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Buildings in cities for non-livestock animals

Budynki w miastach dla zwierząt niebędących zwierzętami gospodarskimi, czyli nieinwentarskie budynki dla zwierząt

Abstract

Animal buildings and rooms, which by definition are not livestock type buildings, have a specific decorative function as well as an educational, recreational, research and sometimes social function. The buildings should provide conditions that ensure the animals' welfare and mirror their natural environment as closely as possible. Increasingly, the architecture, including the form and construction of non-livestock buildings, is bold and modern, unconventional, interesting and even outstanding.

Keywords: animals, non-livestock animal buildings, zoo

Streszczenie

Szczególną funkcję dekoracyjną, edukacyjną, rekreacyjną, badawczą oraz społeczną i socjalną pełni niebędące budynkami inwentarskimi budynki i pomieszczenia dla zwierząt znajdujące się często w przestrzeniach publicznych miast. Powinny w nich panować warunki zapewniające dobrostan zwierząt, zbliżone do panujących w ich naturalnym środowisku. Coraz częściej architektura oraz forma i konstrukcja budynków nieinwentarskich są odważne i nowoczesne, niekonwencjonalne, interesujące i wręcz wybitne.

Słowa kluczowe: zwierzęta, budynki nieinwentarskie, ogród zoologiczny

1. INTRODUCTION

A non-livestock building is a building for animals that are not livestock and are not serving as such¹. Animal buildings and rooms, which by definition are not livestock type buildings, often located in the public spaces of cities such as boulevards, parks, zoos or museums, have a specific decorative function as well as an educational, recreational, research and sometimes social.

There are also animal rooms and buildings for non-productive purposes, i.e. non-livestock facilities on private lands. They remain a part of residential properties. These primarily include kennels for keeping dogs, for example, intended for hunting with battue – currently not permitted in Poland – and birdhouses. Non-livestock buildings are erected in zoos, animal training centres and in animal shelters and veterinary clinics.

2. ZOOS – DEFINITION AND HISTORY

The definition contained in Article 2 of Council Directive 1999/22/EC of 29 March 1999 states that:

(...) “zoos” mean any permanent establishments where animals of wild species are kept for exhibition to the public for seven or more days a year, with the exception of circuses, pet shops and establishments which are exempted from the requirements of this Directive on the grounds that they do not exhibit a significant number of animals or species to the public and that such exemption will not jeopardise the objectives of this Directive².

The zoo is primarily intended to have an educational and recreational role. Modern facilities usually also have a scientific basis needed for systematic research on the species being bred. Zoos can play a role in preserving species that are extinct in the wild or are on the brink of extinction. Thus, they are scientific, research and educational institutions with a suitably arranged and developed area with technical infrastructure and functionally connected buildings, providing a place for breeding and maintaining wild animal species for their conservation outside their natural habitat (ex situ conservation) as well as allowing scientific research, education and the public exhibition of these species for visitors. In addition, they actively support conservation programmes for endangered animal species in the wild (in situ conservation).

The history of zoos goes back to ancient times. These were mainly preserves with game for hunting, as well as menageries transporting animals for shows or set up in castles and

¹ Ustawa z dnia 10 grudnia 2020 r. o organizacji hodowli i rozrodzie zwierząt gospodarskich, Dz.U. 2021 poz. 36.

² Dyrektywa Rady 1999/22/WE z dnia 29 marca 1999 r. dotycząca trzymania dzikich zwierząt w ogrodach zoologicznych.

palace gardens for exotic animals. The first gardens existed in ancient Egypt (the garden of Queen Hatshepsut from the 15th century BC), Assyria (the garden of King Ashur-bel-kala from the 11th century BC) and China (the Garden of Intelligence of King Wen of Zhou from the 11th century BC). Large collections of animals of many species were also owned by King Solomon of Israel (10th century BC), King Ashurbanipal of Assyria (7th century BC) and King Nebuchadnezzar II of Babylon (6th century BC). The zoo of the Chinese Emperor could be called a zoo rather than a preserve because it was not an institution like those set up in the Middle Ages by European kings and magnates at their castles to breed animals for use in great hunting events. As the old Chinese chronicles attest, its first task was to acquaint the public with interesting specimens of fauna of the whole known world (Luckenbill, 1927).

