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THE HERITAGE OF POLISH ZOOLOGICAL GARDENS - ARCHITECTURAL AND ARTISTIC MONUMENTS AND THEIR CONTEMPORARY PRESENTATION

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Abstract

The aim of this article is to introduce, present and highlight the importance of historical buildings and works of art in Polish zoos. It focuses on strategies for managing this cultural heritage. It uses mainly descriptive methods through case studies chosen for their effectiveness in illustrating complex and individual solutions. The findings suggest that common practices for preserving architectural and artistic heritage include maintaining the existing state with possible reuse, creative adaptation with isolation and partial restoration of essential elements, or relocation of valuable elements. Previous research on zoo facilities has mostly focused on changes in breeding and display requirements and their impact on spatial development. This article fills this gap by providing evidence on how architectural and artistic heritage is managed and used within operating zoo facilities. The results show that in the selected institutions there is a certain level of awareness of the value of historic objects and buildings in modern zoos, leading to their proper conservation for further use and display. However, historical studies and observations indicate that management processes have led to irreversible alterations and demolitions. The article contributes to the existing body of knowledge in two ways: first, by initiating a discussion on the conservation and adaptive management of cultural heritage in zoos and second, by providing examples and highlighting successful conservation practices.

Keywords*: Zoological gardens; Architecture; Cultural heritage; Artwork; Conservation strategies*

Introduction

Historical and contemporary zoos usually occupy a prominent place on the urban map, fulfilling complex roles as research centers, educational institutions and nature conservation centers, but also as places of recreation, leisure and contact with nature. The carriers of these functions are both the open spaces, animal enclosures or park areas and the buildings, the structures within the zoo [1]. Many of these buildings date back to the founding of the zoo or to an earlier form, the menagerie. Throughout the years of the zoo's existence, buildings and pavilions have been constructed to provide better living conditions for the animals, as close to their natural environment as possible [2]. This issue is well recognized in the scientific literature and much attention is paid to the health and welfare of the animals [3, 4]. However, a research

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gap can be identified and that is the problem of the cultural heritage (spatial arrangements of gardens, architectural and engineering elements and works of art) that have the potential to improve the perception of the zoo as a brand and its prestige [5]. In addition, as pointed out by Mason [6, 7], the problem of preserving and maintaining this heritage in the context of the operational challenges of zoo gardens needs to be better recognized.

The aim of this article is to examine the historical architectural structures and artistic elements found in Polish zoos, with a focus on the strategies used to manage these culturally significant buildings and artworks. Previous research on zoo facilities has concentrated on the development of breeding and display needs and their corresponding spatial adjustments. However, there is a significant gap in the literature regarding the conservation and management of architectural and artistic heritage within zoo environments. The present study aims to explore and clarify the architectural and artistic heritage of Polish zoological gardens, highlighting their contribution to the cultural significance and overall appeal of these institutions.

The research is limited to the current borders of Poland to ensure the comparable legal and economic conditions of zoo management and focuses on zoological gardens and their architectural and artistic artifacts. The selection of these artifacts is based on their historical significance, age and exceptional artistic merit, requiring careful attention to their preservation and protection for future generations. This article examines preservation and management strategies used in three Polish zoos (Wrocław, Poznań and Kraków) highlighting the significance of safeguarding architectural and artistic heritage in these cultural settings.

The manuscript is structured as follows: the first section contains an introduction to the research problem and the next section provides a brief overview of the history of zoological gardens in Europe, with a special focus on the territory of Poland as a background to the research. The third section is devoted to the presentation of case studies from three Polish cities, selected based on the long period of operation of the zoo. The results are presented and discussed in the fourth section and the fifth and last section concludes the research.

History of the development of zoos in Europe and Poland

Zoological gardens are scientific and educational institutions whose origins in their modern form can be traced back to the Enlightenment—the turn of the 18th and 19th centuries [8]. At that time, they were established in most major European cities because of the traditions and collections of royal, princely, or episcopal menageries. These menageries developed and declined from antiquity or the Middle Ages and became particularly popular after the period of great geographical discoveries in the 15th and 16th centuries [9]. Originally, they were mainly associated with the residences of rulers and their size remained small, as did the enclosures and the enclosures of the animals within them. Most zoos in European cities have little in common with these earlier menageries, either in terms of species or location. In many places, such facilities were not built until the 19th, 20th, or 21st centuries. In the older ones, valuable architectural structures for various purposes have survived to the present day, as have works of art from different periods decorating the buildings or the spaces between them.

One of the few exceptions to this rule is the world's oldest zoo, the Tiergarten Schönbrunn in Vienna [10]. It is located on the grounds of the former suburban imperial summer residence of Schönbrunn, which is now the city's largest park and residential complex. The centerpiece of the zoo is the late Baroque multi-axial layout. Emperor Franz I Habsburg founded the Menagerie in 1752 and it was opened to the public, together with the palace gardens, some 20 years later. The centerpiece of the Menagerie was a polygonal pavilion for the imperial family, set on an elevated platform (now used as a restaurant) from which radial walkways diverge. The space in between is filled with enclosures for larger animals (Fig. 1), while further away, in the garden, there are more display pavilions and ponds for waterfowl. Most of the original buildings have survived to the present day. The historic garden setting has

been significantly altered and expanded to accommodate the function of a scientific center [11], but its most valuable parts are protected by the law, as is the entire Schönbrunn complex.

Fig. 1. Tiergarten Schönbrunn - Imperial Pavilion, today serving as a restaurant (left) and giraffe house, historical part (right)

The layout of the Vienna Zoo was in fact modeled on the earlier Menagerie des Vincennes (in the Bois de Vincennes—now part of Paris) of 1661, which did not exist in its original form and was dismantled rather quickly, as Louis XIV had already moved the royal menagerie to Versailles in 1664 [9]. In contrast, the second oldest zoo in Europe is still in operation in Paris—the Menagerie du Jardin des Plants, which was established after the French Revolution, based on animals from the royal and aristocratic menageries and opened to the public in 1794 [12]. For many years it was the largest zoo in Europe. The third oldest zoo still in operation is ZSL London Zoo, founded in 1828 [13].

It should be noted that older menageries and 19th-century zoos were primarily places of entertainment where wild animals were exhibited for the enjoyment of visitors, so they aimed to bring people closer to the animals. As a result, the cages and enclosures designed were small and quite different from today's standards. It was only with the passage of time, particularly after the Second World War and especially with the establishment of new zoos and the modernization of existing ones, that these paradigms changed. Today, animals are exhibited in pavilions and enclosures designed to mimic natural conditions. Modern zoological research, but also modern construction techniques and equipment, which help to maintain appropriate climatic and lighting conditions, have greatly changed the fate of animals living in zoos [14].

The development of zoological gardens in the territory of present-day Poland came at a relatively late stage. It should be noted that between 1795 and 1918, Poland was divided between three neighboring partitioned states: the Russian Empire, the Austrian Empire and the Kingdom of Prussia [15]. Inevitably, parts of the country were treated as distant provinces by the partitioning powers and any innovations, especially those in the field of entertainment, such as the zoo, arrived there with considerable delay. The situation was best in the Kingdom of Prussia, perhaps because the Prussian partition was relatively small and much closer to Berlin than the territories of the other partitions to their new capitals: St. Petersburg or Vienna. The Prussian state invested heavily in the territories it seized and some of the areas that have been within Poland's borders since 1945, such as Silesia and much of Pomerania, had been linked to Prussia much earlier than 1795. Poland, especially its central and eastern parts, was the scene of numerous rebellions in the 19th century and in the 20th century, the arena of the eastward- and westward-moving fronts of the two world wars, which brought enormous destruction to these areas. The first Polish zoological garden of a scientific and didactic nature, founded by Stanislaw Ignacy Pietruski in Podhorce (present-day Ukraine) in 1833, did not survive these difficult trials [16].

