



annual rings.

AR-walk through the endangered cultivated landscape of the Ilmpark.

audioscript

help audio navigation advice

>>> *click „help“*

The audio files will lead you with exact instructions from here to the end of the star avenue „Stern“. Additionally you will find visual navigation on your device. Usually you will find two buttons in your interface scene, always click on the bigger one first that is indicated with a “1”. After the audio segment has finished or you have arrived to one stopover you can continue with the interface scene by clicking on the second, smaller button with a “2” on it.

When you reached a stopover have a look around with your device. You might find augmented imaged there.

In every interface scene you will have the possibility to go back one scene by clicking on the „go back“ button. This button is always located exactly centered on the floor in your interface scene. To begin with the AR-walk press “Start!”.

audio 1 introduction AR-walk

>>> *click “listen”*

The park that you are looking at was designed more than 200 years ago. Since the time – that we today call the “little ice age” – the average temperature in Germany has raised more than 1 degree. This change of the climate means a risk for many species and an increasing difficulty in maintaining the garden artwork in its original form. The trees of this park are contemporary witnesses. Every tree manifests climate data in its annual rings. In analogy to the annual rings of the trees this project aims to reflect about the condition of the Ilmpark dependent on the climate change. While we will walk through the Ilmpark and observe the Existing we will ask ourself questions about the future.

This walk will take you through the so called “star avenue”- which you can see right in front of you – until its end. Audio files will lead and inform you along that way. At the waypoints you are invited

to move your device around, to discover additional information in this augmented interface. This walk will take you through the so called "star avenue"- which you can see right in front of you – until its end. Audio files will lead and inform you along that way. At the waypoints you are invited to move your device around, to discover additional information in this augmented interface. Our first stopover will be on the right path towards the star avenue when you are in line with the sphinx grotto and the circular spring "Ochsenaue".

Press the second button now to enter the next scene. Start the audio and begin your walk, taking the stairs down through the bridge.

>>>click „...2“

audio 2 original Ilmpark and Ilmpark as a world heritage

>>> click "1 listen and walk"

The design of the park as we know it today started in 1776. Right now, you are entering the park at the most historical part that was built in the first design phase. The duke Carl-August and Johann Wolfgang von Goethe played an important role in creating a new face for the park. Before that, here was a baroque plantation in a society with an absolute monarch.

The new park was designed using the natural landscape as a role model. Even though every single tree and its position was planned in a precise landscape plan, an overall composition, the park should still seem like it naturally grew that way. It was intended that people would be animated with curiosity and observation. Organically shaped paths lead randomly to view axes, monuments or places to linger. The park stands for a holistic discovery of nature and the free development and autonomy of the citizens who use it.

The park is still in a well conserved state and it seems like an almost unchanged scene of the 18th century. One reason for that could be the cult-like worship of Goethe in Weimar's history. Already when he was still alive, the places where he worked and lived were regarded as mythical and museal places. Later, successors of dukes used to refuse landscape architects permission to redesign the park, in order to keep the appearance of that time.

Since 1998 the park belongs to the UNESCO world heritage and today the Klassik Stiftung Weimar is responsible for the upkeep of the testimonials.

It is of high priority for the Klassik Stiftung Weimar to keep the appearance of the park as close as possible to its original state to be able to pass on this garden artwork and cultural history to future generations. Each and every tree is an important aspect of this heritage. This means expensive care and maintenance for the bosks.

The great challenge here is that unlike monumental heritage the vegetation and the trees are living and organic material. It underlies the law of entropy with constant thrive and change.

By the time you have finished listening to this audio segment you might have reached our first stopover with a direct view of the sphinx grotto. When you are there, please pause your walk. Enter into the next scene on your device with clicking on button two, then start the next audio file.

>>>click „...2“

audio 3 historical and future tree species

>>> *click "1 listen"*

Have a look through your device towards the sphinx statue with the tall trees in front of it.

This historical picture of the sphinx and its surrounding vegetation is from 1801. Can you find similarities with the vegetation that is here today? Or maybe see a tree from that time?

One thing is for sure. When studying historical documents that show the park in its original state of the romantic ideal of the English Landscape park, you can see that it was not always possible to maintain this look. Trees have a life span and in a landscape park like this they can live as long as 200 years. Importantly, their well-being and age also depends on outer circumstances, like specific temperatures or sufficient water supply for example.

