BEEyou

- how architecture can reconnect us with the honeybee

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Master´s thesis at Chalmers Architecture
Master programme Design for Sustainable Development

CHALMERS

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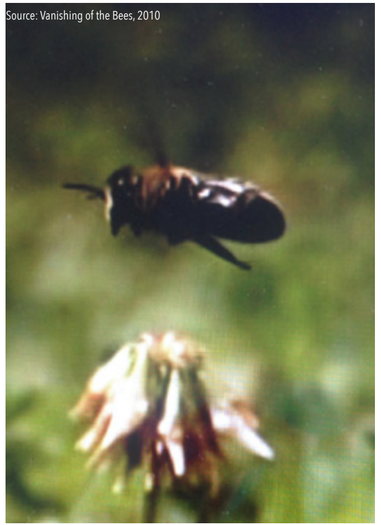


Source: Vanishing of the Bees, 2010

Thank you Lena - for your inspiration and engagement.

Thank you Emilio – the project wouldn´t be the same without our conversations.

Thank you Alexander - for all your knowledge on urban beekeeping and your enthusiasm.

Thank you Hanna & Ylva - for your support, sofa and smiles.

Thank you Edvard - for your never-ending interest in honeybees and me.

BEEyou - abstract

Today millions of honeybees are disappearing from the face of the Earth. The reason why is still being debated, but there is a consensus view that modern food production, with monoculture and pesticides, has a big influence on the honeybee population. The phenomenon is called Colony Collapse Disorder and is a consequence of the disconnection between people and the natural world. This master´s thesis explores how architecture can reconnect people and the honeybee, and hence foster more environmentally friendly behavior.

Based on literature regarding bees, psychology and architecture, the design discusses a new approach to how we can inspire change. The design also discusses how nature can inspire and improve modern city planning.
On a rooftop in Oslo, an urban beekeeper takes care of two beehives. This is the starting point for my master´s thesis. I look into how architecture can create a healthy and green environment for the urban honeybees and at the same time explore how humans can interact with the honeybee in an urban environment.

The end result for my master´s thesis is a design, consisting of two parts. The design for the rooftop ensures the possibility to grow vegetables and, at the same time, provide the honeybees with an important food source. Across the river, overlooking the rooftop, a green beehive will create a meeting place in the urban environment people share with the honeybees, and bring local food production out in the city.

The project is meant to be an inspiration for expanding urban beekeeping in Oslo, and a reminder of the natural connection we as human beings share with the honeybees.

Urban beekeeping in London

Urban beekeeping in Hong Kong

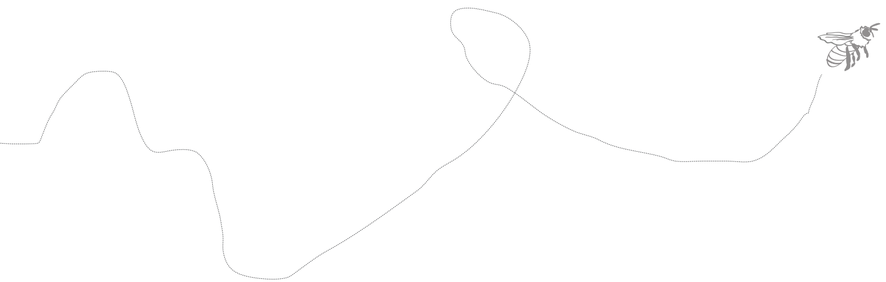
The bee & me


Me and the most famous beehives in Norway

I started my architectural education in Trondheim, at the Norwegian University of Science and Technology (NTNU), in 2009. When starting on my fourth year I decided to make a new choice regarding my education. I wanted to engage myself in sustainable architecture, with focus on how architecture can inspire people to live more sustainable. I found Chalmers to be the best university for me, and I am now proud to deliver my master´s thesis within the master program Design for Sustainable Development.

During my two years in this program I have followed different kind of studios and gained new knowledge. I have worked with system thinking, how an old brewery can reintroduce itself in an urban environment, why allotment gardens at a tram stop should steer the development of an area and how a specially designed henhouse can encourage the inhabitants of a small Swedish town to keep hens in their garden and create a new understanding of where our food comes from.

The first time I really saw bees for what they truly are, was in an old movie theatre in Gothenburg, in the fall of 2013. Seated in a warm, purple velour seat, in a theatre for 10 persons only, I saw the inner secrets of the bee's life. I followed their dance, their flying patterns and their community.
And they moved me.
Seeing the movie "More than Honey" (2012) changed my view on these wonderful creatures and I discovered a whole new movement, working worldwide, to secure their survival.



introduction

Background and problem

Mankind used to be part of the natural community. Our survival depended on our understanding of our natural surroundings. Today we separate ourselves from the natural world, which leads to a lack of belonging and knowledge.
One example is how we have forgotten about the connection between our diet and the honeybee's pollination. We don´t know, or don´t consider, how we as humans still depend on the natural world, even though we now live in human made environments.

Colony Collapse Disorder is leading to a mass death in the honeybee population all over the world. Nobody knows exactly why, but experts agree that the human lifestyle is to blame. Colony Collapse Disorder is therefor a consequence of the disconnection between humans and the natural world.

Today many of us live in urban environments without contact with the natural world. We have to start to involve nature and animals in modern city planning and stop the disconnection between people and the natural world before it has gone to far.

Aim and questions

The aim of this master´s thesis is to explore how architecture can create a space where people and honeybees can meet, strengthen the human/nature connection and inspire people to take better care of the planet we live on.

I will explore how an architectural project can connect humans and urban honeybees by creating a common ground within the urban environment we share, and at the same time make people more aware of the importance of the honeybee´s existence.

If people in an urban environment reconnected with the honeybee, could this lead to a stronger connection between people and the natural world? And how can architecture create the urban space for this reconnection?