Presentation of selected case studies

Monuments of the oldest zoo in Poland, the Zoological Garden in Wrocław

In the area of the so-called Big Island, with an area of 11km^2, at the confluence of the Oder and the Old Oder [22], northeast of the historical center of Wrocław, there is one of the largest green complexes in the city. It consists of Szczytnicki Park with the former exhibition areas and the Centennial Hall (the first monumental reinforced concrete building in Wrocław, designed by Max Berg 1911-13) and on the southern side of today's Wróblewskiego Street: The Zoological Garden, first opened on 10 July 1865 and the sports grounds on its eastern side [17]. In the 18th century there was a suburban residence of Prince F.L. von Hohenlohe-Ingelfingen, surrounded by a regular garden and an English-style park in the city's meadows and woods, including the remains of the old Oder riverbed [23].

The original area of the zoo was 8 hectares, in what is now the western part of the zoo. The zoo had two breaks in its activity: 1921-27 (due to the economic crisis) and 1945-48 (after the devastation of the Second World War). Each time, however, it came back to life and doubled its area by incorporating the former exhibition grounds along the main channel of the Oder River, so that it now occupies an area of 33 hectares. This riverside location influenced the zoo's need to defend itself during the great flood of the century in July 1997, which was successful in Wroclaw, while in the upstream city of Opole, the flood destroyed the zoo located on the Oder's Bolko Island [8].

The oldest part of the zoo is under monumental protection and since 29. Nov. 1978, it has been listed in the Register of Monuments of the Lower Silesian Voivodeship under no. A//5263/361/Wm [24]. The original location of the zoo was a picturesque, partly wooded area with the remains of an oxbow lake, which was and still is used as a pond for waterfowl. The garden was designed by the architect Karl Lüdecke, the author of many public buildings in Silesia and in Wroclaw itself (including the Main Railway Station and the reconstruction of the Cathedral on Ostrów Tumski), the botanist (and also palaeontologist and medicine doctor) Johann Heinrich Robert Göppert and the city gardener Julius Lösener [17]. The zoo's founders and their successors have made significant efforts to cultivate a diverse array of trees on the grounds, including many exotic species that are now recognized as natural monuments.

The charm of the area is undoubtedly enhanced by the historic architectural buildings and structures. The animal pavilions, fences and gazebos were designed during that time and have remained, although several functional adaptations and structural alterations have been made. The examples include, among others buildings such as: Bear Fortress (now Owl Pavilion) with tower and terrace overlooking the old town of Breslau (designed by K. Lüdecke 1864-65, extended in 1900 by F. Jung, renovated 1986-87) (Fig. 2); Restaurant and Concert Hall - now Terrarium (designed by K. Lüdecke 1864-65 and C. Schmidt 1887) (Fig. 3); monkey house (designed by C. Schmidt 1865-66, reconstructed in the 1880^s and in 2005); modelled on the Parisian and Berliner examples Elephant House (designed by A. Grau 1873 and C. Schmidt 1887) (Fig. 4); an aquarium from 1881-90, extended in 2009 and a large cat pavilion from 1887, no longer in use, extended at the beginning of the 20th century [17].

The area of the zoo is equipped with several small wooden structures that have distinctive stylistic features: a bridge and a pavilion over a pond and the so-called nutria house—one of the oldest structures in the zoo that still performs the same function thanks to the conservation efforts (Fig. 5). In addition to that, the numerous examples of masonry work are of considerable value and still under formal protection. For example, the former entrance pavilion (now changed to adapt to the restaurant) with a gate from 1891-95; the zoo walls from 1863-64; the bear, seal and baboon enclosures from the 1930^s, which have undergone several alterations that changed their original form.

Fig. 2. Wrocław Zoo—Bear Fortress (designed by K. Lüdecke 1864-65, F. Jung 1900, present view

Fig. 3. Wrocław Zoo—Restaurant and Concert Hall—now terrarium
(designed by K. Lüdecke 1864-65 and C. Schmidt 1887)

Fig. 4. Wrocław Zoo Elephant House (designed by A. Grau 1873 and C. Schmidt 1887), present view

For the subject of the case study, the Bird House, designed by Carl Schmidt and built in 1889, was chosen. The building underwent a complex restoration in 2021. It aimed to conserve its historical architectural characteristics while adapting to modern standards for breeding and displaying different bird species. This was achieved through a careful balance of traditional and contemporary techniques, resulting in a successful restoration that meets the needs of both the

birds and visitors. The restoration project was carried out with confidence and expertise, showcasing the team's commitment to preserving the historical significance of the Bird House while ensuring its continued relevance in the present day.

Fig. 5. Wroclaw Zoo—wooden monuments: Nutria House (left) and restored arbor by the pond (right), present view

The architectural and conservation documentation for the renovation and reconstruction prepared of the Bird House in the Wrocław Zoo included (under separate commissions) buildings and landscaping with outdoor aviaries. The documentation prepared for heritage buildings, or even those located in protected areas, needs to be treated individually, with sensitivity due to the value of the historical buildings or the context, which is often obliterated by subsequent reconstructions. *A. Acierno et al.* [25] suggest that managing architectural monuments requires in-depth knowledge in two main phases: investigation and design. The need for knowledge-based decisions, in particular for managing architectural heritage, is also advocated in a study by *L. Seduikyte et al.* [26]. Therefore, for the Bird House, a detailed historical, iconographic and monumental study was carried out, considering the widest possible range of aspects of the building.

The Bird House of the Wroclaw Zoo is a special case. The building was constructed for the purpose of exhibiting breeding birds and features a historicist style with classicist elements. The three-nave structure of the interior on cast-iron columns with a steel roof structure and glass cladding provided plenty of light, creating a unique atmosphere and ambience inside the pavilion. At the junction with the transept, there was a fountain on the axis of the entrance. The side aisles contained aviaries for birds. The building was also equipped with technical rooms. The interior changed over the years and after 1920 the building was converted into a café. Details also changed, such as the arrangement of metal fittings and plant supports on the fountain. However, it was the post-war reconstruction of the pavilion that brought about the greatest changes. The daylight window area and the roofing were rebuilt. New aviaries were built inside and the base of the fountain was rebuilt. Decorative elements such as the cornice and frieze were removed and the columns lost some of their decorative head ornamentation. Technical corridors were added and the arrangement of the exhibits was changed. In 1971 the largest of the external aviaries for white-shouldered eagles (*Haliaeetus pelagicus*) was built.

By 2018, the pavilion had undergone several major renovations, mainly consisting of reconstruction and extensions, during which most of the original decorative elements, both inside and on the façades, were removed: architectural details of the interior design, woodwork,

façade details, mainly cornices and the shape of the window band, skylight and skylight covering. The functional layout of the interiors was changed, additional breeding areas were separated, technical corridors were added, a heating substation was added and the form of the external aviaries was changed. The building has lost much of its original fabric and form (Fig. 6). After decades of intensive use, it was in urgent need of renovation. The immediate surroundings of the building have also been redesigned.

Fig. 6. Wrocław Zoo—Bird House—external view,
state before renovation (photo by Beata Pawelec, Creoprojekt)

The main objective of the recent conservation renovation was to adapt the facility to the current needs of the livestock. It was necessary to carry out thermo-modernization measures that could be implemented in the historic building, based on an optimal variant of the energy audit. Due to the nature of the breeding (exotic birds), the building requires remarkably high levels of energy for maintenance, so it was necessary to find energy-saving solutions while limiting the impact on the original fabric of the monument. Complicated guidelines for the breeding of birds required the application of functional and infrastructural solutions, which had to be incorporated into the historic building in such a way as to meet the necessary legal, technical and health and safety requirements, or accessibility for people with disabilities, without compromising the breeding technology. At the same time, the original form and functional layout had to be authenticated and the original appearance of the building had to be reconstructed based on collected historical materials. This was done both externally and internally.

At the stage of preparing the documentation, in agreement with the investor and the Municipal Conservator of Monuments, after historical-iconographic analysis (Figs. 7 and 8), the following guidelines were adopted and the manner of their implementation. Firstly, to restore the original functional and spatial layout, the external form of the building, joinery and skylight openings are based on archive materials and studies. A new technical vestibule was created inside the building by glazing; the new division into aviaries was made as close to the original as possible; new divisions were made in place of demolished secondary structures and the basins were created in such a way that each aviary was as adaptable as possible in terms of breeding conditions and scenery.

