

## Article

# One Hundred and Thirty-Five Years of Ornithology in Bulgaria: The Role of the National Museum of Natural History at the Bulgarian Academy of Sciences in the Development of Ornithology in Bulgaria—Representatives, Collections and Achievements

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**Abstract:** For the first time, an attempt has been made to present, chronologically and in a systematized form, the development of ornithological studies at the National Museum of Natural History in Sofia (Bulgaria) from its foundation in the last decades of the 19th century to the present day. This 135-year period (1889–2024) includes the work of 12 curators of the ornithological collections. Their major contributions and most-significant ornithological publications are also presented.

**Keywords:** history of ornithology; ornithological collections; natural sciences; birds studies; science in Bulgaria; natural history museums



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## 1. Introduction

Ornithology is the oldest and most developed zoological discipline in Bulgaria. A recent publication [1] provided a comprehensive overview of the main achievements and most prominent researchers in bird studies in Bulgaria over the past 277 years. So far, scientists in the country have worked on a total of 46 areas/aspects of bird research. Georgi Hristovich (1863–1926) was the first Bulgarian ornithologist, who published the first scientific research on Bulgarian birds in a Bulgarian scientific journal in the Bulgarian language [1]. He was followed by Pavel Patev, Nikolay Boev, Stefan Donchev, Simeon Dimitrov and many others, most of them part of the staff of the National Museum of Natural History in Sofia (NMNHS-BAS). Bulgarian ornithology has data on 739 species of birds (421 recent and 318 established on the basis of their fossil/subfossil remains). Avian faunistics is the oldest and most developed field of ornithological research. The countries of the Balkan Peninsula are the foreign territories most studied by Bulgarian ornithologists. Antarctica is the most remote region where Bulgarian scientists have conducted ornithological research. They have contributed to the study of birds in 68 countries and territories around the world. A total of 40 new taxa of birds have been described by scientists from Bulgaria—one modern (*Streptopelia decaocto*) and thirty-nine fossil (Miocene–early Holocene)—which form a valuable contribution to world bird science. The oldest and largest collection of birds is kept in the NMNHS-BAS. For the past 135 years, this institution has been, and is currently, the most influential research center in the field of ornithology in Bulgaria. Here, we present for the first time all twelve of the curators of the bird collections (of stuffed skins, total mounted dry preparations, fluid preserved specimens, eggs, nests, skeleton/bone, fossils and subfossils) of the NMNHS-BAS, as well as their major and most significant scientific contributions to the field of ornithology.

1. **Tsar Ferdinand I (Ferdinand Maximilian Karl Leopold Maria von Sachsen-Coburg und Gotha) (1861–1948).** Curator of the Ornithological Collections 1889–1892 (Figure 1).



**Figure 1.** Tsar Ferdinand I. ca. 1890s. After [2] Schumann (1929).

The idea of establishing a national natural history museum originated even before the liberation of Bulgaria from the Ottoman Empire (1878). The first natural specimens of the National Bulgarian Museum in Brăila date from 1870. They were brought from Romania to Sofia by Prof. Marin Drinov (1838–1906), whose initiative it was. According to the political advisor and Minister of Education at the time, Dr. Konstantin Ireček (1854–1918), in addition to archaeological and industrial artefacts, the National Museum should also have a natural science department [3].

After the arrival of Prince Ferdinand of Saxe-Coburg in 1887 as King Ferdinand I, state head of the Bulgarian government, the idea of creating a natural history museum was successfully realized. His in-depth knowledge of natural science, acquired during his youth at the Viennese Academy “Theresianum”, also gave rise to his lasting interest in living nature and especially in exotic birds. The fact that, in 1862, he accompanied the famous Alfred Brehm (1829–1884) on his trip through Africa also speaks of Ferdinand I’s interests and appearances in various fields of natural science. With them was the animal artist Robert

