This course is one of the few academic in-depth investigations into the planning of animal facilities, drawing on an interdisciplinary collaboration between landscape architects, zoologist, biologists and specialist planners. Before drawing the first sketch this translates into nothing less than the «invention of a new world».

The aim is not confined to sparking a discussion about contemporary animal husbandry, but also to provide important and innovative inspiration for facilitating an up-to-date transfer of construction-related knowledge to zoos. What are the outlines of the generally valid aspects of the design and which of these may be relevant for future building concepts? How can planners develop a design which successfully reflects the needs of animals, their keepers, visitors, and thereby the zoo.
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»The creation of zoological gardens is arguably the second oldest and second largest biological experiment of humanity, a phenomenon of tremendous significance.«

Heini Hediger (1956)
How do humankind and animals, or architecture and zoology, fit together and relate to each other? The views of society on the optimal coexistence of humans and animals have changed fundamentally over time. This shift in the public perception of wild animals—from mere showpieces to beings with rights—is now more than ever a topical issue, especially in terms of how to accommodate these animals.

This seminar addresses an important question: how best to design buildings for animals, using the example of a panda house. The aim is not confined to sparking a discussion about contemporary animal husbandry, but also to provide important and innovative inspiration for facilitating an up-to-date transfer of construction-related knowledge to zoos. What are the outlines of the generally valid aspects of the design and which of these may be relevant for future building concepts? How can planners develop a design which successfully reflects the needs of animals, their keepers, visitors, and thereby the zoo? This course is one of the few academic in-depth investigations into the planning of animal facilities, drawing on an interdisciplinary collaboration between landscape architects, zoologist, biologists and specialist planners. Before drawing the first sketch this translates into nothing less than the invention of a new world.

„Pandas seem to bring out the best in people. And that is only one of about a thousand good reasons why we should keep them living on earth.«
Design Project Framework
Upon completion of this course, students will be able to: 1) Use scientific research to design buildings for animals, 2) Explain building history of zoo architecture 3) Determine fundamental architectural principles to meet the needs of the animal and visitors 4) Define planning parameters and quality standards for zoo buildings 5) Work interdisciplinary with parties involved in construction and planning.

In this seminar students were required to produce their own brief, in which case they will be responsible for creating their own project and finding a site relative to their design idea. The program checklist helps to develop the project, areas of importance, areas that need clarity, and the general deliverables for the project. This must all be researched and analysed prior to formalising. Each selection should enclude: Site: location, access, reasons for choosing, health and safety aspects, key elements or features; Building: size, use, form, scale and hierarchy; Narrative: coherent design, which corresponds to the user requirements; Programme: areas, specialist items; Zoning and Size: dimensional considerations such as boundaries, access, future expansions; Landscape: natural features of the site such as trees, rocks, topography, ponds etc.; Circulation: movement and circulation of men and animal in, through and around the site; Climate: suitable for animal keeping; Views: visitor and animal perspectives.

Step 1: Research-based Design
Formulating design parameters for buildings for animals is a challenge at first. The requirements of the building mean that planning parameters have to adapt to the scales and habits of both animals and human beings. Although this analysis by no means claims to be complete, by observation of these parameters, the design and planning of a panda house can be carried out. The section that follows is intended to serve as a planning aid for the development of a design. It can also be used as a communication platform if all parties involved in planning and construction want to agree on an optimal building concept. It should be stated at the outset that the concern here is architectural and pedagogical design parameters. That should also make it clear that the planning of a zoo building should be entrusted to an architect who will of course engage landscape architects and specialist planners. Only if the architect from the beginning creates a collaboration with specialist planners, can a design emerge that successfully reflects the needs of the animals, keepers and visitors.

Step 2: Methodical Design Solution
In this complex planning task there were many questions, that had to be solved. The methodical design process hereby helps the student to find a structured way of solving problems by using object-design-knowledge within a design team. The central aim of the course is to learn how to independently gain a deep understanding of a problem area, formulate the problem based on thorough research, and to develop an individual, interdisciplinary, and methodical design solution. By structuring activities and communication between the team members, the aim was to create an individual reflection on the design results.

Step 3: Final presentation
The sketching phase leads to the synthesis phase, where the design comes together. At this stage, the logistics of the building and site, the construction, the form and materials etc. become united into one entity. Finally, the presentation phase and public discussion covers all the material used to present and explain the project.

Project Design Brief
Following research and discussions students begin to build an understanding of the spatial requirements of the project like: functional program, floor area standards to carry out particular tasks, spatial relationship requirements to the site and context.

Kick-off event in the Zoo with Dr. Andreas Kniariem, the director of Zoo Berlin.

Field Trip: Visit of Dan Pearlman office in Berlin, October 2019. Pictures: Natascha Meuser
Master Architektur / DIA
Architectural Studio WS 2019/20
Building for Animals

CONDUCT RESEARCH

Field Trip
01 Dan Pearlman: Storytelling and Scenography as Design Methods
02 Natural History Museum Berlin: Biodiversity of Nature
03 Zoologischer Garten Berlin: A Walk with Dr. Andreas Krier

Exercises
01 The Aesthetics of Perspective. View into Nature
02 The Aesthetics of Biology. Construction of Nature
03 The Aesthetics of Abstraction. Integration of Nature
04 Draw Attention to the Story. To See a Problem from Multiple Angles
05 Create a Design: Understand the Nature and Context of your Concept

CREATE A DESIGN

Submission
The building site is chosen by each student and can be anywhere in the world. The physical, geographic, climatic and cultural context of the site must be documented.

• Create a design, including the outdoor spaces – both plan and rendering
• Provide floor plans, sections, elevations (scale of 1:200)
• Create a site plan (scale of 1:500) that places the design in its context
• Present all solutions relevant to the design
• Create a model (scale of 1:500)

Schedule

Week 8
Nov 25, 2019
Lecture

Week 10
Dec 4, 2019
Crits/Pin-ups

Week 11
Dec 11, 2019
Interim Presentation

Week 12
Dec 18, 2019
Consultation (see list)

Week 13
Jan 8, 2020
Crits/Pin-ups

Week 14
Jan 15, 2020
Workshop: Layout

Week 15
Jan 22, 2020
Final Submission
(Documentation and Exhibition)

Week 16
Jan 29, 2020
PROJECT REVIEW
Man and animal, architecture and zoology: how do these various elements fit together and relate to each other? Society’s view of the optimal coexistence of humans and animals has changed fundamentally since the first scientifically managed zoological garden was built in Paris in 1793. This change in human conceptions of the wild animal – from a mere showpiece to a being with rights – is now more than ever a topical issue.

The project in the winter semester of 2019/20 dealt with the construction of a new panda house. Before the first sketch is drawn, the question of the future inhabitants of the facility must first be clarified. For the dramaturgy and staging of buildings and fauna, this means nothing less than the ›invention of a new world‹. The core principles for the design must be developed through research and then implemented and presented in a concrete design. The final works should not only spark discussion about contemporary animal husbandry, but also provide important and innovative inspiration for the up-to-date transfer of knowledge in zoos.

Structural principles were taught in cooperation with the Membrane Structures degree programme. Students could further explore and refine their design as part of a concurrent elective course, such as Textile-, Tensile- and Cushion Constructions or Lightweight Membranes. Students were engaged with the subject matter systematically through exercises and organised their work independently.

The central aim of the course was for students to learn how to independently research and analyse a design problem and to develop an individual, interdisciplinary, and methodical solution. To consider architecture as an alliance of form, biology, and ethics unleashes new and exciting possibilities in the design of zoo buildings. The students also identified the need for a rigorous, visionary new agenda regarding buildings for animals, one that pursues animal enclosures as a steppingstone towards a new relationship between architecture, nature, and the built environment. One that puts the wild animal to a being with rights.
In the course of social change and especially in light of heightened concern for protection of nature and wild animals, design guidelines have fundamentally changed. Along with the rapid progress in technical developments over the last 150 years, which have made zoo buildings safer and more comfortable, a manifold pluralism of forms and styles for animal dwellings evolved. «Artificial surroundings are as old as mankind it -self.»1 Is this insight of Aldo Rossi, the architect and architectural theoretician, also applicable to the artificially created surroundings of animals in zoos? Building typologies have always developed in tandem with the relevant human needs but to what extent can the needs of animals exert an influence on the architectural type? Internationally, the zoo as housing for animals has undergone a similar development. The designs of zoos in various social milieus and climate zones resemble each other. A zoo in Jakarta looks basically the same as a zoo in Wrocław. The zoo is integrated in the urban development, fenced in and consisting of many different buildings, from aviaries to stables, to wooden or solid structures. It has its own infrastructure, a pathway system, and facilities including shopping and supply outlets. Then there is the scientific requirement of zoology. A consistent development of zoo buildings can be discerned beginning in the mid-nineteenth century, in the wake of the bourgeoisie emancipation. Since human beings began building their own dwellings, they also erected facilities for their domestic animals, either a simple fence to keep livestock from running away or a stall to protect it from weather and predators. However, well into the twentieth century, the subject of building structures for animals was largely ignored in building theory. This deficit also applied to zoo buildings, a type of building that emerged during the Baroque period as the zooological garden, evolving into the colonial era with the imagery of exotic worlds, and developing in the modern period into an independent architecture. For the most part, the designs were oriented to stage sets, circus-like shows, and prisons. The architects, if they had not been replaced by a zoo director with architectural ambitions, applied an architectural understanding of zoology. The result can be seen today: architecture as a contribution to building culture has almost completely vanished from the zoo and has been replaced by amorphous constructions that democratically cater to every need, as Urban Entertainment Centres, souvenir shops, restaurant facilities, restrooms, playgrounds, and ice cream stands, with the requisite shrubbery, bark mulch, and wheelchair accessible paths. According to the principal of «the squeaky wheel gets the oil» the lobby that makes the most noise is awarded the largest space. One could almost get the impression that the zoo buildings are missing exactly what they purport to provide, namely animals and appropriate architecture.

In this sense, the architect elevates nature in order to achieve an ideal form. But the term of nature has the drawback of being constantly subject to change. For instance, during the Enlightenment, nature stood for the work of a God who had constructed his Creation according to a principle of order, while during the Romantic period the idea of this image became one in which it was precisely the disordered – apparently coincidental – that was the focus of attention. And if one continues in this vein today, the question inevitably arises: what do architects want to express by employing, in abstract form, the shape of an animal’s body as inspiration for a building, as Santiago Calatrava has done with his skeleton-like constructions or as Zaha Hadid did with her stadiums in the form of a stream-lined insect carapace. The same is true for building for animals, as zoo architecture, in a way, demonstrates in its subjection to continuous change. Where animals at first were locked behind bars or prevented from escaping by trenches, beginning in the twentieth century they are presented on stages, only to disappear again today in practical amorphous structures, which, according to Georg Wilhelm Friedrich Hegel, would mutate as the organic form into the root of free architecture. This consciousness transformation also pertains to the animal

With society’s increased environmental consciousness and improving animal-keeping methods, architecture is fading from the zoo, as if a landscape park could disguise the fact that the animals are imprisoned.

in Darwin’s time because »almost every naturalist are subject to an evolution, not exactly a new idea. To begin with, he postulates that (1) living creatures, human beings along with animals, share a common origin. All the members of whole classes can be connected together by chains of affinities, and all can be classified on the same principle, in groups subordinate to groups. Fossil remains sometimes tend to fill up very wide intervals between existing orders. Darwin explained that change with (3) gradualism, is with the assumption that the smallest modifications ultimately lead to great changes. According to Darwin the relevant magnitude here is not the individual but (4) the population. Finally Darwin introduces (5) selection in the form of the survival of the fittest as a central mechanism for selection. Those living creatures will survive that can best adapt to their surroundings. The appearance of a species or genus then becomes the solution to the problem posed in the life environment. In a sense, Darwin’s theories can be related to the evolution of architectural styles. Architecture has not been static over the centuries, but characterised by style changes. Changes in context, i.e. culture, politics, climate, technology, or similar parameters lead to modifications in building construction. This rarely occurs in evolutionary leaps, but usually in small steps. And architecture is also always a solution for construction-temporal problems. People react to their environment and develop buildings for specific requirements. As curious as individual designs may appear – especially from a temporal distance – they too have emerged as a result of a lifeworld examination, for example regarding economic, constructive, and functional framework conditions. Some appear to be successful and are then copied and handed down. Other styles, which are not considered to be efficient responses to the existing problems, find no or ever fewer imitators, and eventually die out – in the sense of the theory of evolution.