The honeybees are small and hard to get a good look at. But what we see clearly everyday, maybe without noticing it, is the traces they leave behind. Their pollination enriches our surroundings with colourful and tasty fruits, vegetables and plants. One part of my design is boxes for planting vegetables on a rooftop where honeybees already live. The other part is a green beehive across the river from the roof - implementing urban farming as well as a viewpoint to/of the roof.

Methods

In this process I have used different kind of methods to be able to explore my subject. I have studied literature on human psychology and change, honeybees and the human/nature connection. I have conducted several interviews in Oslo. I have talked to urban beekeepers, people working with sale of locally produced food and people in the Municipality of Oslo, responsible for the greenery in the city. I have followed Alexander Du Rietz, an urban beekeeper in Oslo, on different events and also been able to take a closer look at his beehives. This has provided me with hands on experience on urban beekeeping.

Sketching has been important through out the process, together with model studies and site analysis. The site analysis consists of photographing, sketching on site, learning more about the neighbourhood and the natural conditions of the place.

Delimitations

I have limited my thesis to focus on human behaviour and change, human/nature connection, the honeybee and urban beekeeping. This master´s thesis will still not hold all the information in these fields, but rather focus on the connection between them.
If the time had been there I would have liked to study

ecosystem services and urban landscape design. I believe that there is a lot to gain for this project from these two fields.

Reading instructions

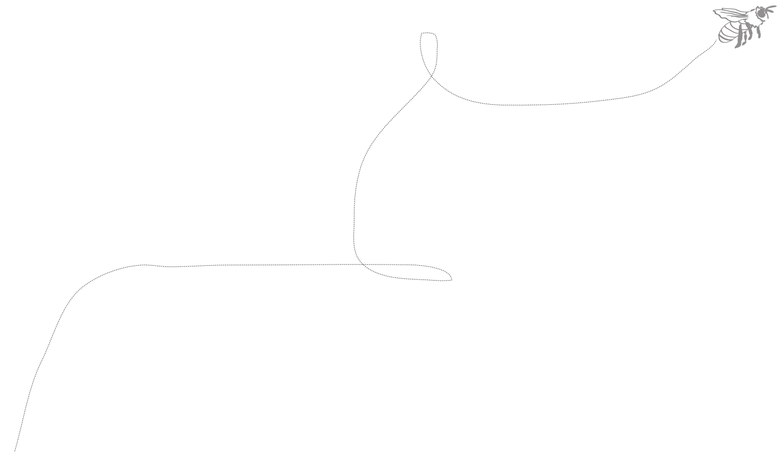
Chapter 2 "Research background," starts with the human mind and behaviour psychology, followed by my own reflections. From here you can read about human/nature connection, before reflections on these two fields ends this section. This chapter ends with my design guidelines, extracted form the research part. In the chapter called "Conclusions," I reflect on how the design managed to follow these design guidelines.

The third chapter, "The honeybee," contains facts on the honeybee, the honeybee community and urban beekeeping.

In the chapter "The site," you can read about Oslo, Norwegians and the area for my design.

In the "Design" chapter, you will first read about my design concept, before I first present the design at the rooftop, before presenting the design in the nearby park. This chapter ends with pictures from my landscape model and my thoughts around the design and the seasons.

The following chapter, "Conclusions," starts with a reflection on the guidelines, as mentioned above, before I reflect on the project as a whole and take a look into the future.



research background

This chapter is based on my literature studies on the human minds ability to change, environment psychology and human/nature connection. There is a lot of information to be found on these subjects, and I have made a selection based on my personal interests in these fields, and studied the links between these fields.

I will use the term environmental psychology and ecopsychology in my text. These are wide fields, and I focus on only some of the aspects. Environmental psychology focuses on the relation between people and their surroundings. The environment includes the build-, the social- and the natural environment. Ecopsychology studies the relation between humans and the natural world by looking at ecological and psychological principles. Ecopsychology wants to expand our emotional connection with the natural world.

The human mind

-How understanding the human brain can help us inspire people to change

"Technological solutions might be important and impressive, but without a behavioural technology that changes what people actually do, sustainability cannot be achieved."
(Koger & Winter, 2010, p.132)

I started the whole process with my master´s thesis, exploring how the human mind affects our ability to act in environmental friendly ways. My goal was to gain background information I could transfer into guidelines for the design.

In 2009, World Wide Fund for Nature, WWF, published the report "Meeting Environmental Challenges: The Role of Human Identity." This report gives a critical view on todays environmental campaigning, and introduces a new mind-set, based on the human mind and the human identity.
Together with the book "The Psychology of Environmental Problems," from 2010, I formed the background for this master´s thesis.

These two texts discuss how we need to take on a new perspective when examining how environmental campaigning can reach through to people. By identifying certain aspects of the human mind, we can understand where the mind works against environmentally friendly choices and hence how we can start to address these aspects towards a change. Research points to three aspects of the human mind that works against us making environmentally friendly choices. These three aspects are people's values and life goals, the in-group and out-group effect and lastly how we attempt to manage fear and threats to our existence.

By understanding how these three aspects influence our will to act, we can explore new ways of addressing environmental problems that works with the human mind, instead of against it.

These three aspects of the human mind influences our ability to cope with environmental challenges, but also other challenges such as war, poverty, racism, homophobia and indifference to animal welfare (Whitley & Kite, 2006). The three aspects are genetic components of the human psyche, but they are also affected by the culture we live in. In the history of the human race, we have seen dramatic and rapid changes happen before, such as the agricultural, -industrial, - and technological revolutions (Ehrlich & Ehrlich, 2008). This means that the green revolution is achievable, despite the psychological mechanisms of personal goals, in-group/out-group effects and threat management.

The three aspects

-How our brain limit our ability to change

As mentioned on the previous page the aspects of values and life goals, in-group/out-group and how we manage fear, are important to be able to understand how humans try to deal with environmental challenges.