Kretschmar (1818–1872), who illustrated A. Brehm’s legendary edition of the encyclopedia (“Tierleben”). Some of his originals are still kept in the museum. As soon as he arrived in Bulgaria, King Ferdinand I set out to familiarize himself with the nature of the country. The solid education he received in his youth, as well as his numerous travels, turned him into a passionate nature lover. On 2 August 1889, the official celebration of the second anniversary of the “ascension” of His Royal Majesty Ferdinand I to the Bulgarian throne was organized in the Palace in Sofia. The king’s personal collection of birds and insects was displayed at the afternoon cocktail party. Among the first collections of birds shown were preparations of South American species of hummingbirds, and the entomological collection featured the beautiful tropical butterflies of South America. The exhibition was arranged in two halls of the court building in Sofia. This was the first organized exhibition of natural objects—stuffed birds, mammals, insects and minerals—in Bulgaria. In addition to the princely family, the opening was attended by government officials and distinguished Bulgarian nature lovers. The French diplomat, ornithologist and naturalist Count Amedée Alléon (1838–1904), after meeting King Ferdinand I, proposed to him the idea of establishing a natural history museum in Bulgaria based on the exhibits collected until then [3]. His collection of stuffed birds was of extremely high scientific and artistic value. A. Aléon, on his own initiative, collected birds and nests near the Black Sea in 1881–1885 and sent them to Paris for processing. This remarkable collection had already served in its time as the basis of his work on taxidermy [4]. Photographs of some of the preparations that can still be found the ornithological collection of today’s NMNHS-BAS are even in this book, which also have great historical value. These include, for example, the preparations of Eurasian griffon vultures (*Gyps fulvus*), collected in Varna in 1884, the Greater spotted eagle (*Clanga clanga*), collected in 1869 in Belgrade, etc. [3]. As the French ambassador to the Ottoman Empire, Amédée Alléon was among the most influential and high-ranking Western Europeans in Constantinople. He was a hunter, nature lover, collector, preparator and a talented animalist–miniaturist artist [5]. Most of A. Alléon’s bird preparations in the NMNHS-BAS are of diurnal birds of prey (eagles, vultures, buzzards, kestrels, falcons and hawks) and waterfowl (ducks, geese), grebes, gulls, plovers, cranes, etc. He collected them mostly in the vicinity of Constantinople, including Chekmeje, Makrikoy, San Stefano, Buyukdere, Demirji, but also near Varna, Constanța, Skoutari. There are also specimens shot by Alléon in other parts of the Ottoman Empire (in Albania) and far beyond its borders (Finland). Throughout this initial period, the ornithological collections were completed, identified and arranged under the direct direction of King Ferdinand I. More than once had his ornithological interests taken him to interesting observational exotic places around the world. For example, in Europe he visited the island of Heligoland (Germany), where, at this time, the largest ornithological station for observing the bird migration in Europe was located [6]. He was one of the first zoologists in (Eastern) Europe who realized the important role of zoos in the conservation of rare animal species. On his personal initiative, bearded vultures (*Gypaetus barbatus*)—the rarest bird species in Bulgaria and the Balkans—were successfully bred in his zoo in Sofia. Thus, the Sofia Zoo became the first in the world to successfully breed bearded vultures. In a cage measuring  $7 \times 8 \times 9$  m, a pair of these birds produced eleven chicks from 1916 to 1929 (Figure 2; [7]).

For about 50 years, it remained the only zoo to breed bearded vultures, until the 1970s, when they began to be bred in Switzerland as well [8]. His knowledge of zoology and botany has amazed even prominent world experts. The field in which he worked with the greatest pleasure was ornithology and Privy Councilor Prof. Ludwig Heck (1860–1951) called him in one of his articles “the best living connoisseur of exotic birds” [9].



**Figure 2.** Bearded vultures (*Gypaetus barbatus*) bred in the Royal Zoological Garden of Tsar Ferdinand I in Sofia (between 1894 and 1913). Unpubl. photograph.

2. **Paul Leverkühn (Paul Georg Heinrich Martin Reinhold Leverkühn) (1867–1905).** Curator of the Ornithological Collections 1892–1901 (Figure 3).



**Figure 3.** Paul Leverkühn. After 1895. Photograph: [https://en.wikipedia.org/wiki/Paul\\_Leverk%C3%BChn](https://en.wikipedia.org/wiki/Paul_Leverk%C3%BChn) (accessed on 10 April 2024).

During the first few years, the collections grew rapidly with the acquisition of new incomes from abroad. This increased the care taken in arranging, documenting and storing them. Therefore, the first director, the German ornithologist Dr. Paul Leverkühn, was appointed to the museum. Not only the ornithological, but also all of the other collections were under his expert guidance. P. Leverkühn was a corresponding member of the French

