EARTH BOUND

A spatial exploration of ancient construction methods and their value for the present and future design of the human habitat in Western society.

Dictionary

Before you ***‘dig in’*** the thesis I would like to define a couple of definitions that is used in the research paper.

EARTH BOUND
The title of this research paper refers to the idea of creating a habitat that is more in harmony with the ground and environment, to be more aware of the materials and condition of the earth’s crust and the environmental impact of how spaces are made.

Environmental/Climate challenges
The presence of a trouble and change in the environment which can cause damage to our land. In the thesis the meaning relates to climate change that is connected to architecture, like land use, waste, and transport of construction material. The environmental challenge in our habitat also relates to the connection we have lost with each other; the society have become individualised and grown distant from its environment.

Vernacular Architecture
A term that is used to explain an architecture method that is made with locally available sources and tradition. Vernacular Architecture highlights the environmental, cultural, and historical context of the existed space.

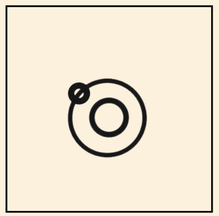
The new vernacular
The new vernacular architecture refers to bringing back the strong relationship between the people, environment, and architecture. Going back to the local knowledge and resources for a more sustainable and social approach that is needed in our habitat.

Industrial field
Production and Tourism industry. In the thesis the word industry/industrial field refers to a domain of activity of processing materials or producing a service.

Landscape
The visual characteristics of an area and how these qualities create the over-all aesthetical attraction. It can also be referred as environment, land, terrain, scenery.

Nature
In simple words; nature is all living physical elements on the earth such as plants, mountains, oceans, soil, sand etc.

Natural elements
Referring to the basic components where nature is made of; earth, water, air, and fire.



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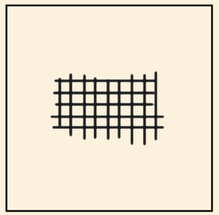

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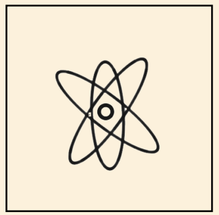

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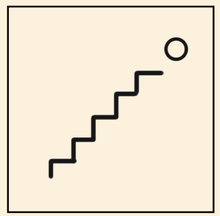

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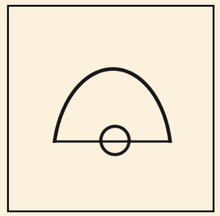

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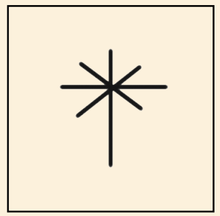

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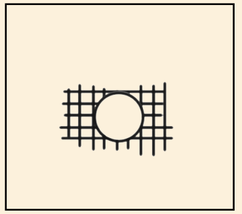
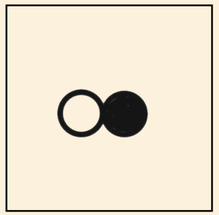
Spacemaking



Rest Material



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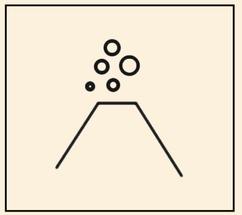

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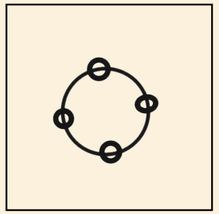

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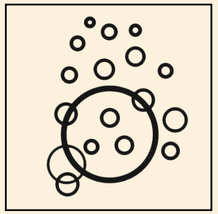
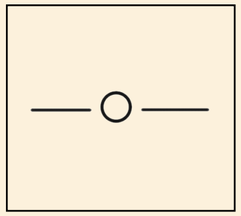


Tourism



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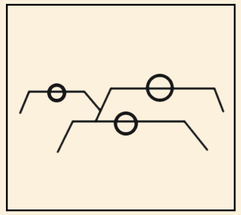
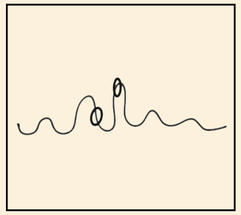


ENCI quarry



Cappadocia

EARTH BOUND

A spatial exploration of ancient construction methods and their value for the present and future design of the human habitat in Western society.

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Royal Academy of Art the Hague, KABK
2022

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De Zandmotor, selfmade landscape

Introduction

This project started with a personal experience in a cave hotel and physical exploration at the surrounding landscape located in Cappadocia, the ancient district in east-central Anatolia of Turkey. This encounter with the natural structures in the landscape has fascinated me, the richness of textures, shapes and colours made me view the rock arrangements as a more valuable element that is extended from the surface of the ground.

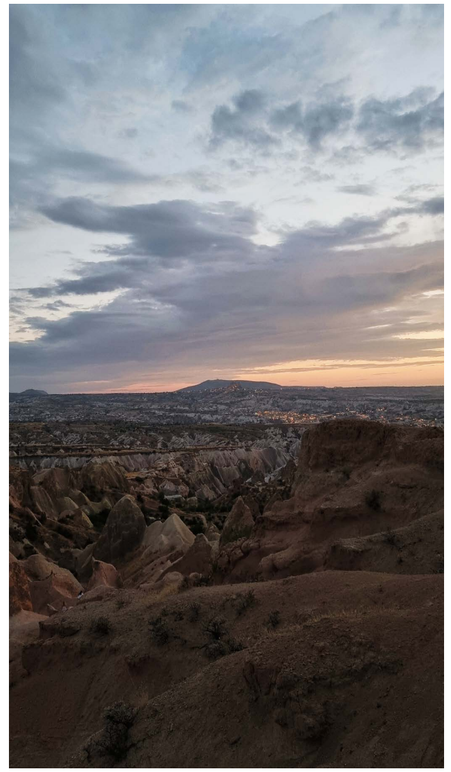
To imagine that thousands of years ago, the people that lived there have used this natural occurrence to their advantages and carved out their shelters to create a home has inspired me a lot. The fact that these spaces are still being used till this day says a lot about the longevity and strength of vernacular architecture.[1]

This got me thinking about the way our habitats are built today and how it has lost its harmony on the earth's surface and detached itself from society. The technology and modernity replaced the use of local resources and reuse. Although we cannot sit and wait for such natural event happening naturally in our environment, I think we can have more control, use the available sources and natural systems that exists to create our habitat. I believe that there is need to a more creative approach in building our dwellings and in handling the conditions of the surroundings.

How can the architecture of our time regain the lost connection to earth and habitat?

1 Rudofsky, B.
Architecture without Architects: An Introduction to Nonpedigreed Architecture.
(New York: Museum of Modern Art, 1964)
p. 26

Group of cave dwellings, Cappadocia, 2008



Sunset view, Cappadocia, Göreme, 2021

This research paper explores the approach to architecture, its relationship with the landscape and how natural environment had transformed in historical, cultural, and spatial aspects. It is about reintroducing a new approach to present a new vernacular and retrieve the old cultural past to create a unique response to environmental challenges. [2]

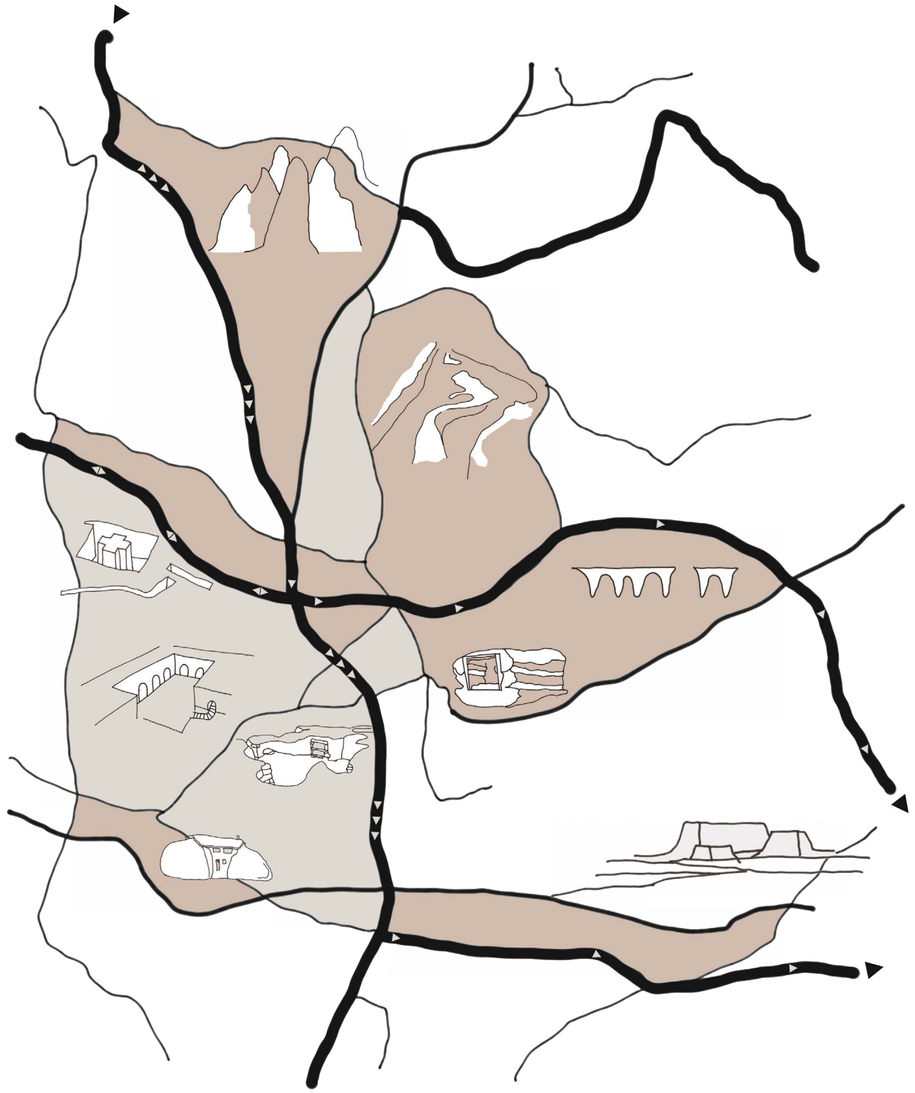
The thesis presents my journey of examining the past as a guidance to learn, explores living in the present and experiencing the existence and it is complete by getting motivated by the future to inspire. This journey through the past, present and the future is translated into three different levels in which the research methods are divided.

The **first level; Release**, starts out with dissecting the architecture of the Cappadocian stone structures through my own experience and research that was done by other professionals. And examining different literature within the topic to assemble and broaden my own positioning. I kept observing and digging which revealed different spaces from which the case studies were formed. The case studies are carefully selected examples from the ancient times to today that explores different approaches of building bound to the ground. While digging I discovered the different layers and perspectives of the cases which I reflected on my own environment.

The **second level; Rebuild**, reflects back on the case studies from the previous chapter and formulates various scenarios that create different opportunities and approaches of building our habitat. These spatial experiments presents a new vernacular of where the life of building and inhabiting comes together. By keeping this active position in the research, I went on a quest to find a site in the Netherlands to observe and analyse. This field research plays a big role in the research because it situates and challenges the research question on a different location.

The **third level; Renew,** is a summary and conclusion of my journey through the past and present. It presents the answers on what we can learn from the ancient building methods and formulates my own positioning on the topic and the value for the location which gives a look into the future.

[2] Frampton, K. Towards a Critical Regionalism; Six points for an architecture of resistance. ("Kenneth Frampton, Towards A Critical Regionalism: Six ...") Critical Regionalism. Revisited, OASE 2019, (103) p. 11



Map of journey through the past, present and future

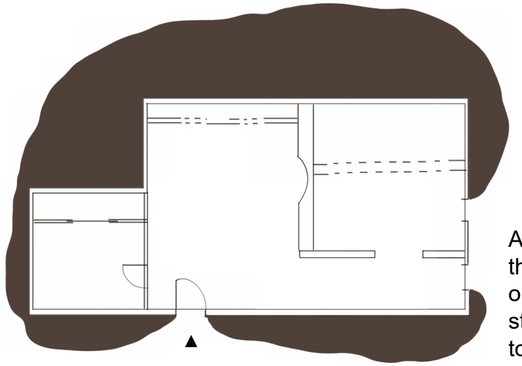
Day 1
My road trip to Cappadocia
09-08-2021

This summer my family and I took a road trip through Turkey. One of the destinations was the region called Cappadocia, which is the central city of Turkey, Nevşehir (New City). Roughly thirty million years ago, volcanic eruptions repeated with following decay which creates the place that exist today.[3] When we arrived, we were in awe with our surroundings. Our eyes were immediately focused to the outside. Even though I have already visited this place thirteen years ago, it still amazed me to this day. I was especially stunned of how the moon like landscape and structures has not been changed a single bit, they are still standing strong after all those years of use and changing weather conditions.