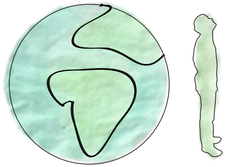
focus on personal goals

The first aspect, our values and life goals, tells the story of how the focus among human beings has shifted over time. Today we focus more and more on ourselves, and our own life. We want to make the most out of our own life and hence we focus on self-enhancing values. Shalom Schwartz and colleagues (1992) describe this as a desire to dominate people and resources, and demonstrate success relative to others, such as the natural world. Studies show that in countries where the inhabitants place a greater priority on pursuing life goals such as wealth, power and status, the CO2 emissions are higher per capita, then in countries with other priorities. These materialistic goals also lead to negative attitudes towards non-human nature and less engagement in positive environmental behaviours (Crompton & Kasser, 2009).

The second aspect is the in-group/out-group phenomenon. The in-group/out-group phenomenon explains how people, by placing themselves inside particular groups, such as gender, nationality and profession, define who they are. This is a highly affective mechanism of the human mind leading to stereotyping, discrimination and even extinction of other species. By placing someone or something in an out-group, we automatically treat this group in a matter that enhances our own group (Hewstone et al., 2002). I have encountered this theory earlier in another project at Chalmers.
The aim of that project was to design a henhouse that would inspire people to keep hens in their backyard, and by doing so reconnect with animals and rethink how their lifestyle affects the natural world. Indeed, everyday we see how people ignore animal welfare, because access to the desired food products is more important. Today, the beekeeping industry is industrialised and has lost it´s natural connection, transporting beehives full of bees across continents to ensure pollination at big, monoculture acres.

my group

their group

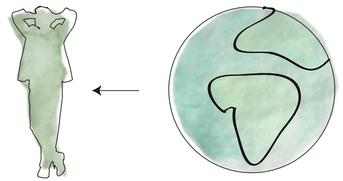


human/nature seperation

The third aspect of the human mind explains how people attempt to manage fear and threats to their identity and their existence. This is a very important feature to address. If we feel overwhelmed and scared over the situation the planet is facing, the easiest and least stressful solution will be to just ignore the fact.
Climate change is a visible threat to the human society. Feeling threaten leads to emotions such as anxiety and guilt, feelings I can recognise from my own coping of environmental questions. When we meet these feelings we react with apathy and denial. Freud said that humans protect themselves against unwanted feelings in order to reduce pain by using defence mechanisms to contain their anxiety. Freud´s defence mechanisms explain our mental operations used (often unconsciously) to manage such threats. "Such mechanisms are commonly used by humans in respond to feelings of anxiety and guilt, threats to one´s self-esteem and identity" (Baumeister et al., 1998, p.66).

The human/nature connection

-How reconnecting with the natural world can shift our mind-set



a one way relationship

Ecopsychology see the reconnection with "The ecological self" as a good starting point for the reconnection of humans and the natural world. The ecological self represents an integration of two selves: the separate physical self, which one normally experiences as a person in the western world, as well as a larger self that identifies with the ecosphere and other living things. If we feel connected to other living organisms we can get in touch with our ecological self. "When in contact with your 'Ecological Self' you will feel sympathy and belonging towards other people, species and ecosystems and you will be willing to act on behalf of them" (Bragg, 1996, p.93).

The stand of eco psychology claims that humans are born with a sense of unity with the ecological world. The human race, our senses, intellectual mind and emotions, have developed in natural, and not a human made, environment. Thus, our physical, mental and spiritual well-being relies on the quality of our relationship with nature. Within the field of architecture we find a direction with similar thoughts, called Biophilic design. Biophilic design strives to enrich the urban environment with natural elements and hence reconnect humans to the natural world. Since I also work within the urban environments in this master´s thesis, elements from Biophilic design will be visible in my design guidelines.

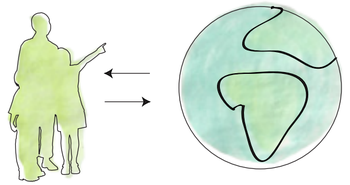
I started to look into the historic perspective of the human/nature connection, to see how this connection has developed over time. As early as the 1400s, theories exploring the human race in relation to the universe started to appear. Copernicus (1473-1543) revealed that the planets revolve around the sun and not the Earth. This means that we are part of something bigger then our own existence. Darwin (1809-1882) found common ancestry between animals and humans, and Sigmund Freud (1856-1939) exposed how irrational humans are, and how much we depend on our biological history. On the other side we find Descartes (1596-1650), representing a mechanical worldview, different from the dynamic, alive and spiritual worldview that had existed. Christianity also contributed to this new worldview. While the Asian religions kept their belief in the holiness of the natural world, Christianity "not only established a dualism of man and nature but also insisted that it is God´s will that man exploit nature for his proper ends" (White, 1967, p.405).

Since the industrial revolution, the human exploitation of the planet's resources has only seamed to increase. We build cities without habitats for animals or birds, we forget where our food comes from and more and more species appear on the red list. The losses of different species are bad for humans in many ways. Biodiversity can generate enormous economic benefits in the form of food, medicines and industrial products. Species are the working parts of natural ecosystems that provide the essential services necessary to sustain life. As the Earth´s dominant species, we have an ethical and moral responsibility to protect diverse life (Novacek, 2008).

More and more research point out the link between human/nature connection and pro-environmental behaviour. In a large cross-cultural study of citizens in 14 countries, connectedness with nature emerged as one of the strongest and most consistent motivational predictors of pro-environmental behaviour (Schultz, 2001). If we see ourselves connected to the natural world and if we integrate nature in our in-group, we are more likely to make choices not only based on our selves, but other living things as well (Schultz, 2000).

Concluding thoughts

- The human mind, human/nature connection and the way forward



respect and coexistence

When we encounter stress, our stress response is activated. Coping efforts may help to escape, remove, tolerate or accept the threat (Sarafino, 2008). When we are unable to escape or control a situation, people and other animals are inclined to give up (Seligman, 1975).

Considering the threat of climate change, experts mean we still are able stop the changes. However, the overwhelmingness of this complex situation is enough to activate the last stress response - inaction. By doing so, our stress levels goes down and we can focus on minor, everyday problems. In the long run however, these actions lead to signs of depression and anxiety.