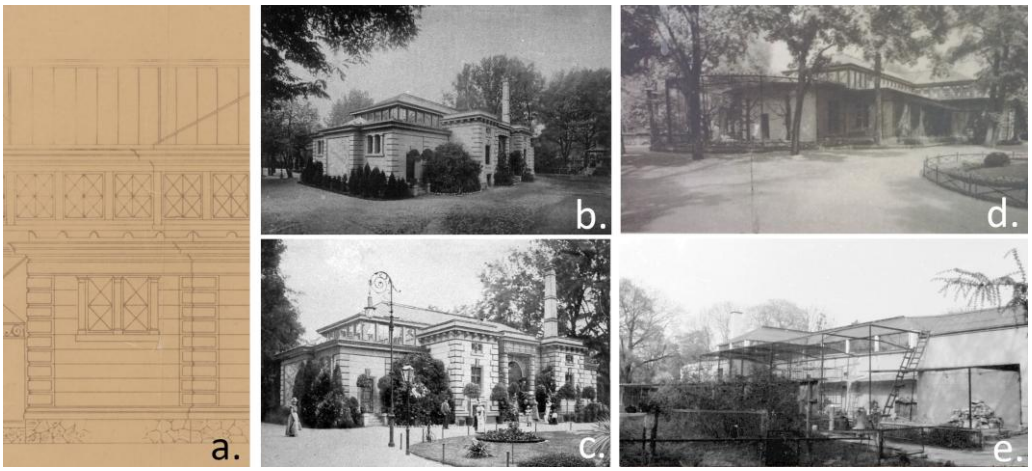

Fig. 7. Wrocław Zoo—Bird House (designed by C.Schmidt 1889) Historical iconography:
a - fragment of a drawing of the façade from the original design of the building (1887); b- view of the finished object (1890); c - view from the side of the aviaries (ca. 1890); d - view of the façade (ca. 1890); e - view of the aviaries (ca. 1970); source: a, c, d, e - materials from the zoo's archives; b - photo by Ottomar Anschütz, in: Horst G.W. Gleiss, Unter Robben, Gnus und Tigerschlangen. Chronik des Zoologischen Gartens Breslau 1865-1965, Natura et Patria Verlag, 1967

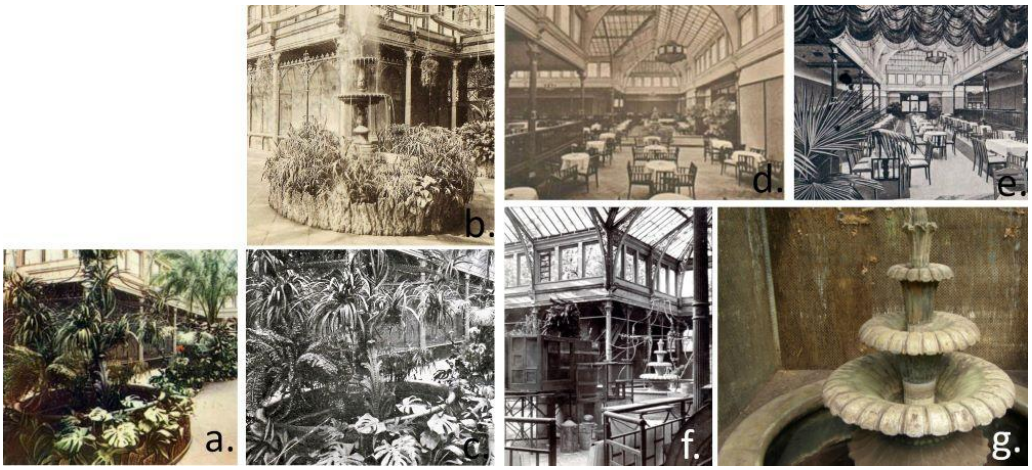

Fig. 8. Wrocław Zoo—Bird House. Iconography of the fountain and interior: a (1890); b, c (ca. 1908-1919); d (1922); e (1925)—both photos depict the interior of the birdhouse after its conversion into a concert hall and café; f (1946-1960)—the fountain before it was enclosed by an aviary; g (2018)—the state of the fountain before renovation; source: a - photo by Ottomar Anschütz, in: Horst G.W. Gleiss, Unter Robben, Gnus und Tigerschlangen. Chronik des Zoologischen Gartens Breslau 1865-1965, Natura et Patria Verlag, 1967, b, c, d, e, f - materials from the zoo's archives, g - photo by Creoproject

The form of all the historic timberwork has been recreated and the window band of the skylight story has been reconstructed, together with the timberwork and crowning cornice. The reconstructed structures of the aviary window band and ceiling were made using modern technology with insulation to improve energy performance and reduce maintenance costs. The new aviaries were made of glass, frameless and secured from above with nets on binders. This allowed the historic cast-iron structure of the pavilion to be properly exposed. Inside, in addition to the exhibition area, there will be breeding and technical rooms at the rear.

Secondly, it was necessary to remove secondary divisions and incongruous elements, at the same time preserving and reconstructing those secondary elements necessary to maintain the functionality of the building. Following that decision, all secondary divisions, breeding cages and their substructures were remove and original columns and interior design elements such as the preserved capitals and frieze elements and the base of the fountain were exposed. The secondary technical corridors were rebuilt and insulated on both walls, bases and flat roofs. The secondary external cages were demolished and replaced by new mesh aviaries on lightweight structures with a contemporary form adapted to the massing of the historic building. All non-exposed roofs and partitions were insulated. All installations were replaced, including the modernization of the heat source and new plumbing and BMS to optimize energy consumption and control indoor climate conditions. New ducts and pipework were installed for the installations, using the spaces under the secondary staircases and in the secondary technical corridors on the sides of the building to minimize the impact on the historic fabric.

Thirdly, the restoration of the characteristic details and decorations of the interior was performed, which included restoring cast iron columns with heads, cornice with frieze, skylight windows and completion of the detail of the skylight structure with its conservation, repair and recomposition—to the original state—of the preserved elements of the fountain at the crossing of the naves. This procedure of restoration of architectural details was repeated on the elevations (restoration of the original form of the cordon cornice and of the windows and woodwork of the skylight story). The cast-iron columns were fairly well preserved. However, the wrought iron, steel substructure and decorative elements of the original aviaries had not survived.

On the basis of the preserved archival materials—the original technical project of the facility, the preserved iconography and an analysis of the materials—a project was prepared for the reconstruction of the damaged capitals of the columns, missing elements of the steel structure of the skylight, the cornice and frieze with painted decoration; divisions and colors of the floors realized with a new technology corresponding to the conditions of the breeding-exhibition facility, but reproducing the divisions and colors of the former terrazzo floors; and recomposition and renovation of the fountain in the last phase registered on the iconography before 1945. Similarly, the profile of the external cornices on the side walls and on the reconstructed band of skylights was reconstructed. The coloring of the building was carried out on the basis of the preserved layers, according to the stratigraphic research, after the calibration of the different variants during the execution phase, under the conservation supervision of the Municipal Conservator of Monuments.

During the design process, it was necessary to address the challenge of meeting both the technical requirements and the legal design standards to ensure the building's proper operation. Cabeza et al. suggest that particular attention should be paid to the incorporation of heating and insulation technologies to ensure indoor comfort and functionality, reduce carbon footprint and preserve the building's architectural and historical value [27]. With this in mind, the existing partitions were carefully insulated to avoid affecting the historic part of the façades that are most exposed. The technical areas' secondary partitions, attics' flat roofs, aviaries' plinths and foundation walls were insulated after cleaning, repairing and, where necessary, installing damp-proofing. Accordingly, the issue of proper accessibility was addressed in such a way that it did not interfere with the façade of the building. The disabled platform was designed at the left annexe of the entrance. This required intervention in the ceiling and walls of the building but allowed the façade with the portal to be retained without additional structures. The entrance was on the side of the entrance risalit.