Zoological Society. In 1893, Tsar Ferdinand I entrusted P. Leverkühn with the management of his zoo in Sofia (the first on the Balkan Peninsula). Later, he took the position of “Director of the Library and Scientific Institutes” that had been opened especially for him. In 1894, Leverkühn sealed the correspondence with a stamp that read: “Director der Wissenschaftlichen Institute und Bibliothek Seiner Königlichen Hoheit der Fürsten von Bulgarien” (Director of the Scientific Institutes and Library of His Royal Highness the Princes of Bulgaria). Even before his arrival in Bulgaria, Leverkühn had a good personal collection of stuffed animals, which he brought to Sofia. Birds predominated among them. The museum’s natural collection was also enriched by some rare and valuable preparations that were donated by Ferdinand’s mother, Princess Clementine [3]. The museum also received the collection of Emil Werner, a friend of P. Leverkühn. According to the catalog of the collections from that time [10], the collection of Emil Werner that is held the museum contains 695 birds. The majority of specimens had been collected by Werner himself, mostly in Germany, but some were from Austria and a few were also from other countries on the Balkan Peninsula. Some additional birds from elsewhere were obtained for Werner’s collection through exchange. However, a quarter of them seems to be lost. This valuable historical collection was built up in the last ten years (1884–1894) of E. Werner’s life [11]. It contains specimens from 27 families with almost half of them belong to the Passeriformes [12]. E. Werner published only one ornithological publication [13]. It is about the occurrence of Pallas’ Sandgrouse (*Syrrhaptes paradoxus* Pall.) in the vicinity of Kiel in 1888. Some of the observed birds were shot and three of these specimens are still kept in the NMNHS-BAS. With great enthusiasm and competence, Dr. Leverkühn arranged the existing ornithological collections, as well as those collected from different parts of Bulgaria and the Balkan Peninsula. To the original ornithological collection formed in this way was added the collection of beautiful preparations of birds and bird’s nests and beetles of A. Alléon, which was bought in 1891. The oldest preparations in this collection were collected back in the 1870s and 1880s [3]. Dr. Leverkühn fulfilled his duties as curator of the museum’s collections perfectly until his last day before his untimely death in 1905.

3. **Knut Christian Andersen (1867–1918).** Curator of the Ornithological Collections 1901–1904 (Figure 4).



**Figure 4.** Knud Andersen. 3 July 1902. Photograph: After [14] Nankinov (2002).

In 1901, Knud Andersen started working as an assistant to the director of the Natural History Museum in Sofia, doctor Paul Leverkühn, and he later worked as a curator at the same museum. During that time, several large collections had already been gathered in the Palace of Prince Ferdinand I, including (1) a collection of birds shot in various areas of the country; (2) the magnificent ornithological collection of the French Count Amedé Alléon who had been living in Constantinople (pr. Istanbul); (3) the collection of African birds and mammals acquired from the Czech traveler Dr. Emil Holub; and (4) the collection of Indian birds acquired by Stuart Baker, former Secretary of the British Ornithological Society. As is well known, Mr. Baker collected birds for his collection in the last 9 years of the last decade of 19th century [15]. The great majority of the stuffed skins originates from the Cachar Hills in Assam (NE India). Until 1904, Knud Andersen was in charge of arranging and cataloging these collections and the collections of mammals [16]. He also contributed a lot to the completion of the collections with preparations chiefly of birds and mammals. At the same time, he carried out a unique triennial study of the night migration of the birds in the region of Sofia [14]. The data from these observations were included half a century later in Patev's monograph [17]. In 1904, he left Bulgaria and traveled to London, where he became an eminent bat specialist at the British Museum (Natural History). We can consider K. Andersen to be the founder of the study of bird migrations in Bulgaria. In this field, he published the first studies in the country [18,19].

4. **Hermann Graetzer (187X–unknown).** Curator of the Ornithological Collections 1905–1907.

After the departure of K. Andersen and the death of P. Leverkühn in 1905, the second court physician Dr. Hermann Graetzer was appointed to replace Dr. Leverkühn as head of the museum collections. He directed the museum for 8 years (until 1914). Dr. Gretzer, Dr. Ivan Buresch and the preparator Henrich Julius completed the arrangement of the collections in the halls begun by P. Leverkühn. The process of increasing the collections (donations and acquisitions from across the country) continued intensively [3]. Dr. H. Graetzer was the author of the foreword to the first catalog of the collections of the Royal Museum of Natural History [10] and is believed to have been heavily involved in its preparation. Unfortunately, no data about his activities have been preserved in the museum's archives. No other publications by H. Graetzer are known.

5. **Henrich Julius (1866–unknown).** Curator of the Ornithological Collections 1907–unknown.