In front of the spring "Ochsenauge" you can see two tall, slim trees and a smaller newly planted one of the same kind. These are bald cypresses - "Sumpfyypressen" – which were planted there just under a hundred years ago. They are well adapted to the wet site and have good living conditions.

Turn around and look through the trees to the opposite side of the Ilm. Above the foot path at the top of the slope you can see a cluster of three „japanischen Schnurrbäumen". They have bean like seeds and white blossoms in the summer. These trees are very resistant against aridity while still resilient against frost. That makes them quite suitable for adapting to the climate in the future, says Katrin Luge, a landscape architect of the Ilmpark. Therefore she calls these trees „future trees" of the park.

Japanische Schnurrbäume are not bosks of Central Europe. Most probably they were unknown to the park designers at the end of the 18th century. Although in that time there was a big curiosity for exotic bosks and natural aesthetics. Around 21 percent of all plant species in the Ilmpark were brought and cultivated from other countries.

All this brings us to the question if it is at all possible to create and keep a lasting and finished design in garden art with its original plant species or if we need to consider new forms of vegetation in the future?

audio 4 climate change and consequences for the trees

>>> *click "1 listen and walk"*

We will walk until halfway of the avenue. There, at the circular place will be our next stopover. Walk until there and then pause your walk again.

Climate change has not only been scientifically proven, it is clearly noticeable in people's daily life and in the landscapes around us.

But what exactly has changed up until now and what is yet to come?

In recent years many climate extremes have been recorded. The spring drought in 2017, the storm front Xavier in October 2017 or the intense low-pressure system Friederike in January 2018 with wind speeds of more than 130 km/h, are just some examples of extremities which have been fatal for many trees in the Ilmpark.

According to the senior scientist at the "Potsdam Institute for Climate Impact Research" Peter Hoffman, the number of heat days - which means days with 30 °C or more - in Thuringia doubled since the 60s and will probably double again by 2050. If we can't minimize our emissions to 0 by 2050, the temperature will be 4 °C higher than it is today. That being said, a higher average temperature in Germany in the coming years is very probable. Interestingly, frost and long winters will still appear.

Also forecasted is a shift in rain distribution, with long arid periods on the one hand and severe rainfalls on the other hand, with changed wind patterns occurring.

Many bosks in the Park originally grew in a moderate climate. Heat days and long dry periods cause great stress for many trees of Ilmpark and reduce their life span. Very hot days with more than 40 degrees and direct sunlight can make the trunks of the trees burst which lets then lets bacteria and diseases in. In nature trees prevent that with having branches or ivy covering the trunk. In a landscape park like this, it gets removed most of the time to create a clear view through the park. One thing that gardeners do to help with this problem is paint the trunks white so that strong sunlight gets reflected. You can find an example of this on the small, recently planted trees in front of Naturbrücke.

Probably you have now reached the entrance of the avenue, of the so called "Stern", which exists since the original park design. Not original are the poplars lining the path. These trees were replanted in the 80's during the DDR. At that time the range of accessible tree kinds was limited. The original planting, probably spruces, linden trees and chestnuts, was replaced which gave the avenue a whole new look. This shows how sticking to the original state of the park in the past was not always possible. The heritage conservation goal of the Klassik Stiftung Weimar is, to replant the historical bosks along the avenue. The poplar trees are quite sensitive to wind and throw twigs or branches on the path. This can be harmful for the park visitors. And the effort to maintain them is therefore high. The future of these trees at this site is therefore limited.

To what extent will the historical planting have a future has to be estimated in the climate debate and research in the upcoming years.

Scientist Peter Hoffman from the "Potsdam Institute for Climate Impact Research" speculates that in just 100 years time, the climate of Weimar will be like a city in the South France.

By the time you have finished listening to this audio segment you probably have reached our second stopover in the middle of the star avenue. In the case of scientist Peter Hoffmann's scenario of a Mediterranean Weimar in 100, how would this avenue look like?

Klick on button 2 first and open the szenario with klicking on the icon.