Finally, the restoration of all the surviving original decorative elements, such as the rusticated, plastered façade, surviving cornices, stone plinth, staircase and entrance portal, internal columns and surviving but decayed fountain in the interior, was made. Based on the

historical-iconographic and stratigraphic research and the work program, a conservation restoration of the entire façade, portal and door carpentry was designed (Fig. 9).

Fig. 9. Wrocław Zoo Bird House after renovation:
a - new external aviaries against a background of the reconstructed historical form of the building;
b - entrance (photo by B. Żmuda); c, d - interiors (photo by B. Żmuda)

To sum up, the Wrocław Zoo has a rich history. It has survived interruptions in its activity and expanded to its current size. The presented case study focuses on the Bird House, built in 1889 for breeding birds and later converted into a café. The post-war reconstruction brought significant changes. Over the years, the Bird House has been renovated and extended, resulting in the removal of many original decorative features by 2018. The aim of the most recent conservation renovation was to adapt the facility to meet the current needs of the animals while preserving its historical and architectural significance. Thorough historical, iconographic and monumental studies were undertaken to inform the restoration process. The conservation and renovation project considered the original form, detail and functional layout of the building while adapting it to the needs of both the visitors and animals.

Architectural and artistic heritage of the Old Zoo in Poznań

The history of the establishment of the first zoo in Poznań (now called the Old Zoo) began with a private collection of 11 animals, including exotic ones, belonging to the president of a bowling club located in the beer hall of the Stargard Railway Station, which had existed since 1848 [28], outside the fortified area of the city in the village of Jeżyce, incorporated into the city in 1875 [29]. On 15 May 1875, to raise funds and formalize the care of the animals living in the catering garden of the aforementioned station, located near the suburban walking park, the Poznań Zoological Garden Association was registered. The commitment of the successive directors and administrators of the institution, particularly the chairman of the Board of Trustees, Robert Jaeckel (1851-1907), as well as close cooperation with the prestigious Berlin Zoo, contributed to its development according to the spatial and architectural patterns of the time [30].

The Poznan Zoo saw a significant expansion of its animal collection, which by the end of the 19th century had reached 900 animals of 400 species living on 5.24 hectares [30]. Because of this high density, the facility was justifiably criticized for the next 100 years [18, 31] until the opening of the 121-hectare New Zoo in another part of the city in 1974 and the gradual relocation of much of the animal population there. Nevertheless, the zoo's popularity grew during the interwar period, as it was the only zoo in the reborn Poland until 1928. During the General National Exhibition in the summer of 1929, the zoo was visited by over 700,000 people. After the Second World War, the zoo continued to operate, renewing its collection, but from an architectural heritage point of view, the modernization of the pavilions in the 1960s and 1980s disfigured and impoverished the architectural expression of many of them.

Today, Poznań's Old Zoo is an area of architectural, artistic and natural interest. It is one of the few green enclaves in this part of the city. According to Bielawa-Pałczyńska the complex of the Old Zoo contains valuable architectural objects [32] and ten of them have been included in the Register of Historical Monuments of the City of Poznań since 25th April 1978 under the entry A/201 [33]. According to the register, the protected architectural heritage includes the Alpine Garden with a grotto (1905-06), designed by Böhmer and Preul and built on the site of a previous half-timbered monkey house, which holds great value. Next to the area are the former bear cages, which now house ornamental plants and a small pond with carp. Adjacent to the cages is the former aviary (Fig. 10), which features an artificial rock in the interior. Currently, the aviary is home to small capuchin monkeys (*Sapajus apella*), which enter from the nearby monkey house through a netted corridor over the visitors' walkway. The building is designed in neo-Gothic style and the vaulted reinforced concrete interior is inspired by the famous Azure Grotto in Capri.

Fig. 10. Old Zoo Poznan - Aviary in Alpinarium with grotto
(designed by Böhmer and Preul 1905-06),

An important architectural element in the establishment of the zoo and the basis for fundraising in its initial stages, was the entertainment section of the garden, with an elegant restaurant housed in a brick building on Bukowska Street. The building was built in 1908 to a design by Paul Pitt, the author of many of the city's Art Nouveau townhouses. For the restoration he used a proto-modernist aesthetic inspired by Berlin architecture. The building has a rectangular plan and is covered by a hipped roof with pronounced eaves (Fig. 11). The building was once flanked by a platform, a terrace connected to the animal house by garden steps [34]; however, it did not last to this day. After 1918 the building became the property of the City of Poznan and at present it houses the Museum of Environmental Knowledge and the Institute of Agricultural and Forest Environment of the Polish Academy of Sciences.

Fig. 11. Old Zoo Poznan - Museum of Environmental Knowledge and Institute of Agricultural and Forest Environment of the Polish Academy of Sciences (ca. 1910).
Illustration source: https://polska-org.pl/8232910,foto.html?idEntity=7384622

In the center of the garden there is a small pavilion for elephants and giraffes (Fig. 12). It is a remnant of the steam engine depot of the former Stargard Railway Station, the very center of the Old Zoo. The steam engine shed was built as a frame structure, due to its location in the fortification zone of the Poznan fortress, which allowed no permanent brick buildings due to military requirements [28]. The building was rebuilt in the 1880^{s} and 1890^{s}, gradually losing its original architectural features. Today, the skeletal structure of the façade is no longer visible.

Fig. 12. Old Zoo Poznan, former elephant and giraffe house

At the beginning of the twentieth century, the strict fortress restrictions (Rayonbeshrankungen) were no longer in force and it was during this period that several brick structures were built in the zoo [35]. For example, the monkey house and the aviary made of brick with wooden elements. In the first stage of the zoo's development, during the reign of Robert Jaeckel, the construction of the large carnivore pavilion began, the northeastern wall of which was decorated with minarets reminiscent of Moorish or Indian architecture. Unfortunately, wartime damage and subsequent modernization in the 1960^{s} and 1980^{s} obliterated the building's distinctive, exotic style. It now houses the Zoo and Lion History Museum (Fig. 13) [36]. The Ostrich Pavilion, adjacent at the rear, also had a neo-Moorish façade, the surviving parts of which, evoking associations with the Great Mosque of Cordoba,

have recently been painstakingly repainted (Fig. 14). The zoo was extended in 1928-29 with the construction of a brick pavilion for rodents and small carnivores, a pavilion with an aquarium and a brick entrance with ticket offices.

Fig. 13. Old Zoo Poznan, Old Lion House pavilion—former cages of the big cats, now a didactic part of the museum

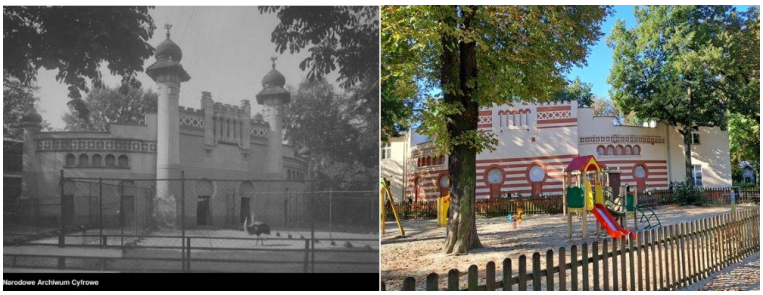

Fig. 14. Old Zoo Poznan - Large carnivore pavilion with ostrich pavilion (ca. 1924) (left). Illustration source: https://gloswielkopolski.pl/zoo-w-poznaniu-przed-wojna-wygladalo-pieknie-przenies-sie-w-czasie-zdjecia/ar/c1-14537397. Present view of the old ostrich pavilion (right)

In the 1970ˢ, the artist and engraver Stanisław Mrowiński created unique sgraffiti depicting animals on the facades of the Bird House, Monkey House, Small Carnivores and Aquarium buildings. At present they are still in place and serve as the unifying element of the various architectural forms of the pavilions (Fig. 15). It should be added that greenery has been an important and integral part of zoos since their beginning. High greenery and flower beds adorned the entertainment area of the garden. Despite the damage caused by the war in 1945, which affected not only the buildings but also some of the old trees and even though almost 150 years have passed since the garden was created, the Old Zoo still has chestnut trees that are protected by law and have had the status of a natural monument since 1992.

