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What about Exotic Species? Significance of Remains of Strange and Alien Animals in the Baltic Sea Region, Focusing on the Period from the Viking Age to High Medieval Times (800–1300 CE)

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Abstract: During the Viking era and the Middle Ages, in the Baltic Sea area, the remains of alien animal species are found rarely but recurrently. These species, which were previously widely distributed in other regions, were originally considered "exotic" by the local people of the Baltic Sea region. Conversely, "exotic" was also used to describe the last local specimens of those indigenous species that had become very rare over time. Other categories of exotic animals can be defined: the first specimens of domesticated animals seen in an area, and mythical species whose existence was generally, but erroneously, assumed. In the present paper, the evidence of selected exotic species in the Baltic Sea area is analyzed with regard to both their cultural–historical and ecological significance. Many exotic specimens were used for social and hierarchical display, illustrating the individual's sophistication and broad knowledge of the world, their wealth, and their supra-regional influence. As a result, before Christianization, these species became part of burial rites. At the same time, some of these species became or were already integral parts of the fauna of the Baltic Sea region. Some newly immigrated species were welcomed by the people, while others were considered pests. "New", initially exotic, species formed the basis for the purely anthropogenic urban ecosystems that emerged during this period. Meanwhile, other, formerly common, species had become "exotic" because of their increasing rarity; when they became extinct, they left significant gaps in the biocoenoses wherein they were interconnected. These ecological effects, as well as some of the socio-cultural characteristics of exotic species, find parallels in modern times.

Keywords: archaeozoology; zooarchaeology; exotics; archaeology; cultural history; palaeoecology

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1. Introduction

Research on human food sources in early historical times focuses mostly on those animal species that were most important for the human diet. Therefore, the importance of animal species may well show variations between the different groups of local human populations. People of different social statuses or ethnicity could have different dietary habits, even if they lived in the same place. Such differences can also be traced using archaeozoological methods, i.e., with the analysis of animal food remains from archaeological sites, particularly, but not exclusively, through stable isotope analysis, as used in previous studies [1–5]. In exceptional cases, it is even possible to detect gender-based or age-specific food consumption within local communities [6].

Until today, the status of food has been measured in the context of general availability vs. rarity/exoticism [7]. In English, something exotic is unusual and exciting because it comes (or seems to come) from far away. Remarkably, in the German language, the word "exotic" means more than that: on the one hand, "foreign, strange, and alien", and on the other, "conspicuous, rare, and unusual". In the present paper, these two meanings will be taken as a starting point. In the case of exotic food or an exotic animal species, humans are confronted with something that is alien in a fascinating way. In the archaeological

and historical context, I would like to define exotics as those animals that occur only very sporadically in the area in question at a certain time, that at the same time have a fascinating effect on humans. The reasons for the rarity can be manifold; among others:

1. They are the first of their kind in an area, in the course of natural expansion.
2. They are the last of their kind in the area; the reasons for their disappearance are diverse.
3. They appear as gifts or merchandise from distant regions.
4. They existed only in the imagination of people, but their real existence was generally assumed.

Being limited spatially to the surroundings of the Baltic Sea in northern Europe, and temporally, to the time frame from the Viking Age to High Medieval times (800–1300 CE), this article will present examples of all four different categories of exotic species. This paper discusses the background and reasons for the appearance of exotic species in archaeological sites and draws some general conclusions.

2. Materials and Methods

The archaeozoological data used for this study about the presence of exotic species in the Baltic Sea area are gathered from a huge collection of data, "The Holocene History of the European Vertebrate Fauna", which was collated under the leadership of Angela von den Driesch (Ludwig Maximilian's University, Munich), Norbert Benecke (German Archaeological Institute, Berlin), and Dirk Heinrich (Christian Albrechts University, Kiel) in the 1990s [8]. Even if it only sporadically represents the results of excavations published after the year 2000, the collection includes data from more than 7400 archaeological sites, with the remains of animals from all over Europe, from the Late Glacial period to early modern times, and comprises over 10.144 million mammal bones alone.

Concerning the Baltic Sea area, the data collection lists 1875 archaeological sites. For this article, these entries were searched for exotic species in the sense of the above-mentioned categories. The chosen time frame was between the beginning of the Viking Age (800–1050 CE) and the end of the High Middle Ages, at the end of the 13th century CE. The evidence found for this study was supplemented by new finds taken from more recent publications and—wherever possible—from contemporaneous written sources. All additional sources are cited. It is not the purpose of this article to give a complete list of all recorded exotic species. Rather, it is intended to present case studies for each of the four categories mentioned. The aim is to derive general conclusions from them.

3. Results

3.1. Natural or Anthropogenic Range Expansion: First of Their Kind

The phenomenon of immigration and the range expansion of animal species have been extensively described elsewhere [9–12]. Two general categories can be distinguished: natural range expansion or the appearance of captive escapees on the one hand, and deliberately released animals or new pets on the other. Regardless of whether range expansions occur rapidly or extend over longer periods, in the beginning, the new species is always "exotic" to humans. The appearance of such exotic creatures may proceed largely unobserved or be ignored, as discussed in [13], but it may also trigger broad social debates or human fantasy [14].