>>> *click „...2“*

virtual reality future szenario of a mediterranean „Stern“ avenue

>>> *click „avenue icon“*

>>> *click „...continue“*

audio 5 park maintenace and user conflict in the Ilmpark

>>> *click “1 listen and walk”*

Let's continue our way through the avenue. At its end you will find a crossing of paths, our destination point. Stop your walk there and then click on button 2.

Every single tree in the Ilmpark is an important protagonist when shaping the characteristic of the composed scenes. To expand the life span of the already old trees the park management uses various gardening methods. One gardener's only task is to water the young and especially the old trees in the park. As the rain does not provide enough water, particularly in the warmer summer months, the old trees get watered additionally with up to 3000 litres every two weeks. Right now, this is being done in a time and resource consuming way. Gardener of the Ilmpark, Stefan Hupel is wishing for a better system in the future. One solution would be to collect rainwater for the trees in the wetter months, which then could be distributed when the trees need it the most.

Another example for the maintenance effort in historical english landscape gardens are autumn leaves on the green lawns. The falling leaves in autumn in their quantity would cover the area under the trees crown and stopping sun light from reaching the lawn. This would result in the lawn dying off. In order to protect the green lawn, an important visual attribute of the park, gardeners collect and remove all the falling leaves under each tree. Lately studies have shown that removing all the leaves and therefore the needed humus and minerals weakens the trees. For that reason, the gardeners started shredding the collected leaves in small chunks which later get distributed on the lawn again.

Many old trees in the park have an age over 200 years and are therefore especially fragile. Some have very sensible roots. Compacting the soil around them through the weight of machines, like lawn mowers or even frequent walking over this area, hinders the already weak roots to reach out for water.

Strong wind easily breaks off big branches of old trees. This means a danger for the park visitors. Right now the road safety is hardly met by pruning the trees or stabilizing the branches with straps, especially the ones close to the path. If this does not secure enough safety, the whole tree must be cut down.

In the winter, when the leaves are gone, many trees reveal their cut back branches or the straps in the crowns.

A park regulation was established. Among other things it calls park visitors to keep off the grass in large parts of the park. With this action park visitors would contribute to the conservation of the park. More commonly you will also find closed paths in the park due to construction sites after a heavy wind or rainfall. This current development has a tendency to make a park visit more restricted and communicates a museal picture of the historical park.

The big question here is, how can we maintain our park without disrupting the trees within it? The goal to conserve the UNESCO world heritage on the one hand and people wanting to experience the garden artwork in a holistic way on the other hand leads to a user conflict. The Ilmpark being in the heart of the town makes it part of the daily infrastructure for many citizens. Paths - like the one you are walking on right now - are highly frequented by walkers, joggers, cyclists and commuters on their way to work or university.

From Goethe's time until today, the Ilmpark has always been an open place for the people of Weimar. It also was and is still a refuge for the citizens in times of conflict regarding nature, individual and society. More than ever, in this Corona crisis, we can experience the benefits of the park. Everyone being able to use the park in a self-determined way, increases the identification with this place and leads to a higher awareness, respect and responsibility for its maintenance and preservation.

audio replanting of old bosks

>>> *click „I listen”*

Existing trees and positions are accurately catalogued for the Ilmpark. Following the demands of the world heritage, the exact same tree must be replanted at the exact same position. To replant the same tree kind can be challenging in some cases.

On the example of the copper beeches – “Blutbuchen” - in the Ilmpark this can be well explained. If you turn your device facing your right side, you see a virtual copper beech showing you the direction towards the “Tempelherrenhaus” with two old copper beeches in front. If you want you can search for them later.

The trees have a unique habitus with an even trunk surface a majestic form of the crown and a spectacular reddening of their leaves. The copper beeches were planted more than 200 years ago. These old trees are bosks of a moderate climate and are struggling a lot with the changing weather conditions. This might not be visible on the outside now, but the gardeners of Ilmpark calculate their remaining life to be less than 10 years.

So, what will happen after the copper beeches have died?

Breeding new copper beeches is challenging and it takes many years until you can see if the new tree has inherited the missing enzymes, which cause the reddening of their leaves. Due to the different climate new copper beech trees would be exposed to even more stress and therefore would never reach the same height or expressiveness as their parents. Also, the hope for genetic diversity to create more resistant exemplars is very unlikely in the case of the copper beech.