Even though the post-war period saw a significant decline in the historical architectural forms and the majority of investments were made by the Poznań Zoo in the New Zoo, the Old Zoo is still attractive for visitors. It is treated and presented as an essential element of the city's urban, architectural and immaterial heritage. Ongoing renovations are being carried out and information boards with historical photographs and descriptions of the pavilions and their most famous animal inhabitants have been placed throughout the Old Zoo (Fig. 16). This strategy is in line with the idea of presenting heritage and preserving the social value of monuments as described by Sroczyńska and should be evaluated very positively [37].

Fig. 15. Old Zoo Poznan- sgraffito by S. Mrowiński on the pavilions of the birdhouse

Fig. 16. Old Zoo Poznan, Didactic and informative board showing the former appearance of the alpine garden with grotto

The study shows and describes various conservation strategies employed to maintain and enhance the Old Zoo's architectural and natural heritage. This includes ongoing renovations, restoration efforts and educational initiatives aimed at preserving the site's historical significance.

Historical monuments of the Cracow Zoological Garden

In Cracow, as in other European capitals, royal menageries had been maintained since the Middle Ages, but they declined with the transfer of the capital to Warsaw at the end of the 16th century and then disappeared completely. In 1895, a small zoo was established in Cracow

Park, which lasted for a few years [38]. It was not until 1927 that the idea of a zoo was born. A clearing in the central part of the Wolski Forest, located in the hills to the west of the city, where a peasantry had already existed since 1926, was chosen as the site of the future zoo [39]. The forest complex surrounding the garden is a natural area, a fragment of a former beech forest, unique in the metropolis, currently part of the Bielany-Tyniec Landscape Park and a fragment of the "green wedge" of natural areas and city parks [40]. It penetrates deeply into the spatial structure of the city from the west, up to the borders of the historical zone under UNESCO protection [41]. The zoo was officially opened on 6 July 1929 in the presence of the President of the Second Polish Republic, Ignacy Mościcki and its director until 1966 was Antoni Koziarz, who made an enormous contribution to its development. During the Nazi occupation (1939-45), the zoo remained under German administration and some of the animals were taken to German zoos. After 1945, the zoo received some of the animals from the destroyed Wrocław Zoo [42].

In 1963, the Municipal Zoological Park and Garden Company was established and from then on, the zoo began to expand and rebuild. In 1975 the zoo was extended to 15 hectares and in the following years the enclosures and paddocks underwent successive phases of reconstruction, adaptation and adjustment to the changing requirements of exposure and breeding, particularly intensive after 2000. This process continues with several major building projects currently underway on the zoo site. The zoo's animal collection has also grown and it participates in international programs for the breeding, conservation and reintroduction of many endangered species.

The zoo's flora has also been enriched over the years. Thanks to the specific climatic conditions (an area surrounded by natural forests, at an altitude of approximately 345 meters above sea level, on average 150 meters above the city, above the prevailing smog), there are excellent conditions for the cultivation of many plant species, including azaleas and rhododendrons, in the richness of which the zoo successfully competes with the Botanical Garden of the Jagiellonian University, located in the historical center of Cracow. The zoo contains old trees, some of which are protected, as well as more recent plantings of various species and fragments of natural forest. It is an area of great biodiversity and an important part of the system of green areas in Kraków.

Most of the zoo's original buildings were wooden structures that have not survived or have been rebuilt using different materials but following the formal decisions. Of the zoo's pre-war monuments, three elements have survived in their original form: a small mammal enclosure, now used in the summer to exhibit land tortoises (Fig. 17); a former marten house (now serving as a sculpture in one of the flower beds at the entrance to the zoo) and a glassed-in "Bison Pergola" from the 1930[s] (Fig. 18), located on the main axis of the garden next to the current giraffe enclosure.

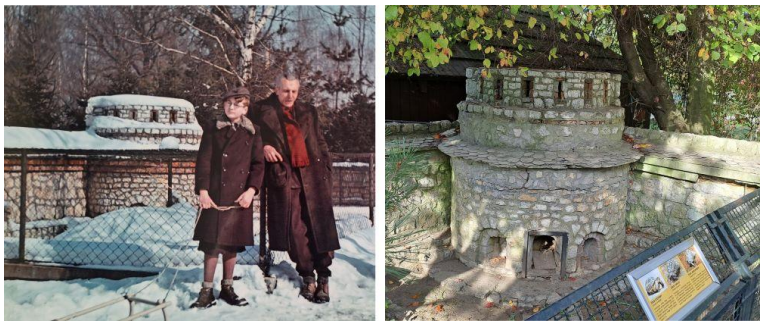

Fig. 17. Cracow Zoo—former small mammal enclosure, now summer tortoise enclosure, view in 1940 (left) (photo by M. Szumiec) and actual state (right)

Fig. 18. Cracow Zoo—"Bison Pergola" from the 1930ˢ

The pergola is the only object from the zoo listed in the Municipal Register of Monuments of the City of Kraków under no. 5850 and no animal house or enclosure is listed in this document [43]. Another highly interesting object in the same part of the zoo is the aviary of birds of prey, with dynamic and elegant form dating from the 1950ˢ. Currently it is inhabited only by great condors (Vultur gryphus) and is not under any type of legal protection.

In the 1960ˢ and 1970ˢ, the garden authorities collaborated with the highly talented artists Roman and Helena Husarski. Roman Husarski (1923-2004) was a writer, architect and sculptor who taught at the Drawing, Painting and Sculpture Department of the Faculty of Architecture at the Cracow University of Technology. Together with his wife Helena, in the 1950ˢ he patented a technique of ceramic decoration called piropicture, which involved spraying a liquid-colored glaze onto a substrate (masonry, plaster) heated by gas or electric burners so that the two layers were permanently bonded [44]. Using this technique, they created many avant-garde decorations for important public buildings in Kraków and Malopolska, such as the northern wall of the KS Korona hall in the Podgórze district of Kraków [45]. They also designed and executed numerous mosaics, mostly abstract, which decorated both private and public buildings, such as the complex of the Cracovia Hotel and the Kijów Cinema, designed by W. Cęckiewicz and built in the 1960ˢ and 1970ˢ [46]. For the Cracow Zoo, they made a mosaic wall decoration for the Exotarium, connected to the Monkey House, with the characteristic 'crocodile' at the entrance and mosaics for the complex of cages and indoor enclosures for big cats, located opposite the Monkey House, completed in 1967 in the front part of the zoo (Fig. 19).

Fig. 19. Cracow Zoo - Mosaics in the big cat enclosures before (1967-1968) and after rebuilding of the walls between the enclosures (2009). Illustration source: Cracow Zoo's archive (left); photo by K. Wawer/P. Redmerski (right)

The complex of enclosures for big cats functioned until the animals were gradually moved to new, larger pavilions in the distant and more wooded part of the garden in 2012-18, which met modern breeding and display requirements. Parallelly, it was decided to demolish it and build a modern pavilion for chimpanzees and macaques in its place. For this task, detailed documentation was prepared. Although the cats' enclosures were not under the legal Conservators protection, the mosaics on the internal walls were of great artistic value; therefore, it was decided to preserve and relocate them.

As a first part of the design work, an inventory of the building was carried out, resulting in the knowledge of the actual technical condition of the building. It was built with poor-quality materials and had been subject to particularly rapid deterioration over many years of use. The mosaics lacked the proper conservation and protection as well, resulting in progressive deterioration. Due to their high artistic value, the mosaics required rapid intervention. The work of Helena and Roman Husarski, which forms the backdrop to the five outdoor runs, was therefore inventoried (Fig. 20) and photographed.