Nevşehir consist of different regions with various types of structures that has become an identity for each different place. After a long ride through the dusty landscape, we arrived at our hotel. The streets are narrow and hard for a car to find its way. A small parking area next to a courtyard ruin was reserved for parking for visitors of the cave hotel. When I stepped out of the car and took a couple of steps my black shoes were immediately covered by the dust.

The hotel includes a series of structures that were connected by new arrangements. The cave dwellings of the past were transformed into a hotel to experience the spaces of the past. After the car was parked, we checked in at the reception area, this was a dark and small area filled with a small couch, a desk and chair. Behind the desk there were niches carved out of the wall, these were loaded with small nick-nacks and pictures that represented the symbols of the region like the hot air balloon and the different types of rock structures that represented the landscape. Seeing the images of air balloon, we immediately made a reservation for the next morning.

[3] Yildiz, P. Analysis of the 'Cappadocian cave house' in Turkey as the historical aspect of the usage of nature as a basis of design. (WIT Press, 2016) p. 62-63



Floorplan hotelroom, Cappadocia

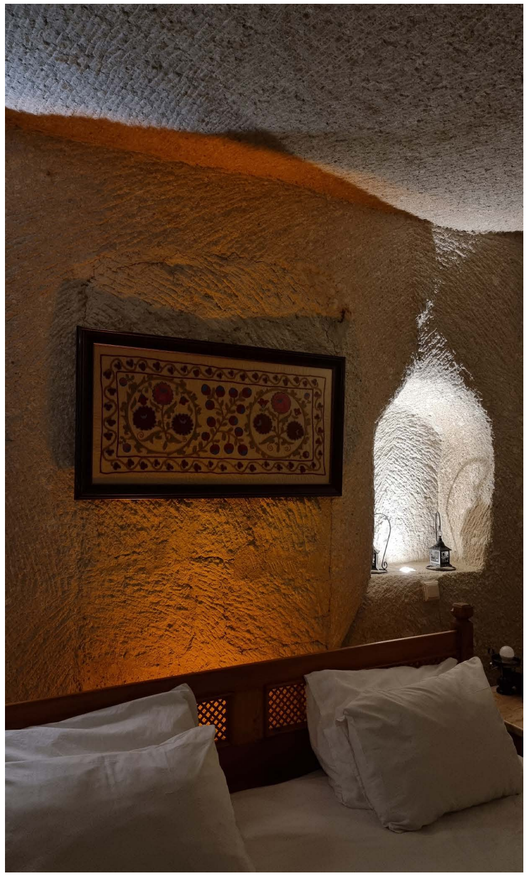
After we made the reservation, we received the keys for our room. The room was located on the semi-basement floor. Walking a couple stairs down, I unlocked the door and it opened to one big open space. The room was dim lit and felt quite cosy even though the summer nights here are very cold. The room was divided into two separate sleeping areas, the big entryway consisted of one bed and the other area with two separate beds, which was reachable through a narrow corridor.

The second area was located on the outside of the space, so it had a small window that looked out on the ground of the patio area. The bathroom was reachable from entryway. I did notice that the door to the outside was not fully extended to the floor, so it you could feel a little breeze coming in from this small opening. The walls of the room were completely of stone, when I touched it a bit too hard small bits off the wall came off. The floor was finished with light hardwood floor which made a lot of creaking noise while walking which added to the ambience of the cave atmosphere. The modernized elements inside, like the running hot/cold water and electricity in the cave made it comfortable to stay overnight in the place.

Hotel room balcony, Cappadocia, 2021

Hot air balloon light, Cappadocia, 2021

Interior cave hotelroom A, Cappadocia, 2021



Interior cave hotelroom B, Cappadocia, 2021

Day 2
A day of exploring
10-08-2021

The next morning, we woke up just before sunrise since we had a reservation for the hot air balloon. unfortunately, we were informed with some bad news, the balloon ride was cancelled because of the cloudy and windy weather situation. The hot air balloon has become such a symbol for this region which is quite ironic; the cities below the ground have now been replaced by the balloons above the ground.

We continued the morning slowly by getting ready to go out and explore the rest of the city. The breakfast was located on the rooftop of the cave structure which was recently added on. The view from this area was breath-taking and showed how small we really are compared to the landscape surrounding us. After the breakfast we hopped in the car and rode through the region, since it was quite busy on the official tourist trail, we decided to go off route and explore by ourselves.

After a while we found a good spot to park the car on the side of the road and headed into the landscape. It was much quieter which was very soothing. We came across a field of grapes which is Cappadocia's main agriculture product, and they grow very well on the eroded tuff soil. [4]

After a whole day of exploring and looking for recognizable elements out of the rock formations the day ended with a beautiful sunset looking out on the fairy like landscape, it was out of this world.

On the next day it was time to check out and leave to the next destination of the road trip. It was a very rainy and cold day. During the car ride through the landscape, the rain reminded me of home, the Netherlands. I imagined the landscape there and how these rock structures would look like in a different place, it will probably look very different, in term of the difference in material, culture and climate. These elements have played a role in creating our habitat and order in dwellings.

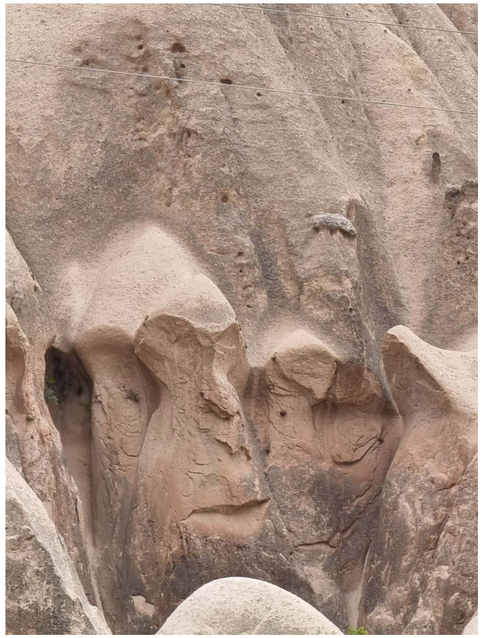
[4] Emge, A.Old Order in New Space: Change in the Troglodytes' Life in Cappadocia, in: Change in Traditional Habitat; Traditional Dwellings and Settlements Working Paper Series, Vol. 37, Berkeley: University of California, 1992 ("Cave Houses as Arcetypes of Shelter Formation in ...") p. 2

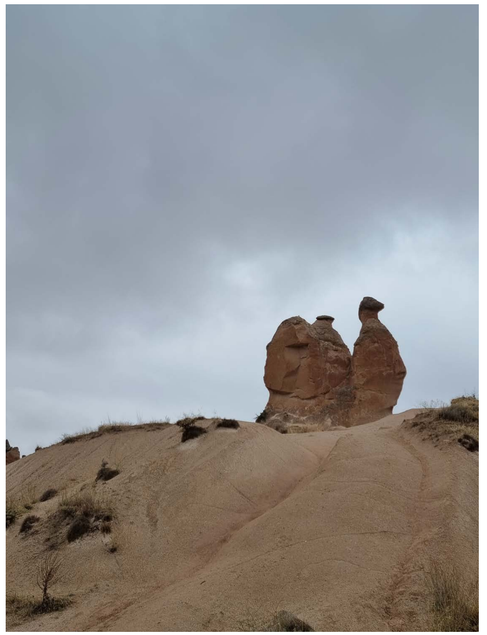
I think that today's architecture creates a barrier between the physical human bodies and the environment. I believe that the structures we design and build today are not ready to create for the future and it is time to rethink our building method and how we treat the crust of the earth.

So, I asked myself; **How can the residential building methods from the past inspire spatial designers to cope with the threat of present environmental issues?**

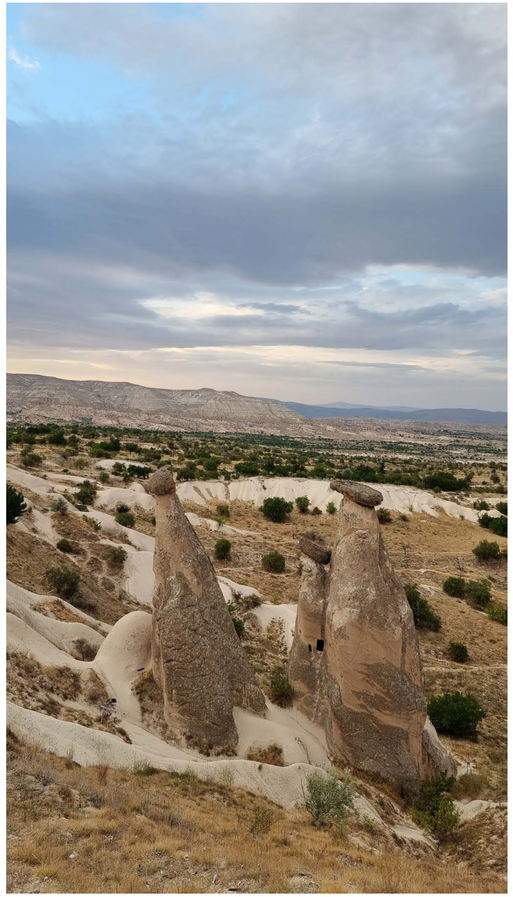
Cut out rock formations Cappadocia, 2021

View from balcnoy cave hotel, Cappadocia, 2021



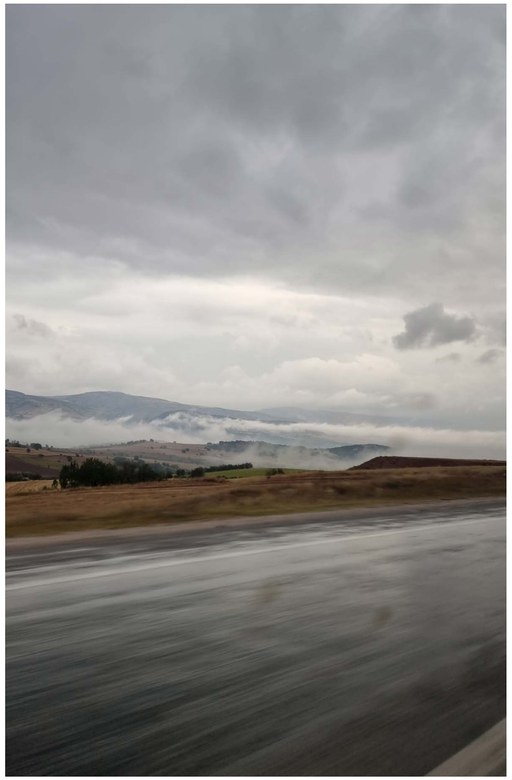


Recognizable shapes in rock formations, Cappadocia, 2021



The three rock structures with small cutout, Cappadocia, 2021

The three rock structures with small cutout, Cappadocia, 2008



Rainy travel day from the car, 2021

Misty travel day from the car, 2021

Level I. Release

Past; Using the past as a guidance to learn

Cappadocia was made by an erupted volcano million years ago. The ash from the volcano travelled through the landscape, layer by layer, it formed coatings of tuff.[5] These formations have been sculpted by wind, sand and rain into the structures that exists today.

What are the characteristics and spatial qualities of the Cappadocian cave dwellings?

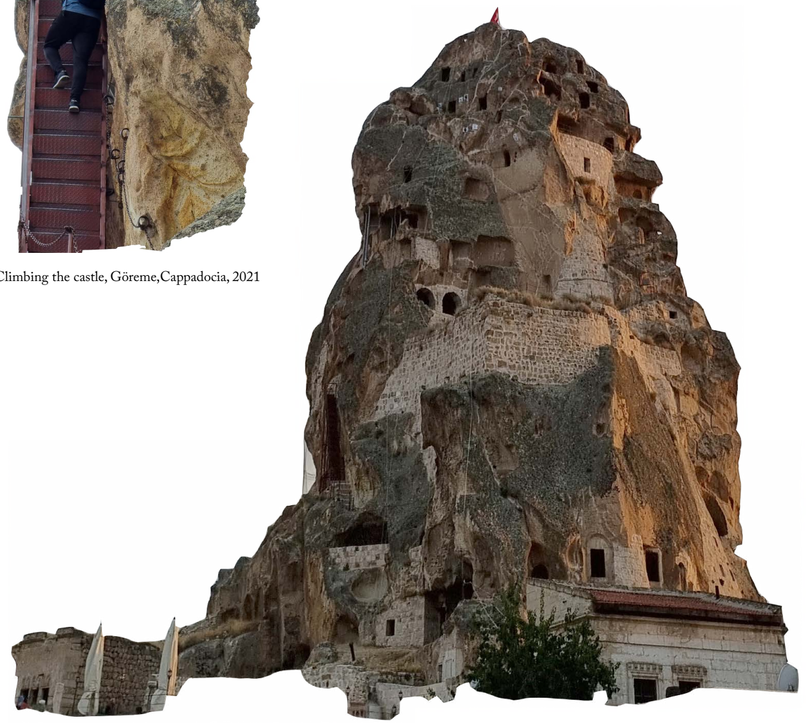
The inhabitants quickly discovered that the tuffaceous rock was easy to work with and that it was possible to carve in the stone. Therefore, over generations, made spaces in these rock formations.[6] By using the existing formations and resource rather than creating new buildings the Cappadocian carvers started by mining in the centre of a space and followed this by carving out the details of their homes. This is one of the elements that makes the cave dwellings sustainable.