In terms of the zoo and zoo architecture, that means human architecture for presenting animals must adapt to the specifics of each case. The conditions of their life environment to which the living creatures had to react in their evolution must in part be reflected in the construction of their enclosures, even if natural selection no longer plays a significant role in that evolution. This means that architecture for zoo buildings must adapt to a great variety in natural living spaces. That is a tremendous task that requires a great knowledge of art. The search for the greatest degree of naturalness inevitably leads to the greatest degree of artificiality in the detailed simulation of the living space. In addition to the requirement that the zoo must be built to serve the animals as well as human beings, the building should provide an exhibition context in order to make the presentation easy to understand. Building for zoo animals then becomes an infinite loop in the sense that zoo architecture attempts to create an environment as appropriate for the zoo visitor as it is for the animals. According to Darwin, animals adapt to the environment in which they find itself. If animal creatures were formerly considered as more or less demonic, during the Enlightenment they were revamped as machines, to which one began little by little to ascribe consciousness and individuality. There are philosophers today like Richard David Precht who propose that animal rights should be guaranteed a coexistence along with human rights, for which he has formulated an Ethic of Ignorance (Ethik des Nichtwissens). The work of the British naturalist Charles Robert Darwin broke the ground for the paradigm change of the image of the animal-as-beast to the animal-as-creature. In On the Origin of Species by Means of Natural Selection, or The Preservation of Favoured Races in the Struggle for Life, published in 1859, the contemporary of Hegel formulated his theory, still valid today, which is divided into five subsections. To begin with, he postulates that (1) living creatures are subject to an evolution, not exactly a new idea in Darwin’s time because almost every naturalist supported the great principle of evolution. This principle states that the types of life forms are not static but constantly changing. Furthermore, Darwin poses the thesis that (2) all living creatures, human beings along with animals, share a common origin: All the members of whole classes can be connected together by chains of affinities, and all can be classified on the same principle, in groups subordinate to groups. Fossil remains sometimes tend to fill up very wide intervals between existing orders. Darwin explained that change with (3) gradualism, is with the assumption that the smallest modifications ultimately lead to great changes. According to Darwin the relevant magnitude here is not the individual but (4) the population. Finally Darwin introduces (5) selection in the form of the survival of the fittest as a central mechanism for selection. Those living creatures will survive that can best adapt to their surroundings. The

4 Ibid.
Building History

The question can be posed: what is actually being built in zoos? Nowadays, the animals that are capable are reproducing in artificially created zoo environments. In other words, by contributing to a new life environment, the zoo is influencing the animal’s evolution and generating a new form of pet, namely zoo animals, which have the ability to withstand this kind of captivity without perishing. What emerges over time is a highly artificial system with two components, neither of which have anything to do with what used to be called nature. Theodor Adorno traced the origins of zoos back to the nineteenth century and aptly analysed them in his Minima Moralia reflections.

“In their true form, zoological gardens are products of nineteenth century colonial imperialism. They flourished in the wake of the exploitation of wild areas of Africa and central Asia, which paid a symbolic tribute in the guise of live animals. The value of the tribute was measured by how exotic or difficult to obtain it was. The development of technology put an end to that and banished the exotic. The lion bred on the farm is just as tame as the horse that has long been subdued by birth control.”

Of course, this idea is a product of civilisation and denaturalising wild animals can hardly be the goal of modern zoology. In order to find a starting point to formulate an architecture theory for building zoos, it is best to return to Darwin’s time, a century before Adorno’s work on the mutation of lions in captivity. The first half of the nineteenth century was marked by research expeditions and nature observations, by surveying, charting, and documenting new regions and landscapes. New life had been breathed into the debate about the origins of life because of the countless discoveries of previously unknown species. Charles Darwin was the first researcher to formulate, in written form, a theory of evolution from the fill of his own research results and the literature of colleagues. His thesis called into question the view supported by the Christian church that could not accommodate the origin of human beings from apes in the story of creation. Representatives of the humanities were ecstatic about these new findings. As described by Darwin, the evolution theory rode a wave of popularity. The architect and founder of modern architecture theory, Gottfried Semper, adopted Darwin’s ideas and related them to his own. After demonstrating for civil rights, in Dresden’s May 1849 uprisings, Semper relocated to England, where he met scientists from the intellectual circles and salons in the radius of Darwin. As a political refugee, he found himself in the company of the philosophers Karl Marx and Friedrich Engels. At first, Semper resumed writing in London, continuing his studies about the colour scheme of antique temple buildings. During his exile, other subjects occurred to him, such as applying science to architecture not acknowledge nature as a teacher, thereby freeing it from “fake frills.” But, as Semper continued, should architecture not acknowledge nature as a teacher, giving her form and expression in the shape of an architectural idea?

The World Association of Zoos and Aquariums (WAZA) adopted in 1993 the first World Conservation Strategy, setting standards and guidelines for zoos and aquariums worldwide.

5 The World Association of Zoos and Aquariums (WAZA) adopted in 1993 the first World Conservation Strategy, setting standards and guidelines for zoos and aquariums worldwide.


7 Semper, Gottfried: Die vier Elemente der Baukunst. Ein Beitrag zur vergleichenden Baukunde, Braunschweig 1851, p. 53–54.
It is obvious that Semper’s ideas were coherent with the naturalists’ and zoologists’ intellectual property. The influence of Darwin’s research on Semper’s architecture theory becomes evident in comparison to the manual Der Stil (1860) and the lecture Ueber Baustyle (1869). In both works, Semper examined the question of architectural style. In the preface of his manual for engineers, artists, and art aficionados in 1860, he writes about archetypal forms in nature and their relevance for creating style in architecture.

»Nature, in its infinite abundance, is extremely sparing in its motives – as is shown by a constant repetition in its basic forms. How are these modes sparing in its motives, which he makes in the following sections. Second, he derives a generally valid definition from the word and its use in other languages. In a way that is typical for him, Semper lays the foundation for an understanding of architecture theory, still applicable today. His ideas on the development of style deserve special attention because they resemble Hegel's ideas about nature: Hegel posits organic forms of nature that are abstracted by art while Semper draws attention to the smallest basic forms of nature, seeking to recognize an abstraction of form within. For Gottfried Semper, whose nephew, the zoologist Karl Gottfried Semper was in close professional contact with Darwin, it is striking how much the original position changed.

This understanding of art is still in the spirit of the academic approach to the arts by which art can only be based on what already exists, following a strict canon of form and style. For instance in the main section of the third chapter, Semper underscores this hypothesis: Textile Art with Illustrations from Snake Motifs in Various Cultural Circles. He typically makes use of animal motifs to emphasize the unity of art and nature. Semper here refers to the term knot (from the Latin nádus, or French nœud) and its etymological affinity with the word node. Two aspects are of interest. First, Semper makes an issue of the aesthetisation of spatial borders, which he develops in the following sections. Second, he derives a generally valid definition from the word and its use in other languages. In a way that is typical for him, Semper lays the foundation for an understanding of architecture theory, still applicable today. His ideas on the development of style deserve special attention because they resemble Hegel's ideas about nature: Hegel posits organic forms of nature that are abstracted by art while Semper draws attention to the smallest basic forms of nature, seeking to recognize an abstraction of form within. For Gottfried Semper, whose nephew, the zoologist Karl Gottfried Semper was in close professional contact with Darwin, it is striking how much the original position changed.

»An important extension of his theory was also the reference in the Zurich lecture to Darwin’s Origin of Species and to those historians who saw architecture as a kind of deterministic biological model determined by laws of natural selection, inheritance, and adaptation.«

This fascinating reference from 1869 shows, that even at this early stage, the social application of the Darwinian theory came into fashion within history and art. Semper’s argument was directed against the axiom, which read: Art makes no leaps. He argued that art in fact makes leaps, often through the creative genius of a single individual.«

»The old monuments are rightly called the fossil casings of extinct social organisms, but these are the latter as they lived, not like snail shells on their backs, nor are they shot after a blind natural process like coral reefs, but free formations of the human being to set mind, nature observation, genius, will, knowledge, and power in motion. Therefore, the free will of the creative human mind is the chief factor in the question of the origin of architectural style, which, of course, has to move within certain higher laws of tradition, requisite, and necessity in its creation; but these, through free conceptions and exploitation, appropriate and serves, as it were.«

Semper picks up two lines of argument. In the first he establishes his position on the relationship of art and nature, which he argues can only be based on what already exists, following a strict canon of form and style. But in contrast to art, he maintains that architecture must also fulfill a practical function. In the second, he combines Darwin’s theory with his own position on the evolution of architectural form, which he makes clear in the description of the »Monumente als die fossilen Gehäuse ausgestorbener Gesellschaftsorganismen (Monuments as the fossilised shells of extinct social organisms)« and other comparisons to dwellings built by animals. As the Vienna architect-historian Gabriele Reiterer once wrote, Gottfried Semper developed his theoretical framework in parallel to the ordering of nature.

He built theoretical work on an evolutionary-historical, functional-morphological framework. In doing so, he created a completely new intellectual approach to architecture. His comparative systems and his search for original forms in architecture are closely correlated with the emerging comparative anatomy. Semper explained that, as with science, in conceiving the development of architecture, one must incorporate the origin and development of building styles in an ordering system. Put simply, he founded an evolutionary theory of architecture.«

9 Semper, Gottfried: Der Stil in den technischen und taktischen Künsten oder Praktische Ästhetik. Ein Handbuch für Techniker, Künstler und Kunstfreunde, Frankfurt am Main 1860, p. VII.
10 Numerous letters from Charles Darwin to Karl Gottfried Semper are documented in the University and State Library of Düsseldorf.
12 ibid.
14 »Nur einen Herrn kennt die Kunst, das Bedürfnis.« In: Semper, Gottfried: Vorläufige Bemerkungen über bemalte Architektur und Plastik bei den Alten, Alltag 1834, p. VIII.
Reiterer attributed to Semper a «highly creative and bold theory, a daring new look at the development of architecture.» That approach placed Semper in opposition with Otto Wagner, who had formulated an architecture theory in Vienna at the same time in which engineering was elevated to an art form. Semper’s theory ought to have been pursued because his analogies to evolution theory, together with the personal acquaintance of the Darwin and Semper families, represents a key to understanding the establishment of a modern theory of zoo architecture. However, Semper’s theory also reflects an understanding of architecture based on a definition of space beyond its boundaries, that is, a view of dimensions that does not depend on the object in space. It bears a close proximity to the design parameters for the hybrid zoological building merging the elements of theatre, museum, and prison. The design is focused on the boundaries between the spaces, either those between the animals’ territory and the public area of the zoo visitor, or between the inside and outside enclosures. Even if zoo architecture during Semper’s time was characterised by the idea of exhibiting an exotic beast and behaviour research was not established as a discipline, his theoretical reflections during his lifetime are as valuable as a blueprint today.