An example of an animal species that immigrated to the Baltic Sea region, which was immediately met with great interest among the people there due to its appearance, is the white stork (*Ciconia ciconia*). It was probably only the medieval clearing phases that created appropriate habitats for this often human-associated species; in any case, the birds only appeared in the study area from the southwest at the end of the Viking Age, around 1000 CE (Figure 1). Later, the white stork even became the national bird of Lithuania and the (unofficial) national symbol of Belarus and Poland, although it only immigrated to all three countries at the beginning of the early modern period [15]. Obviously, in all these regions, the immigrating white stork was a new "exotic" bird species that was welcomed with thoroughly positive emotions. This has been shown in the context of late Medieval

and modern Poland in a detailed study [16]. The most important reason for the positive relationship of humans with the new bird species from the beginning of its appearance is likely its synanthropism, including breeding on house roofs. At least in Poland, this was perceived as trustful; when combined with the bird's unusually beautiful appearance, the belief quickly arose that stork nests on human homesteads brought good luck to the inhabitants of the house. In later times, another reason for the positive image of the species was its usefulness as "pest controllers", since white storks eat mice and moles, among others. Soon, people were advised against employing those who killed storks—they brought bad luck and were unreliable [16]. Generally, white storks were not hunted at all in the newly colonized areas of Central and Eastern Europe [17].

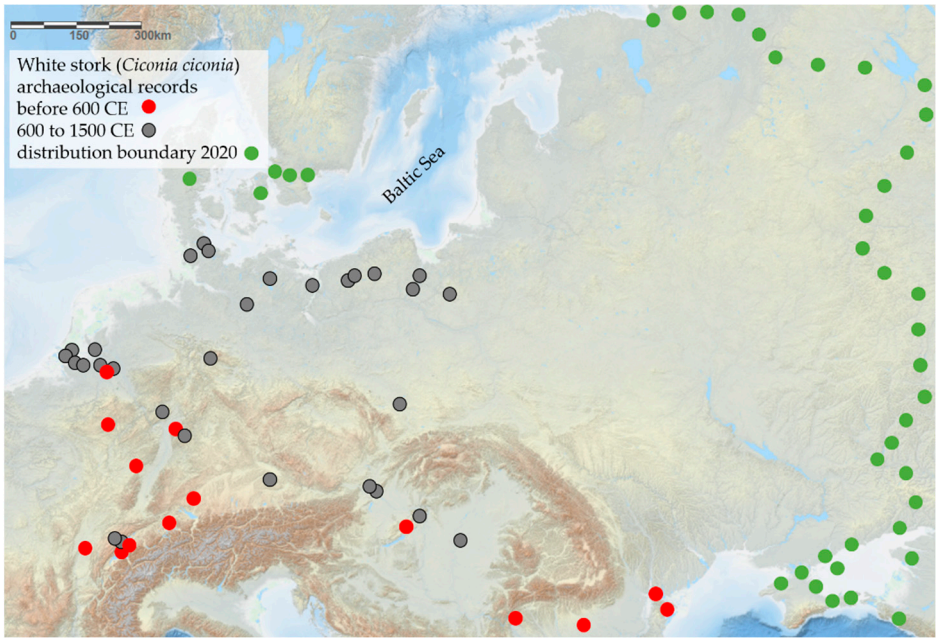

Figure 1. Archaeological sites with records of white stork (*Ciconia ciconia*). Modified after [18,19].

Not all exotics that appeared in the Baltic Sea region were received so positively by the local people. The exact opposite reaction surely occurred with the black rat (*Rattus rattus*). Originally, it was completely unknown in Europe; after all, it originated from Southeast Asia. It first appeared in Europe around 2000 years ago, and it was only during the early 9th century that it appeared in Scandinavia (the earliest black rat remains are from Birka [20]). The region east of the Baltic Sea was reached in the 12th century (at the site, Minino 6, at Lake Ilmen [21]). After the black rat had entered Norway (the oldest record dates to 1225–1295 CE, in Bryggen [22]), the species finally also reached southern Finland by the late 14th century (in Turku [23]).

Thus, we are dealing with a species that gradually expanded its range and whose sudden presence confronted people in Denmark, Sweden, and Norway one thousand years ago with a storage pest. Since there are no related written sources from that early time, when the black rat was still exotic, we do not know how the people of the Baltic Sea region reacted both emotionally and practically to these new animal species that suddenly lived in their close environment. However, one reaction of the people is obvious and can be proven archaeozoologically: they began to keep domestic cats (*Felis silvestris* f. *catus*). It is of course no coincidence that the first appearance of the house mouse and black rat in the north coincides with the spread of domestic cats. Earlier, however, domesticated cats were considered very exotic animals in northern Europe [24].