[5] Yildiz, P. Analysis of the 'Cappadocian cave house' in Turkey as the historical aspect of the usage of nature as a basis of design. (WIT Press, 2016) p.63

[6] Ibid, p.65

Niches in cave dwelling cutout, Cappadocia, 2021

Climbing the castle, Göreme,Cappadocia, 2021



Cave Castle, Göreme, Cappadocia, 2021

The material of the rock formations is called tuff and it is created by a volcanic eruption and the travelling ash. When it comes in contact with the natural elements it becomes a solid rock. The tuff stone is high in porosity and easy to deform but overtime once it comes more in exposure to air it hardens and becomes tough and stronger material. When the structures were still relatively soft the inhabitant dug and carved out the living spaces with small iron tools such as pickaxes, hammers, jemmies, and adzes. [7]

The perfect climate inside the dwellings made it comfortable to stay inside during the different seasons.

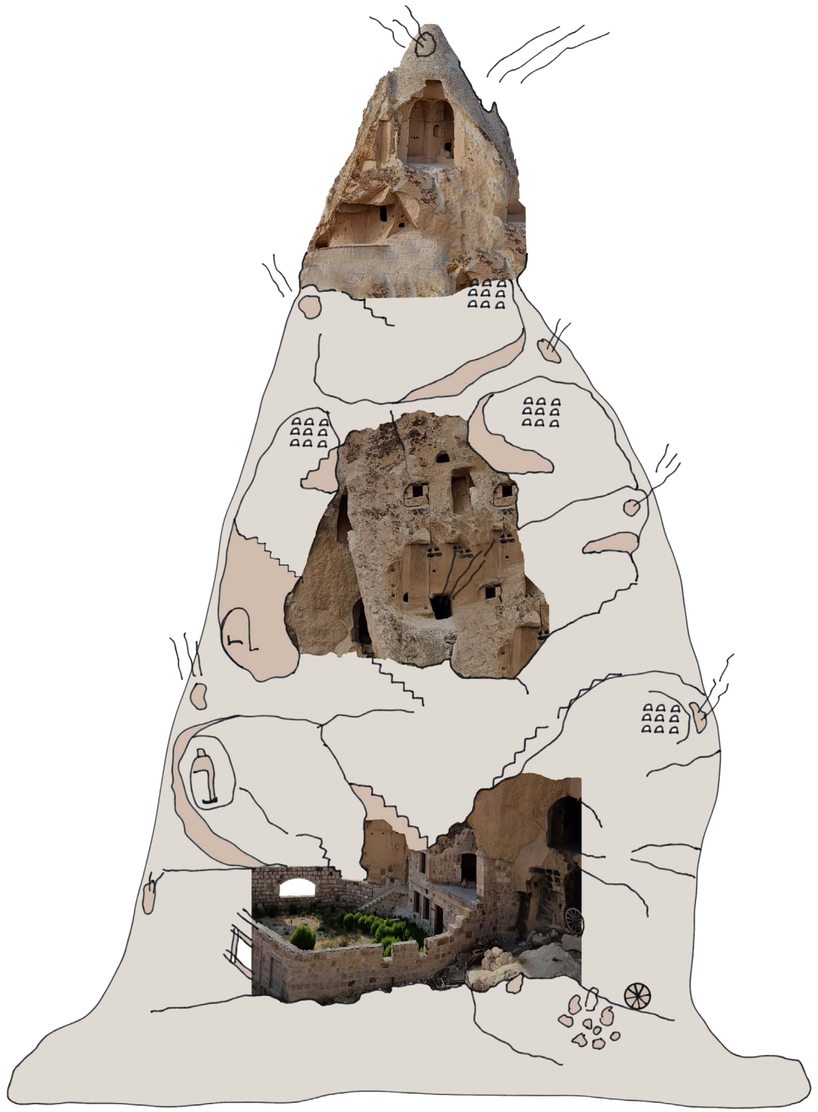
How are the cave dwellings divided regarding the daily routines of their residents?

The layering and division of the interior spaces were all organized in coexistence, the ventilation stream passed through the different heights of the layered spaces.[8] The stables were located at the lowest level, to keep the dirt out of the living room, the entrance was located somewhat lower in comparison to the living spaces. The kitchen would be located and the highest levels in order for smoke to travel up easily and escape invisibly from the openings. The holes made in the middle of each room was used to heating. [9]

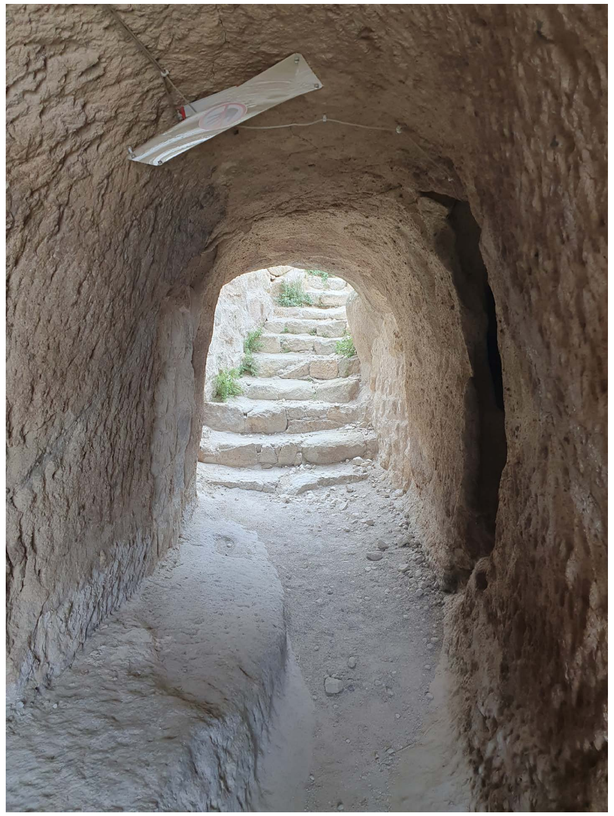
[7] Oytun, B. Cappadocian Ribbon; Cave, Human and Space. Universita Degli Studi Firenze. (Thesis Report, Published on Issuu, 2021) p.16

[8] Davidová, M. Uygun, E. Living in Bio-Climatic Layers: An Investigation of Cappadocian Caves in Relation to Today's Design and Its Futures. ("Ground and Semi-Ground Inhabitation: Cappadocia Case Study ...") p.9

[9] Yildiz, P. Analysis of the 'Cappadocian cave house' in Turkey as the historical aspect of the usage of nature as a basis of design. (WIT Press, 2016) p.69



Section cave dwelling interior layers



Inside passageway cave dwelling A, Göreme,Cappadocia, 2021

Inside passageway cave dwelling B, Göreme,Cappadocia, 2021

One of the disadvantages of the cave dwellings are that the organization of the spaces created a non-flexible interior situation. But the inhabitants from the region were from nomadic origin which explains the concept of a multipurpose living space wherein multiple function are incorporated in one space[10] with the help of simple furniture and hidden walls screened by small wooden doors the interior was well optimized. The other spaces inside the structure were organized from the central room which made it the core of the dwelling. The centralized fireplace in the middle of the multipurpose room worked as a central heater, travelling up, through the spaces and the chimneys.[11]

The smaller openings and niches of the cave dwellings were also inhabited by other species, like the pigeons. The pigeons would locate themselves in the higher parts of the structures, the places where the ventilation shafts were connected to the human lived spaces. The pigeons would leave their droppings as rich fertilizers of otherwise infertile environmental conditions for agriculture.

The collaborating between the human and the pigeons would lead to a better living standard for the pigeons inside the cave architecture and the humans for a richer agriculture.[12]

This probably explains the reason why I have seen many pigeons and other birds flying around the rock structures, this shows this collaboration between human and pigeons might still exist.

To this day, the agriculture of Cappadocia are grapes, the tuff earth is perfect for grapes to grow, since the high porosity of the material made it very fertile.[13] The cave dwellings are connected to the agriculture because the smaller niches in the interior and courtyards were used for crushing the grapes to make juice. The rock formations in this region are a good example of why the relationship with the ground is so interesting and valuable. It presents how the landscape and dwellings are merged in together which creates a camouflaged appearance.

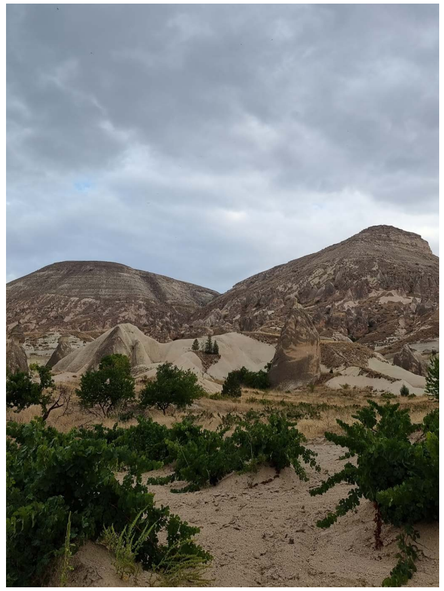
The space making in the rock formations shows the respects of what was given by the nature by using it to create unique spaces, the adaptability of the spaces to the environment and other species by working together with the qualities of the tuff sand/stone.

[10] Yildiz, P. “Cave Houses as Arcetypes of Shelter Formation in Capadoccia Region, Turkey.” (“Art Education Regarding Design and Nature- Bringing ...”) (Athens Journal of History, 2015) p.33

[11] Ibid, p. 27

[12] Davidová, M. Uygun, E. Living in Bio-Climatic Layers: An Investigation of Cappadocian Caves in Relation to Today’s Design and Its Futures. (“Ground and Semi-Ground Inhabitation: Cappadocia Case Study ...”) p.3

[13] Oytun, B. Cappadocian Ribbon; Cave, Human and Space. Universita Degli Studi Firenze. (Thesis Report, Published on Issuu, 2021) p.12



Grapefield, Cappadocia, 2021

The natural process and creation of the structures in Cappadocia also led to various types of rock formations, the difference in the structures is also visible in the different type of cave dwellings that exist. This is the reason that the cave dwellings in Cappadocia vary in comparison to the other regions in Nevsehir and the features of the specific landscape that shaped the type of positioning of a cave dwelling; on, in or between the ground.

The relationship with the ground is not only interesting because this can lead to different and creative forms of dwellings. But it is also important because I think by understanding the ground, we built on in terms of the material characteristics, shape, how it transforms with the changing natural elements and live more in harmony with it, we can create spaces that are not only future proof within the changing natural elements but also invites the nature to live freely.