Once again, we are confronted with the notable case that the spoken language comes to the aid of architectural theory. The etymology of these terms reveals this kinship. Since these texts always involve words and terms for spatial transitions, like the word Zaun (derived from Saum, or seam) or Wand (derived from Gewand, or robe), they go to the core of architecture theory. Further, Semper provides a kind of theoretical blueprint for architecture design that traces back the façade or enclosure to its textile handcraft origins. In that respect, this conclusion is significant because it helps derive quality criteria for contemporary architecture. For zoo architecture that means that in the zoo, wickerwork or artistic decorations should be discernible in a fence, and a façade ought to obey its tectonic lawfulness, which however does not mean that a fence should imitate a tree stump or be represented by an artificial cliff. By the same token, a façade does not have to resemble a tree or be crafted as a stump or be represented by an artificial cliff. By the same token, a façade does not have to resemble a tree or be crafted as a stump or be represented by an artificial cliff. By the same token, a façade does not have to resemble

Germain languages, the word Wand (sharing the same root and meaning with Gewand), directly recalls the origin and typology of the visible space closure. This also true of Decke (blanket/ceiling), Bekleidung (cladding/clothing), Schranken (barrier/gate), Zaun, synonymous with Saum, or seam (fence) and many other technical expressions that are unmistakable indications of the textile origins of these construction parts. 18

Gottfried Semper’s theoretical essays underpin his basic understanding that architectural styles had developed from the textile arts. The etymology of these terms reveals this kinship. Since these texts always involve words and terms for spatial transitions, like the word Zaun (derived from Saum, or seam) or Wand (derived from Gewand, or robe), they go to the core of architecture theory. Further, Semper provides a kind of theoretical blueprint for architecture design that traces back the façade or enclosure to its textile handcraft origins. In that respect, this conclusion is significant because it helps derive quality criteria for contemporary architecture. For zoo architecture that means that in the zoo, wickerwork or artistic decorations should be discernible in a fence, and a façade ought to obey its tectonic lawfulness, which however does not mean that a fence should imitate a tree stump or be represented by an artificial cliff. By the same token, a façade does not have to resemble an elephant hide. Heinig Hediger’s statement that for the animal it is «certainly of no consequence whether its space is cordoned off with traditional means, or instead of gratings with ditches or similar means», 19, is still valid today. The beautifications in contemporary large-scale buildings in zoological gardens are there to amuse the visitors. They conceal a condition that is anything but natural. The enclosure is still a mixture of stage and prison, augmented in the visitors’ space by a museum.

But a theory of zoo architecture would be incomplete without an investigation of terms that are as often used in architecture as in zoology. The term being (Wesen) in the sense of a living being (Lebewesen) in zoology comes to mind. One is reminded of August Schmarsow, who plays with terminological drawings from architecture and nature in his book Das Wesen der architektonischen Schöpfung. 20 In his Leipzig inaugural lecture, in 1893, the art historian Schmarsow considers architecture from the viewpoint of a history of creation. The term ›being‹ plays a special role here as it does for later theoreticians. For example a glimpse in the literature of the 1920s, a period of manifestos and many theoretical discussions, offers reference points. One of them is the architect Leo Adler, whose book Wesen der Baukunst was published in 1926. Even if the term ›being‹ (Wesen) has several meanings in German today, it can be traced back to the Old High German verb wesan (to be). In English translations like nature, creature, or character come closer to the idiom of architecture. The term ›being‹ describes the Eigentliche (real), the Essenz (essence) or the Kern (core) of the matter in philosophy, while in architecture theory the question of fundamental being is the absolutely central theme. 21 The work titled Grundriß der Allgemeinen Zoologie by Alfred Küh n 22 may be recommended if one wishes to examine the theoretical analogies between architecture and zoology. The work published sixteen times between 1922 when it was first published and 1969. It describes the general characteristics of living beings and the tasks of zoology. In the main chapters, Küh n delves into the structure, performance, and evolution in the animal world. The choice of key words in the text is interesting as is the contextualisation of the language of zoology and architecture. In his instruction manual, Küh n makes use of terminology drawn from architecture.

Forms that are systematically categorised are called ›form related‹ or ›type related‹. They are constructed according to a common blueprint or type. They consist of similar parts in a coherent order. 23

17 Ibid.
20 Schmarsow, August: Das Wesen der architektonischen Schöpfung, Leipzig 1894.
22 In the further course of this work, the use of architecture-specific terminology in the title Grundriß der Allgemeinen Zoologie (Leipzig 1922) will be discussed. Alfred Kühn’s role in the period between 1913 and 1945 is not considered, nor is his work Grundriß der Vererbungstheorie (Leipzig 1939).
Architectural theoretic approach to terms also used in zoology. Adela, Lee: Vom Wesen der Baukunst. Die Baukunst als Eneignis und Erscheinung, Leipzig 1926


Taken out of context, the reader would hardly conclude that it came from a zoologist. And the fact that the author employs architecture-specific terms in the text does not detract from this supposition. Put another way, Kühn identifies a terminological kinship between the two disciplines, which becomes clear in the conclusion of his first chapter. The task of architecture can not be reinvented. Architecture, like nature, gets along quite well with a few basic forms that creativity can then infinitely vary. If this requirement could be a reason for which this building type is hardly mentioned by architects in the expert literature, and the subject of building for animals seems to be reduced to zoo architecture.24

In fact, the discussion of the building task is much broader and more differentiated. On the one hand, perhaps the use of shared zoology and architecture terminologies might lead to a situation where building for animals could help determine a site location for humans in the context of the fauna. Because «the design of a zoo is always an indication on the status of the relationship between man and animals».26. On the other hand, the reflection about zoology may give the architecture discussion a new impulse in which Semper’s idea of an evolution of form provides an orientation in the haphazard confusion of superficial knowledge and private theories propounded by commercially motivated architects. Architecture can not be reinvented. Architecture, like nature, gets along quite well with a few basic forms that creativity can then infinitely vary. If this research work on the relationship of architecture and zoology, of building culture and nature succeeds in laying a building block for an architectural debate about contemporary building, that is appropriate for animals, then another significant milestone will have been passed.

Formulating design parameters for zoo buildings is a challenge at first because as long as a purely building typological investigation has not been made there is no reference point for the architectural foundation for such a building. What are the outlines of the generally valid aspects for a design? Although this ten-part list by no means claims to be complete, by observation of these parameters the design and planning of a zoo building can be carried out.

1. **Discovering a new world**
   The regions the animals come from

2. **Urban integration**
   The particular urban context of the zoo

3. **Building form**
   How the architecture is presented

4. **Paths and signposting**
   How visitors are conducted through the building

5. **Spatial barriers**
   How to shape fences, trenches, and display windows

6. **Safety management**
   How human beings and animals can be mutually protected

7. **Displaying the animal**
   How the animal can be attractively presented

8. **Signage and didactics**
   How information reaches intended recipients

9. **Design**
   What the selection of material, colour, and light can do for design

10. **Architecture and brand development**
    How striking buildings create advertising for the zoo

Beginning with the first design sketches, the question of who the occupants are – who will move into the animal building – must be answered. In the recent past, a trend in zoos has emerged to build theme parks in which the fauna of larger regions, like the ice deserts of the Arctic or Antarctic, tropical regions, or the African savannah are presented. A general trend «from animal house to theme park» can be discerned. This increase in the content complexity exerts an influence on the architecture as well as the museum support programme housed in the building. In Anglo-Saxon countries, one speaks logically enough of animal collections, a terminology that is also used in museums. To begin with, the staging for the dramaturgy of buildings and fauna means that the ›museum collection‹ must be assembled by a curator and a zoologist. The composition of different habitats under one roof, which in nature are geographically disparate or at best adjacent to each other. With this environmental gesture in mind continents can be presented as ›one world‹.
Two opposing aspects emerge in the urban context: on the one hand, the institution of the zoological garden is dependent on an inner city or a proximate urban location in order to guarantee accessibility for visitors. On the other hand, a densely settled urban location may influence the behaviour of the animals and limit the zoo’s expansion possibilities. Three categories that characterise the urban context are:

1. The suburban location in the vicinity of other significant urban facilities. For instance the Wrocław Zoo is next door to the famous Max Berg Century Hall, opened in 1913 as an exhibition and fair facility, and still in use for large-scale events today. As a consequence, there are enough parking opportunities nearby.

2. Location in the middle of a zoo/inner city zoo. Like in London, Paris, Vienna or Berlin. Although they are lacking space for expansion, they are convenient to reach by highway or a main rail and are a welcome local recreation area for visitors fleeing big city stress.

3. Surrounding countryside. A lack of space is not an issue in the surrounding countryside. For example, the Helsinki facility is located on an island on the coast of the Gulf of Finland. And in Tbilisi a new zoo was planned to be built in 2012, on an artificial reservoir on the outskirts of the city.

The educational aspect is an argument for keeping zoos active in cities. »If we’re going to have any chance as a society to teach the public about climate change and the environmental crisis, zoos are going to be a place where it happens, in part because they attract so many people, but also such a wide variety: religious, secular, Democrat, Republican—everyone visits the zoo.« (David Grazian)
The path is the goal: as worn as this saying may seem—for buildings where the focus is the transfer of knowledge, entertainment, and visitor guidance—this solution is the basis of every concept. In addition to museum buildings or art galleries, this pertains to zoo buildings. In the case of zoological gardens, as a consequence of the high proportion of children amongst the visitors, a selection of different routing systems is available. Large distances between two enclosures or buildings can be psychologically shortened with a clever system of attractive passageways, bridges, and paths. The design of internal access ways is by far the most architecturally prominent element in a zoo building. The spatial characteristics can be typologically differentiated as »over«, »through«, and »underneath«. In contrast to a museum, where the architecture takes a »back seat« to the exhibit or at best supports the exhibit with its effect, routes in zoo buildings are very often themselves staged. The animal can’t be everywhere and because of the size of the enclosures, the distances between them can hardly be shortened. It therefore stands to reason, that a bridge over water, like the one in the Arnheim Zoo (in the Jungle Hall) becomes an adventure playground. Or when a treetop path like the one in the Zurich Zoo (in the Rain Forest Hall) turns into a 7 metre-long spatial adventure, weaving over the ground, through the green foliage. The ground level accesses are no less spectacularly designed. In the Hanover Zoo, the visitors are led through an Indian palace, in Vienna the spiral-shaped path runs next to penguins and polar bears. All visitors vividly recall the passage through water conduits and burrows. This is where architecture and zooology fuse: human behaviour becomes an essential element.

Spatial Barriers
How to shape fences, trenches, and display windows

The former use of cages and bars in zoos has been replaced today by a broad array of spatial barriers. That is partially due to a changed consciousness of the animals’ needs as well as advances in structural engineering. Even if the common fence has not completely vanished from the zoo, the contemporary palette of technical possibilities offers architectural leeway. Since the days of Hagenbeck’s enclosures without bars, when trenches as spatial barriers were introduced in zoo architecture, landscaping has become one of the important enclosure parameters. In addition to trenches, these include pools of water and the use of natural or artificially shaped hills on the grounds. Low impediments like these are needed simply to keep the visitors from getting too close to the animals. Fences are often replaced with thorny bushes. The technical advances of the glass industry, which can now produce impact and pressure resistant storey-high panes of glass, also contributed to the demise of cages with bars. Visitors can look a predatory cat in the eye at a distance of a few centimetres or count the bubbles in the fur of diving polar bears. But even the modern zoo can not do without heavy fence constructions. Simply on account of their weight, the pachyderms (elephants, rhinoceroses, or hippopotamuses) represent such a special problem that steel posts must be anchored to a depth below the earth that is equal to their height above the earth. Sheer mass is the best protection. In the case of climbing or jumping animals, fence dimensions correspond to the animal’s anatomy and physical capacities. If a fence can be dispensed with, then as with all other spatial barriers, the alternative must be incorporated into the design and simply ordered from a specialised catalogue.

Paths and Signposting
How visitors are conducted through the building
Safety Management
How human beings and animals can be mutually protected

Safety management is without a doubt one of the most complex tasks of a zoo. It starts with the usual building code requirements (fire prevention, for example), extending to special regulations (like occupational safety), to evacuation and escape concepts for the entire facility (such as disaster control). This section will deal with a single aspect of this subject: physical security in facilities for pachyderms. The primary concern is to protect the human being from the animal and also to protect the animals from themselves and each other. In addition, there is the fact that because of their sheer size and weight, pachyderms can only be moved on their own or with the aid of a crane. In the internal areas of the enclosures that are not open to the public, an important aspect in safety planning must include amongst others, the capability to separate one elephant from the herd. This can be done with locks whose gates can be moved vertically or horizontally. The doors and gates for zoo personnel must be designed in such a way that they cannot be squeezed shut by the animal by mistake. Since these steel installations require optimal anchoring in the ground and walls, they are one of the most significant design elements of the overall plan, for outdoors and indoors. As a rule, the material used is stainless or galvanised steel without sharp edges in order to reduce maintenance and danger caused by injury. The protection is designed for animals and humans alike. Barriers for the visitors areas in elephant facilities are often formed by trenches or pools of water with steep walls. In only a few instances are additional electrified wires used, either for building code reasons or to protect the elephants from their own curiosity or clumsiness.