In 1898, the first preparator—Henrich Julius—was appointed to the museum. In the following years, many preparations came out of his hands, distinguished by their scientific and artistic value [3]. H. Julius was not only a master preparer, but also a hunter, a nature lover and a good connoisseur of Bulgarian nature. He played an important role in arranging and curating the collections, especially those of birds and mammals. In the archives of the museum (almost all of which were destroyed by fire during the bombing of Sofia in 1944) there is no record of how long Henrich Julius kept the ornithological collections. No biographical data about him have been preserved.

6. **Tsar Boris III (Boris Klemens Robert Maria Pius Ludwig Stanislaus Xaver) (1894–1943).** Curator of the Ornithological Collections ca. 1919–1928 (Figure 5).

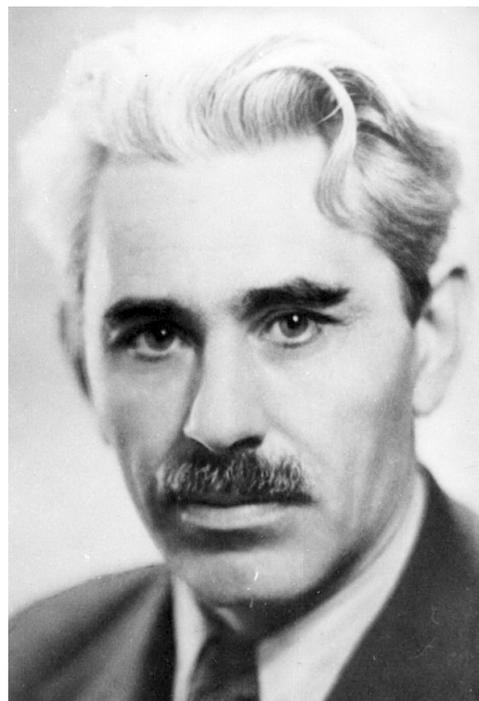
Tsar Boris III, like his father, was an excellent connoisseur of the world's birds. In recognition of his ornithological competence, Marquis Masauji Hachisuka (1903–1953) described [20] a genus of family Zosteropidae using his name (*Borisia*, Hachisuka, 1936), and the two have become synonymous. It included four species (three of g. *Sterrhoptilus* Oberholser, 1918, and one of g. *Dasycrotapha* Tweeddale, 1878): *B. dennistouni* (now *Sterrhoptilus dennistouni* (Ogilvie-Grant, W. R., 1895)—Golden-crowned Babbler), *B. nigrocapitatus* (now *Sterrhoptilus nigrocapitatus* (Steere, 1890)—Black-crowned Babbler), *B. capitalis* (now *Sterrhoptilus capitalis* (Tweeddale, 1877)—Rusty-crowned Babbler) and *B. plateni* (now *Dasycrotapha plateni* (Blasius, 1890)—Mindanao Pygmy Babbler) [21]. Because of his colossal knowledge of zoology (and ornithology in particular), Tsar Boris III was elected a “life” member of

the British Ornithological Society, a regular member of the German Ornithological Society (since 1931), an honorary member of the Union of Hungarian Ornithologists (since 1930) and an honorary member of the Bologna Academy of Sciences (since 1930, and its only foreign member at that point) [22]. As Nowak [23] writes “For a long time, the king not only took care of the ornithological collection of the museum in Sofia, but also personally identified the systematic affiliation of new acquisitions”.



**Figure 5.** Tsar Boris I. May 1929. Photograph: Lovets. Unknown.

- 7. Pavel Atanasov Patev (1889–1950).** Curator of the Ornithological Collections 1928–1948 (Figure 6).