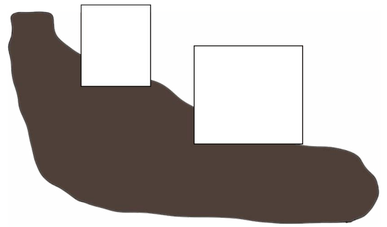
Cave hotel expansion, Cappadocia, 2021

Construction mixing types of cave dwellings, Cappadocia, 2008

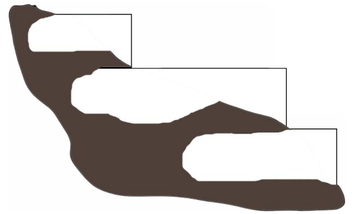
Main different types of cave dwellings; [14]

Chaning and mixing ypes of cave dwellings

1. Rock-cut cave spaces



2. Rock-cut and cliff cave spaces



3. Cliff work cave spaces

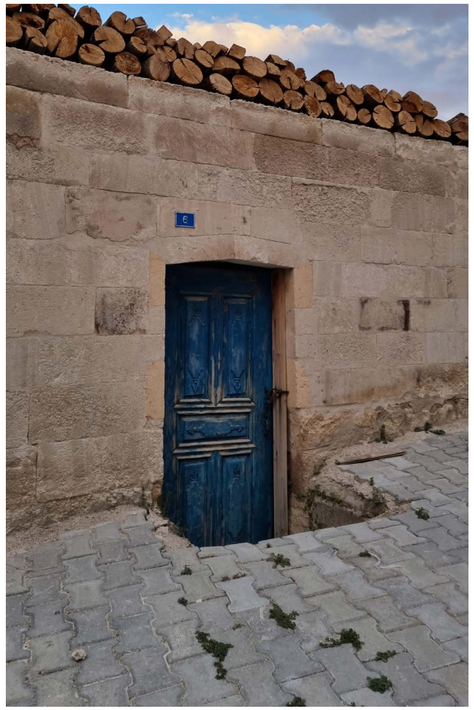
[14] Oytun, B. Cappadocian Ribbon; Cave, Human and Space. Universita Degli Studi Firenze. (Thesis Report, Published on Issuu, 2021) p.19

The characteristics of the different cave dwellings are still very much in common; the only difference is the positioning in or on the rock formations and hills. The function to hide and blend into the landscape to creates a safe space against the wildlife outside. Cave dwellings in general are low in maintenance because there is no need for a roof and walls, the earth covered dwellings are the same and they are energy sufficient since the earth gives an extra layer of protection. And of course, the aesthetical value of the cave dwellings which is one of the most valued characteristics today. Inside, the unevenness and curves of the walls are one of the elements that represents the process and way this space was revealed.

The addition of the courtyard to the cave structures has created a more social ground plan in the village and the private cave dwellings. The courtyards connect every house in the village forming organic grown network where everyone and every place in the village is connected with each other. This addition of the courtyard helps the strengthen the communities trust and wellbeing which presents that architecture is more than the creation of isolated structures; it also requires social and environmental considerations which is a detail that is important to bring back in a different form within our society today.[15]

[15] Mastenbroek, B. Mecredy, E. Baan, I. Dig it! Building Bound to the Ground. Search Architecture. (Taschen Gmbh, 2021) p.118

Courtyard cave dwelling, Cappadocia, 2021



Underground door, Cappadocia, 2021

Detailed section interior cave dwelling cutout, Cappadocia, 2021

What are the strategies and benefits of building with the excavating method?

This ‘negative’ building method introduces an approach where space is created by taking away. Every niche, every wall, is an expansion to the space, enlarging the living area by taking building material out, whereas in a ‘stone on to stone’ architecture the living spaces become smaller by putting things inside.[16] But with this building method there is another situation that comes with is, which I could not find a clear answer to;

What happens with the excess material of the carved/dug out space?

[16] Yildiz, P. “Cave Houses as Arcetypes of Shelter Formation in Capadoccia Region, Turkey.” (“Art Education Regarding Design and Nature- Bringing ...”) (Athens Journal of History, 2015) p.26

[17] Davidová, M. Uygun, E. Living in Bio-Climatic Layers: An Investigation of Cappadocian Caves in Relation to Today’s Design and Its Futures. (“Ground and Semi-Ground Inhabitation: Cappadocia Case Study ...”) p.1

The subtractive building style in architecture and design plays an important role through all its history.[17] This building method has developed in many forms through the architecture revolution. To understand how the development on this building style and the social culture that is connected to this methodology has transformed, I personally selected various projects starting from the ancient till the modern times, to compare and learn how it has been done in different parts of the world. The selected examples present a different way of creating a strong connection to the ground, either underground or aboveground which suggest there are diverse ways of building earth-bound.

Let’s dig deep into the origins of building!

2. Braid, J. Skara Brae, Orkney Island, Photograph

Skara Brae, Orkney Island, 3180-2500 BCE

This example shows a different method of building by of using thin red sandstones, that were perfect for a masonry construction and can be find on the site. By carefully interlocking the stones and filling the void with clay to make the space waterproof and well isolated. The reason I was so intrigued by this type of dwelling is because of the shape and height of the structure. The pattern of the dwellings was right in between circular and rectangular. The dwelling lays half in the ground and half above ground which creates a playfulness in the interior space of the dwelling. The forms of vernacular shelters around the world started out largely circular, for example the Inuit Igloo, the Ethiopian tukul, the Mongolian yurt etc. On this site it is possible to see the gradual shift from circular to a more rectangular space.[18]

When did we start building more in rectangular? Is there something our ancestors know we do not about circular spaces?[19] I think there is something we can learn from this observation and to create a new way of constructing that starts from the shape and quality of the material.

[18] Mastenbroek, B. Mecredy, E. Baan, I. Dig it! Building Bound to the Ground. Search Architecture. (Taschen Gmbh, 2021) p. 31

[19] Ibid, p. 376

3. Braid, J. Skara Brae, Orkney Island, Photograph

The case studies

Level I. Release

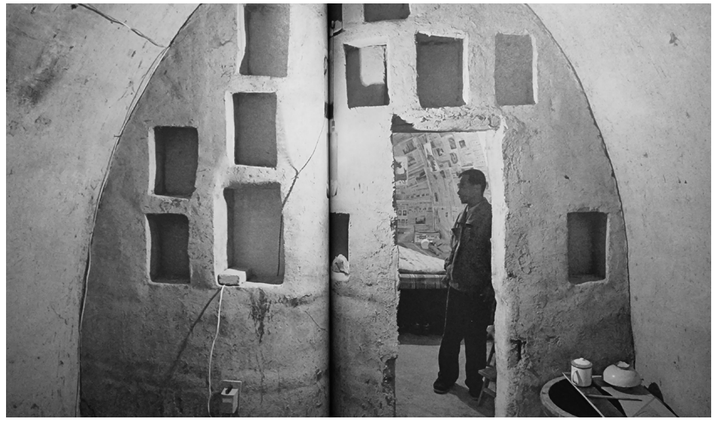
4. Architecture without Architects: An Introduction to Nonpedigreed Architecture. Photograph.

The Yaodong; Loess Plateau, China, 300 BCE-present

Imagine how the landscape would look like if our all our dwellings were built in the ground and the ground above would be used for other activities like agriculture. This is the reality in the Yaodong Loess Plateau in China. The sunken courtyard inside the earth would reveal the core space of the dwellings, surrounding the courtyard the remaining living spaces exist. The use of the open courtyard plan shows that there is a certain trust that exists in the community. Everyone can just look down into the space. It is clearly a community protecting its member instead of looking for privacy or retreating from society.[20]

Looking back to Cappadocia and the use of courtyards there is a value with using this space to create a trusting and engaging community which is something we can learn from. In this example the excess material that have been dug out during the process of creating the pit dwellings and stairs to the sunken spaces are being used on the edges of the courtyard, at least two meters of earth is being laid down in order to isolate its interior better. This shows that there is a way to use the excess material in a practical way.

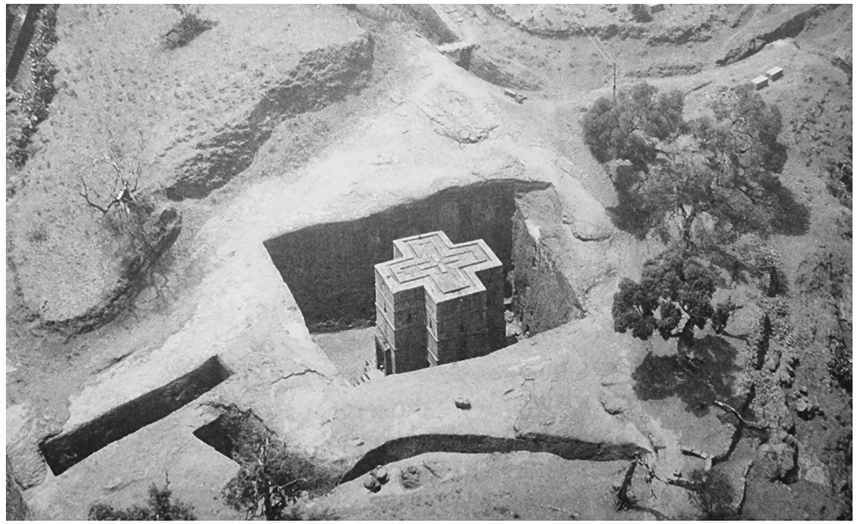
[20] Mastenbroek, B. Mecredy, E. Baan, I. Dig it! Building Bound to the Ground. Search Architecture. (Taschen Gmbh, 2021) p. 201



5. Baan, I. The Yaodong; Loess Plateau, China, Working above ground. Photograph

6. Baan, I. The Yaodong; Loess Plateau, China, Interior. Photograph

Biete Ghiorgis, Lalibela, Ethiopia, 1100-1200

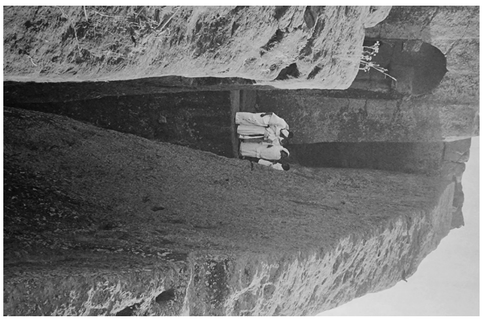


7. Jones, A. Biete Ghiorgis Ethiopia, Bird eye view. Photograph.

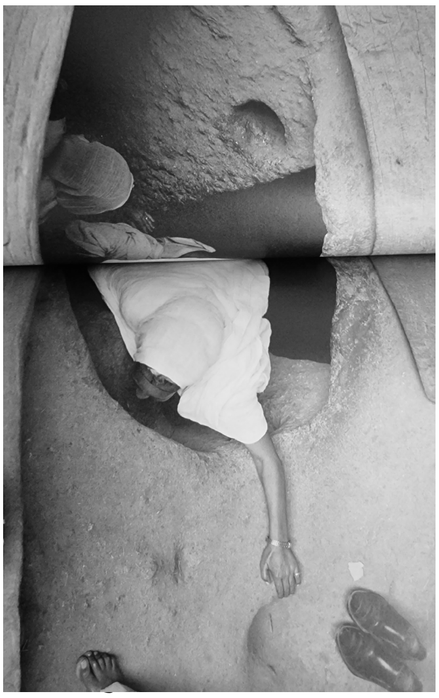
The rock-cut church is somewhat similar to the pit dwellings in Yaodong China but with this instance the focus lays on how the design of the ramps that travels inside the ground connects to the scared spatial experience of the church. As humans we tend to think; the higher, the closer to heaven and God. But my observation from this case study is going underground could also be considered to being close to God because you enter the earth that God has created. To create this church nothing else is needed, other than the earth present on the site, the whole structure is cut out from one single block of earth. Although this church is cut out from the landscape, the space still obeys the rule of nature since it is still a part of the continuous landscape.[21]

The interior of the floor inside the church is covered with bright red mats to keep the area clean to sit down and perform the religious rituals. In the Cappadocian dwellings it was also important to keep the living area clean which is why the level of the living rooms were levelled higher off the ground.

[21] Mastenbroek, B. Mecredy, E. Baan, I. Dig it! Building Bound to the Ground. Search Architecture. (Taschen Gmbh, 2021) p. 222-225



8. Baan, I. Biete Ghiorgis Ethiopa, Spatial sacred experience. Photograp



9. Baan, I. Biete Ghiorgis Ethiopa, Spatial sacred experience. Photograph

10. Aguiar, G. Casa do Penedo, Serra de Fafe, Portugal, May 10,2015, Photograph

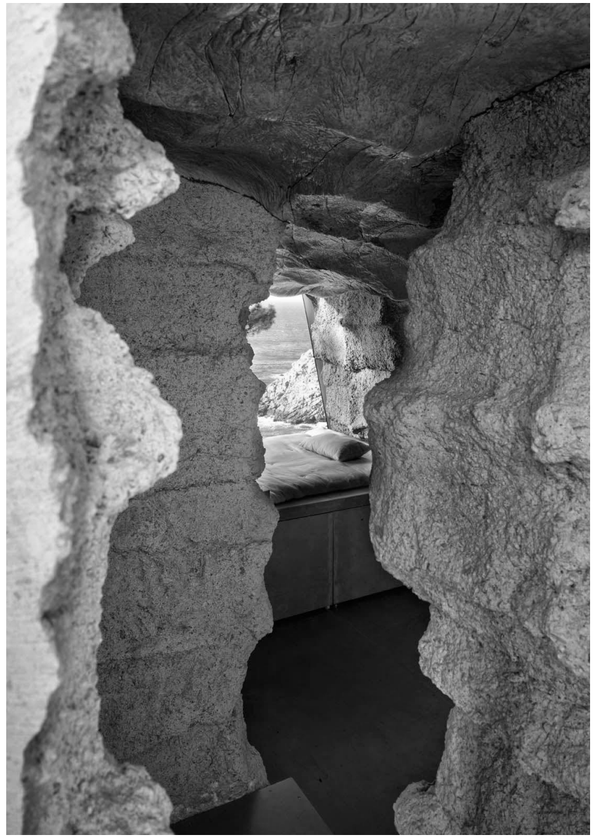
Casa do Penedo, Moreira do Rei, Portugal, 1974

This dwelling has become an internet sensation because of its odds looks, to me it almost looks like an edited image or something that exists in a fantasy movie. And makes me think, we can just put windows and doors in every existing volume on the earth. This dwelling is created by an engineer in Portugal.