Displaying the Animal
How the animal can be attractively presented

The architect, landscape architect, and zoologist are especially called on in presenting the animal. This is where the visitors’ expectations – to be able to optimally observe the animal – must be fulfilled. By the same token, the animals must not be disturbed in their daily routine. Active zones and rest areas for human beings and animals must be coordinat-ed with each other. While the animals have hardly any opportunity to escape the gaze of the visitors in a traditional zoo enclosure (cages or indoor enclo-sures), the outdoor territory provides a modicum of freedom and a certain autonomy. However, the visi-tor must be given the opportunity to go on the hunt and to lie in wait. Architecture can serve to enhance this enjoyment of nature, from vantage points; from above, a level perspective, or below. The view from above for the giraffe enclosures has become estab-lished. Being able to look the animal in the eyes has become standard operating procedure, and in some zoos, feeding the animals with fresh leaves and twigs is allowed. By means of a hole in the floor of a bridge over a pool of water can also provide a different view of the animal. Architecturally staged ground level views can be created if the gaze can be diverted with the aid of a display window, or when an unexpectedly transparent distance between animals and humans is created, with floor depth full glazing. The presentation of the animal also depends on the layout of the path (see 4 – Paths and Signposting), for example when at the end of a crawl way, a glass dome rises in the middle of an enclosure, visitors and humans is created, with floor depth full glazing. 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A good control system comes with few or even no signs. In the latter, the architecture must speak very graphically for itself, as in the Hanover Zoo, where “narrative” buildings take over part of the orientation and information: West African round huts, a Canadian port facility, or an Indian palace are representative of the fauna in the tropical savanna, in the Arctic, and in South Asia. Of course, the forest cannot be felled in all zoological gardens. The realisation that signage—the conception and design of guidance and orientation systems—is an independent design task, is increasingly gaining acceptance with zoo administrations. For the designing architect, this means involving a specialist at an early stage. Important in the conception and design is the sequence of departure, guidance, and destination points, which are in the complex development system of a zoological garden. Signage should, if possible, be consistent with the didactic concept and branding (see 10 – Architecture and brand development) of the zoo itself. This offers the opportunity to develop a barrier-free visitor guidance system and a modern didactic method aimed at a public effective overall concept. In a further step, the different information media can be defined editorially and creatively. It is advisable not to forego analogue information, as digital media must be maintained and updated constantly. In addition to the conventional information panel on the origin and characteristics of each species, didactic display boards are very popular (for example for identifying the different types of zebras or giraffes). However, the principle applies to both didactics and signage: less is more!

Even in their chosen discipline, architects have no claim to design freedom. An architect designs a zoo building not just for humans. What is pleasant for a visitor may be very harmful for an animal. That starts with colours that may be threatening for animals, or lighting that could impair their vision, or materials that stimulate appetite instead of creating harmony. For example in the elephant facility in Erfurt, eighteen different floor coverings are used in order to give the sensitive pressure receptors in the animals’ feet some variation. Some trends can be observed in newer zoo buildings: in addition to descriptive imitation of habitats, there are often spatial sequences with surprise effects. For instance, a section of the outside wall of the elephant facility in the Cologne Zoo was finished with pre-cast concrete parts, with an elephant skin texture and look. In Singapore, a polished floor that depicts the surface of jungle waters greets the visitors in one of the rooms of the River Safari facility. And the architects of the gorilla facility in the London Zoo were inspired by the ornamental shield of a Central African tribe, which they used as a pattern for the wood panelling. Boltshauser Architekten designed theatrical spaces consisting of circular windows beneath an illuminated fish pool for the Ozeanium in Basel while for the Masoala Hall in Zurich, Gautschi Storrer Architekten created terrariums with a painting-like effect on the wall. Drei Architekten proposed a surprise for the aquarium in Batumi: a primitive circular village plays with changing light by day and that the building on the bank of the lake acquires a mysterious appearance.
Architecture and Brand Development
How striking buildings create advertising for the zoo

The list of design parameters for zoo buildings would be incomplete without addressing the architecture as a point of identification. The idea that striking buildings contribute to the image of a zoo may seem far-fetched at first. But a closer look will show that big city zoos successfully use architecture for their public image. Instead of an image of their buildings in their logo, the Bronx Zoo depicts a high-rise silhouette between the legs of two giraffes. And for a series of posters for the reopening in 2014, the Parc Zoologique de Paris used internationally recognised buildings from Paris. Architecture is also used in miniature format for identifying wildlife parks and zoos; for example the official postage stamps that show zoo buildings, of course with animals as poster boys. This practice underscores the value that outside parties attach to the zoo as an institution and its architectural impact. This is no surprise. In a time when almost all zoos feature the same stock of exotic animals, a lion or an elephant does not represent a unique selling point, as might have been the case one hundred years ago. Zoos are differentiated from each other by the programs they offer (events in the zoo), by the upgrading of park facilities (local recreation factor), or simply by the increase in attraction in the form of unusual buildings. Since the majority of planning contracts today are issued in public competitions, the increased quality of the buildings and the heightened public awareness of architecture also have an effect on the zoos. This new focus can only contribute greatly to their general benefit.
This checklist is a possible communication platform for architects, zoologists, and builders. It is composed of four columns: Territory, Workspace, Visitors’ Space, and Buildings as well as three double lines: Space, Function, and Design. For every planning project, the checklist is to be adapted accordingly and supplemented if necessary.
Giant pandas live in a few mountain ranges in south central China— in Sichuan, Shaanxi and Gansu provinces. They once lived in lowland areas, but farming, forest clearing and other development now restrict giant pandas to the mountains. Giant pandas live in broadleaf and coniferous forests with a dense understory of bamboo, at elevations between 5,000 and 10,000 feet. Torrential rain and dense mist descend throughout the year on these forests, which are thus often shrouded in heavy clouds.1

**Native Habitat**

Giant pandas live in a few mountain ranges in south central China— in Sichuan, Shaanxi and Gansu provinces. They once lived in lowland areas, but farming, forest clearing and other development now restrict giant pandas to the mountains. Giant pandas live in broadleaf and coniferous forests with a dense understory of bamboo, at elevations between 5,000 and 10,000 feet. Torrential rain and dense mist descend throughout the year on these forests, which are thus often shrouded in heavy clouds.1

**BASICS**

**Biological Systematics**

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Animalia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phylum</td>
<td>Chordata</td>
</tr>
<tr>
<td>Class</td>
<td>Mammalia</td>
</tr>
<tr>
<td>Order</td>
<td>Ursidae</td>
</tr>
<tr>
<td>Scientific Name</td>
<td>Ailuropoda melanoleuca</td>
</tr>
<tr>
<td>Common Name</td>
<td>Giant Panda, Giant Panda Bear</td>
</tr>
<tr>
<td>Other Name(s)</td>
<td>Giant Bear Cat, Bamboo Bear</td>
</tr>
<tr>
<td>Group</td>
<td>Mammal</td>
</tr>
</tbody>
</table>

**Number of Species**

Giant Pandas (Ailuropoda melanoleuca)

**Location**

Mountains of central China

**Habitat**

High-altitude, moist bamboo forest

**Colour**

Black, White, Brown

**Skin Type**

Fur

**Size**

1.5m - 1.8m (4.9ft - 6ft), height ca. 0.75m

**Weight**

170kg - 250kg (375lbs - 551lbs)

**Top Speed**

32kph (20mph)

**Diet**

Omnivore

**Prey**

Bamboo, Fruits, Rodents

**Predators**

Humans, Leopards, Birds of Prey

**Lifestyle**

Diurnal/Nocturnal

**Group Behaviour**

Solitary

**Lifespan**

20–35 years

**Age Of Sexual Maturity**

4–8 years

**Gestation Period**

5 months

**Average Litter Size**

1

**Name Of Young**

Cub

**Age Of Weaning**

12–15 months

**Conservation Status**

Vulnerable

**Estimated Population Size**

2,000

**Biggest Threat**

Habitat loss

**Most Distinctive Feature**

Extension of wrist bone acts as a thumb

1 [https://nationalzoo.si.edu/animals/giant-panda](https://nationalzoo.si.edu/animals/giant-panda) (accessed 20 January 2020).
Enclosure requirements

All enclosures must be easily subdivisible (e.g. with electric fences) or have partitioning enclosures. Enclosures or partitioning enclosures must meet the minimum requirements set out below.

Space requirements

The following dimensions apply to enclosures with paved, drained or otherwise treated floors, where the paved floors do not cover more than a quarter of the area. In enclosures with solid ground or extensive farming, the minimum area required is 1,000 sqm for up to 2–3 Malaysian bears and 1,500 sqm for up to 2–3 other bears.

Giant panda (Ailuropoda melanoleuca)

Outdoor enclosure: At least 200 sqm per animal. In case of pair management, 2 separate (if possible spatially separated) but connectable outdoor enclosures are necessary. Indoor enclosures: Connectable individual boxes of 8 sqm.

Enclosure equipment

For bears in outdoor enclosures, enclosure structuring in all three spatial dimensions is particularly important. It must be designed to allow the implementation of a systematic plan for habitat enrichment and employment of the animals from the outset. Climbing facilities with several entrances and exits as well as elevated resting places with sufficient distance for each animal must be provided. Screens, avoidance and retreat facilities, e.g. by means of rocks and thick tree trunks, must be provided and the animals must be able to retreat from the view of visitors. Shady and sunny places at a distance, which allow each individual to thermo-regulate through behaviour, are indispensible. Many opportunities for activity and a bathing area of at least 20 sqm (except for polar bears, see above) as well as areas with natural substrate (sand, bark mulch, applied, sown soil) with the possibility of digging are necessary. In indoor enclosures without underfloor heating, bedding is required in winter, for Malaysian bears in winter generally. Bedding is also required for nest-building. Hammocks or nest baskets with nesting material for nest building are to be provided for partly tree-living species. For breeding, quiet, darkened and dry litter boxes with self-watering facilities, which can be separated from other species and the keepers’ working area, as well as access to a separate outdoor enclosure are essential. Enclosure boundaries: Dry or water ditches, walls, reinforced glass or grating with protection against climbing over and under.

Enclosure requirements

Social structure/society: Although all bears live solitary lives in the wild, they can be kept in pairs or small groups. However, it must always be possible to separate animals and keep them individually. The latter applies especially to the Giant Panda. Habitat enrichment: A systematic habitat enrichment plan for bears is needed for their employment and health care. There are detailed bear enrichment guides, including practical and varied sample calendars, toy-making guides and refurbishment examples. Enrichment objects, especially those with food, are to be offered in sufficient quantities, i.e. at least as many as the animals are kept together. There are numerous possibilities for habitat enrichment through tasks in feeding, which should be used variably. These include distributing portions of food decentrally throughout the entire enclosure, presenting whole fruit and vegetables, offering feed in cardboard boxes or similar containers, feed tubes provided with holes or hidden in holes in trees or pieces of branches. Food containers should be placed in such a way that the bears have to stand upright. Smell stimuli are important, e.g. scent tracks should be placed to filled and unfilled food hiding places or scents should be applied to vertical surfaces. Constantly present but regularly changed nest material stimulates nesting behaviour.