**Figure 6.** Assist. Prof. Pavel Patev. After 1947. Photograph: Unknown.

At first, he studied single-celled organisms, but his main scientific activity was related to the fauna and flight migrations of birds in Bulgaria. Since 1930, he had been curator of the Bulgarian Ornithological Center. Under his leadership from 1928 to 1941, 22,021 birds were ringed at the Bulgarian Ornithological Center [24]. He recruited a large number of bird-ringers and compiled a special guide to facilitate their work [25]. He represented Bulgaria at the ninth International Ornithological Congress in Rouen, France, where he participated with a summary report on the distribution of birds in Bulgaria [26]. He published the first report on bird fauna of Bulgaria [17]. In addition to the author's personal observations of birds in nature and his studies of museum and zoo materials, practically all of the information on the Bulgarian avifauna, both foreign and Bulgarian, was reflected in this monograph. It was made with the competence and skill of a long-term researcher of the avifauna of Bulgaria and on the basis of rich zoological material, numbering over 11,000 bird specimens. Most (but not all) of these birds have been taxidermied and entered into the museum's collections. P. Patev is rightly considered the founder of modern ornithology in Bulgaria [27]. In 1928, Patev was offered the opportunity to deal with the huge library of the Natural History Museum. At the time, it numbered around 30,000 volumes of specialized natural history editions and was in fact one of the richest libraries of its kind in South-Eastern Europe. Later, Patev became curator of the ornithological department at the Natural History Museum. Despite being burdened with library work, Patev took up the classification and study of the ornithological collections and their replenishment with new materials with great enthusiasm. The birds collected by Patev and his assistants were arranged in a special, scientifically valuable collection of the birds of Bulgaria, which reached 9000 specimens under his editorship following 10 years of collection work [28]. After conducting about 15 years of collecting work, practically all over the country, Patev managed to collect no less than 5400 specimens of birds for the ornithological collection of the museum, a significant part of which are currently kept in the scientific collection of the National Museum of Natural History at the BAS [27]. In 1930, Patev was assigned the leadership of the Bulgarian Ornithological Center. For 19 years, he put a lot of effort into its activation. P. Patev established and maintained constant contacts with all of the ornithological centers in Europe. The data collected by him have been essential for establishing the flight paths [28] of migratory birds from Bulgaria. With his scientific activity in the field of ornithology, P. Patev gained international authority and popularity. He was elected to be a corresponding member of several foreign ornithological societies—the Union of American Ornithologists, the British Ornithological Society, the Bavarian Ornithological Society, the German Ornithological Society and the Hungarian Ornithological Center. His reputation as an ornithologist in the Balkans, and indeed far beyond, remains high; his authority was international [29]. During the period 1929–1950, Patev published a total of 33 scientific and popular scientific works in Bulgarian, German and English on various ornithological topics.

8. **Nikolay Krumov Boev (1922–1985).** Curator of the Ornithological Collections 1948–1969 (Figure 7).

N. Boev, with short interruptions, was an employee of the museum from 1947 to 1969: from 1947 to 1949 as a laboratory biologist; from 1950 to 1951 as a Junior Research Associate; from 1963 to 1969 again as a Junior Research Associate; and in the period 1963–1965 he was curator of the museum. In the 1950s and early 1960s, he was the only Bulgarian ornithologist. He established 36 species of birds that were new to the fauna of Bulgaria. Of the 315 bird species reported in [17] as being part of the fauna of Bulgaria, N. Boev identified 36 species (11.4%) that were new to the country. In 1941 he published the first publication in Bulgaria about birds that had disappeared in historical times. In 1945 he sorted the vertebrate collections (under the guidance of scientists at the museum) after their destruction during the bombing of Sofia in 1944. In 1949 he created the emblem of the Union for the Protection of Native Nature: the profile image of a bearded vulture, which later became the symbol of Bulgarian nature protection. In 1949 he enriched the Sofia Zoo, which too was depleted of species and specimens after the war. Three bird species that were new to the Bulgarian fauna—*Rissa tridactyla* (Linnaeus, 1758), *Phalaropus lobatus* (Linnaeus, 1758), and *Chroicocephalus genei* (Breme, 1839)—were reported by him too [30]. In 1966 he

actively participated in commissioning a draft of the text of the Nature Protection Act and the Regulations for its application. His personal field and literature research allowed him to publish, in 1962, the most complete study of the bird fauna in Bulgaria [31] at the time (after that of [17]), containing a lot of data from personal observations and illustrated by him with color and black-and-white line drawings. For several years he worked on an extensive study of the composition and distribution of birds in Thrace [32]. For 16 poorly studied species of birds with border (peripheral) distribution in the country, he reported the most abundant amount of information that had ever existed in Bulgaria up until that time [33]. He also published (co-authored) the first textbook on the conservation of nature in Bulgaria [34]. In 1963, for the first time in Bulgaria, he gave lectures on ornithology (special course) at the Faculty of Biology at Sofia University “St. Kliment Ohridski”. In 1963–1965 he undertook a “gradual modern reorganization” of the exposition of the Museum of Natural Sciences at the BAS with the introduction of a new type of exposition in biogroups and “small model dioramas”. Many new locations of some owl species of boreal distribution in Bulgaria have since been published in [35]. In the period 1975–1981, N. Boev actively promoted the idea of publishing a national “Red Data Book” of endangered animals and plants in Bulgaria and participated in its publication [36] as co-author and co-editor. Since the early 1970s he began to popularize his idea for the establishment of an Institute of Ecology and Nature Protection in Bulgaria, which eventually became part of the BAS, but only for a short time, and after 2010, this institution (and its successors) lost its legal independent status. For four years (1973–1976) he gave lectures on the “Fundamentals of the Protection of the Natural Environment” for the first time in Bulgaria at the Faculty of Biology of Sofia University. In 1976–1983, he initiated and prepared the publication of a three-volume study on the bird fauna in the BAS, entitled the “Fauna of Bulgaria” series, which was published only between 1990 and 2011 in four volumes [37–40]. He devoted the last three years of his active life (1979–1981) to the organization and construction of the new exposition of the Natural History Museum in the town of Kotel (SE Bulgaria). In 1980–1985, N. Boev popularized his idea for the creation of a Bulgarian Society for the Protection of Birds, which was realized (1988) three years after his death [41].