The oldest existing zoo is the Tiergarten Schönbrunn, founded in 1752 in Vienna. The first scientific and educational institutions were the Parisian menagerie, Jardin des Plantes, founded in 1794, and London Zoo (ZSL London Zoo), founded in 1828 (*Biologia. Multimedialna encyklopedia PWN*, n.d.). The oldest zoo in Poland is the Zoological Garden in Wrocław, opened on 10 July 1865. Wrocław Zoo has the largest number of animals (about 12,000) and the largest number of animal species in Poland (about 1,100).

An animal trainer and dealer, Carl Hagenbeck, had an unusual vision of the zoo for his time (Reichenbach, 1980). He wanted to create a garden without bars, where the animals could move freely, as far as possible, and would be separated from visitors by pits or moats. By studying the jumping ability of lions and tigers, among others, Hagenbeck was able to calculate the exact width of the moat that would be impassable for these animals. He was able to realise his vision in 1907 in the Hamburg district of Stellingen, where the Hamburg Tierpark was established.

The 1960s proved to be a breakthrough. Many newly formed environmental and animal welfare organisations began to question the need for zoos. This resulted in the bankruptcy of many gardens. Those that survived, underwent a huge metamorphosis. Above all, the main function of the gardens changed. Instead of providing empty entertainment, teaching the public, research and protecting endangered species became a priority.

3. BIRDHOUSES

Birdhouses were erected in zoological gardens, which, as the author of one of the 18th-century building guides wrote, placed in walking and adorned gardens, were useful objects for decorating the habitat (Giżycki, 1829).

The "Owl's Grotto", a Baroque birdhouse built in 1627 at the palace of Prince Albrecht von Wallenstein in Prague was intended for owls and exotic birds. In 1721–1722, two wooden birdhouses for rare species of songbirds expressing the taste of Tsar Peter I were erected in the gardens of the Peterhof Palace. The facades of the pavilions were covered with tuff

and oyster shells, and the interiors were decorated with paintings by Louis Caravaque. Also noteworthy is the elegant Baroque dovecote built between 1750 and 1776 for Empress Maria Theresa in the gardens of the Schönbrunn Palace. Here, the circular, openwork aviary is covered with a copper roof and framed by four brick niches with cells serving as shelters for the birds. After renovation in 2010, they were plastered white, even though they were originally yellow in a shade used in the Empire for many buildings, above all, official buildings, which supposedly was a favourite of the Empress.

In 1964, London Zoo commissioned a birdhouse designed by Antony Armstrong-Jones, the Earl of Snowdon, Cedric Price and Frank Newby, the “Snowdon Aviary” (fig. 1). The form, which defies the law of gravity, was achieved through the use of at-the-time innovative structures – suitably anchored and connected V-shaped tubular spans and steel cables, between which a welded steel mesh was installed.

In 1969, the Bloedel Floral Conservatory orangery and aviary was opened in Vancouver’s Queen Elizabeth Park (fig. 2). The object is covered by a polyhedron, a geodesic dome, the “Fuller’s Dome”, which copies the surface of a sphere with a diameter of 43 m and a height of 21 m. The most rigid polygons were installed there, these are isosceles triangles that are close to equilateral triangles, made of acrylic glass or PMMA which are the most often used materials in such constructions. The interior is divided into three climate zones, which house characteristic plants, fish and over 100 free-flying birds.



Fig. 1. Snowdon Aviary, London Zoo, A. Armstrong-Jones, C. Price and F. Newby, 1964 (*Expedition Engineering*, 2016)



Fig. 2. Bloedel Floral Conservatory, Vancouver, Queen Elizabeth Park, 1969
(*Bloedel Conservatory. Vancouver, British Columbia, 2013*)

4. ELEPHANT AND GIRAFFE HOUSES

In recent years, interesting buildings have been erected in several European zoos, undoubtedly enhancing the attractiveness of the zoo spaces. They were designed to take into account the principles of animal welfare, i.e. creating conditions as close as possible to their natural environment, they are distinguished by their unusual form.

In 2004, an elephant house was opened in Cologne Zoo. The building for the Asian elephant herd was designed by the Cologne planning offices: Oxen + Römer und Partner Architekten. A 5,000 m² building and a run of 15,000 m² make up the “Elephant Park”, which now accounts for 10% of the Zoo area. The covering and support structure, which gives the illusion of a palm forest, is made of glued laminated timber elements.