The very first two records of domestic cats in the Baltic Sea area show them as gifts found in rich graves. Both cases, in Kastrup, located in southern Jutland, Denmark, and Överbo in Västergötland, Sweden (two specimens), date back to about 200 CE [25,26], and represent likely imports from the Roman Empire, where domestic cats were known and widespread [27,28]. In the following centuries, cat-keeping slowly spread in the Baltic Sea region, but in Denmark, Sweden, and northern Germany, cats were only occasionally recorded until the middle of the first millennium; even then, it was mostly in human graves [25,26,29]. It was only after 500 CE that their presence was more often detectable; in the Viking Age, as seen in cremation burials in Uppland, Sweden (800–1100 CE), the cat was already the second most common animal after the dog and had spread in upper-class households to become a "pet" [24,30]. However, since cats were still found mostly in high-status burials, obviously, they still had an exotic flair and were a symbol of prestige [24]. A ritualistic symbolism connected to cats cannot be ruled out. Due to their nocturnal activities as predators, their elegant movements, and their ability to reach almost every place in total silence, it seems likely that cats may have been regarded as animals that were able to cross the border between this world and the next and to guide the souls of the deceased into the afterlife. This speculative interpretation would be in accordance with the strong association of cats with the supernatural sphere in Old Norse saga literature and mythology [24]. At the same time, the new species had a very practical function in real life—as a pest controller and as a provider of fur. It quickly became commonplace to have cats on board ships [25,31].

Here we have a case where an exotic species is brought into the study area by humans, and practical reasons were certainly at the forefront of their minds. This acquaintanceship with cats then quickly led to the introduction of the exotic species in a spiritual context.

3.2. Natural or Anthropogenic Range Restriction: Last of Their Kind

Sometimes, distinctive, common animal species that are known to everyone because of their frequency or their economic, emotional, or spiritual significance become rare. This decrease in their abundance is often accompanied by a reduction in their range. Fewer and fewer people then have the opportunity to see this formerly well-known animal with their own eyes. Over time, the species becomes more and more "exotic". The reasons for the gradual disappearance of formerly common and widespread species are manifold, but in the study area and in the time frame relevant here, they are almost always linked to human activities. Often, it is human population pressure that increasingly restricts the habitats of the animals in question, leading to the fragmentation of breeding populations and ultimately to the rarity or even disappearance of the species. Sometimes, this is also a result of direct pressure from humans.

An example of this from Medieval times is the aurochs (*Bos primigenius*). Following the last Ice Age, for many millennia, the species was widespread and common in most parts of Europe, including the Baltic Sea region south of latitude 59° north [32]. In Scandinavia, aurochs had already disappeared before the Roman period [33], but south of the Baltic Sea, they occurred regularly during the first millennium CE and were quite common [34]. However, the reduction of suitable habitats made aurochs increasingly rare in those areas as well, and parallel to this development, it is clear that this formerly common species became exclusive [35,36].

Around 1400 CE, the last few hundred animals in the area between present-day Lithuania and Poland were placed under the protection of the sovereign. In 1417, three of these aurochs were captured and sent as presents to potentates at the council in Konstancja, Lake Constance. They became a sensation there; no one had ever seen such an animal before. Later in the 15th century, aurochs were repeatedly described in letters as "the greatest attraction in Poland". As the population continued to decline despite the hunting ban, around 1510 CE, the regulations for their protection were further tightened. Special game-rangers had to submit reports to the Polish king about the status of the population. The exclusion of aurochs from hunting laws gave them the privilege of immunity [34]. The

formerly widespread species had become an exotic gift that was presented to guests from all over Europe. However, in the end, the official protection did not prevent the extinction of the species in 1627. The large horn of one of the very last males was set in metal, with the engraved words: "Horn of the last aurochs of Sochaczewski primeval forest, sent by the woiwod of the Rawski province, Stanislaw Radziejowski, the starosty of Sochaczewo, in the year 1620" [34]. Today, they are part of the King's armory in Stockholm.

Remarkably, there has been a similar development in the recent past. Here, too, a common animal, rejected as a food source by many people, became so rare that it ended up as a delicacy of the powerful. This is the case with the sturgeon.

Industrialization in the 19th century had a serious impact on the population of the largest fish species in northern Europe, the sturgeon (*Acipenser*) [37], which had been part of the regional fauna since the end of the last Ice Age [38,39]. Whereas sturgeon meat had been hard to sell before the 19th century, in working-class neighborhoods, this fish now became an extraordinarily cheap and popular food. This, in turn, created a new and important source of income for the fishermen, who resolutely exploited it.