**Figure 7.** Assist. Prof. Nikolay Boev. 1984. Photograph: Unknown.

9. **Stefan Ivanov Donchev (1931–2010).** Curator of the Ornithological Collections 1969–1974 (Figure 8).



**Figure 8.** Assist. Prof. PhD Stefan Donchev. 2000. Photograph: Unknown.

In addition to the ornithological collections in the museum (which from 1947 to 1974 was merged with the Zoological Institute of the BAS), St. Donchev headed the Bulgarian Ornithological Center for 6 years (1969–1975). In the 1950s, he studied the birds of the Vitosha mountain, which were also the subject of his PhD thesis [42]. St. Donchev is the author of about one hundred scientific works, three hundred popular scientific articles and three books in the field of ornithology [43]. Among his more significant studies are those on the systematics, ecology and biology of corvid birds [44] and the bird composition of the Western Stara Planina [45], the Central and Eastern Stara Planina [46] and the Rose Valley [47] in Bulgaria. Nine species of birds from the avifauna of Bulgaria were reported for the first time by St. Donchev: *Aquila fasciata* Vieillot, 1822, *Vanellus spinosus* (Linnaeus, 1758), *Hydroprogne caspia* (Pallas, 1770, *Phalaropus fulicarius* (Linnaeus, 1758), *Locustella fluviatilis* (Wolf, 1810), *Acrocephalus agricola* (Jerdon, 1845), *Curruca cantillans* (Pallas, 1764), *Monticola solitarius* (Linnaeus, 1758) and *Lanius nubicus* Lichtenstein, M.H.C., 1823. [48]. He also reported two species of birds (*Circus cyaneus* (Linnaeus, 1766) and *Ichthyaetus relictus* (Lönnerberg, 1931) that were new to the fauna of Vietnam [49]. He also studied birds in Algeria and Tunisia. As head of the Bulgarian Ornithological Center, Donchev also prepared and trained voluntary bird ringers. He also published one of the first bulletins with data on the birds that had been ringed in the country [50]. In 1972, the museum conducted a complete inventory of the mounted total preparations of birds (performed by the ornithologist Bozhidar Ivanov). Most of the established species of birds, and those that were new to the fauna of Bulgaria, in the museum's collections are also presented with the original proof specimens that were obtained by Stefan Donchev himself.

10. **Krasimir Paskov Kumanski (1939–2006).** Curator of the Ornithological Collections 1976–1986 (Figure 9).

After the separation of the NMNHS-BAS from the former Zoological Institute through the foundation of a Museum at the BAS, the curatorship of the ornithological collections was entrusted to the entomologist K. Kumanski. He was a specialist in caddisflies (Trichoptera) insects and one of the world's experts on this group. He is the author of two volumes on the fauna of caddisflies in Bulgaria [51,52]. As a scientist with extensive zoological competence, he

formally maintained these collections, but did not actually conduct research on them. During his time, Zlatozar Boev, who entered the museum in 1980 as a young specialist, began a complete inventory of the mounted total dry preparations of birds in the exhibition halls and depots, as well as the osteological collection of mammals (mainly carnivores, lagomorphs, bovids, etc.) and the conchological collection of freshwater snails. Kr. Kumanski directed most of the inquiries from abroad about the ornithological collections in the museum to Z. Boev.



**Figure 9.** Assist. Prof. PhD Krasimir Kumanski. 22 March 2006. Photograph: Z. Boev.

11. **Zlatozar Nikolaev Boev (b. 1955–)**. Curator of the Ornithological Collections 1986–2023 (Figure 10).