Animal stock management

Feeding/nutrition

Different types of bamboo are the basic food for the giant panda. Polar bears receive mainly fatty meat, preferably horse or beef, enriched with oil containing unsaturated fatty acids. The Giant Panda does not hibernate. It is the least seasonal in terms of food quantity. Since bears are opportunistic omnivores and are mainly engaged in foraging, the food should be distributed over at least 4 feedings per day, of which at least 2 should be decentralized by distributing the food throughout the entire outdoor enclosure.
Spatial Programs
Using the example of the Panda House at Berlin Zoo

Giant Panda's enclosure. Zoo Berlin, Germany
Analysis by students
Architecture: dan pearlman

Infographic: Christian Schlippes
Source: Berlin Zoo

By Fred Richter, 10/2019

Design Parameters
PANDA MOONWALK or WHY MENG MENG WALKS BACKWARDS

Video Installation, Dur. 8:00 min, HD couleur, sound
Bärenzwerger Berlin (2018)
Artist: Kerstin Honelt

Illustration: Natascha Meuser
Pick a painting from the Romantic period (from the 19th century, for example, Jakob Philipp Hackerts, Carl Gustav Carus, Caspar David Friedrich). Add space and volume in the form of architectural boundaries.

Nature is a dominant theme in paintings from the Romantic period. The Romantics sought to restore man’s relationship with nature. They saw nature as something pure and uncorrupted and, therefore, almost spiritual. In this first exercise, the students were asked to take a new approach to nature. They picked a painting of their choice and explored and explained their personal views on nature by analysing the chosen artwork. The students then supplemented the paintings with built demarcations and add the image of a panda. This exercise was intended to make them aware that every human intervention produces effects and alienates the image of paradise. Basic ways of presenting nature and basic principles of perspective were discussed. Finally, the students developed a statement for the picture to represent an allegory or tell an anecdote which looks at the panda and explores themes, concepts, or gestures.

**Excercise 01**
Image Analysis and Intervention Using the Example of Romanticism
WHAT CAN PANDA DO FOR YOU?

WALK A PANDA

When they run out, you’ll be without.

Because there is no panda

When they run out, you’ll be without.

Just do it

Panda, activate paradise

You’re in good hands

Exercises

The Aesthetics of Perspective

View into nature

Left:
Wanderer above the Sea of Fog (1817)
Caspar David Friedrich (1774–1840)
Kunsthalle Hamburg
Design: Eddie Goh

Top to bottom:
Memory of a Wooded Island (1843)
Carl Gustav Carus (1789–1869)
Staatliche Kunstsammlungen Dresden
Design: Mohamed Shehata

Rast am Brunnen in oberitalienischer Landschaft
Albert Emil Kirchner (1813–1885)
Private Collection
Design: Veronika Langen

The Dort packet-boat from Rotterdam becalmed
Joseph Mallord William Turner (1818)
Yale Center for British Art, New Haven
Design: Anna Yan Thum

A Walk at Dusk (1830–1835)
Caspar David Friedrich (1774–1840)
Source: The J. Paul Getty Museum
Design: Jameel Trowers

View of Lake Geneva (1849)
Alexandre Calame (1810–1864)
Source: Musée National d’Histoire et d’Art, Luxembourg
Design: Martin Hundeshagen

Easter Morning (1830)
Caspar David Friedrich (1774–1840)
Museo Nacional Thyssen-Bornemisza, Madrid
Design: Anotidaishe Mavazhe
HOW TO MEET A PANDA

BE ALL YOU CAN BE

left: The Times Of Day, The Midday (1821/22)
Caspar David Friedrich (1774–1840)
Source: Lower Saxony State Museum
Design: Mehmet Celengli

Alterslandschaft mit zwei Männern (1830–1835)
Caspar David Friedrich (1774–1840)
Source: State Hermitage Museum, St. Petersburg
Design: Anotidaishe Mavazhe
Manifesto for Nature

Panda Claim

Exercises

65
Black and White
Space, Volume and Contrast
Excercise 02
The Aesthetics of Biology. Construction of Nature

Find a strong example from the history of building in which nature served as a model for new materials, constructions or forms. Draw architectural diagrams to explain the abstraction of general principles. Make use of natures solutions and develop them further. Each student presents an example of built architecture, that shows a strong relationship to nature.
Based on your last presentation you must furnish proof of being able to address a task independently within a given timeframe and apply the results of your design thinking. Students are expected to demonstrate the capacity to depict the outcome of their academic research in oral form, as well as portraying and defending content methodically and convincingly within academic exchange. The following topics will require to be addressed:

**Concept and Title**
How should the work be titled?

**Selection of Topic**
What is the argument to be put forward and/or defended?

**Exposition**
What is the motivation behind the work and why?

**Key Visual**
Pick a key visual that demonstrates your design idea!

**Architectural Diagram**
Sketch your main design idea to increase communication, and to provide vision and guidance.

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**Exercise 03**
An Instruction to How to Write a Claim
What is your Message?

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**Examples for Titles**
- From Breeding Station to Research Centre
- Why Zoos Should Focus on Research and Conservation
- Free the Panda from Being a Rockstar
- How the Focus can Shift Towards Education Rather than Entertainment
- The Panda as Urban Showpiece
- Why the Entrance to Zoos Should be Free of Charge
- Watching and Being Watched
- How Viewing can Change the Perception

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**Exercises**
**Personal Reflections**

In future giant pandas could be left hungry and struggling to survive owing to insufficient food supplies – i.e. bamboo. The question is, how will there be any bamboo left for pandas when human developments are slowly wiping out most of the bamboo fields in the world? What can pandas do in response? Is it necessary for them to migrate? The hypothetical concept here is to create a journey emulating the migration of pandas from one place to another in order to look for their source of food. The structure is an attempt to symbolise the creation of Noah’s Ark which is to protect pandas from harm or, in this case, starvation. Supporting this idea, plans for bamboo plantations in China are intensively underway which will play a significant role in solving this problem.

**Mobilising the Habitat**

This proposal is an experimental suggestion. The objective is to provide a mobile structure that is periodically able to change the habitat without necessitating any natural demolition and is able to offer endless bamboo supplies for pandas. The structure will be situated for a maximum of three years at each location, allowing enough time for the bamboo on site to grow and mature for pandas to consume it. For ease of handling, parts of the structure can be assembled and disassembled.

**Maximising the Habitat**

Other than supplying pandas with bamboo, the aim is to give pandas more freedom to roam about within their natural and original habitat without any obstructive barriers or differences in temperature. This demands more space for them to interact with each other, with the ability to develop physically and cognitively.

**Endless Movement and Multiple Experiences**

This project represents an exploration for humans too who trace the experience of pandas on their migration journey in search of food. A long and endless trail begins with visitors’ arrival on site on a hot air balloon. They then stroll around site without any end point or destination. The trail and materials create multiple interactions for both pandas and humans with flora and fauna at different latitudes.

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**Noah’s Ark**

What if Noah’s Ark Lends Meaning to a Potential Journey for Both Pandas and Humans?

Nurin Abdullah
Separation
The long trail is created with the help of subtle elements. It creates a separation of the two genders.

Floating
Structures are located at different heights and levels, mimicking the site contours, making them look as if they are elevated and floating on the air.

Landscape as Structure
Using vegetation as part of the structure stimulates a sense of common homeland with the pandas.

Original Habitat:
Southern China

Site A
Qingchen Mountain, Dujiangyan

Site B
Chengdu, Sichuan, Yangtze River

Site C
China Bamboo Forest, Zunyi, CHN

Site D
Shunan Bamboo Forest, Yibin, CHN

Multi-Purpose Structures

01 Landing Port (Visitors)
02 Landing Port (Staff)
03 Ticket and Souvenir Booth
04 Seating Area
05 Cafe
06 Indoor Enclosure (S)
07 Indoor Enclosure (M)
08 Veterinary Clinic
09 Training Cage/Exercise Area
10 Training Cage
11 Washroom
12 Changing Rooms/Rest Area
13 Playgrounds
14 Outdoor Enclosure (900sqm)

Zootopia
Platforms are elevated on different levels and create the impression of a flowing structure, like floating in the air.

Circulation
A guided endless circulation, without having an ending point. The structure allows different places and views of nature.

Noah's Ark Nurin Abdullah

Floating Structures are located at different heights and levels, mimicking the site contours, making them look as if they are elevated and floating on the air.

Zootopia Platforms are elevated on different levels and create the impression of a flowing structure, like floating in the air.

Circulation A guided endless circulation, without having an ending point. The structure allows different places and views of nature.

Noah's Ark Nurin Abdullah
since there are no roads leading to the pandas’ habitat and the mobile structures are to be set up at ever new places in the forest that have sufficient food resources. The experience will thus evoke associations with the exotic adventures such as those portrayed by Jules Verne. What remains is the shape of the hot-air balloon, which now no longer rises but, freed from its envelope, hangs down as a struttured structure like an oversized hanging chair and is attached to the existing wilderness. In these structures are not only the pandas, but also the people, so that both are equally shielded from a potentially hostile environment.

«In presence of Nature’s grand convulsions, man is powerless.»

Jules Verne
Vertical Architecture
Architecture has and always will be aimed at creating a design that favours its users. Each living being should have access to spaces which suit their nature and temperament. By focusing on vertical architectural elements, this project hopes to unveil the true nature of pandas – not the fat and lazy bears we have grown accustomed to, but rather playful and adaptable treeclimbers. To release all pandas back into the wild is and should always be an overarching goal. Hence, this enclosure serves to prepare pandas for the wilderness by honing their natural instincts and survival skills.

Form Derived from Nature
No amount of enclosed space is large enough for any enclosed living being besides the open world itself. For this project, however, the scale of architecture encapsulates nature dwarfing all living beings. Designed on top of a mountain in China, the concept behind the form is derived from nature itself: bamboo enwrapped by the mountain. The circulation route enables visitors to explore the entire scale of the architecture.

Vertical Zoo
How Verticality can Change the Zoo Experience
Shaun Yong

Side-by-side Circulation
The goal of this design is to create an enclosure for pandas to explore and to provide people with a better understanding of pandas. Each circulation route in the building brings people closer to this animal, rather than aspiring to be merely a touch-and-go event. As we venture through the building, we learn more about their nature, home, and surroundings, experiencing verticality alongside the pandas. Ultimately, it is important to bring together humankind and pandas since we, as humans, need to understand why these animals must be conserved and protected.
Design Idea
The purpose of this enclosure is to not only serve as an education medium revolving the ecosystem of the giant pandas but to also prepare the Pandas for the outside world. By planting different species of bamboos on the different levels of the enclosure, this would train them to seek for their own food while training their survival skills.

Flora and Fauna of the Zoo
1. Tibetan Snowcock Bird
2. Tibetan Sandgrouse
3. Giant Babax
4. Tibetan Eared Pheasant
5. Chimonobambusa Quadrangularis (Square Bamboo)
6. Giant Panda
7. Bambusa Sinospinosa (Thorny Bamboo)
8. Dendrocalamus Latiflorus (Mei-Nung Bamboo)
Forests as a Source of Inspiration

This design started with the question: “Do pandas have a house?” and sought to find a method for making pandas feel at home. At the same time, it is aimed at designing a building where visitors can better experience the natural environment of pandas. Pandas are wild animals which normally live in bamboo forests at the heart of a natural landscape. The building is thus inspired by such forests. The multiple structural poles within the building are inspired by bamboo poles and the organic top cover is inspired by forestry. This brings visitors closer to the experience of wandering within a bamboo forest.

Interaction

Interaction between pandas and humans is one of the core aspects of this project. The design provides different boundary typologies to create diverse experiences for visitors. It also creates semi-private areas for the panda. When pandas do not wish to see visitors they are able to retreat to these areas, although visitors may continue to observe them behind boundaries with a limited view. The “Interactive Wall” is aimed at attracting visitors’ attention by inviting them to play the “Find the Panda” game. The purpose of the “Angle Wall” is to play with viewers’ perceptions.

The Diversity of Circulation

The design creates a wide range of alternative circulation routes for both pandas and visitors. The visitor’s route draws inspiration from the Möbius Strip, also called the twisted cylinder, in order to maintain continuous and fluid circulation. Visitors can access different levels and explore different perspectives on their route which comprises ramps leading to the roof as well as indoor and outdoor exhibition and observation spaces. The project is designed for two pandas of different genders. These two pandas have different sub-spaces within their territory, although during certain periods the individual panda habitats can be merged to form one large single habitat.
How on EARTH...? Down to EARTH!
Can Rammed Earth Elicit Emotions between Humankind and Animals and Transpire as the Future Material of Zoos?