A panel of physicians concluded that climate change represents the biggest global health threat of the twenty-first century (Boseley, 2009). As a result, the prevalence and severity of stress disorders will increase, such as grief, depression, anxiety, suicide attempts and substance abuse (Fritze et al., 2008).

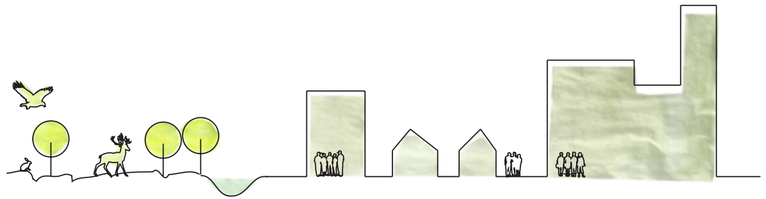
Our perceptual system evolved over a period of time where sudden dangers where present, and problems that would reveal themselves later was of lesser importance (Ornstein & Ehrlich, 2000). This helps us explain why we don´t respond to future danger, but also why our response can happen too late in the case of global warming. We don't want to think about problems that feel too threatening and too big for us to handle. But our lack of response leads to unexpected levels of stress that is damaging to the human health and the Earth.

The serious problem of Colony Collapse Disorder displays the features that produce these kinds of psychological responses in human beings. To enable people to react in a more environmentally friendly way, we need to lower the level of stress and anxiety, and focus on direct action.

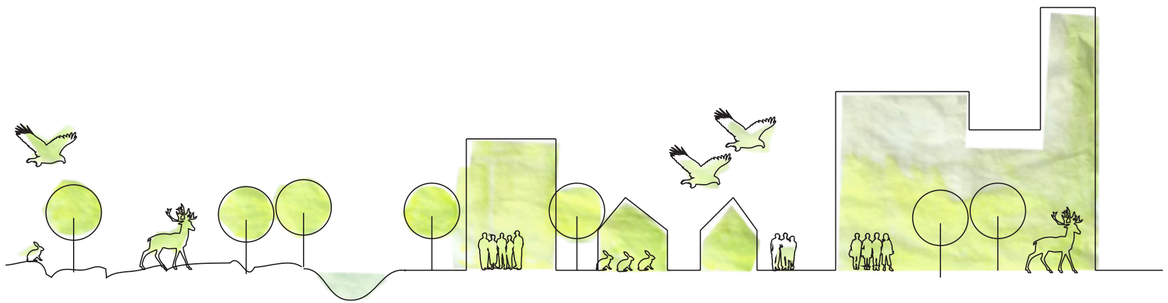
From this review of the human mind we can conclude that the environment the human species evolved in, is radical different from the environment we live in today, especially in the western world. Because our biological evolution has used centuries to develop, and the cultural evolution happened over night in comparison, the human mind is having a hard time making sense of, and coping with, the current environment, despite the fact we are ourselves the creators (Koger & Winter, 2010).

Today, environmental campaigns still focus on the specific behaviour, not on the people engaging in this behaviour (Crompton & Kasser, 2009). This means that today people are encouraged to change aspects of their behaviour, like starting to recycle, but as more and more recycling is being done, the same people also consume more and more. In this way we miss the link between our actions and the bigger meaning.

To be able to truly change, you need to learn about something in relation to who you are and your own values. Then you are more likely to take this information to use (Vansteenkiste, 2009). Moreover, if we see similarities and connections between humans and the natural world, which we were part of from the beginning, we will develop a relationship with the natural world that will foster pro-environmental behaviour (Crompton & Kasser, 2009).



city separated from nature



A new type of city, where the natural world can develop side by side with humans.

From theory to design guidelines

Here I will translate elements from the research background into strategies for my design. By doing so I combine the fields of human psychology, human/nature connection and urban beekeeping, and connect them to the field of architecture.

Design for an optimal connection between humans and nature.

Humans need to consider the natural world as a part of our in-group, instead of increasing the distance by seeing plants and animals as an out-group. This can be done by developing means of increasing optimal contact between humans and non-human nature, including indirect contact. I will explore how architecture can create this optimal contact between humans and bees.

Design for reminding us of our connection with the natural world.

Today people are surprised when they hear that the bee's pollination is responsible for 75% of our diet. By creating a space where people can reconnect with the bee and be aware of our connection to them, this fact will not surprise people, but remind them to take better care of the honeybee population and the rest of the natural world.

Design for a new, positive attitude.

In a setting where you see positive actions for the environment being taken, it´s easier for humans to direct energy towards changing behaviour, and use less energy to fight negative feelings such as anxiety. I will try to utilize this effect with my design by connecting it with existing urban bee keeping, and hopefully foster further actions in benefit of the environment.

Design for new views.

The vast majority of humans are visual-dependent. Sight uses a greater part of the human brain cortex than the other senses, and people generally relay on what they can see. We cannot really see the bee and their fascinating movements, but architecture can open up our eyes to the traces they leave behind when pollinating our plants.

Design for empowerment.