Almost at the same time, two more elephant houses were built in Europe with gently yet boldly outlined curved forms of the objects. One of these was the Foster’s studio elephant house for Asian elephants at Copenhagen Zoo, opened in 2008 (fig. 3). The designers’ main objective was to create a facility that would reflect the conditions of the animals’ natural environment as closely as possible. For this purpose, sand floors in open pavilions, partly allowing the animals to move freely, and a colour scheme that is characteristic of the rainforest have been included. Providing daylight, the domes have a specific pattern obtained by computer analysis of the leaves of four species of trees found in the natural

habitat of Asian elephants. As a result, the impression of a natural chiaroscuro has been achieved by diffusing the light penetrating through the covering.

Rafał Mysiak and Piotr Poniatoński of the MTT Architecture Group, designers of the most modern elephant house in Poland at the new Zoo in Poznań, unquestionably comparable to those presented earlier, have also created a remarkable facility that allows the animals, African elephants, to live in conditions close to their natural conditions (fig. 4). The interesting architectural form of the elephant house complex, with clear modernist tendencies, has been skilfully integrated into the natural landscape of the new Poznań Zoo. Opened to the public in 2009, the facility consists of two pavilions: summer and winter, and a complex of runs. The openwork construction of the covering, which provides daylight illumination, gives the interiors an intriguing, positive aesthetic expression.



Fig. 3. Elephant House, Copenhagen Zoo, Foster + Partners, 2008
(*Elephant House, Copenhagen Zoo, 2022*)

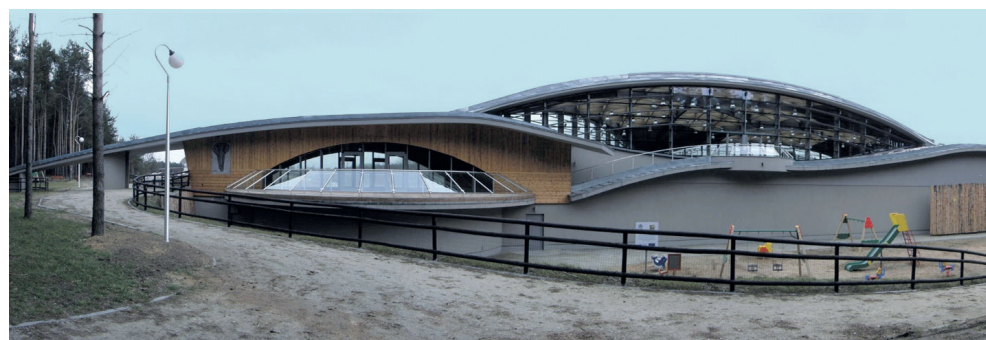


Fig. 4. Elephant House, Poznań Zoo, R. Mysiak and P. Poniatoński MTT Architecture Group, 2009.
Photo by author



Fig. 5. Giraffe House, Savannah House, Rotterdam Zoo, LAM Architects, 2009
(*Savannah Haus/LAM Architekten, 2009*)

Also in 2009, a giraffe house was completed in Rotterdam#. The designers from the LAM office modelled the form of the building on the traditional African kraal – a cattle pen (fig. 5). The filling of the exterior wall panels is made of natural materials, wood and compressed straw. An interesting idea is the use of a system for collecting and distributing rainwater, which is used to water plants in the vicinity of the giraffe house.

5. AQUARIUMS

A separate group of non-livestock buildings are aquariums, or buildings in which they are a component. The designers of the aquarium complex completed in 1998 in the Norwegian city of Tromsø took their inspiration from ice floes that are inextricably linked with the landscape of the city, located in the Arctic Circle. Designed by a Norwegian architectural office, JAF Arkitektkontor AS of Gjøvik, the centre of Arctic flora and fauna is called “Polaria” and houses the world’s northernmost marine aquarium (fig. 6). The water reservoirs here are located in the floors, walls and ceilings. The facility consists of two buildings of different construction. At the foot of the seven-storey cuboid, there are five “ice floes” brought by arctic storms. The “floe” housing the entrance is faced with Siberian larch, and the facades of other floes are made of glass and aluminium.

One of the newest natural history museums in the United States is the California Academy of Sciences building, completely rebuilt in 2008 according to a design carried out under the direction of Renzo Piano by an international team of designers. The project was awarded a silver medal in the international competition for sustainable buildings, the



Fig. 6. POLARIA, JAF Arkitektkontor AS, Tromsø, 1998 (JAF Arkitektkontor AS, 1998)

Holcim Awards, in 2005. In 2008, it was awarded the LEED platinum (highest) certification by the Urban Land Institute and received.