**Figure 10.** Prof. PhD, DSc. Zlatozar Boev. 16 June 2022. Photograph: Zlatozar Z. Boev.

Z. Boev is the son of N. Boev. Z. Boev was the curator of all of the ornithological collections in the museum from 1986 to 2010. After 2010, he was the curator of the fossil and subfossil bird collections and the osteological and fluid-preserved (alcohol-formalin) bird collections. In the first two years (1980–1981), he carried out the first complete inventory of the ornithological collections. Over the next few decades he published a number of publications on various parts of the ornithological collections. Z. Boev created two new collections: (1) the osteological and (2) the paleo- and archaeo-ornithological collections. As of 2024, both rank first among Southeast European collections of this type in terms of richness. In 1999 he defended his DSc thesis [53] on Neogene and Quaternary birds in Bulgaria. Z. Boev founded three new ornithological branches in Bulgaria: (1) osteology, (2) exterior morphology and (3) paleo- and archaeo-ornithology. In addition to Bulgaria, he studied fossil birds from Azerbaijan, Greece, New Zealand, Serbia and Vietnam. He participated in training and evaluating scientific personnel in paleornithology in Greece, Russia, Serbia and Ukraine. His basic scientific contributions to ornithology can be grouped as follows: **(1) Paleornithology and Archaeornithology:** For 43 years he explored bird remains from 130 localities. As such, Bulgaria became one of the more well-studied countries in terms of its fossil and subfossil avifauna. He found over 410 taxa and 318 species, 120 of which have been extinct since the late Tertiary and Quaternary periods in Bulgaria. He discovered and described 41 taxa—5 genera, 35 species and 1 subspecies—of fossil birds that were new to the science. He discovered the first fossil remains of ostriches [54], peacocks, hornbills [55], snowy owls, waldrapps and many more in Bulgaria. For the first time in Europe, he discovered the distribution of a new order of birds—the tropical hornbills (*Bucerotiformes* Fürbringer, 1888). He found that over one-tenth of the bird families in the contemporary fauna of Bulgaria during the “Pliocene–Holocene” period significantly reduced their species diversity [53]. Based on his studies, in the 1990s, four Bulgarian localities of fossil avifauna (Varshets, Slivnitsa, Dorkovo and Muselievo) were included in the list of the most significant (“reference sites”) paleornithological localities in Europe, and the first two were ranked among the most important localities for Plio-Pleistocene avifauna in the entire Palearctic [56,57]. **(2) Morphology and ecology of recent birds:** Z. Boev compiled a complete “Osteological Atlas” and an identification guide for all elements of the skeleton of the representatives of a family of birds, herons (*Ardeidae*), from the European avifauna and studies on their bone–morphological anomalies [58]. Comparatively, he studied the exterior and skeletal morphology of all species of herons in Europe and established the adaptation mechanisms and the directions of evolution of the subfamilies and tribes within them. For the first time in the world, he studied the adaptations of this group in relation to their movement on the ground and obtaining food, and established the correspondence between their anatomical structure and the type of habitats they use and their degree of adaptation to ichthyophagy [59–61]. Morphometric data for European herons significantly complement the characteristics of their morphological adaptations, sexual dimorphism and their individual modification variability and have been used in major national and world reference books for these birds. Z. Boev explored the nesting biology of rare and endangered species in Bulgaria. For the oystercatcher, for the first time, he established an intracontinental extension of the nesting area, reported an unknown new subspecies for the country—*Haematopus ostralegus longipes* Buturlin, S. A., 1910—and also discovered new nesting sites (the first nesting of the species along the Danube). **(3) Faunistics and zoogeography of recent birds:** For the first time, the full composition of the modern avifauna of Bulgaria (419 species, 266 breeding) was identified. He studied the distribution of several dozens of bird species in Bulgaria and summarized and carried out the first comprehensive zoogeographical analysis of the contemporary Bulgarian avifauna [62]. He carried out the first review and evaluation of bird studies over the last 262 years (1744–2006), the composition of the avifauna of Bulgaria (96 Neogene, 160 Pleistocene and 399 recent species), its changes in the last 100 years, the importance of the Bulgarian territory for the migration and wintering of birds in Europe, migratory routes, wintering areas and the network of important bird sites, as well as the modern ornithographic regionalization of the

country [63]. Z. Boev was the supervisor of ten PhD students who successfully defended their PhDs in ornithology. In addition to his ornithological publications, Z. Boev also published a series of articles on the history of NMNHS-BAS, which always contain a lot of information about the history of ornithology and ornithological collections in Bulgaria. A significant part of his research has also been related to modern, subfossil and fossil mammals, but these remain beyond the scope of the present review.