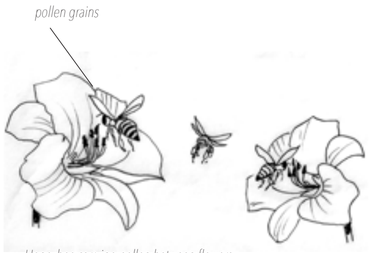
Small steps towards a greater meaning will lead to empowerment and control. With the feeling of control, follows reduced stress levels and you become more open towards behaviour change. I will not focusing on all the different aspects of climate change, but rather inspire people with a place to start.

the honeybee

Honeybee facts

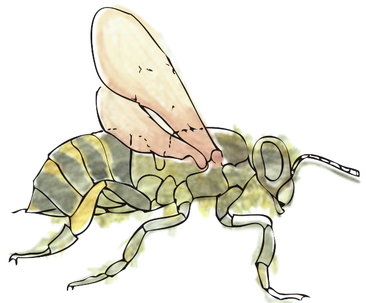
honeybee wasp bumblebee

Honeybees are part of nature's pollination crew, together with other species of bees, bumblebees and insects. Pollinators are key parts of ecosystems, both in the wild community and in the agricultural community. 75% of our world´s crop species require pollination to set seed (Utah Farming Bureau, 2014). Honeybees are contracted out as pollinators by beekeepers, and are by far the most important commercial pollination agents. Honeybees are well adapted to pollinate; they are fuzzy and carry an electrostatic charge so pollen easily attaches to their bodies. On their hind legs they have a structure called the pollen-basket, where they collect pollen. Bees gather nectar, a concentrated energy source, and pollen. Pollen is high protein food that they use to nurture their babies. By "accident" they spill some of this among the flowers they are working on, and pollen grains transfer from the male anthers of a flower to the female stigma of a flower.



Honeybee carrying pollen between flowers

Honeybees need an abundant and steady pollen source to multiply and they will fly up to 5 km to gather food (Honningsentralen, 2010). The nectar is regurgitated into a honey cell, and by flapping their wings and extracting fluid from the nectar, the honey is made. Then they seal the cell to keep the honey safe. It takes 150 trips to a flower or a tree to make one teaspoon of honey.



grape kiwi okra onion cashew celery strawberry starfruit beet mustard rapeseed broccoli cauliflower cabbage brusselsprouts turnip chilli papaya cherry almond peach sesame chestnut watermelon coconut coriander melon cucumber squash pumpkin lemon lime carrot cardamom cotton lupine macademia apple mango avocado apricot pear raspberry

plants pollinated by honeybees

The honeybee today

There was a time when the bee was considered a sacred animal. The honeybee symbolised the fertility of life and their community inspired human beings.

The bee community is a fascinating structure. Each bee works for the hive and strive only for the common good. The bee is biological depended on the hive, and can only survive 24 hours outside the community (Siegel, 2010). Today the honeybee is threatened by a phenomenon called Colony Collapse Disorder.

Colony Collapse Disorder

Colony Collapse Disorder (CCD) is a phenomenon in where whole honeybee communities disappear from their hive. The queen, the food and the brood are left in the beehive, but the bees never return home. This is what makes the CCD so challenging to comprehend - bees would normally never leave their hive with the queen and brood still in it.

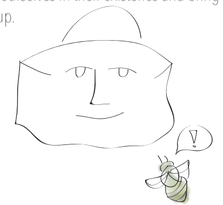
CCD was first noticed in North America in 2006, (Henein & Langworthy, 2009), and has since then spread throughout out the world. CCD is not yet detected in Norway, making it ever so important to understand CCD and prevent it from occupying our beehives. Agricultural crops all over the world depend on the pollination from honeybees - without their help, we will loose 75% of our daily diet (Utah Farming Bureau, 2014). Fruits, vegetables, almond and berries are some of the food that will disappear from our plate. The cause for CCD is, as mentioned above, still under debate. However, more and more research is pointing to pesticides, loss of habitat, a new beekeeping culture, the Varroa mites or a mixture of all of these, as the main problem.

The monoculture farming we see around the world today, makes it hard for the bees to survive in an area for the whole season. The bees depend on a variety in plants and flowers, so that they can access pollen and nectar from April to August. The Varroa mite is a great threat to the bee, mainly because of the viruses it carries into the hive. Consequently, The Varroa mite is responsible for millions of dead b ees each season. As for the Pesticides, they are often based on nerve gas, which destroys the bees natural "GPS system" so they don´t find their way back to the hive (Henein & Langworthy, 2009). These are the main possible causes of CCD, but this review is far from exhaustive.

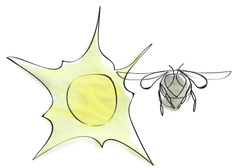
Source: survivalofthehive.com

The honeybee & you

While reading about the honeybee, I found a lot of interesting information about this intricate creature, such as their ability to recognise human faces and that they communicate through dancing. Understanding that the bee holds all of these qualities can help us seeing the bee as something more than an insect, but recognise ourselves in their existence and bring them into our in-group.

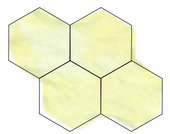


bees can recognise human faces



bees navigate after the sun or polarized light if it is cloudy

bees have their own language, they communicate by dancing



the honeycomb structure, the hexagon, is proven by mathematics to be the most practical structure for maximum use of unit area

their honey is a pure nature product and is filled with healthy nutrients

the bee brain stops aging when they preform jobs ment for younger bees

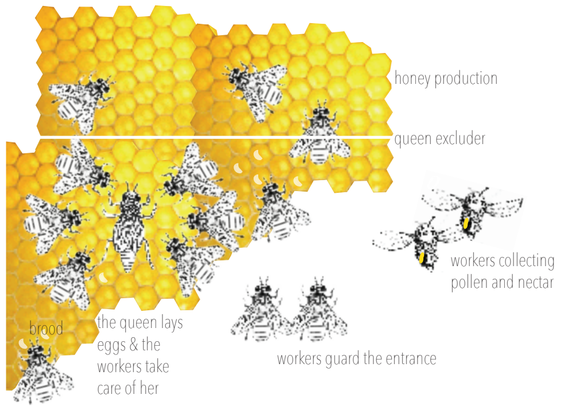
a toxin in bee venom called malittin may prevent HIV

the bees pollination is responsible for 75% of all the food we consume

The honeybee & the hive

Honeybees are called social animals because they live in colonies and rely on each other. Honeybee colonies are super organisms. A super organism is an organised society or group consisting of many individuals, that together function as a whole unit.