Electricity is generated here by means of photovoltaic cells. The technologies used make it possible to reduce the production of wastewater. The current California Academy of Sciences headquarters produces 50% less wastewater than the pre-existing facility. Also, the rainwater used for irrigation of the green roof is recovered and a large proportion of the materials used during construction were recycled.

Among other attractions, the Steinhart Aquarium is located in the building, showing the world of coral reefs, marsh habitats, a colony of Cape penguins and a presentation explaining wave formation in water bodies. Particularly noteworthy here is the way in which the exhibition interiors designed by the originators at Urban A&O have been arranged. The glass and lighting of the aquariums blend with the wavy walls and ceilings, iridescent in a range of blues.

The competition to design the aquarium in Kastrup near Copenhagen was won in 2008 by architects from a Danish studio, 3XN. The building, which has been given the name 'Blue Planet', was opened to the public on 22 March 2013. Its unique architecture consists of five curved wing-arms with a form inspired by water, the movement of which creates a water vortex. The steel structure is covered with shimmering aluminium plates that are meant to evoke fish scales. The streamlined building sits on a promontory jutting out to sea, organically combining architecture and nature. Against the endless background of changing colours of the sky, it "flows out" from the land into the sea and "flows in" from the sea

into the land. The glazed roof of the central foyer allows visitors to participate in a subtle chiaroscuro play. The facility uses a water-cooling system to reduce energy consumption.

Blue Planet is currently the largest aquarium in Northern Europe. Its total area is 9,000 m². It contains a total of fifty-three reservoirs, holding seven million litres of water, with 450 species of fish and other aquatic creatures.

The Afrykarium opened in the Wrocław Zoo in 2014 created by Mariusz Szlachcic and Dorota Szlachcic – Fabryka Projektowa ArC2, is the first oceanarium in Poland and the only one in the world dedicated to African fauna (figs. 7, 8). It presents the aquatic (marine and freshwater) and terrestrial ecosystems of Africa. The rectangular black building of Afrykarium, 160 m long, 53 m wide and between 12 and 15 m high, is situated on a north-south axis connecting the zoo with the exhibition area around Centennial Hall. The Afrykarium is divided into five ecosystems: The Red Sea, East Africa, the Mozambique Channel, the Skeleton Coast and the Congo River Jungle. In all “biotopes” the exposure is underwater and aboveground. Along the north, the entrance facade of the pavilion and a shallow water reservoir is placed, reflecting the slightly undulating facade. The entire complex is comprised of nineteen aquariums, pools and reservoirs with a total surface area of 4,600 m² and a capacity of over fifteen million litres of water, purified by fifty filters (Dzikowska, 2014). At the time of its opening, several thousand animals representing around one hundred species were on display at the Afrykarium.



Fig. 7. Afrykarium, Fabryka Projektowa ArC2, Wrocław, 2014. Photo by author

At the end of April 2022, the Orientarium was opened; this is an oceanarium in Łódź, also designed by Fabryka Projektowa ArC2. This “home” for exotic animals and plants from Southeast Asia is seven hectares in size, two hectares of which are under a roof. The total

volume of the exhibition reservoirs is almost 5.8 million litres. The acrylic tunnel, which the visitors can walk through and see swimming stingrays and sharks above their heads, is 27 m long and 2.4 high with 12 cm thick walls. The average depth of the reservoir is 6 m, at its deepest point, it is 8 m. The space above the tunnel is filled with 2.5 million litres of water.



Fig. 8. Afrykarium, Mozambique Channel, Fabryka Projektowa ArC2, Wrocław, 2014. Photo by author

The Orientarium presents thirty-five species of land animals and 180 species of fish, many of which are in danger of extinction³. It is divided into four parts: Elephant house with run and pool, Celebes, Sunda Islands, Ocean Zone.

6. VETERINARY CLINICS AND ANIMAL SHELTERS

Non-livestock animal buildings also include veterinary clinics. The buildings of private clinics, whose form, in countries with a high demand for the services from high-income clients, the pet owners, is often adapted to the taste of these clients. The designed additional, non-medical functions also take into account the needs and requirements of clients. Veterinary clinics are also located within university complexes.