Norbert Kühn is a scientist for plant use at the “Technische Universität Berlin”. He researched an approach for conservation of cultural assets and woody vegetation in historical gardens under the influence of climate change. Speaking to him about finding similar tree species to replace copper beeches he revealed that up until now no suitable or satisfying alternative has been found.

We must face the possibility of having water shortages in parts of Germany in the future. Under these circumstances it will be highly cost intensive and questionable in terms of climate goals for the management of historical parks to continue with the current strategy of conservation.

Karl-Heinz Plum, the president of the “Bund Deutscher Baumschulen” stated that it will be difficult to hold onto proven design “recipes” with the use of current tree species. To conserve the existing

landscape with its current diversity will be only practical in very few and selected sites. But the concrete consequences for the bosks in Ilmpark in terms of the climate change can only be calculated with resilient data in the next years.

Is the Idyll of the Ilmpark finite?

Climate change happens slowly and subtly and therefore to the common eye is almost unnoticeable. It is very hard to actually recognize the changes around us.

The german sociologist Dirk Baecker describes the analogy of 'the cooked frog', in which the frog does not realise that the water he swims in heats up very slowly until the frog itself is cooking.

A tree however saves changes internally and with the help of its annual rings we can read the changes reliably. In this way data can be read.

Following this, a weather diagram is created that captures weather data on a daily basis and visualizes it in the form of a dot. As a result 365 dots make up one annual ring. This process has no time limitations and could deliver us data for the many years to come.

Critical weather parameters for the life span of the old trees in the Ilmpark are: a temperature of over 29 degrees, ongoing drought of over 14 days with temperatures of over 24 degrees or strong winds reaching speeds of over 20 meters per second.

The three weather parameters each day are either critical or not critical. The critical events - which could also simultaneously occur- get displayed in color. The number of critical weather days in one year can sensitize us and make us aware of the current condition of the old trees and maybe of the Ilmpark itself too.

To access the webpage with the weather diagram, click on button 2 to enter the last interface scene. You are invited to bookmark the webpage with the diagram and follow the process in the future any time you want.

annual rings an ongoing visualisation of critical weather data fo the trees in the Ilmpark

>>> *click „webpage icon“*

>>> *bookmark the webpage*

imprint

author

Hannah Kettel
semester project MediaArchitecture
Bauhaus-Universität Weimar

tutors

Prof. Sabine Zierold
Prof. Bernd Rudolf
Prof. Andreas Alfred Kästner
Jun.-Prof. Reinhard König
Brian Clark

cooperation partner

Klassik Stiftung Weimar:
Katrin Luge, landscape architect Ilmark Stefan Hupel,
gardener Ilmpark
Kirsten Münch, culture manager

Dietmar Sommer, gardener Belvedere park

Peter Hoffmann, scientist at „Potsdam
Institute for Climate Impact Research“

Norbert Kühn, scientist for plant use at
„TU Berlin“

sources

De Gruyter Akademie Forschung. Hüttl, R. / David, K. /
Schneider, U. / Hüttl, R. (2020). Historische Gärten
im Klimawandel. Eine Aufgabe für Gartendenkmalpflege,
Wissenschaft und Gesellschaft.

Potsdam-Institut für Klimafolgenforschung. <https://www.pik-potsdam.de/de/themen/wetter-extreme-atmosphaere> (last access 08.02.2021)

Wikipedia. Park an der Ilm. https://de.wikipedia.org/wiki/Park_an_der_Ilm (last access) 08.02.2021)

Raumstation. Der Park an der Ilm - Ein Klassiker?. <https://weimar.raumstation.org/post/135446813606/der-park-an-der-ilm-ein-klassiker> (last access 08.02.2021)

sources images

<https://foto.biblhertz.it/exist/foto/object.xql?id=08118823> (last access 08.02.2021)

<http://www.goethezeitportal.de/wissen/topographische-ansichtenalt-weimar.html> (last access 08.02.2021)

sources interviews

Norbert Kühn (11.12.2020)

Peter hoffmann (10.12.2020)

Katrin Luge (04.02.2021)

Stefan Hupel (30.11.2020)

Dietmar Sommer (26.11.2020)

Kertin Münch, park tour (02.11.2020)