Literally called, ‘’The house of rocks’’, is a dwelling that consist of four large boulders that serve as the main foundation, walls, and ceiling. The space is created inside these four boulders, the size of the windows and door shows how big the stones are and presents the strength and value of the stones that is available in the nature.

The dwelling becomes a camouflaged object in the landscape, it is another form of hiding, but not underground. Although this dwelling could not hide very well because the tourists have bombarded this location to take scenic pictures in front of the structure.

11. Aguiar, G. Casa do Penedo, Serra de Fafe, Portugal, May 10,2015, Photograph



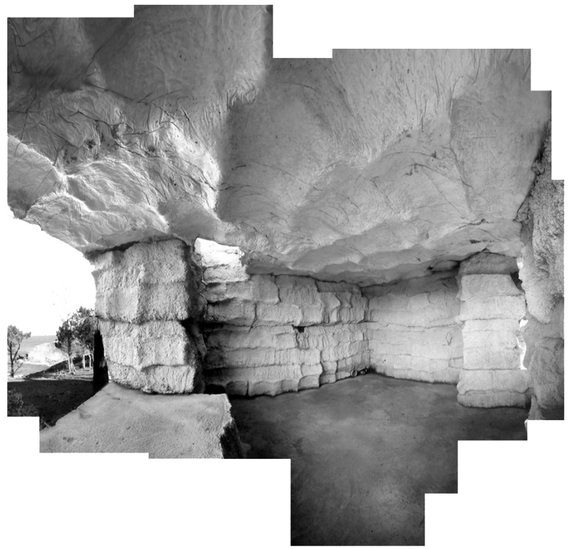
12. Halbe, R. Ensamble Studio The Truffle interior and exterior, Costa da Morte, 2018, Photograph

The Truffle, Costa da Morte, Spain, Ensamble Studio, 2010

In Cappadocia, the pigeons lives inside the small openings and niches of the rock structures. And in return, the droppings of the pigeons were used as a fertilizer for the agriculture. Humans and other species worked together to create a better habitat.

The next example shows a similar method, of creating a space with a cow. The process of creating this space started off by digging in the earth, placing the blocks of hay in the hole, and filling the gaps with concrete to conceal the object inside the earth. After the concrete the excess earth was removed, opening were created, for the cow to come on site and eat the hay in order to reveal the space. This project not only shows a collaboration between other species but also presents the concept of time; when working with natural elements it takes time to complete a space but adds a layer of value and durability to the place.

13. Halbe, R. Ensamble Studio The Truffle interior and exterior, Costa da Morte, 2018, Photograph



14. Halbe, R. Ensamble Studio The Truffle interior and exterior, Costa da Morte, 2018, Photograph

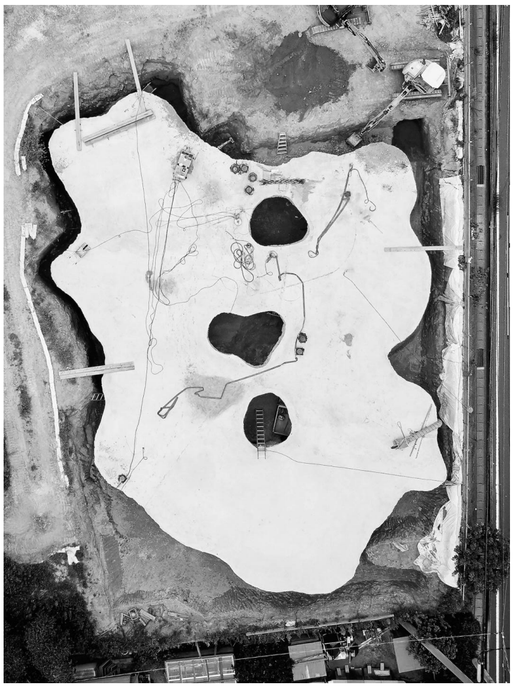
15. Emoto, S. House and Restaurant Cave, Yamaguchi, 2018, Photograph.

House and restaurant, Ube, Japan, Junya Ishigami, 2018

This, space, that looks like an ant nest was created with very simple process that is somewhat similar on how the cave dwellings in Cappadocia were created but it has a modern twist to it.

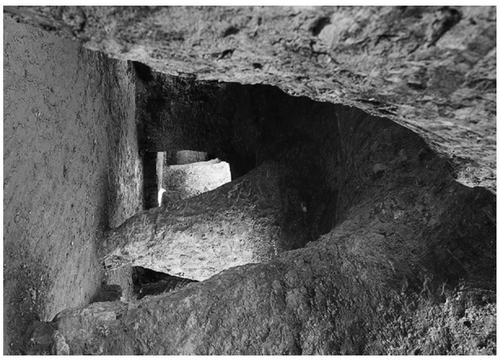
It starts with a systematic approach of digging holes in the ground, filling the holes with concrete, and burrowing the soil in between. This leads to a space with fluid walls and fluctuating heights that add to the experience inside the space. It shows the simplicity of two simple but strong materials working together that can create a space that connects with the ground.

This has to be one of my favourite projects for a very long time, and it is not mainly about the creation and process of this house and restaurant space but about the playful approach of the architect, Junya Ishigami, has on architecture and design. The approach to his research of space is very freeing, open, and natural, he takes a very simple process or element and turns it into something so imaginative and poetic. This approach in the project makes me also feel more inspired to work and experiment freely. The space is not immediately visible when walking on level ground, so it becomes part of the crust of the earth. The small opening in the ceiling bounces off from the fluid walls and creates a unique and strong atmospheric space.



17. Emoto, S. House and Restaurant Cave, Yamaguchi, 2018, Photograph.

16. Emoto, S. House and Restaurant Cave, Yamaguchi, 2018, Photograph.



It is time to reflect back on the past experiences and analysis to today's scenario. Nowadays the cave dwellings are not used anymore by its original use, most of these spaces have been renewed and transformed into hotels.

The original function and qualities that were valuable in the past are now lost. The only thing that is left is the aesthetical value from the inside and outside of the structures. The functions inside have been replaced by modern implements, which resulted in losing the significance of the originated space and function. The popularity of experiencing such cave dwellings have grown so much over the past years that architects started to mimic the authentic cave designs to keep up with the incoming tourists, which is great for the region, but the locality of the caves and culture is slowly disappearing.

The modern way of building today is so universally conditioned by optimized technology that the possibility of creating a meaningful urban form has become extremely limited.[22]

[22] M Frampton, K. Towards a Critical Regionalism; Six points for an architecture of resistance. ("Kenneth Frampton, Towards A Critical Regionalism: Six ...") Critical Regionalism. Revisited, OASE 2019, (103), (11-22.) p. 15

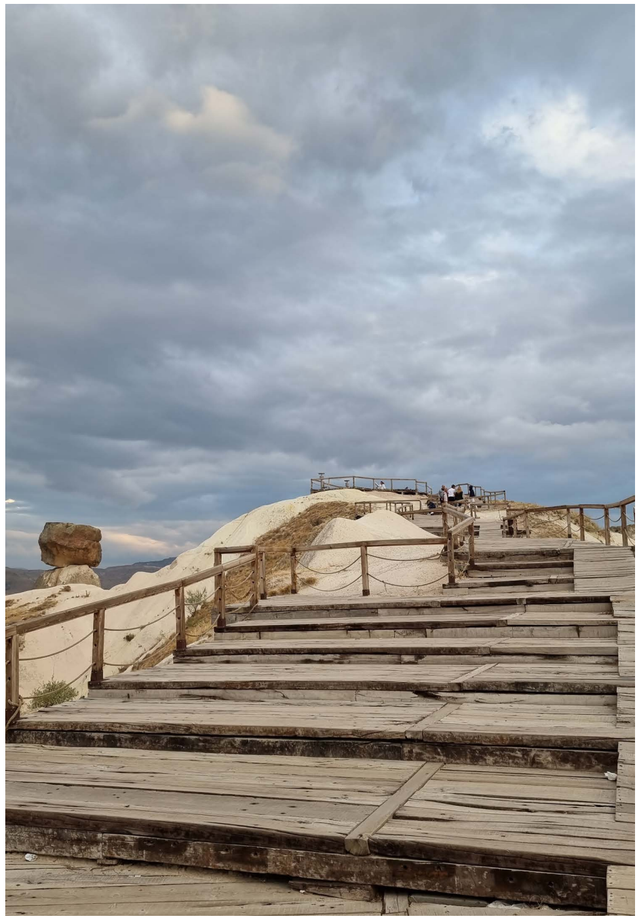
This transition of the landscape into a tourism industry have changed the atmosphere and experience in the landscape, from my own trip I noticed that the viewpoints of specific rock structures have been transformed into a place with added elements, for example the wooden stairs over the already perfect existing ground and different stands with poles that contain information about the different routes to take through the landscape.

Additions like these on the earth changes the shape of the landscape and also how we experience it.Slowly the rock structures are going to detach itself from its surrounding, reducing it to a picturesque view and then looking back from a distance.[23]

The landscape started as something that the changing climate shaped and by human impact it formed the cave dwellings and now also the use of these spaces.

[23] Mastenbroek, B. Mecredy, E. Baan, I. Dig it! Building Bound to the Ground. Search Architecture. (Taschen Gmbh, 2021) p. 88

Busy touristic place to view rock formations, Cappadocia, 2021



Busy touristic place and added layer on ground to view rock formations, Cappadocia, 2021

We only imitate the surface and looks of the landscape; shouldn’t we also imitate how the landscape works with the natural elements?

I was interested in finding a space whereby the landscape was manipulated by human actions in order to change the appearance of the place to create a safe environment.

‘’De Zandmotor’’ at the Dutch coast; Kijkduin, is a good example of how humans have manipulated the natural elements to protect the city against the rising sea level. An artificial sand bank was laid on the location, with the help of the waves, wind and the current the sandbank will spread further along to coast to grow the land naturally. Since the natural elements on the land are very strong it is a hard feature to collaborate with. This struggle was also visible on the site, it took almost ten years to fully see the results of the growing beach.

The reason I have chosen to visit this place is because it shows an example nearby that it is possible to work together with the strong natural elements to be able to create something that is not only beneficial to our habitat but also works well to the environment.

Fallen trashcan, De Zandmotor, Kijkduin,2021

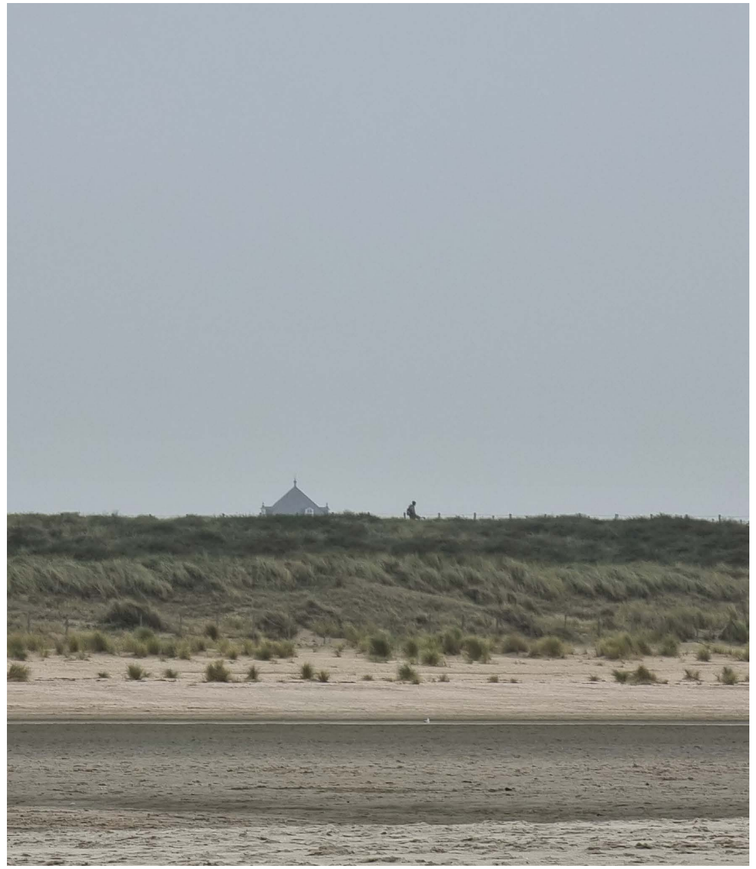
Flat view, De Zandmotor, Kijkduin,2021

Traces of the natural elements, Zandmotor, Kijkduin,2021

It is hard to explain, but visiting this place almost felt like I landed on another planet. It is always very windy and flat land seems endless. The dike opposite from the sea and the roof of the house peeking behind the dike really presents the human scale towards the volume that is keeping the land safe. The artificial sand bank, which is still moving and growing presents this process live on location. On the site, the sign of movement, the sign of new land, the sign of new life and the end of some lives is clearly visible. The movement of water, sand and wind creates trails of shells and shapes embedded in the sand that leaves traces of the moving natural elements. This movement in the process builds a unique landscape and brings opportunities to grow new lives.