Soon, thousands of large, adult sturgeons were being landed each year in Hamburg alone. The population of sturgeon was unable to cope with this overfishing. Within a few decades, the populations had completely collapsed everywhere (Figure 2). By 1920, sturgeons were only rare catches. This was not only a local occurrence; a drastic decline in numbers happened in all regions from the Bay of Biscay to the eastern Baltic Sea and affected both *Acipenser sturio* (from the Bay of Biscay to Kattegat) and *A. oxyrinchus* (Baltic Sea) [39]. In the following decades, apart from a very small relict population in the French Gironde system, sturgeons had disappeared nearly completely from all north-eastern Atlantic waters. This disappearance occurred even though the species was by now strictly protected. The catching, as well as the killing and selling of the second-to-last sturgeon from the North Sea in 1993, was absolutely illegal and was against all wildlife conservation efforts. In the context of the present paper, it is remarkable that the fish was nevertheless bought by the cafeteria of the Ministry of the Interior of the Federal Republic of Germany and was also consumed there [37].

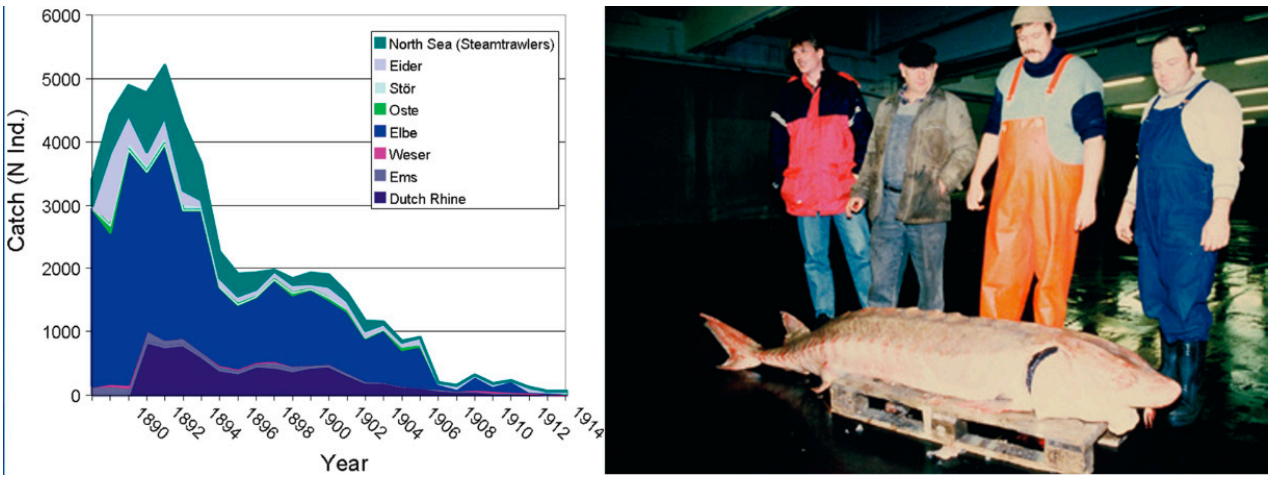

Figure 2. (**Left**) Sturgeon catches, in terms of the number of individuals caught between 1888 and 1915 in the German and Dutch North Sea tributaries [37]. (**Right**) One of the very last North Sea sturgeon specimens was sold in 1993 to the canteen of the Ministry the Interior of the Federal Republic of Germany [40].

We see the pattern here, in this modern example: within one or two human generations, the reputation of an animal can change completely. What was just the unloved food of the poor becomes a delicacy that—despite all prohibitions—comes to the tables of the rich and powerful. A species can become "exotic" and, thus, suddenly valuable because it becomes extremely rare and therefore something special.

The examples of the sturgeon and aurochs show some similarities. In both cases, a previously common animal species that was known to everyone became so rare that it ended up being so strange and exotic that the authorities put it under protection and banned its hunting (fishing). In both cases, however, the protection was of little use in practice—the animals were still killed by poorer, ordinary people, whether out of necessity or for profit. The rarer both species became, the more valuable they and their meat became, and, in both cases, powerful state institutions reserved the right to eat the last specimens. However, such a development is not obligatory, as the analysis of another species shows.

The great auk (*Pinguinus impennis*) was a large, flightless, and colony-dwelling seabird that was probably never very numerous; it lived in a relatively narrow climatic zone at the border of the northern temperate zone and the subarctic. As it required "a combination of a safe breeding place surrounded by rich supplies of [fatty fish] food to reproduce successfully", it was more vulnerable to climatic changes and predation than other species [41]. In historic times, the great auk could be found around the North Atlantic [42], and its eastern range touched the Baltic Sea area in southern Norway, western Sweden, and Denmark. However, as a breeding bird, the species disappeared here 4000 years ago [43]. At the Norwegian site of Kobbehelleren near Bergen, a directly dated specimen proves the presence of at least one great auk at about 1018 CE [40:7], while from southwestern Sweden, a reliable sighting was reported in 1783 [44]—sixty years before the great auk became globally extinct in 1844 [41].