12. **Petar Stanislavov Shurulinkov (1975–2023).** Curator of the Ornithological Collections 2010–2023 (Figure 11).



**Figure 11.** Assist. Prof. PhD Petar Shurulinkov, 18 April 2016. Photograph: Z. Boev.

Initially, P. Shurulinkov worked in the field of blood parasites of birds. After joining the NMNHS-BAS in 2010, he qualified as an Associate Professor and took over part of the museum's ornithological collections (that of the dry preparations of birds and that of bird nests and eggs). Since 2010, Z. Boev has remained the curator of the osteological collections and the collections of fossil and subfossil birds. P. Shurulinkov is the author of over one hundred and forty scientific publications, mostly in the field of ornithology and bird parasitology, including among them eight books, thirty-three articles (chapters) in scientific books and eleven essays on bird species in the second edition of the Red Book of Bulgaria. Among his popular works, the field guide to birds of Vitosha Mountain [64] stands out, and among his scientific works, his summary of Biodiversity of the Lower Danube is key [65]. Petar's main scientific contributions are in the field of ornithology, parasitology and nature conservation. In ornithology he worked mainly on the distribution, migration, population dynamics, biology and ecology of birds. In the field of parasitology his achievements are related to the blood unicellular parasites of birds; the fauna and the distribution of hemosporidians in Bulgaria; the influence of various factors on the extent of infection of birds with *Haemosporidia* Danilewsky, 1885; and the impact of *Haemosporidia* on wild birds and on the migration patterns of migratory species [66]. P. Shurulinkov devoted a significant part of his research efforts to nature conservation—both to the study and preservation of some species (e.g., *Haliaeetus albicilla* (Linnaeus, 1758), *Dendrocopos leucotos* (Bechstein, 1802), *Glaucidium passerinum* (Linnaeus, 1758), etc.), as well as to the protection of conservation-valued natural territories. His contributions to nature and conservation are significant in the fields of the protection of birds, conservation legislation, important bird areas for the protection of birds and their habitats. P. Shurulinkov was the supervisor of two PhD students who successfully defended their PhD theses in 2022 and 2023. One of the last initiatives of Assoc. Prof. P. Shurulinkov was the Ornithological Camp "Durankulak" (NE Bulgaria on the Via Pontica flyway), organized by the NMNHS-BAS. In

the last few years, ten or more thousand birds from about 90–100 species have been ringed there. This ranked the camp first on the Balkan Peninsula. P. Shurulinkov established the Dusky warbler (*Phylloscopus fuscatus* (Blyth, 1842)) as a new species in the Bulgarian avifauna at this camp. In his memory, the Ornithological Camp in Durankulak in 2023 was named “Peter Shurulinkov”.

## 2. Conclusions

The first studies on birds in Bulgaria were carried out by foreigners. The first ornithological publications by Bulgarians appeared in 1890. As a scientific branch of zoology, ornithology arose on the basis of the first ornithological collections in Bulgaria that were stored in the NMNHS-BAS. An extremely favorable circumstance was the fact that two of the state rulers of Bulgaria—the king Ferdinand I and his son Boris III—were professional connoisseurs and lovers of birds. The collections were enriched and arranged under their direct supervision. For the entire 135-year period of their existence (1898–2024), they have been curated by a total of 12 curators (two of whom were the two kings of Bulgaria). The longest was the curatorship of Z. Boev—37 years (1986–2023). As of 2024, the ornithological collections number over 19,200 units of fossilized and subfossil birds, over 4000 units in the osteological collection, over 4300 units of mounted total dry preparations, 11,300 stuffed skins, 44 alcohol-formalin preparations, 150 nests and 420 eggs. Based on materials from Bulgaria, 42 bird taxa that are new to science have been described so far. The study of ornithology in the countries of the Balkan Peninsula during the last century was mostly developed in Bulgaria and especially in the NMNHS-BAS.

The ornithologists who worked in this museum were among the most qualified Bulgarian zoologists. Some are also the most famous and notable natural scientists in Bulgaria in general. This article is not just about the two Bulgarian kings and their professional ornithological competence, Pavel Patev, Nikolay Boev, Stefan Donchev and most of the other curators are prominent names in Bulgarian science with excellent reputations as world scientists. We can rightfully claim that such scientists can only develop and perform in solid scientific institutions such as the NMNHS-BAS.

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