While walking back to the other side of the dike, I came across giant hills of sand. Dumped on the site of the trail. There was so much sand, that is created a new layer of hills on the ground that blocked the view of the surrounding landscape. Walking past the trail of sand, I started to see where all this sand was coming from, a construction site. The site showed a big and deep ditch in the earth for setting up the foundation of a building. This is possibly where the sand came from.

But what is going to happen with the excess material from this construction site? Is it possibly going to be added to the Zandmotor to create more land?



House peeking behind dike, De Zandmotor, Kijkduin,2021

Extra layer to the ground, De Zandmotor, Kijkduin,2021

Level II. Rebuild

Present; Live in the present and experience the existence

I like to view each case study as an investigation; a time to experiment with a given method and applying it to another situation, another place, another size, or system.[24]

The case studies that are discussed in Level I; Release, are further explored in this Level; Rebuild.

Each case study is examined by its building method, process and its function which is translated into an assignments and action to approach the architecture more freely, more openly, relaxing, being our natural selves. [25]

[24] Lefebvre, P. The act of building: BC Architects & Studies. (Vai – Vlaams Architectuurinsituut, 2018) p.49

[25] Ishigami, J. Freeing Architecture. (Foundation Cartier Pour L'Art Contemporain, 2018)

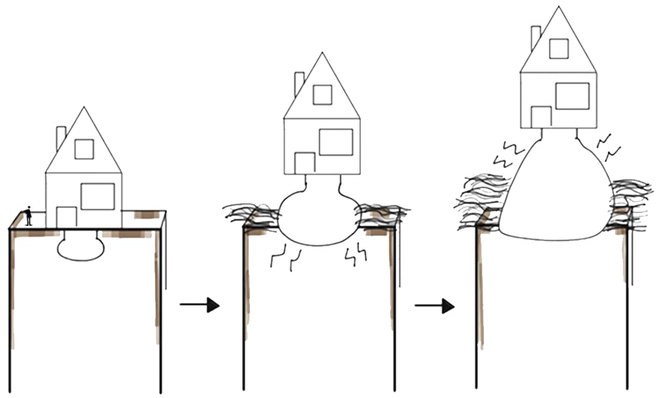
The Spatial Experiments

Where the life of building and inhabiting comes together

Level II. Rebuild

In the ground

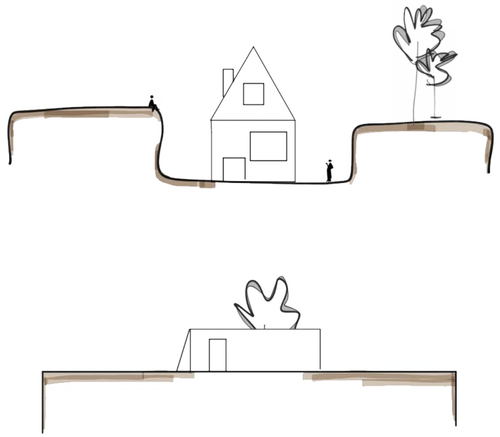
Inspired by the Korowai tree house, West Papau



1. The dwelling air bag. The air bag that is always connected to the bottom of the dwellings is always ready whenever there is a danger of flooding. Its air bag senses the amount of water from above ground and expands to a bag that will carefully float on the water.

In the ground

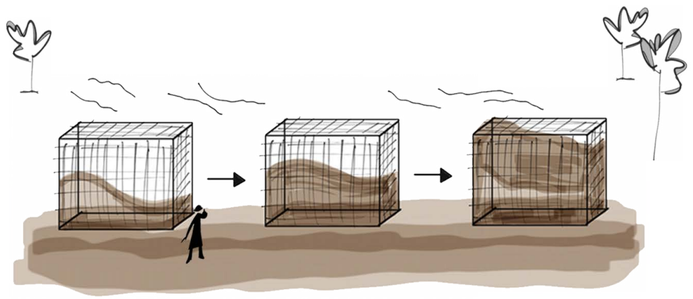
Inspired by case study; The Yaodong; Loess Plateau, China



2. Lowering the ground level in relation to the street level. How would the city landscape look like if the existing dwellings were built lower into the ground? How would this effect the experience above ground?

On the ground

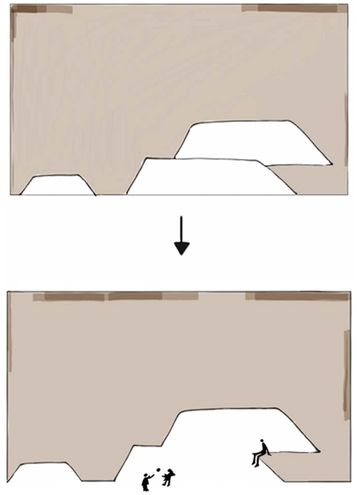
Inspired by field research; De Zandmotor



3. Setting up a grid structure in a landscape with sand and active wind on location, the structure gets filled with sand during an amount of time the ‘‘walls’’ of the dwelling will be created in collaboration with the natural elements.

On the ground

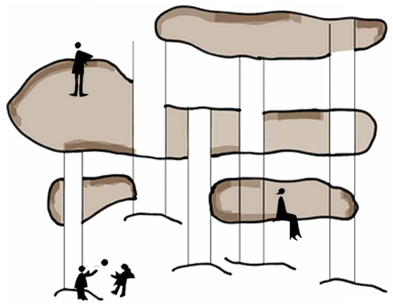
Inspired by case study; The Truffle, Costa da Morte, Spain, Ensamble Studio



4. Casting existing volumes on the earth; removing the cast, revealing the new space.

Above the ground

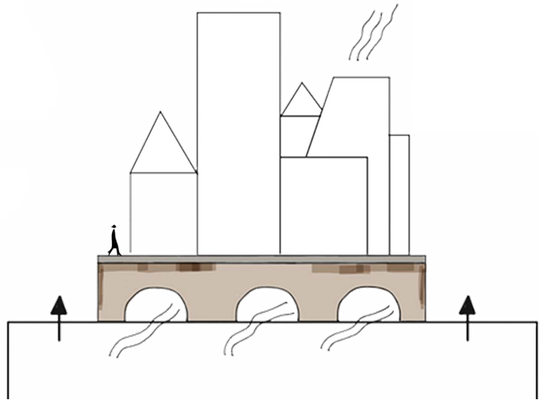
Inspired by case study; Casa do Penedo, Moreira do Rei, Portugal



5. Using existing volumes on the ground; trees as foundation to create a structure around it.

Above the ground

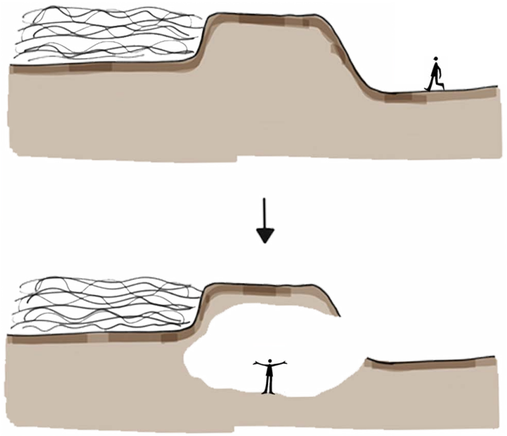
Inspired by case study; The Yaodong; Loess Plateau, China



6. Having the existing dwellings on a platform; creates space for natural elements to flow freely or the space underneath could also be used as the function of a space to hide whenever there is a danger in the environment above.

Between the ground

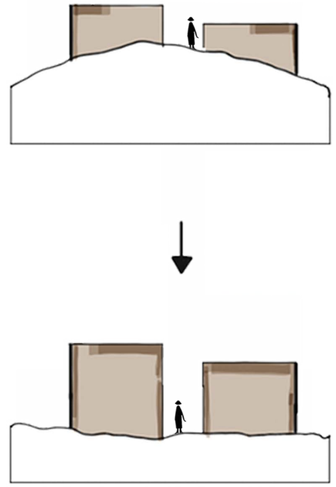
Inspired by case study; Skara Brae, Orkney Island



7. Making space for living in the dikes.

Between the ground

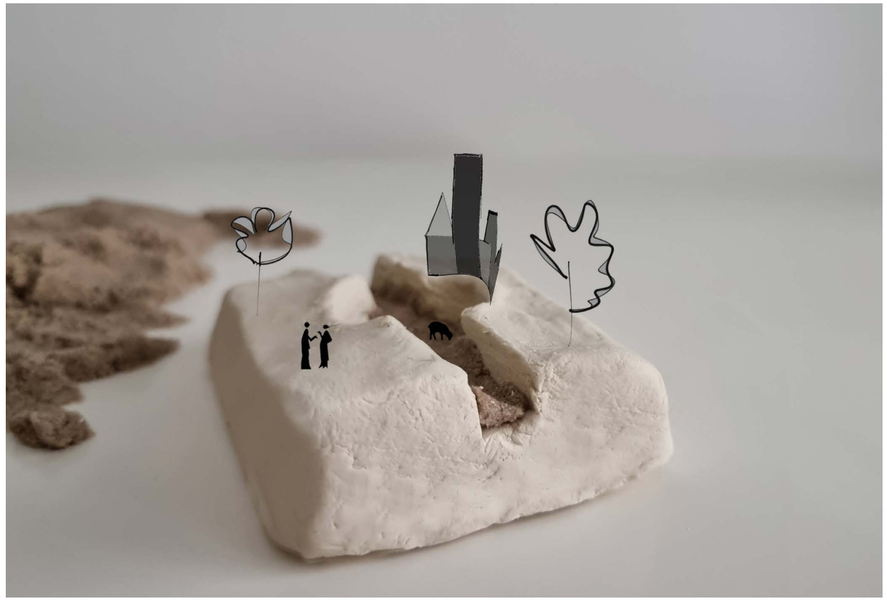
Inspired by field research; De Zandmotor



8. A structure hidden inside the sand landscape; the ebb and the flow on the beach reveals a temporary space and hides the space whenever the water goes away.

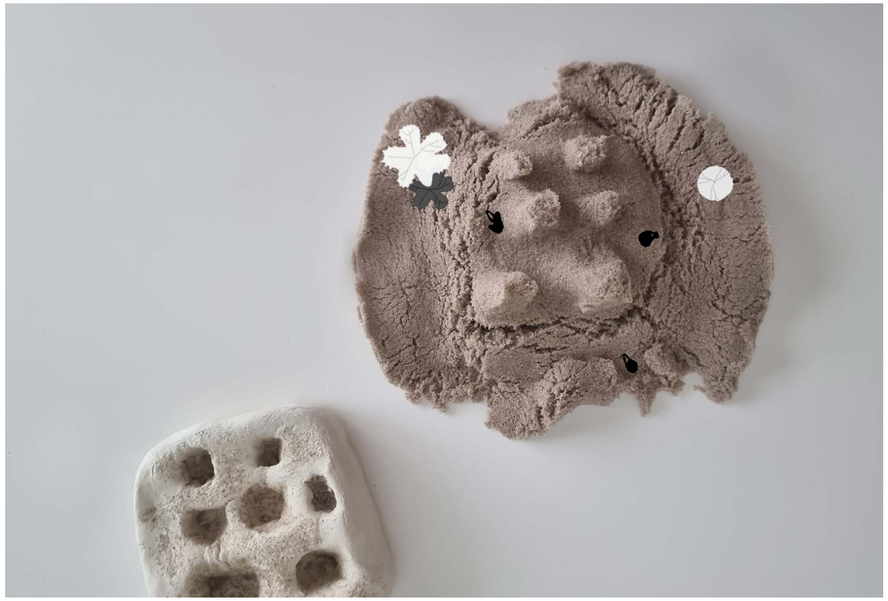
Circular pattern
Inspired by case study; Skara Brae, Orkney Island
9. The use of a circular courtyard IN the ground

Circular pattern
Inspired by case study; Skara Brae, Orkney Island
10. The use of a circular courtyard IN the ground



Circular pattern
Inspired by case study; Skara Brae, Orkney Island
11. The use of a circular courtyard ABOVE the ground

Dig > fill > Remove – method
Inspired by case study; House and restaurant, Ube, Japan, Junya Ishigami
12. What kind of spaces can be creates with this method? And can the mould also be a part of the dwelling?