The University of Glasgow's Faculty of Veterinary Medicine's Small Animal Hospital, designed by the Archial Architects team (fig. 9), has been showered with awards (*Small Animal Hospital Glasgow*, 2011). Among other accolades, it received the Andrew Doolan Award from the Royal Incorporation of Architects of Scotland (RIAS) for the best building

³ <https://orientarium.lodz.pl/> [date of access: 11.05.2022].



Fig. 9. Small Animal Hospital, University of Glasgow's faculty of veterinary medicine, Archial Architects, 2009 (Olcayo, 2010)

in Scotland in 2009, the Royal Institute of British Architects (RIBA) award as one of the 102 buildings in 2010 and the Civic Trust Award in 2011.

The hospital has a total area of 4,500 m² and is fully integrated into its surroundings by, among other features, a seamless transition from the green roof to the lawns of the adjacent park. The combination of the green roof with the gabions facing the facade gives the centre the character of a part of the natural landscape. One of the objectives of the designers was to create a large building without destroying the green space, a symbol of the Garscube Estate, where the faculty is located. They realised this by raising, changing the level of the lawns, under which they placed a large proportion of the hospital rooms that did not require daylight. Undeniably, 2009 saw the creation of a modern and functional clinic in Glasgow that sets new standards in the design of this type of animal facility.

The Center for Veterinary Medicine at the College of Veterinary Medicine in Athens, Georgia, part of the University of Georgia, was completed in 2015. The facility includes an educational building and a clinical hospital for large and small animals. The new facilities, which cover approximately 300,000 square feet, will enable the college to better meet the educational needs of students and current animal care requirements. The Centre for Veterinary Medicine was designed by the Perkins+Will studio (Rice, 2015). The facility's flexible structure meets current needs and allows for future expansion.

A new standard in animal-shelter design was set by a pound completed in 2007 in Amsterdam (ArchDaily, 2008). The facility has a distinctive form, created by Arons & Gelauff Architecten (fig. 10). A building with curved walls is perfectly integrated into the natural landscape cover of the site, located by Amsterdam's canal. One of the innovative functional solutions used is the positioning of the cat runs and rooms above the dog boxes and runs to create an additional acoustic barrier. The design of the facade colouring was based on a computer analysis of the colour tones of local grasses. Both the functional solution and the form of the building are a good testimony to the treatment of the problem of homeless animals by the prosperous and highly civilised society of the 21st century. Furthermore,



Fig. 10. Animal Refuge Centre, Amsterdam, Arons en Gelauff Architecten, 2007 (ArchDaily, 2008)

it is a showcase not only of the building's owner – non-government organization supporting homeless animals – but also of the city and the country. It is also another example supporting the claim that architecture, including the form and construction of buildings for animals, can be unconventional, interesting and even outstanding, bold and modern, and can also reflect the climate and tradition of the place.

7. SUMMARY

Every zoo is obliged to provide all animals with optimal living conditions, as close as possible to those in their natural environment. Due to the great diversity of animal species held in captivity and bred, zoos provide opportunities for scientific research in the fields of ethology, anatomy, physiology, genetics, parasitology and veterinary medicine, which is crucial to improving the welfare of zoo animals and effectively planning and implementing conservation programmes for these species. They have a very important educational role. The biggest advantage of zoos is that they fix the problems that already exist, accumulating over the years. They do this mainly by breeding endangered species. As a result of this, many of them are introduced into the wild, even though they are officially extinct there. In addition to breeding endangered animals, they also support the reintroduction of certain species by providing individuals for breeding. The most controversial function of zoos is the one that has accompanied them from the beginning – providing entertainment. Nowadays, much more attention than in the past is being paid to animal welfare and their behavioural needs. This is controlled by various organisations such as the European Association of Zoos and Aquaria and the Association of Directors of Polish Zoological Gardens and Aquariums.

Some zoos also run animal asylums. It is considered that this function is questionable, not least because of the danger of disease transmission by animals of often unknown origin. Animals in need of asylum – invasive alien species, seized at borders and within the country, confiscated, found and dumped – should be housed in specialised centres. The issue is partly regulated by recent amendments to the Nature Conservation Act⁴.

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⁴ Ustawa z dnia 16 kwietnia 2004 r. o ochronie przyrody, Dz.U.2022.0.916, rozdział 3: Ogrody botaniczne, ogrody zoologiczne oraz ośrodki rehabilitacji zwierząt.

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