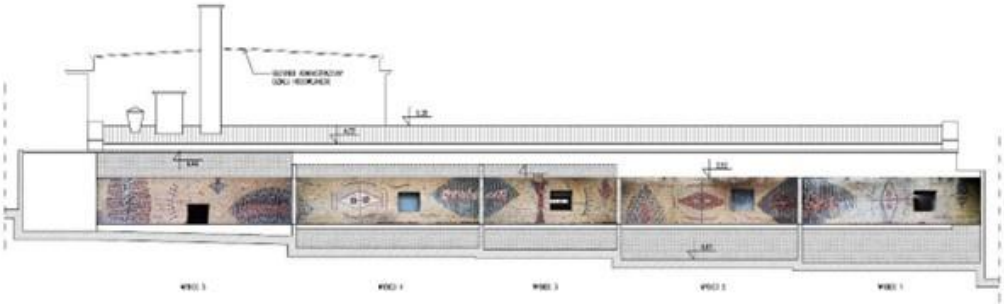

Fig. 20. Cracow Zoo - Inventory of the external mosaics in the big cat enclosure for the purpose of conservation. (Source: K. Wawer/P. Redmerski 2009)

The inner walls of the animal enclosures were also decorated with mosaics (Figs. 21 and 22). The pavilion was originally designed to allow visitors to view the animals from inside. However, these rooms have not been open to the public since at least 1980.

Fig. 21. Cracow Zoo - Existing condition of the interiors of the big cat pavilion before its demolition in 2009 (photo by K. Wawer/P. Redmerski)

The fragments of the ornaments located on the outdoor walkways were selected for conservation and exhibition based on the conservation program approved by the decision of the Municipal Conservator of Monuments. It made it possible to preserve the entire composition. During the preparation of the study, it was found that the external mosaics were designed as a single composition only divided by the grates between the catwalks. Due to the nature of the building and the subsequent use of solid walls (originally there were steel grids between the

enclosures, but the animals exhibited there had to be separated by opaque partitions), it was not possible to perceive the entire work between the enclosures.

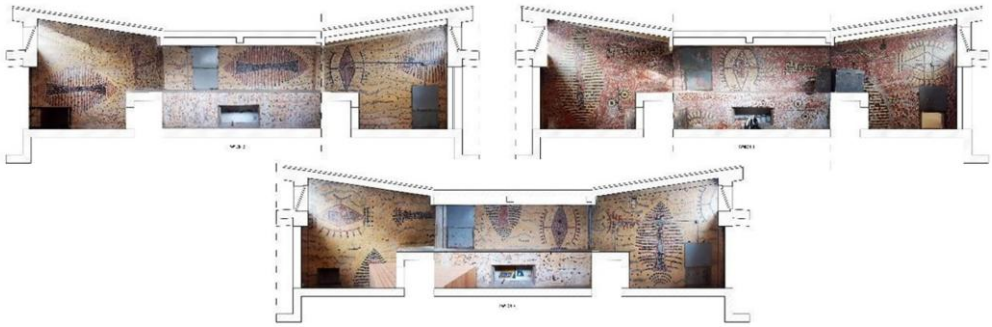

Fig. 22. Cracow Zoo - Inventory of the elevation of selected interior rooms of the pavilion with mosaics (Source: K. Wawer/P. Redmerski 2009)

The conservation project entailed relocating the long external mosaic to a dedicated section of the zoo's perimeter fence, adjacent to the big new cat pavilion. Figure 23 shows the fragment of the projected relocation.

Fig. 23. Cracow Zoo—Fragment of the exhibition project of the restored mosaic on the external wall. (Source: K. Wawer/P. Redmerski 2009)

This has enabled the preservation and proper display of the original composition of ceramic tiles in a pisco beige tone, adorned with red, black and white abstract geometric motifs in an African style. The mosaic now serves as the backdrop for an animal enclosure and is visible from the walking alley. The artwork is displayed on a section of fence that is located approximately 15 meters away from the pedestrian route. This location was chosen by the authors to allow for a complete view of the artwork. The mosaic was originally located on the outside wall of the pavilion, where it was also more than 13 meters away from the viewer. The composition is bordered on one side by the recently constructed 'second entrance to the zoo. On the other side, a double zoo exit building is planned to replace the current entrance gate. Two fragments of a reinforced concrete wall are located on either side of the decoration. These fragments form the background for the central part and visually separate it from the existing and planned entrance and exit buildings.

The fence was designed to protect the revalued ceramic decoration from rain. The cornice with a drip prevents dripping from above, while the lower shape of the parapet/sill protects the mosaic from splashes and rising damp from the ground (Fig. 24).

It was technically impossible to conserve the mosaics in their entirety. Due to the extended period of use of the rooms, the shape of the walls and the technical infrastructure (secondary operation of numerous installations), their deterioration was considerable, as is often the case with wall decorations in heavily used buildings [47]. It was therefore decided to preserve the most valuable parts. This was preceded by a thorough analysis and the individual elements of the mosaics were selected in consultation with the Municipal Conservator of Monuments. They were placed in crates to await reuse and exhibition.

Fig. 24. Cracow Zoo—view of completed wall with mosaics exhibition

In 2022, during the modernization of the changing room and workshop building at the rear of the Zoological Garden, some other, previously unknown ceramic decorations designed and produced by Mr. and Mrs. Husarski were discovered. It is supposed that they have been moved there during one of the renovations of the Exotarium building (Fig. 25). In connection with the planned construction of the 'New Exotarium' on the zoo site, it is planned to display them and incorporate them into the planned building.

Fig. 25. Cracow Zoo—mosaics found in the staff changing rooms from the Exotarium pavilion (left), mosaic of crocodile at the entrance to the Exotarium (right) (photo by M. Raźny, P. Redmerski 2020, 2024)

Results and discussion

The study results reveal three distinct methods for conserving and managing the architectural and artistic heritage in zoological gardens. These findings shed light on effective conservation strategies and ongoing efforts. A primary outcome of this research is a better understanding of the valuable elements within zoos that warrant identification, appreciation and protection. These elements contribute to the attractiveness of these sites as tourist destinations. By presenting and analyzing selected cases from Polish zoological gardens [7], this study

contributes to the existing knowledge of zoos as heritage tourist attractions. The cases provide insights into common strategies and challenges related to preserving and managing cultural heritage and offer valuable guidance to practitioners.

The renovation of the aviary, the pavilion and the fence wall at Wroclaw Zoo was awarded in the competitions "Beautiful Wroclaw 2020" and "Well-Kept Monument 2022". This underlines their importance in the field of modernization of historical buildings [48, 49]. The Wroclaw Zoo has been one of the most popular zoological gardens in Poland since the 1960s. Thanks to strategic investments such as the introduction of the modern Afrykarium in 2014 [50], the zoo continues to attract a significant number of visitors, with over 1,700,000 recorded between January and July 2023. The zoo's appeal is not only due to its diverse collection of more than 10,000 animals representing 1,100 species but also to its commitment to preserving and restoring historic structures such as the aviary. This is complemented by careful landscaping that allows the growth of valuable mature trees.

It is, however, important to provide information about the heritage and to build the zoo brand not only based on the latest investments and breeding facilities but also based on the objects and works of art preserved in historic zoos. Such activities can be seen as supporting the construction and transmission of humanistic heritage values [51] but also play a vital role in setting the zoo among the tourist heritage sites of the city [7]. This strategy can be seen particularly in the oldest zoos in Poland: the Wroclaw Zoo and the Old Zoo in Poznań.

The Old Zoo in Poznań was founded in 1848 and from this time it evolved along with the city's urban development and architectural trends. Despite the modernization and several rebuildings, it has retained its historical significance and architectural value and several of its buildings have been declared historic monuments. The zoo's heritage has been preserved during the contemporary modernization efforts and this is clearly visible in the preservation of architectural elements such as the elephant and giraffe pavilion, the remains of the steam engine depot and the carnivore pavilion with its neo-Moorish façade. The zoo's aesthetics are further enhanced by the presence of greenery and artistic contributions such as the sgraffiti by Stanislaw Mrowiński. Despite the challenges resulting from difficult periods in history, such as World War II and the following communist times, the zoo has retained its value and charm based on the presence of the historical buildings and details.