Dig > fill > Remove – method
Inspired by case study; House and restaurant, Ube, Japan, Junya Ishigami
13. What kind of spaces can be creates with this method? And can the mould also be a part of the dwelling?

Dig > fill > Remove – method
Inspired by case study; House and restaurant, Ube, Japan, Junya Ishigami
14. What kind of spaces can be creates with this method? And can the mould also be a part of the dwelling?

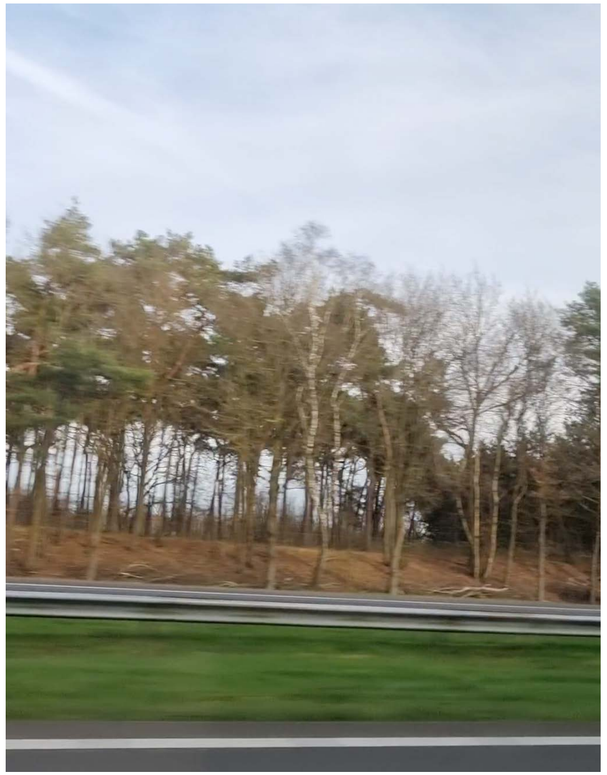
Dig – make block – dig – make block- cycle
Inspired by case study; Biete Ghiorgis, Lalibela, Ethiopia
15. The cycle of digging and excess material

Dig – make block – dig – make block- cycle
Inspired by case study; Biete Ghiorgis, Lalibela, Ethiopia
16. The cycle of digging and excess material

Starting the new year off with field research at the ENCI Groeve in Maastricht
01-01-2022

The day I saw the image of this location on television I was immediately in awe. I was so intrigued by the unusual shapes and the bright green water of the landscape, to hear that this uncommon site was in the Netherlands, I instantly planned a day to travel to the location.

What a great start of the new year, travelling to the South of the Netherlands, getting close to the border of Belgium. A place in Maastricht where the shape of the landscape is created by the action of mining, the mining of marl, this raw resource was processed into cement. Called the ENCI quarry, the only factory location in the Netherlands where the total production of cement took place, for almost 94 years.



On the road to Maastricht, 2022

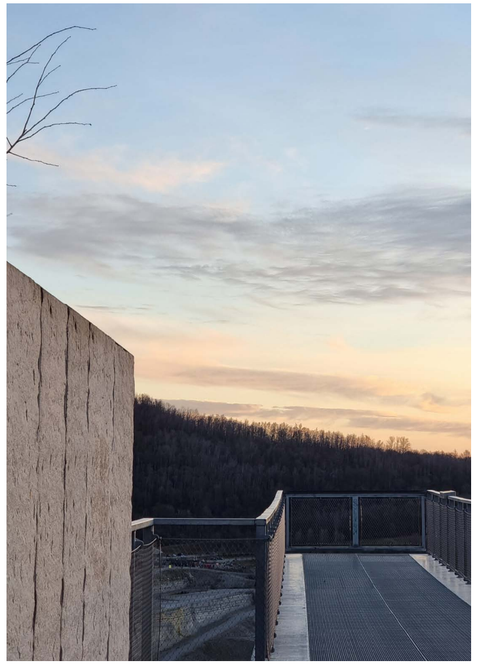
After a long car ride, we had arrived in Sint-Pieter, Maastricht. We parked the car at the reserved and quite spacious parking space for the park. At the entrance there were choices of different routes you could take, I choice the yellow route since it was the shortest amount of walking to the quarry. The sun was already starting to set, so I walked as fast as I could to be able to see the site before it got dark. When I arrived at the viewpoint, I was standing there in amazement. The golden glow of the sun setting behind the hill highlighted the shapes, layers, and materials of the landscape. The colours of the earth and the old cement factory blended into each other.

The reason I chose for this specific landscape is not only because of its beauty but also because it displays a strong image of how humans have impacted the landscape from mining a material to using and changing the place for leisure purposes. It is also an unusual but important location in the Netherlands because of the hilly landscape, different soil, and the historical value to the surrounding dwellings of the place.

From the viewpoint, the connected staircase descended 50m down, into the quarry. I became a small dot that travelled into the site. Every step down the stairs, my senses got more and more pungent.

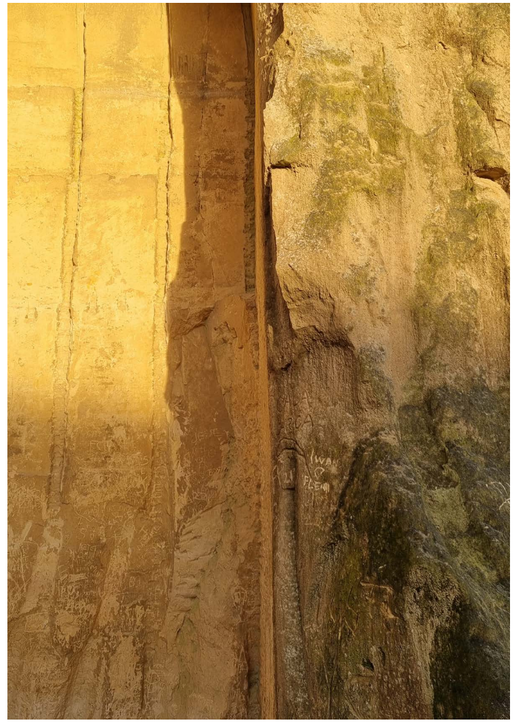
It almost felt like I stepped into a soundbox, I heard the birds chirping, water moving, the leaves falling, every little movement got intensified. The stairs led me to a path, down through a cave, my feet sank into the sand, names were carved into the walls, one soft touch and the sand would crumble off. The path opened little by little, every step forward would reveal the landscape slightly.

Traces of the quarry, Maastricht, 2022



Viewpoint first look to quarry, Maastricht, 2022

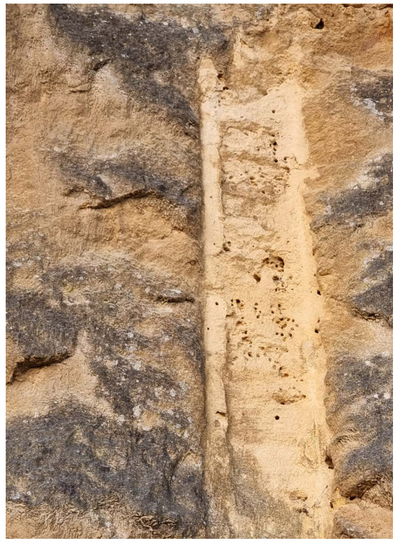
The landscape of the quarry, Maastricht, 2022



Detail cave quarry, Maastricht, 2022

Journey to the soundbox, Maastricht, 2022

Details quarry water vs land A, Maastricht, 2022



Material characteristic, Maastricht, 2022

Details quarry water vs land B, Maastricht, 2022

This day brought me back to the trip I took to Cappadocia this summer, the long walk, the hills, the atmosphere of the landscape and the climate. Both places have a lot in common that are not immediately noticeable by eye, but by experiencing the places, I have discovered the connecting elements that tie these changed and changing landscapes together.

The production industry made an impact on how the ‘’nature’’ on this location looks today. Since all activities of mining and cement production have officially stopped here, what will happen to this quarry now?

Right now, the site is available for the nature and other species to grow and explore but it is also open to the public, when the site first got open to the public, people were quick to use the site as a place to swim and cool off in the hot summer months. The bright and clear green water with the soft sand laying on the site were quickly transformed into a beach. This event is one of the occasions that led to the possible transformation of this site soon, most likely, this year, to a swimming playground and other leisure activities.

With the history and the possible future transformation plans in the ENCI quarry, I see similarities with Cappadocia in the transition phases of the place. The material qualities of marl seem to be similar with tuff. the volcanic stone of the structures in Cappadocia. Marl is a soft limestone and is good against moisture, the raw material consists of lime combined with clay. In the beginning the raw marl is soft and you can easily pulverize it completely with your hands. Unlike the natural created structures in Cappadocia the mining of marl in Maastricht impacted and created the unusual shapes and openings in the hills and landscape. This local material was used to make cement which was used in a lot of housing in the environment and the rest of the Netherlands. [26]

[26] Binnenstebuiten. ENCI groeve Maastricht. (KRO/NCRV, 18 September 2021), 0:45-0:50

The last transition phase of this place is that the industrial field, the production industry changes to a ‘’tourism’’ industry, it focuses on the recreation, attraction, and adventure of visitors. There is a continuing cycle of transformation in industrial (Maastricht) and ancient cultural residential areas (Cappadocia) that turn into leisure, it shows our desire to escape to a ‘’natural’’ paradise. So much so that a synthetic nature is being packaged up as a product to be consumed. [27]

This transformation brought much appreciation to the site and also affected my own experience as well. During the conversion of the quarry, Architects Rademacher & de Vries created a viewpoint with a connecting staircase that leads to the former quarry. This created path travels down and bring you through the story of the site. Which for me, had a positive experience and influenced the way I walked through the space.

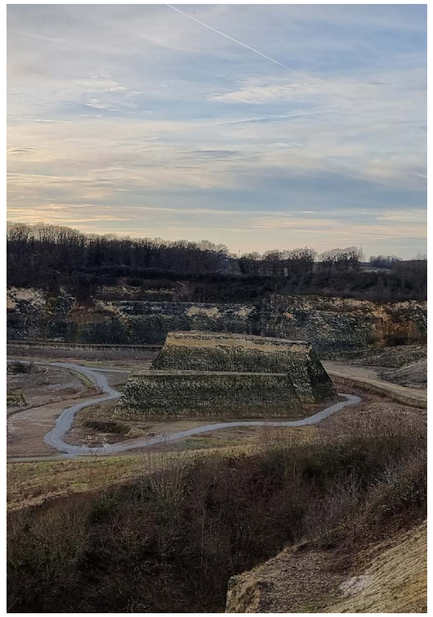
Although, during my walk I felt the buildings of the old cement factory following me with its shadow asking for help.

[27] Mastenbroek, B. Mecredy, E. Baan, I. Dig it! Building Bound to the Ground. Search Architecture. (Taschen Gmbh, 2021) p. 1168

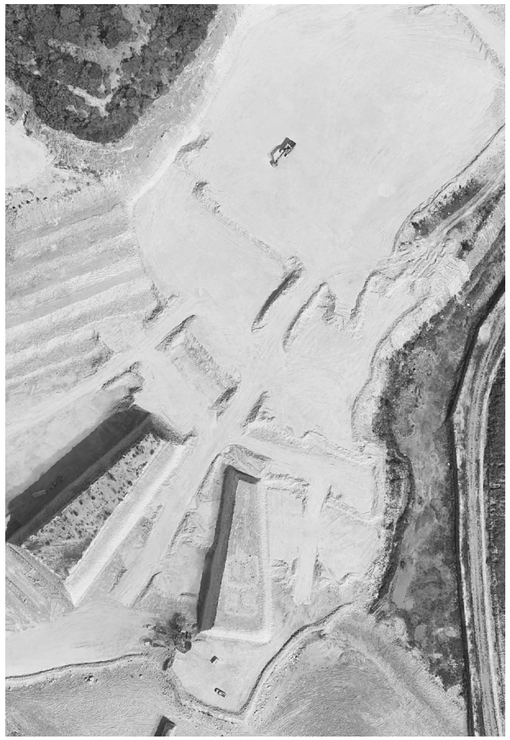
The marl blocks are left standing as icons in the landscape. The nature became landscape and landscape became scenery.[28] The space between the ‘’natural’’ ground and factory became a border that separates the place which creates an odd experience and separation even though these two areas have had a strong connection in the past.