Anotidaisho Mavazhe

Materials and Prefabrication
Made from locally excavated earth, this enclosure demonstrates the practical and aesthetic benefits of a material which is so often dismissed as inferior or irrelevant for contemporary buildings. The enclosure and structure are entirely made from rammed earth; therefore the zoo is 99 % recyclable. Complementing the structure is a wooden roof covered in straw.

A Rotary Exhibit
The aim here is to bring the panda to an African country; Hwange National Park in Zimbabwe. This will in turn allow tourists and locals to visit the enclosure and witness a non-indigenous animal. Due to its location and climate the enclosure hosts the panda during the winter period and other animals within the national park afterwards. The threshold between humankind and pandas has been redefined by harnessing different stylistic openings and displacing the concept of cages. This is intended to forge an intimate relationship, appealing to the visitor’s emotions through experiences, exhibitions and redefined thresholds.

Circulation and Experience
The design concept aims to understand the relationship between humankind and natural landscapes within the enclosure as a design medium, a medium that will provide opportunities to reconfigure spaces. This will be achieved through amplification, abstraction, purification, materialisation and juxtaposition. The intent of the design is therefore to stimulate a sensory haptic quality, enabling a reconciliation between the visitor with the animal and its habitat. This experience will be made possible in the design enclosure through the process of stimulating different senses. Materiality will therefore serve as an important factor in the physical construction of the landscape. This experience will be enhanced through spatial manipulation. Circulation is a key element to the visitor’s experience and will be designed to maximise the zoo experience, lending structure to a coherent story within the exhibition space.

This «romantic relationship» between the maker and nature informed the design of a building that seeks to achieve a similar sense of mystery and unpredictability in its layout and materiality.
How on EARTH…? Down to EARTH!

Location Concept

Panda exhibited during the winter period only

Ground floor

1 Meeting Point/Reception
2 Reception
3 WC
4 Delivery room
5 Storage
6 Bamboo Storage
7 Indoor Enclosure Male/Female
8 Panda Stall Male
9 Panda Stall Female
10 Cub Stall
11 Panda Stall Female
12 Ablution
13 Kitchen
14 Incubator
15 Exterior Enclosure
16 Keeper Lounge
17 Changing room
18 Locker room
19 Showers
20 Circulation

Second floor

1 Wall Exhibition
2 Skeleton Exhibit
3 Reading Pod
4 Projected Exhibit
5 Virtual Reality
6 Disabled Exhibit

Airspace

Exhibition

Reception

Corridors

Facilities

Kitchen

Doctor

Keepers area

Visitor area

Outdoor area

Indoor area

Meeting Point/Reception

Exhibition
EXHIBIT 1
EXHIBIT 2

EXHIBITION 3
EXHIBITION 4

ZOOKEEPER AREA
CLINIC

South elevation
Section A

East elevation

Indoor enclosure
Visitor
Zookeeper

How on EARTH...? Down to EARTH!
Walls
The core areas are supported, made out of a mixture of sand, gravel, loam and concrete and compacted by means of a pneumatic tamping device. This results in an aesthetically pleasing sediment look after removal of the formwork. The goal is to achieve a zero-energy building. At the same time the walls serve as hygroscopic moisture storage and have a very good effect on the indoor climate. Further advantages: low technical effort, inexpensive, fire-resistant, good room acoustics. Ecologically, because the material is on site and thus saves transport costs.

Fine sediments
The aesthetic charm of the layered structure is an additional rural design plus. Beautiful is above all the storage capacity.

System Diagram: Rammed earth compressed
- Moist earth mixture of sand, gravel, clay and concrete
- Reinforced plywood frame
- Pneumatic basefill tamper
- Day: Wall absorbs heat slowly, and keeps the internal temperature stable.
- Night: Wall releases the heat absorbed during the day, releasing it at night.

1 Rammed earth construction in Horsham, Australia
Photo: Rammed Earth Enterprises
2 Layers of rammed earth
Photo: Wikipedia, Grégoire Paccoud
3 Hardwoods Bamboo lasertable wood sheets
Creating a New Relationship
At zoos there is a very limited relationship between animals and visitors. Visitors merely observe animals and then continue on their way quickly. This project seeks to create a new type of relationship. It attempts to provide pandas with a natural setting to live in and visitors with different opportunities for observations and experiences, emulating a playground. Through this method, animals can spend time within a natural setting and visitors may observe, witness and understand how they live.

Design in a Natural Setting
We commonly see animals at zoos in cages or boxes which imitate nature. From the outset, this project aims to give animals an authentic natural site in which to live. Thus, visitors can witness pandas climbing, lying down or sleeping amidst trees. For this reason the chosen site of the project is a forest.

Expanding upon the Zoo Experience
Experiences of zoos are usually very short and last a mere moment or two. This project attempts to translate this into a fluid process, behaving like a playground for visitors. Visitors may witness pandas from different angles, heights, levels and indoor and outdoor spaces, although they may not always be able to spot them among the trees. There are also different viewpoints for children and adults which can be helpful in shaping children’s own experiences.
Elbe
Leopoldshafen
Parkplan Georgengarten und Beckerbruch an der Elbe

- Bauwerke
- Kunstwerke
- Gartenanlagen
- Sonstige
- Schloss Georgium
- Orangerie (heute Galerie)
- Küchengebäude
- Hem. Küchen- und Obstgarten
- Heiliger Hain
- Römische Ruinen (Sieben Säulen)
- Ionischer Tempel (Rundtempel)
- Remdenhaus
- Blumengartenhaus
- Historischer Haupteingang
- Mausoleum
- Tierpark
- Roter Bogen
- Weißer Bogen
- Fürst-Franz-Denkmal
- Spittlers Laube
- Kornhaus
- Jankers Paddelgemeinschaft
- Wallwitzburg
- Statue Diana, die Jägerin
- Statuen Apoll und Venus
- Vertiefter Sitz
- Altdeutsche Gräber
- Attische Gräber
- Skulpturstab Amor
- Fürstenplatz
- Völkersprachen-Vase
- Statue Kleopatra
- Unterer Sitz
- Insel mit Hermaphrodit-Statue
- Waldersee-Sitz
- Willibalds Sitz
- Vase
- Stadtplan: Stadt Dessau-Roßlau
- Informationen Kulturstiftung Dessau-Wörlitz

Next to the Zoo
A historically significant location, the Georgengarten in Dessau was chosen for the project.
Next door to an existing animal park.
Visionary New Agenda
The project dealt with the construction of a new panda house. The central aim of the course was to consider architecture as an alliance of form, biology, and ethics unleashes new and exciting possibilities in the design of zoo buildings. My final work should not only spark discussion about contemporary animal husbandry, but also provide important and innovative inspiration for the up-to-date transfer of knowledge in zoos.

For me as an architect the most important point is to expand the scope of experience between animals and visitors. In zoos, people can generally only enjoy a very limited view at a fast pace. This is why observing, but without disturbing. This project aims to create a valuable atmosphere and spaces for both animals and visitors. The design prefers natural materials related to the location and use. Thus, this ‘playground’ stands as a big wooden structure with grass, trees, and some amount of glass. These materials provide and facilitate a natural atmosphere.

I chose a forest as the site. The project tries to create an architectural path in nature, which can enable a better understanding for wildlife outside of human civilisation. The focus among other things is to awaken an understanding for animals and nature through careful architecture. Visitors should learn to understand life and ecological interrelations by

Beyond Observing and Being Observed
Bamboo Playground
How to Reconnect Sustainable Nature

Eddie Goh

Natural Architecture
Here, nature serves as a framework for setting structure. The aim is therefore to build «into» nature, rather than «on to» nature. The form of the design strongly resembles that of a mountain and blends into the site by harnessing organic and low-profile materials, providing the giant pandas with the most authentic setting possible. Bamboo is a low-cost and sustainable material that is intensively grown locally. This material has been historically used in the countryside for the fabrication of handicrafts, native architecture and utilitarian objects.

The Elimination of Barriers
This project is designed to create spaces that allow visitors and giant pandas to remain on the same level throughout, eliminating physical barriers in between and achieving closer encounters and views without any obstacles. Bamboo structures are used to create an interesting interplay between vertical and horizontal lines. In some spaces, vertical and horizontal elements intensify to form a psychedelic perspective, evoking a profound sensory perception.

Surroundings
Architecture is an interplay between mass and hollow space. In this design, space and body stand in a complementary relationship to each other, continuously merging. In this strictly symmetrical Panda House Architecture guides the path through the rhythm of the space and determines the circulation route of visitors and Pandas at the same time. Visitors surround the giant pandas from different viewpoints which afford diverse experiences. Open and active spaces with visual connections enhance the recreational experience.

Cameron Highlands, Malaysia
To create a haven for the giant pandas where they will feel at home is to go back into the nature and provide them an authentic environment. Locating the site in a beautiful tea plantation in Cameron Highlands, one of the most popular nature attractions in Malaysia with breath-taking sceneries and refreshing climate on a mountain. This architecture connects human, giant pandas and the nature through rejuvenating recreational experiences.
Circulation

Up and Down
With viewing platforms at different locations, allowing the visitors to watch the giant pandas from different angles without any obstacles.

Barrier Elimination
Using moats with gentle slopes to eliminate the need of physical barriers, allowing a closer encounter between the giant pandas and the visitors.

Walking With the Pandas
Using ramps to create circulations that allow the visitors and giant pandas to stay at the same level all the time while eliminating physical barriers in between.

Surround & Around
Create activities and encourage circulation surrounding the giant pandas with different views and experiences.

Pocket Garden
With multiple pocket gardens in the architecture, not only it brings aesthetic quality but also allowing the visitors to plant, harvest and enjoy their own tea leaves.

Entrance area Panorama views

Panda enclosures

Visitor areas outdoor

Panorama views
The giant panda is one of the world's rarest mammals and, at the same time, a worldwide symbol of conservation. The aim of my design is to take visitors on a journey, where they can learn about this very peculiar species with its unique and remarkable characteristics. I have designed the building in the shape of an infinite loop. Architecture construed as a path of adventure is intended as an invitation prompting continuous movement. In this way, different attractions and views invite visitors to explore the unknown world of the panda from different levels and perspectives.

Architecture as a Symbol of Self-identity
The task here has been to create a physical environment for visitors which conveys a sense of specific identity and which is non-alienating. The wooden spiral incorporates the natural habitat into the architecture and evokes a sense of belonging which is not verbalised. Instead of visible borders, the building functions as its own border. You can always look outside, but there are also sections which invite visitors to stay longer, rest, absorb information or enjoy the landscape. If you are lucky, you will have the opportunity to see a panda; if not, you will have felt its presence.

Location
The panda house is placed on a plateau between two hills in the Carpathian Mountains in Romania, close to a bear sanctuary near Zarnesti, surrounded by oak and hazel forests. This building could also be placed elsewhere on mountains from across the world, provided there are similar weather conditions. The climate is nearly identical to the climate in Sichuan (China), where the giant panda originally derives from. The airy wooden facade allows the surroundings to shine through and gives visitors a feeling of shelter.
Legend

1. Entrance
2. Indoor Space Female 71.1 m²
3. Mother – Child Space 25.9 m²
4. Indoor Space Male 97.4 m²
5. Intermediate Space Female 9.7 m²
6. Intermediate Space Male 9.7 m²
7. Enclosure (only keepers) 5.0 m²
8. Training Area and Transport Box 15.5 m²
9. Laboratory 16.9 m²
10. Drinking Area 18.3 m²
11. Clinic 49.0 m²
12. Delivery Area 16.0 m²
13. Delivery Area Bamboo 16.0 m²
14. Food Preparation 19.0 m²
15. Keeper Lounge 14.5 m²
16. Cold Storage 49.0 m²
17. Keeper area 13.5 m²

Ground floor

Elevation

Perspective

Module system

System section
Combining Visitor Attractions
Located in one of the largest animal parks, this new panda house benefits from the existing infrastructure and the integration of scientific research facilities, such as the Leibnitz Institute for Zoo and Wildlife Research. The attractive location of the building next to Friedrichsfelde Palace, in an area covered with dense trees, also offers sufficient space for future extensions.

