z. (1986b): Morphological abnormalities of the skeleton system of herons (Aves – Ardeidae). Acta zoologica bulgarica 31: 24-31 (in Bulgarian, English summary).
- BOEV, Z. (1990): Parrots (Order Psittaciformes) in the collection of the National Natural History Museum – Sofia. Historia naturalis bulgarica 2: 3-6.
- BOEV, Z. (1991a): The ornithological collections of the National Museum of Natural History at the Bulgarian Academy of Sciences. Historia naturalis bulgarica 3: 37-48 (in Bulgarian, English summary).
- BOEV, Z. (1991b): The centenary of the birth of Pavel Patev – the founder of contemporary Bulgarian ornithology. Historia naturalis bulgarica 3: 111-116 (in Bulgarian, English summary).
- BOEV, Z. (1993): The osteological collections and their importance for the ornithological studies. Historia naturalis bulgarica 4: 3-9 (in Bulgarian, English summary).
- BOEV, Z. (1997a): Stuart Baker's collection of birds in the National Museum of Natural History (Sofia). Historia naturalis bulgarica 7: 5-12.
- BOEV, Z. (1997b): The Alagoas (Eastern-Brazil Razor-Billed) Curassow *Mitu mitu* (L.) – a World rarity in the collection of the National Museum of Natural History, Sofia. Historia naturalis bulgarica 7: 105-108.
- BOEV, Z. (1999): Neogenic and Quaternary birds (Aves) from Bulgaria. – National Museum of Natural History, Bulgarian Academy of Sciences, Sofia. D. Sci. thesis. 243 pp. + 243 pp. supplements (in Bulgarian).
- BOEV, Z. (2003): The ornithological collection of Emil Werner in the National Museum of Natural History in Sofia. Bonn. zool. Beitr. 51: 105-107.
- Bocv, Z. (in press): Specimens of extinct, endangered, rare and vulnerable birds in the collections of the National Museum of Natural History in Sofia. – Bull. British Ornithologists' Club.
- BOEV, Z. & DIMITROV, D. S. (1995): On the Lanner Falcon (*Falco biarmicus* TEMMINCK, 1825) in Bulgaria. Acta zoologica bulgarica 48: 105-112.
- BOEV, Z. & M. STANEVA (in prep.): History of the National Museum of Natural History in Sofia. Ed. of the Nat. Mus. Natur. Hist. Sofia. (in Bulgarian, English summary).
- BURESH, I. (1951): The zoologist Pavel Patev and his activity in natural history. Izvestiya na Zoologicheskaya institut 1: 348-370 (in Bulgarian).
- DAY, D. (1981): The Doomsday Book of Animals. The Viking Press. New York. 1-288.

- DEL HOYO, J., ELLIOTT, A. & SARGATAL, J. (eds., 1992): Handbook of the Birds of the World. Vol. 1. Ostrich to Ducks. Lynx Edicions, Barcelona. 1-696.
- DEL HOYO, J., ELLIOTT, A. & SARGATAL, J. (eds., 1994): Handbook of the Birds of the World. Vol. 2. New World Vultures to Guinea-fowl. Lynx Edicions, Barcelona. 1-626.
- DEL HOYO, J., ELLIOTT, A. & SARGATAL, J. (eds., 1996): Handbook of the Birds of the World. Vol. 3. Hoatzin to Auks. Lynx Edicions, Barcelona. 1-821.
- DEL HOYO, J., ELLIOTT, A. & SARGATAL, J. (eds., 1997): Handbook of the Birds of the World. Vol. 4. Sandgrouse to Cuckoos. Lynx Edicions, Barcelona. 1-679.
- DEL HOYO, J., ELLIOTT, A. & SARGATAL, J. (eds., 1999): Handbook of the Birds of the World. Vol. 5. Barn-Owls to Hummingbirds. Lynx Edicions, Barcelona. 1-759.
- DEL HOYO, J., ELLIOTT, A. & SARGATAL, J. (eds., 2001): Handbook of the Birds of the World. Vol. 6. Mousebirds to Hornbills. Lynx Edicions, Barcelona. 1-589.
- HACHISUKA, M. (1937): Description d'une nouvelle race de faisan des Balkans. *L'oiseaux et RFO* 7: 1-6.
- HOWARD, R. & MOORE, A. (1980): A complete checklist of the Birds of the World. Oxford Univ. Press, Oxford, 1-701.
- [KORN, W.] (1999): Ferdinand, Zar von Bulgarien, und die Naturkunde. *Jb. Cob. Ld. Stiftung. Coburg*, 44 (5 Abb.): 171-186.
- MONROE, B. L. & SIBLEY, C. G. (1993): A World Checklist of Birds. Yale Univ. Press, New Haven & London, 1-393.
- Nankinov, D., Simeonov, S., Michev, T. & Ivanov, B. (1997): Aves. Part II. – Fauna of Bulgaria. 27, „Prof. Marin Drinov“ Acad. Publ. House, „Pensoft“ Publ. House, Sofia, 1-426 (In Bulgarian, English summary).
- PATEV, P. (1950): The birds in Bulgaria. – Fauna of Bulgaria, 1. Bulg. Acad. of Sci. Publ. House, Sofia, 1-364 (In Bulgarian).
- PETERS, J. L. (1931): Check-list of birds of the world. Vol. 1 Cambridge. Harvard Univ. Press, 1-345.
- PETERS, J. L. (1934): Check-list of birds of the world. Vol. 2 Cambridge. Harvard Univ. Press, 1-400.
- PETERS, J. L. (1937): Check-list of birds of the world. Vol. 3 Cambridge. Harvard Univ. Press, 1-311.
- PETERS, J. L. (1940): Check-list of birds of the world. Vol. 4 Cambridge. Harvard Univ. Press, 1-291.
- PETERS, J. L. (1945): Check-list of birds of the world. Vol. 5 Cambridge. Harvard Univ. Press, 1-306.
- RUSS, K. (1878): Die Vögel des Prinzen Ferdinand von Sachsen Coburg-Gotha. *Zeitschrift für Vogelliebhaber, „Züchter und Sängler“*. Berlin, 8 (34): 348-350; (35): 360-362; (36): 370-371.
- SIMEONOV, S. & MICHEV, T. (1991). The Birds of the Balkan Peninsula. Petar Beron Publ. House, Sofia. 1-250. (In Bulgarian).
- SIMEONOV, S., MICHEV, T. & NANKINOV, D. (1990): Aves. Part I. – Fauna of Bulgaria. 20, Bulg. Acad. of Sci. Publ. House, Sofia, 1-350 (In Bulgarian, English summary).
- WORLD CONSERVATION MONITORING CENTER (1993): World checklist of threatened birds. Joint Nature Conservation Committee, Peterborough, 1-310.
- Dr. Zlatozar BOEV, National Museum of Natural History, 1, Tsar Osvoboditel Blvd, 1000 Sofia, Bulgaria
e-mail: boev@nmnh.bas.bg

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Bonn zoological Bulletin - früher Bonner Zoologische Beiträge.](#)

Jahr/Year: 2003

Band/Volume: [51](#)

Autor(en)/Author(s): Boev Zlatozar

Artikel/Article: [The Ornithological Collections of the National Museum of Natural History of the Bulgarian Academy of Sciences: their History and Scientific Value 157-163](#)