I think that the old factory buildings contain valuable stories from the past that cannot just be demolished. There is a strong social and spatial potential in these spaces in connection to the rest of the environment.

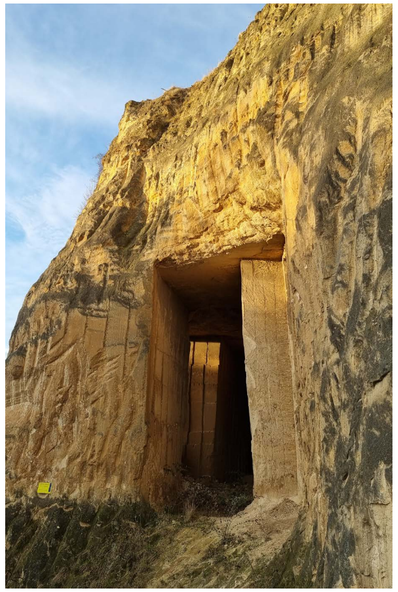
[28] Mastenbroek, B. Mecredy, E. Baan, I. Dig it! Building Bound to the Ground. Search Architecture. (Taschen Gmbh, 2021) p. 88



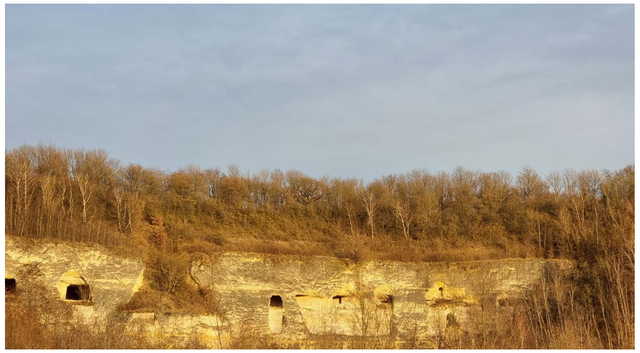
Marl blocks, ENCI Quarry, Maastricht, 2022



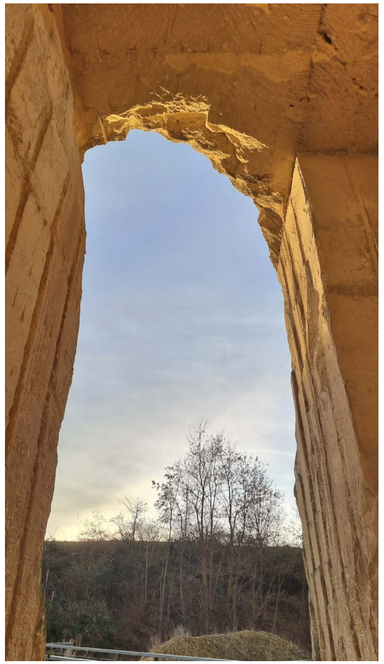
20. Google Earth, ENCI Groeve, Maastricht Construction work, Satellite image



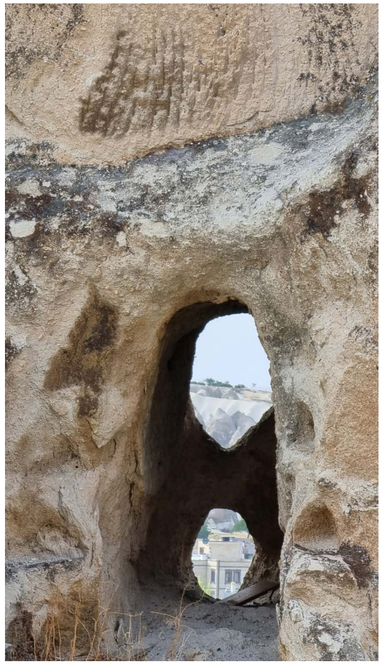
Observing Maastricht and Cappadocia, 2022



Observing Maastricht and Cappadocia, 2022



Observing Maastricht and Cappadocia, 2022



Level III. Renew

Future; Get motivated by the future to inspire

The path towards the future

Lets dig down into the soil. Find the roots of the past and pull it towards ourselves, pull it hard to create a field of roots, this is where the development must take place. It is not about reviving something the past, but it is about renewing and recycling to create the new future.

Architecture is just the beginning, showing where the possibilities are today and discovering where the tomorrow will be. Let’s engage with what is now in front of us, the damage has already been done and the time goes forward. The time doesn’t stop, so let’s try to win time. Let’s create a scenery of memories, a place of knowledge, a place of proud and trust, a place to reconnect with each other and the surroundings, a place to protect together.

Border on border, ENCI Quarry, Maastricht, 2022

Close up pile of sand, ENCI Quarry, Maastricht, 2022

''*For thousands of years, we humans have been gazing at the sky, conjuring up images and stories from random arrangement of the stars and clouds."* [29] – Junya Ishigami

Can we also start gazing on the ground and start imagining new images and stories from the arrangements of the impact we made on the crust of the earth?

During this journey I have travelled from the past, through the present and have been imagining the future in different scenarios. To conclude this journey, I strongly believe that there is something to learn from the ancient building methods and culture to retrieve the lost connection to the earth and habitat to cope with environmental issues in today's society.

I have discovered that the aim was not to try to copy the ancient building and living methods but to learn the way they treated their surroundings, how they dealt with environmental state, like limited resources and space, dealing with specific climate conditions, strong community forming values, living in harmony with other species, treating the earth with respect and how they built their habitats together and live together. To get a deeper understanding of these learnings, I used the case studies and connecting scenario experiments as tools to lead me through an act of imaginative schemes to improve and stimulate the idea of the expertise.

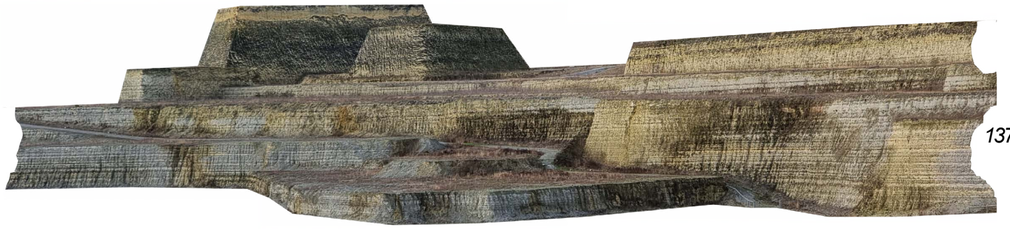
[29] Ishigami, J. Freeing Architecture. (Foundation Cartier Pour L'Art Contemporain, 2018)

As a spatial designer I have always wondered how architecture can have an influence on the social and environmental challenges facing in creating today's habitat. During the research of ancient building methods and cultures it made it clear for me that architecture is one of the strongest volumes we create on or inside the crust of the earth. Through the revolution of architecture, today has come a day that it detached itself from the surrounding, we detached ourselves from each other. Now what can architecture do without our interaction? I learned that spaces are only created by the connection, by the harmony among the people and between their environments.

However, the personal experiences and field research in Cappadocia, at the Zandmotor and lastly in the ENCI quarry in Maastricht were the pieces that tied this research and outcome together. I have discovered qualities in these places but also the common weaknesses of the transitions of the sites that transform into places to consume. Continuing on with the former quarry; Based on this research and the new perspective on creating spaces, earth and people bound, I would like to renew and design a series of structures in the landscape that will trace the shapes and pull the story of the quarry deeper in the landscape.

Working with a place like the quarry, it is important to think about the past of the place, reflect on the impact we made, rethink and ask; How and what do we make visible of the historical and spatial value of the site? And what will the mean to the future of the site?

My view on the history of this place, how it is standing now, and the possible future started off with very mixed opinions. On one hand I think it is beautiful to enjoy this place and make use of the qualities that the site offers. But I am very much against the transformation of this place which has such an important history to the Netherlands and has left pieces of this past in the landscape. That is why I am all about renewing, the difference is; when you transform, you change the form and appearance of something but whenever you renew it means; to make and restore the original state and condition of something that already has so much valuable qualities to offer.

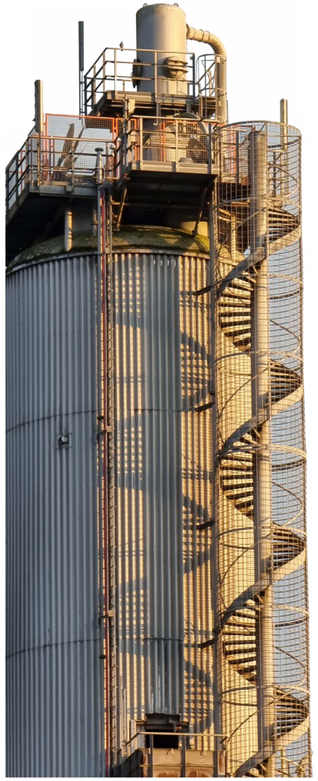


Terraces, ENCI Quarry, Maastricht, 2022

Factory, ENCI Quarry, Maastricht, 2022

The qualities I found valuable, and I think are beneficial for the future and can add an extra layer to the existing architectural additions, are the old industrial buildings of the factory that carries stories and knowledge, the shapes of the hills that were created by the action of mining, the horizontal caverns in the hills and the qualities of the marl. Through these qualities we could trace the path of the past and create a path to the future that is valuable and educational for today's society. The boundary between the factory and landscape can be starting point on where the new vernacular will start to appear.

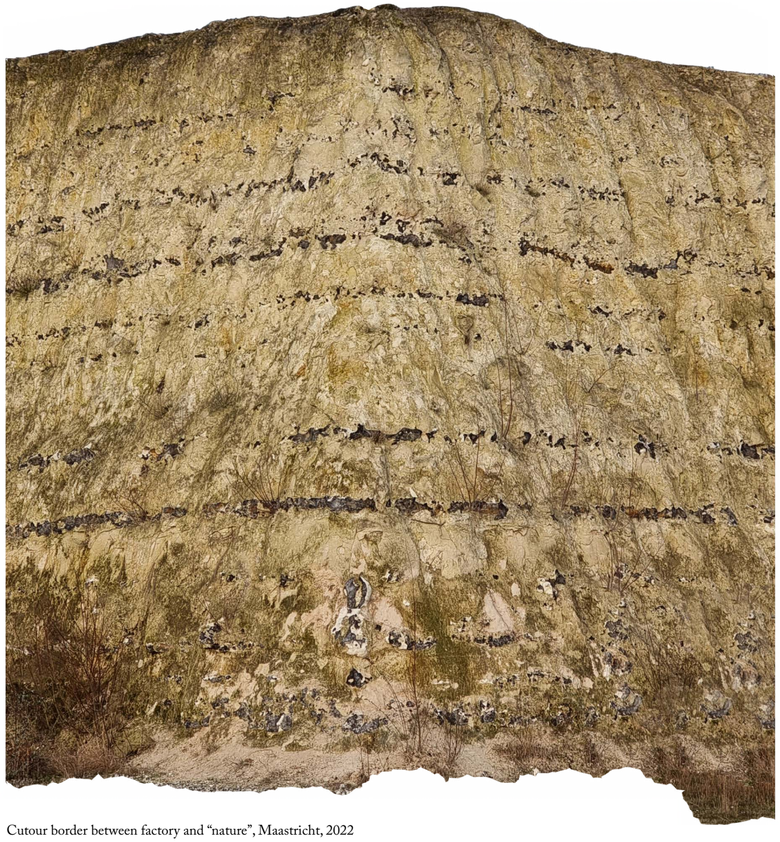
I have started this research from the idea that nothing is impossible. This has become one of my drives to continue and my drive to create a unique response to the future of building and inhabiting. The time only exist to be able to make a change; and the time has come that our habits towards the ''natural'' changed environment renews, go back to a more adaptive attitude towards one another and towards available resources, keep following the new path that will lead us to a more promising future.



Elements of the factory, ENCI Quarry, Maastricht, 2022

Elements of the factory, ENCI Quarry, Maastricht, 2022

Border between factory and “nature”, Maastricht, 2022



Cutour border between factory and “nature”, Maastricht, 2022

Vuursteen from location, ENCI Quarry, Maastricht, 2022

Spatial experiment from stone on location, ENCI Quarry, Maastricht, 2022

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Images

All photos and drawings in this research paper are taken and made by me.

Unless black&white and otherwise stated.

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5. Baan, I. The Yaodong; Loess Plateau, China, Working above ground. Photograph

6. Baan, I. The Yaodong; Loess Plateau, China, Interior. Photograph

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