Without a doubt, the great auk was an exotic species in the study area in the period between 800 and 1300 CE. Although the species certainly attracted the interest of humans—especially hunters—due to its size and inability to fly, and Scandinavian settlers encountered the species in Iceland and Greenland, the near-absence of evidence of the species in northern Europe proves that they were not brought home by the Norsemen, either alive or as a traveling provision. This example thus shows that not every exotic species, no matter how special in appearance and behavior, acquired the status of something extraordinary for the people of the Viking Age and the early Middle Ages as a creature that could be used to increase social prestige (examples of this follow in Section 3.3). Interestingly, this situation changes at the beginning of the early modern period. In the 17th century, Ole Worm, a Danish antiquarian, had a living great auk at home; when it died, it became part of his cabinet of curiosities—an icon of the exotic North [45]. At about the same time, another great auk was being kept alive in the menagerie of the palace of Versailles. Appearing alongside many other exotic bird species, among cassowaries, peafowls, and spoonbills, the great auk had become part of the elite's culture, for the glory and amusement of the king [46].

3.3. Gifts or Merchandise from Distant Regions

The third group of exotic animals includes those species that do not naturally occur in the study area. These are, in most cases, species that are characterized by a spectacular habitus, i.e., they are particularly conspicuous due to their color, shape, or size. Such conspicuously alien species could theoretically have naturally (temporarily) migrated into the study area, as described in [47], but, much more often, they have been deliberately introduced by humans (Figure 3).

The spectacular evidence of two peafowls (*Pavo cristatus*) in southern Norway in 900 CE points clearly to an exclusively aristocratic context. The finds, of the bones and feathers of two male peafowls [48], are derived from the Gokstad grave, where a king of the Viking Age was buried in a complete ship [49]. Perhaps the peafowls were trophies of war or were a gift from another ruler. In the present case, the exotic birds were a source of power in the political networks and elite strategies of Viking Age Scandinavia [50]. Potentially, their meaning was rooted in the ideal of power as originally received from outside, and such exotic elements signaled the association of the king with the foreign, emphasizing the separation from and contrast between the kings and their followers. The peafowls from Gokstad are unique for Scandinavia during the period covered here. Further south, in the hinterland of the coast, there are two more records, both drawn from Castle Hitzacker, dating to the 11th or 12th centuries [51]. At that time, Hitzacker was the seat of the regional rulers. Both peafowl bones (the phalanx posterior and tibia) are derived from a settlement context and are apparently the remains of slaughtered birds. Based on their size, they were determined to be female. A further record of peafowl from the stronghold at Ostrów in Central Poland dates back to the 11th century [52]. Even if the site is now located far inland and no longer belongs to the area studied in the present paper, it is mentioned here because it was, once more, a site with inhabitants of high social status. More recent finds are only known from the 14th to 15th and the 15th to 16th centuries and were found in Mała Nieszawka and Gdansk [53,54]. These very few finds, from a period covering more than half a millennium, show how extremely exotic the peafowl was in the Baltic Sea region in the Middle Ages. This is especially true for the time before 1000 CE. It is very likely that the birds following their owner into the Gokstad tomb were the only ones of their kind in the whole of Northern Europe at that time. They must have shown every visitor of the "Viking king" the status and worldliness of this man (with the birds acting as a prestige object). However, even in later periods, hardly anyone ever got to see peafowls, and after Christianization, they became a part of luxurious, princely dining.

Figure 3. Archaeological finds of exotic animals in the Baltic Sea region between 800 and 1300 CE. The color of the dots corresponds to the color of the photo frames.

The situation regarding the three records of the Eurasian spoonbill (*Platalea leucorodia*) might be considered quite similar. All three are derived from Viking Age Denmark, and they are all associated with food waste [55]. The finds from Mysselhøjgård (a humerus and phalanx dating from the 7th to the 11th centuries) and Fugledegård (a pelvic bone dating from the 7th to 9th centuries) originate from elite residence sites, while another one comes from the trading center of Ribe (a carpometacarpal from the 8th century). It is very likely that such trading centers served as a location for the trading and exchange of birds [3,56], as discussed below, and the record of a spoonbill bone could show that other (exotic) bird

species had changed hands there as well. The large white birds with their spoonlike beak must have seemed strange to the people of Denmark, in any case: the northern limit of the spoonbill's distribution at that time was, at most, in the Netherlands; the species had first colonized Denmark in the 14th century [57].