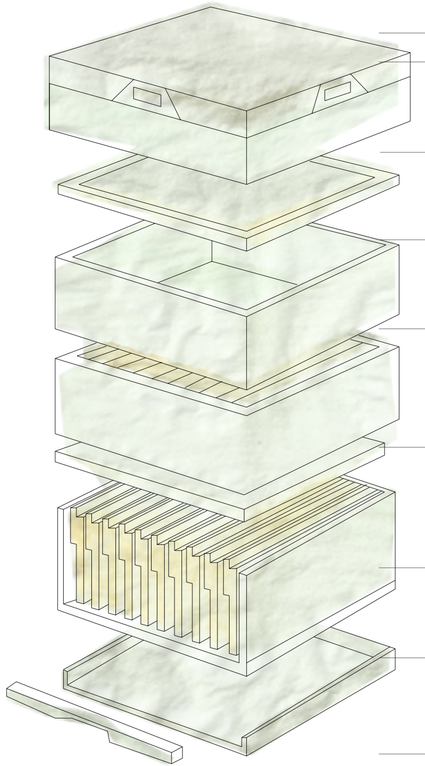
In the summertime one honeybee community can consist of 80.000 individuals, and in the wintertime the number drop to around 10.000. Bees inside one community recognize each other through a common smell, which originates from the queen. Guards at the entrance will make sure that bees with a different smell can´t enter (Heier Du Rietz, 2014).
A beehive consists of bottomless boxes stacked on top of each other. On the inside you can find the honeycombs. These are wooden frames featuring a wax plate, where the bees build their cells. The cells consist of wax and have the shape of a hexagon. The cells will contain pollen, nectar, honey or brood. 90% of a bee's life takes place in the darkness of the honeycomb (Heier Du Rietz, 2014).



The queen is the only member of the hive that is sexually developed. In natural surroundings, the worker bees select the queen egg. In modern beekeeping however, the beekeeper places a queen in the hive. Once she is born, the queen goes on a marriage flight. On this flight 10-15 drones will mate with here and this fertilisation will last for here entire lifespan. She will lay 1000 eggs each day. The queen's temper will affect the rest of the hive. Urban beekeepers strive to keep friendly bees, to avoid conflict with an urban environment (MAAREC, 2014).

The working bee survives for 30 days during summer time. The workers are all female and they are the mightiest bees in the colony. They take care of the babies, build the honeycomb, guard the entrance and collect nectar and pollen. The worker bee makes about 10 flights a day of 15-30 minutes (MAAREC, 2014).

The drone bee survives for 30 days during summer time. The drones are the male bees in the hive. Their main job is to mate with the queen, but you also see them guarding the entrance of the hive. In the wintertime drones are kicked out of the hive, to ensure enough food to the queen and the worker bees (MAAREC, 2014).



roof weather proof the hive

ventilator

crown board separates the bees from the roof

super

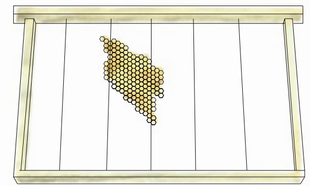
super with frames contain frames used for honey storing

queen excluder wire rods exclude the queen from this area, only the worker bees have access

brood box contains 10 frames used for pollen, nectar and brood

floor

entrance block

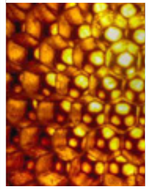


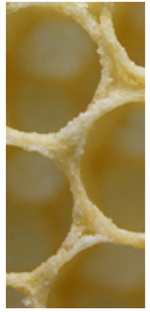
a frame with wax

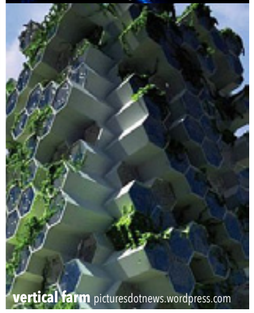
The honeybee & architecture

Architects shape the environment. Today we shape environments without focus on nature and animals right to the space. Today we create urban landscapes without focus on biodiversity and ecosystem services and hence we build unsuitable surroundings for the honeybee. A city without flowers, trees and water, is not only a sad sight for the honeybees, but for us as well.

The honeybees are architects themselves, constructing their own house, using hexagons. Here are some pictures that have inspired me through out this process.







Urban beekeeping

Urban beekeeping is a growing trend all over the world, from London to Hong Kong.

New York is perhaps the most famous city in regards of beekeeping, where beekeepers fought for their right to keep bees in the urban environment. In Oslo you can find beehives in the Royal Castle´s garden, by the highway, at the roof of shopping malls and in backyards. In Norway honey is mostly imported, since Norwegian beekeepers can´t meet the demand (Honningsentralen, 2014). The goal for The Norwegian Bee Society is to keep Norway self-sufficient with honey. To reach this goal they depend on more people taking up urban beekeeping. Urban beekeeping is an important aspect of increasing the honeybee population all over the world, and hence ensure pollination.

Urban beekeeping by the highway in Oslo

Heier Du Rietz
-urban beekeeping in Oslo

Liv Ragnhild Heier and Alexander Du Rietz established Heier Du Rietz - urban beekeeping, in the spring of 2013. Heier Du Rietz produces honey and works to inform people on the importance of the bee and their existence. They have two beehives on a rooftop in the centre of Oslo, and in the summertime 160.000 honeybees live here.

Alexander keeping an eye one the beehives.

I want my project to inspire Heier Du Rietz to expand and develop their urban beekeeping company, and connect beekeeping with urban farming, to put more focus on the honeybee's vital role in our food systems.

Alexander has been a great asset for my project and I hope the finished result can work as a vision and inspiration for his urban bee garden.

the site

Oslo

Oslo is the capital of Norway with more than 600 000 inhabitants. I have chosen to work with Oslo because this is a city I know well, and since it now is my home, I find it very interesting to explore Oslo's potential regarding sustainable development. There is already a growing focus on honeybees and urban bee keeping in Oslo, much because of Heier Du Rietz and their designer beehives.