Cracow Zoo has the shortest history from the group being discussed, but it is also characterized by periods of expansion and renovation, notably during the 1960s and 1970s when collaborations with renowned artists like Roman and Helena Husarski resulted in the creation of distinctive mosaic decorations that adorn various structures within the zoo. Recent renovation endeavors have unearthed additional ceramic decorations, signaling an ongoing commitment to integrating these artistic elements into future developments, such as the planned New Exotarium Pavilion. This approach needs to be valued positively, especially having in mind that actually no animal buildings or enclosures are under Conservators protection.

As mentioned in the introduction, the management of a zoo is complex as it must cover both animal welfare and visitor attraction. Based on the evidence from museums presented in the study by Spiridon and Sandu [52], we can assume that the latter can be achieved through numerous strategies that evolve according to modern society's expectations and include, for instance, more engagement in the life of the cultural institution. In the case of zoological gardens, the engagement strategy can be based not only on the animals but also on the architectural and artistic heritage, which builds the uniqueness of the facility.

Despite undergoing numerous adaptations and modernizations, many historic zoos still retain listed buildings, some of which were pioneering in their design and construction for their time. These structures often utilized innovative materials such as cast iron and glass in the 19th century and reinforced concrete, pre-stressed concrete, or tendon and shell structures in the 20th century. Moreover, facilities designed to house large and dangerous animals, particularly during the transition from the 19th to the 20th century, prioritized durability and robustness, utilizing

technical solutions similar to military architecture of the same era, which, after years of neglect, are now valued, preserved and often re-used [53]. Nowadays these zoo structures can become, like industrial and infrastructural facilities, protected monuments of architecture, as they contribute to our European architectural and urban heritage [54].

Furthermore, it is essential to acknowledge the enduring influence of modernism on European zoos, encompassing both the first modernism of the interwar period and the late modernism of the 1960ˢ and 1970ˢ. Iconic examples include the Penguin Pool at ZSL London Zoo, conceived by Berthold Lubetkin in collaboration with the Tecton Group and completed in 1935 [55]. This oval pavilion, inspired by the double helix, embodies four of Le Corbusier's five principles: open plan, free facade, horizontal bands of windows and pillars. Despite no longer serving its original function since 2004, the structure remains a testament to modernist architectural innovation and is revered as a global masterpiece of its genre.

Today, such architectural monuments often stand as cultural heritage sites within zoos, serving as exhibits in open-air museums that attract visitors seeking to admire these 'spatial sculptures'. The significant post-World War II development and reconstruction efforts across European zoos have resulted in the preservation of numerous objects and even entire zoological gardens within this architectural legacy. Examples include the Silesian Zoo in Chorzów, constructed on reclaimed post-mining land and opened to the public in 1958, as well as smaller-scale artifacts like the sgraffito from the Old Zoo in Poznan and mosaics from Cracow Zoo. These sites contribute to the places of historical and cultural significance within cities and across Europe.

Conclusions

The architectural heritage of the zoos in Poznań, Wrocław and Cracow can serve as valuable examples of historical zoological gardens that are in the process of adapting to contemporary standards while preserving their unique identities. Each case reflects distinct approaches to the preservation and adaptation of existing buildings and artworks, making them relevant case studies for understanding the challenges associated with heritage preservation in modern zoological gardens. Despite numerous adaptations and alterations, the historic zoos still offer buildings and structures showcasing materials, decorations and construction techniques that reflect the spirit of their time.

The historic structures preserved in zoos are mainly pavilions and enclosures for animals, but also buildings for the convenience and comfort of visitors (restaurants, concert halls) and for the daily needs of zoo staff. There are also elements of small architecture, aviaries, enclosures, walls, gates and fences and works of art such as sculptures, paintings and mosaics. They still serve their original purpose (such as the objects discussed from Wroclaw), or they have changed their purpose or place of display (especially their animal tenants). The reuse of old cages for smaller species, botanical displays or educational purposes is a common use of historic buildings and enclosures in many zoos.

The management and conservation strategies presented in the article differ, from conservation of the existing state with possible designation for other functions (the monuments of the Old Zoo in Poznan, the enclosure of small mammals, now turtles in the Cracow Zoo), creative adaptation with isolation and partial restoration of the most valuable elements (Bird House from the Wroclaw Zoo), conservation and restoration of the original state (outer wall and pergola at the Wroclaw Zoo), or relocation (mosaics at the Cracow Zoo) are the most common practices for preserving the architectural and artistic heritage in zoos.

The general conclusion of the research is that the historic zoological gardens in Poland undoubtedly contain buildings and valuable works of art that can enrich the visitor's experience and contribute to their overall attractiveness if managed, conserved and exhibited properly. However, a general problem that needs further recognition can be identified. Namely, the forms

of protection among historical zoos vary widely, from protection of the entire zoo area (Wroclaw, Poznań) without identification of specific objects to no form of legal protection (Kraków). Although the investments in Cracow Zoo can be seen as a positive example, this situation may lead to the degradation, even demolition, of pavilions or enclosures that are examples of high-quality modern architecture of the XX century.

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References

[1] C. Safina, *Where Are Zoos Going—or Are They Gone?*, **Journal of Applied Animal Welfare Science**, **21**, (sup1), 2018, pp. 4-11, https://doi.org/10.1080/10888705.2018.1515015.

[2] S.L. Spooner, S.L. Walker, S. Dowell, A. Moss, *The value of zoos for species and society: The need for a new model*, **Biological Conservation**, **279**, 2023, Article number: 109925. https://doi.org/10.1016/j.biocon.2023.109925.

[3] S.P. Hill, D.M. Broom, *Measuring zoo animal welfare: theory and practice*, **Zoo Biology**, **28**(6), 2009, pp. 531-544. https://doi.org/10.1002/ZOO.20276.

[4] N. Wielebnowski, *Stress and distress: Evaluating their impact for the well-being of zoo animals*, **Journal of the American Veterinary Medical Association**, **223**(7), 2003, pp. 973-977. https://doi.org/10.2460/javma.2003.223.973.

[5] L. White, *Zoos Victoria: Branding, Marketing and Designing Multi-Location Zoos*, in: W. Frost (Ed.), **Zoos and Tourism: Conservation, Education, Entertainment?**, 2010, pp. 204-216, Channel View Publication, vol. 46, series *Aspects of Turism*, Bristol, https://doi.org/10.21832/9781845411657-023.

[6] P. Mason, *Zoo tourism: The need for more research*, **Journal of Sustainable Tourism**, **8**(4), 2000, pp. 333-339, https://doi.org/10.1080/09669580008667368.

[7] P. Mason, *Zoos as heritage tourism attractions: A neglected area of research?*, **International Journal of Heritage Studies**, **5**(3-4), 1999, pp. 193-202, https://doi.org/10.1080/13527259908722267.

[8] M. Adamska, *Zoological Garden In Opole. Harmony Of The World Of Plants And Animals*, **Teka Komisji Urbanistyki I Architektury Pan Oddział W Cracowie**, 2017, pp. 169-179.

[9] P. Sahlins, *The Royal Menageries of Louis XIV and the Civilizing Process Revisited*, **French Historical Studies**, **35**(2), 2012, pp. 237-267, https://doi.org/10.1215/00161071-1498463.

[10] Zoo Vienna, *zoovienna*. Available: https://www.zoovienna.at.

[11] O.B. Fekete, K.M. Szilágyi, *Contemporary zoo design and the historical treasure of garden art: Tiergarten Schönbrunn*, **Journal of Landscape Architecture**, **16**(3), 2021, pp. 82-93, https://doi.org/10.1080/18626033.2021.2046809.