The animals used in the practice of hunting with birds of prey (falconry) were traded in Ribe and elsewhere; they were locally caught for export or for use by the local or regional elite. However, the world's largest and most beautiful falcons, the gyrfalcons (*Falco rusticolus*), were status gifts offered among kings in their gift-exchange network [58]. The birds' European range includes the northernmost Scandinavian coasts and the Swedish and Norwegian mountains, but the most desired birds were the white gyrfalcons from Greenland and Iceland. It is not certain when the export of gyrfalcons from Iceland began, but it may have been around the year 950 CE [59]. At the latest since the 12th century, such birds were highly valued at the courts of both European and Arabian rulers [59,60]. The famous Swedish burials of falconers that have been dated prior to 1000 CE leave no doubt that people of the Baltic Sea area also hunted with gyrfalcons. However, in sharp contrast to these historical documents, the archaeozoological record (not only in the Baltic Sea area) is very limited, although this is not surprising because the investigated animal bone assemblages from the settlements appear mainly to be of kitchen and butchery waste [60]. As a result, gyrfalcons have never been recorded, for instance in medieval Poland, although Polish kings could certainly afford to import them [61]. With one exception (from Eketorp on Öland, in the 11th to 13th centuries [62,63]), the gyrfalcon remains found in Sweden are derived mostly from the burial contexts of people with high social status (Vendel III, from the 8th century; two graves in Söderby, from the 9th to 10th centuries [57]), while a more recent sample is from an early urban site (Söderköping, from the 12th century [60]). One of these finds, the fragment of an ulna, is spectacular because it shows a clearly healed fracture. In the wild, the bird would not have survived such an injury [64].

All three of the bird species discussed in this chapter—peafowl, spoonbill, and gyrfalcon—were exotic birds that needed to reach the Baltic Sea region alive and as healthy as possible. It was only in this way that they retained their value as ornamental birds, as birds for hawking, or—freshly slaughtered—as royal delicacies.

Two exotic mammal species should also be mentioned here. They will confirm the findings reported with the three bird species and extend them to further aspects. The first example is the unique case of the nearly complete skull of a monkey, discovered in geological deposits of the late 12th century in Rurikovo Gorodische and identified as a Barbary macaque (*Macaca sylvanus*) [65]. Located on an important route from Scandinavia to Byzantium, Rurikovo Gorodische was the preferred seat of the Scandinavian rulers in the area of Lake Ilmen. The skull indicates the importing of a living animal from Africa to the Baltic Sea area, again to a high-status site. The macaque might have been a gift to the local ruler or was destined for a menagerie, either there or in Scandinavia, since we know that the first menageries appeared in Northern Europe around that time [66–68], and there are also some references in medieval documents to the keeping of monkeys in Britain, the oldest evidence coming from the 13th century [65]. However, the Gorodishche skull appears to be the oldest piece of evidence for monkeys so far found in northern Europe. There are some more archaeological records, but they are somewhat younger, and they originate mostly from Britain. The next find in the Baltic Sea area is from the 15th-century layers of Hitzacker, on the Elbe river in Germany [69]. All these monkey bones have been identified as being from the Barbary macaque [65]. For the purposes of completeness of the list, the only record of another monkey species, the well-preserved skull (along with other skeletal parts) of a grivet (*Chlorocebus aethiops*) should be mentioned, which was excavated from layers dating from the late 16th to the early 17th century in Rostock, on the German Baltic coast [70,71].

The second case involving the records of an exotic, alien mammal is completely different because, in this case, there was not a living animal that reached the Baltic Sea region, but only parts of animals that were killed in distant places.

People from Scandinavia first encountered the walrus (*Odobenus rosmarus*) when they reached and then settled in Iceland around 870 CE, and then moved to Greenland [72,73]. In the following centuries, walrus tusk ivory became a highly desired product in the Viking Age and early Medieval north-west Europe. The use of walrus ivory can be traced archaeologically in finds from all around the Baltic Sea, particularly in the 11th to 13th centuries, corresponding to the period of Norse settlement in Greenland [74]. In the Baltic Sea area, walrus skulls were recorded in many urban sites of supraregional importance, such as Oslo, Sigtuna, Lund, Odense, Schleswig, Lübeck, Vilnius, and Novgorod, and they were also distributed to the Rus in Ukraine (for illustrations and further citations of all these records, see [75,76]). The hunting of the Icelandic walrus provides an exceptionally early example of hunting in northern Europe that is not for subsistence but is instead for valuable trade commodities. The trade had a bitter end: the extinction of the local population. In contrast to the aurochs, there can be no doubt in the case of the Icelandic walrus that its extinction was caused by human hunting [77]. The evidence for this is very strong, given the timing and the known value of walrus ivory during the Viking Age and early Medieval times, and given how easy these animals were to capture, as mentioned in several Sagas.

Only very few people from the Baltic Sea region will have had any idea of the appearance of a walrus. The walrus remains ended up in the Baltic Sea region as the quite impressive parts of a large skull (Figure 4). Since there is a distinctive pattern on the walrus remains, it seems obvious that the hunters in Iceland or Greenland regularly cut off the rostral part of the skull, removed the skin and tissue, but left the ivory tusks in the skull. Thus prepared, the rostral part of the skull, including the two, often large, tusks, were transported to another destination. The tusks were then detached from the alveoli only at the place of their processing in the Baltic Sea region. This procedure led to a somewhat imprecise idea of what a walrus actually looked like, and assumptions about its appearance were often speculative [78]. At this point, it is only a small step to move from an exotic to a mythical animal.