Geometry in Nature
The strictly geometrical two-storey building with its gently curved outdoor enclosures respects not only the architecture of the nearby palace, but also above all the pandas’ habitat. Facilities for animals and keepers (ca. 800 sqm) are located within the basement. Whereas the plinth area is solid, the upper floor features a light glass construction with a perforated metal shell which conjures up an interplay of light within the interior.

Access and Presentation
The visitor’s entrance and loading bay are on the northern side of the building. Visitor areas and multifunctional exhibition spaces are located on the second level. The upper floor (ca. 560 sqm) is accessed on the southern side via a barrier-free ramp and stairs, flanked by three panoramic planes. Another observation spot is somewhat more hidden and gives insight into the indoor enclosure. The observation points are located at different levels, so that pandas remain visible to visitors from as many places as possible, although these do have at their disposal enough places in which to retreat.
The Idea
My idea is to develop a kilometre-long path for cyclists and pedestrians. This path is to include all spaces needed for a panda house, albeit remaining enclosed in form. In Dessau North a beautiful urban park collides with untouched nature, with only a river dividing the two contrasts in setting. My sculpture now unites them.

The Concept
Inspired by a Chinese dragon, my sculpture winds its way across the natural landscape in a curved motion. This journey amidst this natural setting is packed with experiences. There are diverse viewpoints, places to linger and various meeting points. In harmony with nature, pandas are also able to find a suitable home here.

The Context
Water, wind, earth—everything is granted by nature. On the back of the dragon you can hear the rushing water of the river. The wind blows. Wherever you look there are trees, shrubbery and earth. The dragon, as if it has always been there, forms an inherent strand of nature. Its shape gives rise to the spaces.
Viewing platforms

Guided view

Places to rest

Sculptured pathways

Experience
learn from and with nature and animals

Shelter
viewpoints, places to linger and various meeting points

Nature
urban park meets with untouched nature

Guided Science | Educational spaces

Meeting points

Set of guided pathways
Clusters of an Interlocking Geometry
Clusters of an interlocking geometry are a metaphor for the «Panda Village», where the aim is to reinforce the relationship between humans, pandas and nature. This metaphor is translated into the master plan layout and design form. Each cluster serves its own purpose and caters to a different programme; the interlocking design creates different volumes which bring out the essence of the spatial experience for users.

A Journey of Vitality
This enclosure is intended to foster a dynamic and enthusiastic spirit and vigor. The flow of circulation between programmes helps to develop a package of engagement activities involving learning, fun and leisure. Hence, programmes such as bamboo craft studios and tea houses provide a broader platform for visitors to feel involved in the panda enclosure, opening up different perspectives.

A Dynamic Duet between Transparency and Opaqueness
The focus on the visual experience of both visitors and pandas is a crucial element in the design for the facade and roof. This does not involve arbitrary – but rather well-thought-through – decisions when it comes to determining open and enclosed spaces. Full-height glass facades and openings help to frame the outdoor view and panda activities. This further enhances the relationship between the interior and exterior. The glass roof breathes life into the interior and casts interesting patterns of shade. The enclosed spaces introduce feature walls, patterned screens and weave ceilings, creating a harmonious indoor experience.

Panda Village
How Cluster-like Architecture Benefits the Natural Community

Anna Thum
Site Brief

Located next to Berlin Zoo, this park is an interesting spot for the designated proposal. The site is surrounded by lake and islands, naturally formed a few picturesque spots for the proposed design building. There is a café next to the site, which becomes one of the main sources for the proposed enclosure to attract visitors with the designated programs and its architectural features.

1. Typical blocks design
2. One block is moved and elevated to create 2 floors and interlocking.
3. Blocks are rotated to catch the best view on site. Interlocks are further enhanced.
4. Opening on facade and roof to frame view and bring light.
5. A section of block is taken away to enhance overall architecture feature visually.

Design Parameters

Spatial Diagram

- VR-Cinema/ Holgram
- Mini-Library
- Veterinary Clinic
- Nursing Area
- Cold Storage
- Fodder Delivery
- Fodder preparation
- Technical Area
- Lounge
- Teahouse/Restaurant
- Exhibition Area
- Seating Area (View Indoor Enclosure)

Exhibition Area
- Indoor Enclosure (M)
- Indoor Enclosure (F)

Intermediate Space
- Intermediate Space (M)
- Intermediate Space (F)

Courtyard/ Landscape
- Bamboo
- Water (Lake)
- Earth (Site Contour)
- Wood (Trees)
- Fire (People)
- Metal (Existing Building)
A: Arrival and Exhibition
1. Arrival
2. Lounge
3. Locker/Storage
4. Corridor

B: Exhibition and VR Room
6. Exhibition II
7. Hologram/VR
8. Overhead walkway

C: Dining/Cafe/Tea House/Bar
11. Reception
12. Dining
13. Semi-indoor dining
14. Kitchen
15. Cafe
16. Toilets
17. Tea house courtyard
18. Overwater bar
19. Office
20. Technical
21. Cold storage
22. Folder preparation
23. Corridor
24. Enclosures
25. Utility
26. Clinic
27. Incubation room
28. Nursery room
29. Mother-child box
30. Outdoor enclosures

D: Exhibition and VR Room
10. Cultural Gallery and Bamboo Craft
11. Panda Enclosure

E: Cultural Gallery and Bamboo Craft

F: Panda Enclosure

Site plan

Anna Thum
Zoos, Heritage and Climate
This panda enclosure is designed for a site at Hope Zoo and Botanical Gardens, located in Kingston, Jamaica. This site was selected because of its historical heritage as well as the positive impact the enclosure may exert on the zoo and cityscape overall. The new building is multifunctional, combining a botanical garden with a learning path, exhibitions spaces and panda enclosures – the highlight of the overall experience. For economic reasons the structure extends below the ground-floor level, keeping the building climatised and establishing harmony with the surrounding environment.

Senses and Learning
Good teaching needs good architecture. In its most extreme interpretation this thesis sits comfortably with the concept of «the environment as third pedagogue». My design objective is to connect the visitor with nature through sensual architecture, since architecture is experienced predominantly through the atmosphere it creates. Landscapes in particular forge an atmospheric identity. In this design, landscape architecture supports the shaping of experience through the interplay between interior and exterior spaces. Modern technology supports exhibition scenery (e.g. holograms, special sound effects, etc.) as well as natural materials which represent the soft and cuddly «feel» of a panda.

Circulation and Interaction
Circulation is a characteristic form of movement. The interaction between the moving figure and the structural design is constitutive of the experience. Sightlines and pathways play an important role here. One may hear and smell around the corner, but is not able to see. Before finally being able to clasp eyes on the panda the goal is to activate the senses of visitors along different paths, to experience different spaces and first of all go grasp information. This enables visitors to be engaged and entertained before achieving the ultimate experience which is to witness the panda.

A Focus on Sustainability
Sustainability is a vital part of the design in order to create an environment and atmosphere promoting comfort for both pandas and visitors. Usage of materials, design techniques and energy consumption are considered to a great extent. The indoor botanical garden and panda enclosure emulate natural surroundings through the use of natural lighting created with translucent glass materials. The use of natural materials implemented within this design is illustrated by the wooden roofing to help deflect intense heat radiation from the sun. Materials incorporated within and on to the enclosure help to keep the building climatised for the pandas. The interior creates the most comfortable climate for pandas.
“The more we know of other forms of life, the more we enjoy and respect ourselves.”

E.O. Wilson
Senses and Learning

Good teaching needs good architecture. In its most extreme interpretation this thesis sits comfortably with the concept of «the environment as third pedagogue». The design objective is to connect the visitor with nature through sensual architecture, since architecture is experienced predominantly through the atmosphere it creates. Landscapes in particular forge an atmospheric identity. In this design, landscape architecture supports the shaping of experience through the interplay between interior and exterior spaces. Modern technology supports exhibition scenery (e.g. holograms, special sound effects, etc.) as well as natural materials which represent the soft and cuddly «feel» of a panda.
A Soothing Harmony between Architecture and the Natural Environment
Located in Taiping, Malaysia, this project is designed to blend into its surroundings and flow as an ideological concept. At the heart of Taiping Zoo and Taiping Lake Gardens, it comprises a permeable loop with two very generous gateways capable of absorbing pedestrian flow. This initiative enables children to view the panda as a learning figurehead, gain access to own-grown healthy foods through an aquaponic system as well as to engage in educational opportunities presented by outdoor learning environments.

A Fluid and Permeable Architecture which Embraces Outdoor Learning
The routes from both access points are envisioned as a «place full of magic – a playful escape for children that is a symbol of freedom and endless imagination.» By lifting the earth at both entrances, an undulating green spiral at the heart of the site affords direct views into the pandas’ habitats.

A Fusion of Nature and Technology
Drawing inspiration from the form of tree branches, the ramp is supported by white steel tree-like structures. These ‘columns’ support all loads bearing upon the branches which are then conveyed to the trunk and then beneath to the foundation. The ramp is enveloped in steel, painted white so as to enhance its beauty. The walls are designed in in-situ concrete with bamboo formwork, inspired by the panda’s favourite food. Virtual reality is harnessed to create a living and breathing environment so that children experience the reality of deforestation. The screen is no longer merely placed in front, but rather stretches all around, reinforcing the reality of the situation that the earth is facing.

A Panda House Flowing into a School
Architecture as a Catalyst Encouraging Children to Love the Earth
Chin Ai Ong
Legend
1. Outdoor Enclosure for Males
2. Indoor Enclosure for Males
3. Outdoor Enclosure for Females
4. Indoor Enclosure for Females
5. Visitors Platform with Aquaponic System and Edible Garden
6. Enclosure for Females
7. Tracking Cage for Females
8. Mother-Child Box
9. Traning Cage for Males
10. Enclosure for Males
11. Weighing Area
12. Fodder Preparation Area
13. Fodder Delivery Area
14. Veterinary Clinic
15. Nursing Area
16. Office
17. Cold Storage for Bamboo/Fodder
18. Bamboo Storage Area (Waste)
19. Pandas Loading Area
20. Loading Bay
21. VR Space
22. VR Room
23. Visitors Platform
24. Permeable Loop Garden

Site Analysis - Neighbourhood Context

Concept Diagrams

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Generates pedestrian flows and activities by creating different levels.

Responsive to visionary and external site conditions.

Flow of energy creates volumetric hollow; Green spiral ramp as pedestrian friendly learning environment.

Loop of movement as a route and spatial element.

Permeable Loop Garden

Amphitheatre

Grow and Learn with Pandas

Virtual Room - Reality

Indoor Panda Spaces Responsive to Tropical Climate

Virtual Space - Movement

Seamlessly Blend with Nature

Outdoor Spaces for Pandas

Chin Ai Ong

Site Analysis – Neighbourhood Context

Spiral ramp

Legend

Outdoor Enclosure

Indoor Enclosure

Visitors Platform

Storage / Loading Bay

Panda Indoor Space

Flood Gate

Zookeepers Space

Panda Circulation

Zookeepers Circulation

Visitors Circulation
A soothing harmony between architecture and the natural environment, as well as children and pandas. Aerial view of proposed Panda House.

Visitors platform with aquaponic system and own-grown healthy food garden.

An undulating green spiral ramp at the heart of the site offers views into the panda habitat.
In Harmony with Nature

What happens if we were to encounter animals on a daily basis? Most zoos make a strong distinction between humans and animals through the creation of separate spaces, although humans may interact with animals within a restricted capacity as visitors. I believe that the establishment of a genuine harmony between humans and animals requires a different perspective of space. The target of this project is therefore to demonstrate a new type of zoo as a place which fosters interaction on a daily basis.

How will this Pathway be Efficient

The pathway needed to preferably be located in a busy setting with great transportation links in order to encourage a high rate of daily interaction. Alexanderplatz was therefore chosen as one of the most crowded piazzas in Berlin, located at the heart of the city. It also features the train station of Alexanderplatz. Animals demand special requirements for an appropriate environment – one of the most important being nature. The green pathway on Alexanderplatz will therefore lend a dynamic contrast.