[12] Jardin des Plantes, *jardindesplantes*. Available: https://www.jardindesplantesdeparis.fr
[13] London Zoo, *London Zoo*. Available: https://www.londonzoo.org.
[14] M. Drożdż-Szczybura, *Buildings in cities for non-livestock animals*, **Przestrzeń Urbanistyka Architektura**, **1**, 2022, pp. 5-18, https://doi.org/10.37705/pua/1/2022/02.
[15] N. Davies, **Boże igrzyska : historia Polski**, Kraków: Wydawnictwo Znak, 2010.
[16] G. Brzęk, *Historia zoologii w Polsce do 1860 roku*, **Prace Komisji Historii Nauki Polskiej Akademii Umiejętności**, **3**, 2001, pp. 115-158.
[17] J. Harasimowicz, W. Suleja (Eds.), **Encyklopedia Wrocławia**, Wrocław: Wydawnictwo Dolnośląskie, 2006.
[18] H. Szafran, **Poznań i okolice**, Poznań: Poznańskie Towarzystwo Przyjaciół Nauk Wydawnictwa Naukowe, 1959.
[19] * * *, **GDOŚ**, Available: https://www.gov.pl/web/gdos/wykaz-ogrodow-zoologicznych-w-polsce.
[20] * * *, **Eaza**, Available: https://www.eaza.net/.
[21] * * *, **Waza**, Available: https://www.waza.org/.
[22] H. Adamiczka, B. Adamiczka, *Rozwój, odrzucenie, powrót – fazy interakcji miasto-rzeka w kontekście Wrocławia / Development, rejection, return – phases of city-river interaction in the context of Wrocław*, **Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu**, **443**, 2016, pp. 10-22. https://doi.org/10.15611/pn.2016.443.01.
[23] S. Rozalski, *Protection of historical greenery in Wrocław. Investment and renovation works in Szczytnicki Park in the years 2000–2018*, **Architectus**, **1**(69), 2022, pp. 129-139, https://doi.org/10.37190/arc220111.
[24] * * *, **Gminna Ewidencja Zabytków Wrocławia,** GEZ Wrocław, Available: https://gis.um.wroc.pl/imap/?gpmap=GEZ.
[25] M. Acierno, S. Cursi, D. Simeone, D. Fiorani, *Architectural heritage knowledge modelling: An ontology-based framework for conservation process*, **Journal of Cultural Heritage**, **24**, 2017, pp. 124-133, https://doi.org/10.1016/J.CULHER.2016.09.010.
[26] L. Seduikyte, I. Grazuleviciute-Vileniske, O. Kvasova, E. Strasinskaite, *Knowledge transfer in sustainable management of heritage buildings. Case of Lithuania and Cyprus*, **Sustainable Cities and Society**, **40**, 2018, pp. 66-74, https://doi.org/10.1016/j.scs.2018.03.013.
[27] L. F. Cabeza, A. de Gracia, A. L. Pisello, *Integration of renewable technologies in historical and heritage buildings: A review*, **Energy and Buildings**, **177**, 2018, pp. 96-111, https://doi.org/10.1016/j.enbuild.2018.07.058.
[28] J. Wiesiołowski, *Wstęp*, **Kronika Miasta Poznania. Koleje**, **4**, 2013, pp. 4-13.
[29] J. Śmiełowski, *Jeżyce*, **Kronika Miasta Poznania. Jeżyce**, **2**, 2000, pp. 201-220.
[30] A. Taborski, P. Urbański, **Ogród Zoologiczny w Poznaniu. Dzieje i perspektywy rozwoju**. Poznań - Warszawa: Wydawnictwo Naukowe PWN, 1975.
[31] M. Szczygielska, *Elephant empire: zoos and colonial encounters in Eastern Europe*, **Cultural Studies**, 2020, pp. 789-81, https://doi.org/10.1080/09502386.2020.1780280.
[32] J. Bielawa-Pałczyńska, **Poznań Spis zabytków architektury**. Poznań: Wydawnictwo Miejskie Poznania, 2005.
[33] * * *, ***WUOZ Poznań,*** Available: http://poznan.wuoz.gov.pl/rejestr-zabytkow.
[34] J. Pazdera, **Atlas architektury Poznania**. Poznań: Wydawnictwo Miejskie Poznania, 2008.
[35] J. Skuratowicz, **Architektura Poznania: 1890-1918**. Poznań: Wydawnictwo Naukowe UAM, 1991.
[36] * * *, **Zoo Poznan**, Available: https://zoo.poznan.pl/informacje-stare-zoo/.
[37] J. Sroczyńska, *Preventive maintenance of historical buildings in European countries – analysis of selected examples*, **Architectus**, **2**(70), 2022, pp. 0-2, https://doi.org/10.37190/arc220205.

[38] A. Zachariasz, **Zielony Kraków dla przyjemności i pożytku szanownej Publiczności**. Cracow: Wydawnictwo Politechniki Cracowskiej, 2019.
[39] * * *, **Encyklopedia Cracowa**. Warszawa; Kraków: PWN, 2000.
[40] A. Zachariasz, *Development of the System of the Green Areas of Cracow from the Nineteenth Century to the Present, in the Context of Model Solutions*, in **IOP Conference Series: Materials Science and Engineering**, **471**(11), Article number: 112097, 2019, https://doi.org/10.1088/1757-899X/471/11/112097.
[41] * * *, **UNESC,.** Available: https://whc.unesco.org/en/list/29/.
[42] * * *, **Zoo Kraków,** Available: https://zoo-Cracow.pl/historia-zoo/.
[43] * * *, **Gminna Ewidencja Zabytków Cracowa,** GEZ Kraków, Available: https://www.bip.Cracow.pl/zalaczniki/dokumenty/n/400543/karta.
[44] B. Kostuch, **Kolor i blask. Ceramika architektoniczna oraz mozaiki w Cracowie i Małopolsce po 1945 roku**. Kraków: Muzeum Narodowe w Cracowie, 2015.
[45] J. Purchla, M. Fabiański, **Historia architektury Cracowa w zarysie**. Kraków: Wydawnictwo Literackie, 2001.
[46] J. Gyurkovich, *Quo vadis „Cracovia"*, 2016, pp. 18-24. https://doi.org/10.17425/WK48CRACOVIA.
[47] P. Spiridon, I. Sandu, L. Stratulat, *The conscious deterioration and degradation of the cultural heritage*, **International Journal of Conservation Science**, **8**(1), 2017, pp. 81-88.
[48] * * *, **Competition**, Beautiful Wrocław 2020. Available: https://www.wroclaw.pl/przedsiebiorczy-wroclaw/konkurs-piekny-wroclaw-edycja-xxxi.
[49] * * *, **Competition**, Zabytek Zadbany. Available: https://nid.pl/konkursy/zabytek-zadbany/.
[50] * * *, **Zoo Wrocław**, Available: https://zoo.wroclaw.pl/.
[51] R. Blazy, M. Łysień, I.G. Sandu, J. Dudek, *Historical and Current Humanist Ic Values in Contemporary Urban Trends and Ideas*, **International Journal of Conservation Science**, **13**(4), 2022, pp. 1159-1172.
[52] P. Spiridon, I. Sandu, *Museums In The Life Of The Public*, **International Journal of Conservation Science**, **1**(4), 2010, pp. 227-240.
[53] K. Dudzic-Gyurkovich, F. Suchoń, J. Gyurkovich, G. Stawiarski, B. Boba-Dyga, J. Olesiak, *Conservation of 19th century defensive structure. The case of Fort Swoszowice in Cracow, Poland*, **International Journal of Conservation Science**, **13**(2), 2022, pp. 417-430.
[54] M. Orlenko, Y. Ivashko, W. Niebrzydowski, H. Trammer, M. Krupa, K. Paprzyca, *Restoration and Preservation Procedure of Architectural Monuments. Railway Stations with Monumental Art of the Socialist Period (On the Examples of Ukraine and Poland)*, **International Journal of Conservation Science**, **12**(4), 2021, pp. 1355-1376.
[55] P. Gruffudd, *Biological cultivation Lubetkin's modernism at London Zoo in the 1930s*, **Animal Spaces - Beastly Places**, (Editors: C. Philo and C. Wilbert), London; New York: Routledge, 2005.

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