Figure 4. Walrus (**left**) and narwhal (**right**) were known to people in the Baltic Sea region only through parts of their skulls. From the walrus, one knew the rostral part of the skull, with the tusks prepared for the long-distance trade (the example is from Schleswig, from the 12th century). Tusks from the narwhal were considered to be parts from the mythical unicorn (the photo on the left is from the U.S. Fish and Wildlife Service (public domain); photo (right): Kristin Laidre, Polar Science Center (public domain); the photo in the center was taken by the author).

3.4. Exotic Animals Existing Only in People's Imagination

This section is included in the present study because the existence of certain mythical animal species, such as the phoenix and basilisk in Greece or the ouroboros in northern Europe [79], was a reality to many people in the past. During the first millennium CE, in northern Europe, the existence of *Mischwesen* (human–animal hybrids) was considered possible. At least in art, they are repeatedly seen, and a plethora of properties was assigned to the different animal species, such as strength, honor, closeness to the gods, fighting strength, speed, fertility, and much more [80]. The topic will not be discussed in depth

here, but only in terms of one example, the unicorn. From this exotic "species", there were also alleged proofs in the form of archaeological finds. In the Middle Ages, it was widely thought that tusks from the narwhal (*Monodon monoceros*; see Figure 4) were the remains of unicorns—meaning that this case can be studied from two different perspectives: on the one hand, today's perspective, reconstructing and explaining the distribution of remains from exotic animals living in the Arctic Ocean (creatures similar to the walrus), and on the other hand, the perspective of the people of the Middle Ages, who saw the finds as evidence of the existence of unicorns [81].

In Europe, during antiquity and in Medieval times, belief in the existence of unicorns was widespread, especially in the south and west of the continent, and here, many myths surrounded the species [82]. When, in the course of the first millennium, a demand arose from rulers in many parts of Europe for exotic animals or, at least, parts of them, alleged horns from the unicorn were of outstanding value, even among the exotic. They became prized treasures and considered gifts for kings [81]. Contemporaneous illustrations show people's ideas of the stature and nature of unicorns. As in ancient times, the unicorn had a horse's shape, with a single large, spiraling horn projecting from its forehead. Of course, the narwhal was not the role model for this creature—in the Middle Ages, no one believed that unicorns were sea creatures. The knowledge of the real narwhal was restricted to a very small number of Norse traders in Greenland, and it is even possible that most Norse traders in Greenland might have thought that they had discovered the remains of dead unicorns [78]. The knowing traders were not at all interested in telling the truth. They deliberately constructed and maintained new identities [81]. Perhaps this was especially simple because people in the Baltic Sea area or elsewhere in Europe occasionally encountered real "unicorns": extremely rare mutations seen in sheep and cattle [82].

From the 9th century onward, the remains of unicorns, i.e., narwhal tusks, were in demand throughout Europe, Asia, and North Africa [78,83]. In the end, in the 14th and 15th centuries, "conceived by religion, mythology, and sexuality, the unicorn had become the epitome of chivalry, knighthood, heraldry, and Christ" [84] (p. 70). In this context, the absence of narwhal tusks in medieval archaeological assemblages indicates that the tusks were indeed highly desired and were actually never discarded but were instead inherited; therefore, it is self-evident that they are absent from the normal archaeological find spectra.

4. Discussion

Within the scope of this paper, it is not possible or necessary to analyze all the exotic species recorded in the Baltic Sea area between 800 and 1300 CE. It is easy to name others: the polar bear (*Ursus maritimus* [85]), fallow deer (*Cervus dama* [66]), common carp (*Cyprinus carpio* [86,87]), house sparrow (*Passer domesticus* [88]), and cinereous vulture (*Aegypius monachus* [89] (p. 86)), and there are many more. However, it is already the case that the present study shows results that seem to be generalizable. Thus, evidently, the remains of exotic animal species are not found in the dietary waste of the common people but are instead discovered in special archaeological features. The most frequent special feature containing the remains of exotic animals is a grave of a socially privileged person or in a place that can be directly associated with the residential building of a socially privileged person (as with the last aurochs, the first domestic cats, peafowl, spoonbill, gyrfalcon, and "unicorn"), and there are even parallels with the recent past (witness the last sturgeon).

Thus, the remains of exotic animals are most often found in the same social contexts as other, very valuable, imported goods, be it glassware, ceramics, or dress accessories [90]. The methods of acquisition of such imports were via trade, diplomatic gifts, tributes, payments, and war booty [91]. The imports and, in particular, their archaeological find context suggest that foreign contacts were important for acquiring political power, social influence, and authority [92]. Thus, they were valuable because they were "exotic", and animals that were difficult to obtain were undoubtedly prestige objects. To fulfill their function as prestige objects, it was certainly essential to present the animals to one's social and/or political competitors, to show them off. The data situation only allows speculation

as to in which form this happened at the beginning of the period under investigation, especially in the case of living animals. It was not until about 1300 CE that animal parks were developed specifically for this purpose [66–68]. The picture is clearer in the case of exotics that did not reach the Baltic Sea region alive but were instead only seen in the form of selected body parts: exotic species such as the walrus or "unicorn" were presented in the form of their tusks, skull parts, or pieces of jewelry carved from the ivory [78]. All these aspects had already been the motivation for the demand for exotic animals in Roman antiquity, but at that point, the need to supply dangerous exotic animals for the events in the amphitheaters was an added incentive. This led to a professionally organized industry of hunters whose job was to find, capture, and transport exotic animals in good health to the places where they were needed [93–95]. There is no evidence of anything comparable occurring in the Baltic Sea region. The Great Auk is, again, the example of a quite distinctive exotic species that was obviously not used for representative purposes in the period under study. This shows that there was no automatism and that not every exotic species seemed to be suitable for raising the prestige of its owner at a banquet or as a show object.