How to Implant the Zoo into Daily Life

Much of human history has been written in terms of an ongoing struggle of «man against nature». I needed to align the pattern of people’s movements with animal zones. Instead of viewing the animal zone as a single focal interaction point, it may be implemented across several urban attractions. Humans are continuously absorbed by their daily repeated activities, spending a great deal of time travelling. This zoo therefore may similarly act as a pathway for pedestrians.

The Impact of Form

This project is intended to lend a new palpable atmosphere of greenery to Alexanderplatz, although forms have been produced so as to respect its architectural style. This is demonstrated by a green urbanistic pathway from the edge of Alexanderplatz towards the TV Tower and a supporting pathway from the centre of the platform to the main pathway, respecting the nineteenth-century Neptunbrunnen (Neptune Fountain). Slopes are oriented towards the main attractions.
This project intends to present nature in a bold fashion – not only by implanting animals into a civilian environment, but also creating a strong natural setting at the heart of the city. Green slopes give rise to a grassy valley in between forms. The outdoor cladding of all structures is dry bamboo arranged in a vertical fashion – its brown hues evoking soil. Bamboo is the main food source of the giant panda and is extremely important for both captive and wild pandas. Regarding the strength structure of bamboo, the bamboo kept in a vertically way with a slight warp. The variety of bamboo’s angles makes a special overlapping environment. An image of overlapping bamboo took as visual features study. The visual abstraction showing an intersections regarding vertical warps. Shapes created as a result of sharp and loose angels of vertical intersections.

The form generation started by a green urbanistic pathway from the edge of Alexanderplatz towards the TV Tower. The pathway meant to be straight to fulfill its main function.

The spaces involved as a result of the grid intersections. Creating the functional zones and respecting the nineteenth-century Neptunbrunnen. The form meant to show harmony with the earth by creating green slopes. The outdoor enclosure of pandas elevated down for better visuality access.

Supporting pathway from the center of the platform to the main pathway. The gridlines drawn with specific sharp angels reflecting the Linearity and Intersection concept.

Slopes are oriented towards the main attractions, e.g. the Rotes Rathaus (“Red City Hall”) and the Marienkirche (“St. Mary’s Church”), in order to enhance views.

For more accessibility, Sector of the Panda’s house embedded on the earth. Allowing more connection to Rotes Rathaus shopping center and the surrounding area.
Panda male
Panda female
Zookeepers area
Clinic and Nursing
Vertical circulation

Site Plan

The Civilized Panda
CoeXity is a project that forwards the idea of, as the name implies, coexisting with animals of all shapes, sizes and origins. The panda, as a naturally laid-back member of the Ursidae family, is to serve as an example of how this idea can be integrated into already existing structures like cities, parks and zoos.

**Urban Context**
This enclosure is not only located in a park near the center of the city of Leipzig, but is also a miniature city in itself. The structure and its buildings are aligned with the axes of the already existing buildings and pathways. The enclosure creates a ring that puts emphasis on the park area between it. Its location is convenient enough for visitors who do not have to go out of their way to access it, while providing an unusual experience for first-time tourists. One of the project’s ultimate goals is to heighten the overall quality of the Lene-Voigt-Park which has been neglected by the city for a long time.

**Regional Influences**
The core message of the project is to create a permanent, timeless and unobtrusive structure that establishes a natural habitat for animals and humans. Despite originating from China, the panda enclosure does not rely on stereotypical and striking design choices. The aim is to lend common architectural elements to the panda and vice versa; the animals wouldn’t care much for Buddhist temples anyway! The panda has everything it needs to live a healthy and carefree lifestyle within a regional-oriented design, instead of presenting the animal as something extraordinary.

**Form Factor**
The Panda enclosure incorporates slopes and curves to make the terrain as independent and stimulating as possible, while still providing realistic opportunities for the panda to play and move around. The pathways follow the general structure of the park, breaking out every so often to create resting spaces for visitors. From an outside perspective the enclosure presents itself as a somewhat sculptural object. The existing and new animal facilities bridge a gap by combining the form of the animal enclosure with the general aesthetics of the existing buildings.
History
From the time of its completion in 1874, the approximately 11-hectare site cut a veritable swath through the residential and factory blocks of eastern Leipzig, which were built almost simultaneously. After the construction of the central station, passenger traffic was largely relocated there in 1915. In 1942, operations at the Eilenburger Bahnhof were completely discontinued and the site was largely neglected as a wasteland. What remained was an area about 800 metres long and 80 to 130 metres wide in a prominent location near the city centre.

In 2001, parts of the district park were opened and in 2004 the entire park was completed and handed over to the public. The park offers a wide range of leisure and recreational opportunities for young and old. In the northern part there is a band with sponsorship plots foused by residents or local associations. Like the former railway line, the new Panda enclosure is intended to convey a sense of width and openness. The new enclosure is an example of how Building for Animals can be integrated into already existing urban structures.

Visitor viewing on different levels

Design idea: Your neighbour the Panda
UNZOO
Why We Should Place Visitors Behind the Glass

Isabelle Wuttke

Animal Rights
Animal rights are important and we need to respect them, especially in zoos. In the twenty-first century animals have finally become respected beings – at least in some parts of the world. The quality of zoo architecture therefore needs to reflect this shift too.

Climate and Conditions
In the wilderness mighty pandas live in subtropical mountainous areas containing dense forest. In summer there is quite a cool climate, whereas in winter it is cold. Generally speaking such areas are humid and experience high rainfall. These requirements are thus taken into account in my design.

Modules and Vistas
For my design I pursued three core ideas: a high degree of natural habitat; visitor areas and platforms designed as modular and mobile elements, and visitors positioned behind the glass instead of animals. Integrating architecture into the landscape is integral to achieving this goal.

Mountains Setting the Scene
The design consists of three different spaces: the facility building, the outdoor enclosure, and the visitors’ platform. The mountain scenery acts as an impressive natural panoramic setting, whereas the facility building sits in the valley, forming an architectural boundary. Landscaping the architecture is achieved through glass and natural stone (roughly hued rock) and a walk-on green roof that can easily be traversed from one end to the other. Visitors’ platforms are located high in the mountains at different spots, so that people can look down into the valley from different vantage points.

Architecture Providing Shelter
Visitors’ buildings consist of individual modules grouped around each other, facing different directions and at different angles to each other. The main visitors’ building has a small café, a cinema, balconies and observation halls. The smaller visitors’ facilities mainly contain observation halls and platforms. All buildings are connected by an existing hiking path which will be enlarged and further developed, connecting the enclosure. Within the outdoor enclosure a walking path leads from the roof of the keeper’s building to the hiking trail in the mountains, dividing the outdoor enclosures into a male and female panda enclosure.

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Landscaping the Architecture
The concept here is to build two striking mountains, involving the landscaping of buildings. The design is therefore reminiscent of a Chinese landscape. The tip of the artificial cliffs – the great rocks 30 and 25 metres high – rise majestically above the tree-tops. The objective is to design an exhibit in which visitors share the same landscape (albeit not the same area) as the animals. Two separate enclosures for the pandas are located at the foot of the mountains. The enclosures provide an enriching natural behavioural setting. Even though visitors may not have the chance to view the animals up close, the landscape as a whole forms part of the design.

Inside and Outside
The cement shell, which is planted with greenery on the outside, is supported by a grating made from bamboo framework. Eco-friendly and renewable materials – such as lime-sand brick – are also used. A self-supporting crystal-like »cave« is established inside the rock which visitors can climb via intertwined paths. On a surface of 40,000 square metres, comprising 21 rooms on six levels, pandas are presented interactively through live animal demonstrations and informative games.

Insight and Perspective
Intense viewpoints enable observation from hidden locations on different levels within the structure – from the tunnel and the paths to the observation terrace within increasingly exposed settings due to the widening of the space under observation. Visitors enter the building through a tunnel system. The spiral thematic path featuring platforms guides them, packed with experiences under the motto: »Explore the world of the great panda.« A bridge connects the two mountains and affords a panoramic view of the panda enclosures and the landscape.

PANDADISE
From a Compound to a Living Space

Sandra Misselwitz
Over the past few years zoos and enclosures have changed regarding their design parameters and goals, including whom they ultimately serve. Is a zoo designed for humans or for animals? From the outset, this design process therefore takes into account people and animals and their role in an animal enclosure.

The site, located very close to a chain of mountains, provides natural barriers and simulates the pandas’ natural habitat. As with all spatially malleable objects, the view from a single vantage point is not sufficient to capture a complete snapshot, but rather must be supplemented with a series of viewpoints from different positions. My design achieves this through an elevated and elongated bridge with different sojourn qualities. Guided tours capture changing moods, expectations and illusions.

The panda enclosure has three main areas: a visitor’s area, the zookeeper’s area and enclosure areas, incorporating both the outdoors and the indoors. The building as a whole has a very sober style, featuring concrete on the exterior.
Models (Selection)

1. Anotilaishe Mavazhe
2. Shawn Yong
3. Martin Hundeshagen
4. Nurin Abdullah
5/6. Mehmet Caferoglu
7. Edita Goh
8. Anna Thum

Links: Natascha Meuser
Rechts: Martin Hundeshagen
Acronyms and Abbreviations

ARKS Animal Records Keeping System
ASZK Australasian Association of Zoos and Keencers
Awin Animal welfare indicators
AZA Association of Zoos and Aquariums
BIAZA British and Irish Association of Zoos and Aquariums
DAISIE Delivering Alien Invasive Species Inventories for Europe
CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora
DEFRA Department for Environment, Food and Rural Affairs (UK)
EAM European Association for Aquatic Mammals
EARS European Alliance of Rescue Centres and Sanctuaries
EAAZ European Association of Zoos and Aquaria
EAZWV European Association of Zoos and Wildlife Veterinarians
EEP European Endangered Species Programme (EAZA)
EU European Union
FAO Food and Agriculture Organization of the United Nations
FSC Forest Stewardship Council
GFAS Global Federation of Animal Sanctuaries
IAS Invasive Alien Species
ICP Institutional Collection Plan
ICZ International Congress of Zoologists
IPM Integrated Pest Management
IBIS International Studbooks
ISE International Species Information System
JCUNC International Union for the Conservation of Nature
IWC International Whaling Commission
KEA Keeping Effective Animal Awareness (IUCN)
KFW Kreditanstalt für Wiederaufbau
MUC Marine Stewardship Council
NGO Non-governmental organisation
OE World Organisation for Animal Health
SEAL Social and Emotional Aspects of Learning
SSC Species Survival Commission (IUCN)
SSP Species Survival Programs (AZA)
TAG Tax Advisor Group
WAZA World Association of Zoos and Aquariums
WCS Wildlife Conservation Society
WZACS The World Zoo and Aquarium Conservation Strategy
ZIMS Zoological Information Management System
ZSL Zoological Society of London

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Authors and Participants

Prof. Dr. Johannes Vogel, born 1963. Studied biology and law at Bielefeld University. After completing his doctorate in genetics (1992–1995; University of Cambridge), he worked from 1995 at the Natural History Museum in London. Here he was chief curator of the botanical department from 2004 to 2012. Since February 2012 he is General Director of the Museum of Natural History in Berlin. In addition, he holds a professorship for biodiversity and scientific dialogue at the Berlin Institute of Technology. Numerous vocations (American Association for the Advancement of Science; Lenk Society, Communication; European Community of the Federal Government). Since 2014 he has been chairman of the European Citizen Science Association (ECSA). In summer 2016 he was appointed chairman of the European Open Science Policy Platform (OSPP) – DG Research & Innovation – by the European Commission. Dr. Anselm Weyer, journalist, editor and lecturer, born 1976 in Darmstadt. Studied German philology, philosophy and media studies in Cologne. Freelance editor of the Kölner Rundschau, among others. Worked as a lecturer in Frankfurt, Bremen and Lippsitdt, teaching communication theory, writing and literature. Public relations work for various organisations, including various construction works. Curator of several exhibitions. Publication of numerous articles and books on various cultural studies topics.

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