The honey production in Norway has been declining the last couple of years and the main delivery company of honey in Norway, "Honningsentralen," wants to increase the production from 350 tonnes to 1000 tonnes (Mella, 2014), in order to avoid importing honey like we do today. The unique Nordic fauna makes the honey here especially rich in nutrition, and honey from the centre of Oslo passed laboratory quality tests by a wide margin (Mella, 2014). The test results reports that production in Oslo is safe and the honey is full of healthy nectar from the rich fauna we see in cities like Oslo.

Urban setting

During the industrialisation, people left their natural surroundings and moved into cities and thereby cutting themselves from their place of origin and their previous connection with natural (non-build) places (Bodnar, 2008). Architecture has a great potential to change people's perception of an urban space and set it in relation to the natural world.

Oslo from a bee's perspective

Norwegians

In 2011, Nielsen Global Survey conducted a survey in 51 countries. It revealed that only the people of Estonia care less about the climate than Norwegians.

TNS, The Norwegian Climate Barometer, shows sinking engagement among Norwegians on the climate issue. In 2009, 28% said that climate change was the most important task Norway was facing. In 2013 this number was reduced to 18%. Worth noticing is that people under 30 years old are more engaged.

Kari Marie Norgaard travelled in 2006 from the United States to a small town in western Norway to find out why so many people who are fully aware of the climate change crisis, are staying silent and inactive. Norgaard found that Norwegians have a tendency to focus on how globally insignificant Norway as a small country is, both in relation to national greenhouse gas emissions and political influence internationally.

Denial about environmental problems includes minimizing their severity, seeing them as irrelevant, and seeing oneself as not responsible (Opotow & Weiss, 2000), much as we see happening in Norway.

Source: lorainealvarezposen.com

Norwegians in winter time

The area - Vulkan

My project will be situated in the Vulkan area. Here we find the urban honeybees of Heier Du Rietz, and hence this became a natural site for my project. Vulkan area is located in the centre of Oslo, as you can see from the maps.


Source: gulesider.no

Air photo over Oslo.

Air photo over the Vulkan area

Photo study the Vulkan area.

Vulkan used to be a heavy industrial area by Akerselva, a river running through Oslo. A sustainable city development has been the leading idea for the development of this area. Today Vulkan is filled with schools, apartments, offices, hotels and restaurants.

On the 2nd of October 2012, a new food adventure in Oslo started. "Mathallen" food court is a centre for Norwegian food culture with focus on high quality food and drinks, located in the middle of the Vulkan area. Mathallen consists of 30 special shops, cafes and eating-places. Mathallen also hosts seminars, festivals and cultural happenings. This building makes a good starting point for urban beekeeping, with focus on locally produced, high quality food. Naturally, this is also where the honey produced by Heier Du Rietz is sold.

Entrance area, Mathallen

The area & the honeybee

Vulkan is a great area for urban beekeeping. There is already a focus on locally produced, high quality food and sustainable city planning. The surrounding area consist of several exciting qualities for bees, such as a vide variety of plants. There is also a great possibility to expand food production and green roofs in the area, as this map shows.

1

"Vulkan Bigård"- a perfect home, with all facilities, for busy city bees. Here they have a devoted beekeeper looking after them.

2

The Vulkan area - a new district with focus on locally produced food. Makes it easier to ensure the survival of the bee city at the rooftop, since you can argue that the honeybees have a right to live in this area. This is where their honey is sold and the high focus on locally produced food is more valid with honeybees on the roof.

3

A new park opening 2015. Here the municipality of Oslo has a great opportunity to make a park with focus on the honeybees of Oslo and local food systems in the city. This park could be a case study for the rest of the country regarding urban farming and natural assets.

4

Akerselva-the longest green and blue structure in Oslo. This provides the honeybees with a steady water source through out the seasons. The area along Akerselva is filled with different kinds of trees, so the bees will have access to nectar and pollen from April to September.

5

Allotment gardens full of vegetables, flowers, berries and fruits. This is a very important aspect for the honeybees. Here they can collect different kinds of pollen and nectar from April to September. The people gardening here will benefit form the honeybee's pollination and get a lot of vegetables, berries and fruits from their plants. The honey will also benefit this varied food source, and be full of different flavours and nutrients.

6

Telthusbakken-small wooden houses with lively backyards. This area is a continuation of the allotment gardens and the same qualities will be valid here.

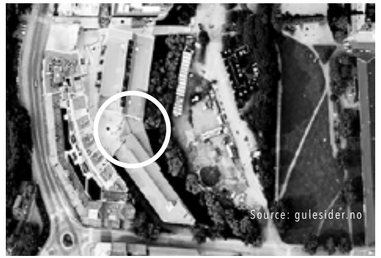
7

Cemetery with different kind of flowers and plants. Provides the honeybees with more variety in their diet. It would be possible to place beehives here as well. the honeybees with more variety in their diet.

8

Grünerløkka city district. Area with small-scale buildings and green backyards. This area would be great for expanding bee city rooftops and backyards. The honeybees living in this area would benefit from the same qualities as the honeybees at the Vulkan bee city does.

Site - the roof



Pictures of the rooftop. Here you see the two designer beehives from Snøhetta.

Two buildings surround the roof where you find the beehives of Heier Du Rietz.
One of them is Mathallen (the food court,) an old industrial iron-production building from 1908. The other building is Dansens Hus (the house of dance) from 1948, which was part of Vulkan engineering workshop. Dansens Hus is a national scene for dance and was established in 2004.

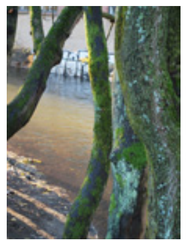
The two buildings surrounding the roof and the roof itself are regulated as "Special area. Cultural heritage. Can be used for: sports, businesses, offices, industry, education."