In addition to the cultural level, wherein exotics have been used primarily for social display, the relationships of exotic species within the ecosystems and biocoenoses into which they migrate or from which they disappear must also be taken into consideration. As the occurrence of "new" species is still a very prominent phenomenon today, their influence and impact on biodiversity is under intense scientific monitoring. Often, such species are referred to as "non-native", but, from a historical or archaeozoological point of view, this term is problematic: if species migrated into a new area a long time ago and can be considered today to be fully "naturalized", as with the synanthrope species, the white stork or the house sparrow in Central and North-Eastern Europe, are these species then still "non-native"? The wild horse (*Equus ferus*) was widespread in the Baltic Sea region during the millennia following the last Ice Age, then it disappeared but returned later as a synanthrope species, once humans had become farmers and livestock breeders and had begun to clear the forest more extensively [96,97]. Was the wild horse returning to the Baltic Sea region after two thousand years as a "non-native species"? The term can only be used meaningfully—at least in research with a long historical depth—if we are talking about species that originate from other, more distant continents, or that have been actively and deliberately released into the wild by humans. One of the latter cases is the European rabbit (*Oryctolagus cuniculus*) from the Iberian Peninsula, which was partly feral, partly deliberately released; in any case, it was initially introduced as an exotic species in various parts of Europe, from Britain to the Baltic Sea coast and thence to Ukraine in the last thousand years [98]. This makes the rabbit one of those terrestrial vertebrates that were deliberately introduced into the Baltic Sea areas in the distant past. The same thing happened, but more recently, with the muskrat (*Ondatra zibethicus*) [99] and raccoon dog (*Nyctereutes procyonoides*) [100]. All these species were or are exotic, in the sense of a non-indigenous, alien species, as well as in the sense of an animal that, at the beginning of its occurrence, was strange and unknown to local people. Other species were and still are introduced unintentionally; today, this is mostly in the form of contaminants of traded products [101–103]. Some of them have become "invasive", i.e., they pose a threat to biodiversity or human health—one historical example that we mentioned briefly above is the black rat. Others, such as white storks, became "naturalized", i.e., they became established and were integrated into ecosystems without the associated disturbance.

While the cultural–historical dimensions of exotic animal species in the Baltic Sea region are relatively well studied, there is still a considerable need for research in reconstructing the influence of "new" species on ecosystems and biocoenoses. The data presented here are often not sufficient for this purpose. It is only in the case of the black rat that it could be shown that people reacted to its appearance by the application of "biological pest control", i.e., the spread of the domestic cat [104], by the way, a very modern approach. Thus, a new urban ecosystem gradually emerged in the immediate human living area at that time, which was not only synanthropic but also even strongly anthropogenic in terms of its niche structure, as well as in terms of species community. Away from direct human context, the data situation is much worse. The appearance of a "new" species has, so far, been mostly interpreted as a response to changing environmental conditions [39,47,96], although their active role in the new habitat has been less widely studied. This need exists because the fundamental phenomenon, with all its effects, is of very current interest for both nature conservation [105,106] and the economy [107]. Somewhat better studied are the short-, medium- and long-term ecological effects of the disappearance of special species. As a consequence of the disappearance of bears and other large carnivores, subtle but decisive changes in important ecological patterns involving behavior and interspecific ecological interactions can be identified [108,109]. It has become clear that non-lethal interactions between predators and their prey are important components of predator-prey interactions in general, and this finding has consequences that can change the behavior of animal populations over time [108,110]. There are also preliminary studies on the ecological changes seen before and after the disappearance of the two bovids of the Baltic Sea region, the aurochs and the bison (*Bison bonasus*), demonstrating how these two species adapted to environmental change and how their habitat altered after their disappearance [111,112]. This is, again, an important issue for nature conservation, where projects with extensive grazing, e.g., by cattle, play an important role [113].

This contribution is intended to show that the research into the topic "exotic animal species in archaeology" is thus not marginal at all, but instead has aspects that concern the central aspects of cultural–historical and ecological research. An attempt should, therefore, be made to further investigate the topic from both perspectives. Starting with the more conspicuous exotic species, there is much to be learned, not only about human relationships with wild animals but also about the threats to humans and ecosystems posed, in particular, by intentionally or unintentionally introduced species.

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