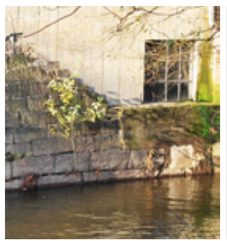
(S-4268, 2006) In the regulation it is also stated: "Changes should be made in consultation with the Cultural Heritage Management." The roof was originally planned as an outdoor restaurant, and the architect brought this idea to The Cultural Heritage Management. They wanted to keep the building's originally appearance by keeping the exterior, and especially the end walls, visible (Kyrkjebø, 2013), and did not recommend the idea. Consequently, the roof was left empty until Alexander Du Rietz suggested starting up urban beekeeping on this spot. The bees demand minimum from the roof, regarding space and facilities, and two beehives with 160.000 honeybees moved up on the roof.

Site - the park

Across from the Vulkan area you find today an empty, grey area used for parking. In 2017 this area will be turned into a new park, called "Nedre Fossen Park." This park will be part of the important recreation area around the river Akerselva. The new park will be developed by the municipality of Oslo and will contain a playground, a big lawn, a restaurant and historical traces from old buildings. After a meeting with Heier Du Rietz they will also try to incorporate bee friendly plants in the park.

Pictures from the park. This is a beautiful site with old industrial buildings, good sun conditions and the river, Akerselva, passing by.





the project

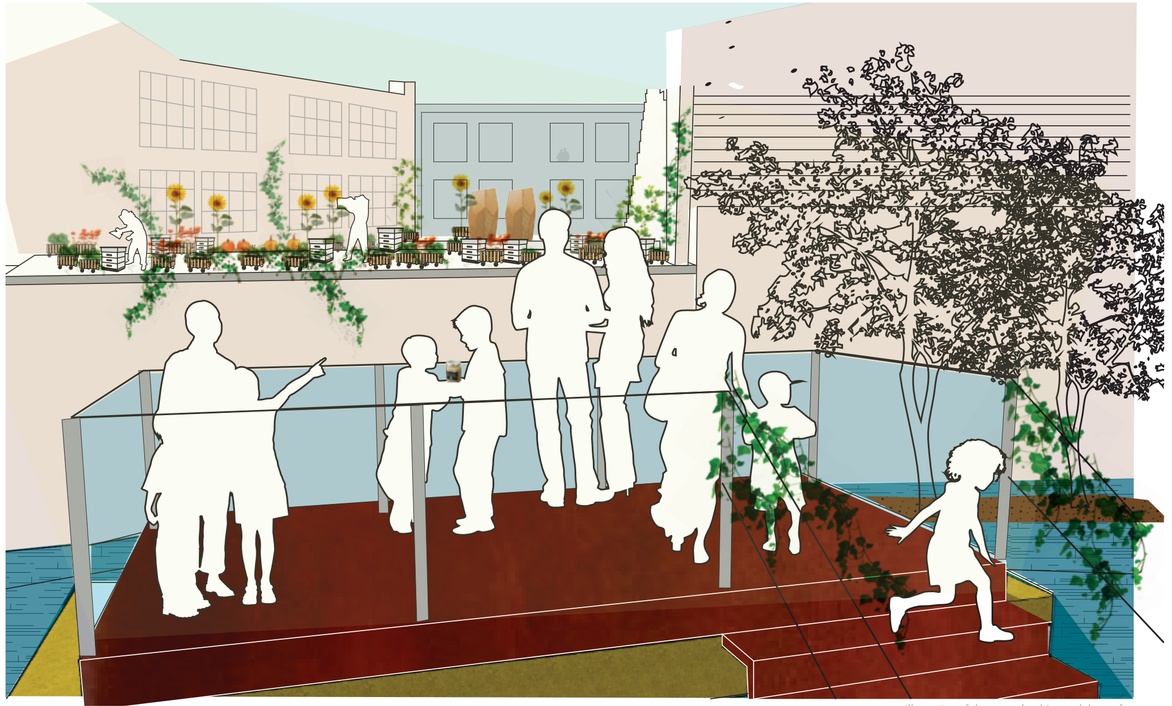


Illustration of the green beehive and the rooftop.

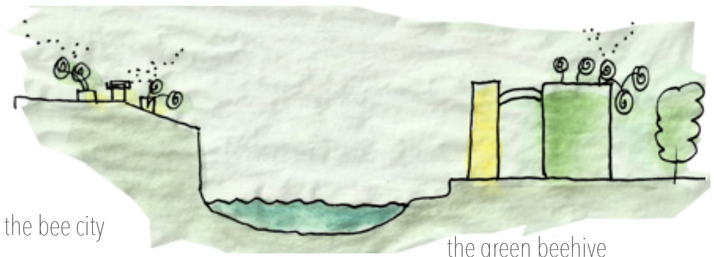
The design

The roof where Heier Du Rietz keeps their urban honeybees will be the starting point for my design. Heier Du Rietz wants to expand with additional beehives and make it possible to grow vegetables on the roof. I want to develop this opportunity, and at the same time explore how people can get to know more about urban beekeeping and maybe even be inspired to start something on their own on another empty rooftop.

Since getting to know the bees by touching them or taking a close look, like you would with other domesticated animals, is not an option, the design will play an important role in the search for human/honeybee connection. The design will show the traces honeybees leave behind after one of their flights, namely pollinated plants and a rich selection of healthy food for humans to eat.

My design has a strong focus on visual contact, and from here the idea of a tower overlooking the roof started to grow. In our everyday life we will not see honeybees close up. So I wanted the meeting with the honeybee to reflect the way you meet a bee in your garden or in a near by park. Therefore, by looking over to the roof you see the bees live their natural life, and maybe they will come over to the green beehive were you stand to get some pollen from one of the plants there.

The green beehive will be filled with vegetables and plants, providing the bees with additional food and creating a beautiful, green city-space.



The design focuses on the traces the honeybees leave behind when they fly from flower to flower

go from...

_Colony Collapse Disorder.
_Monoculture.
_No urban food production.

...towards:

_A strong bee society.
_Urban food production.
_Contact between people and nature.
_Building an understanding of where our food comes from.

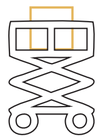
the bee city

The bee city focuses on the living conditions for the urban honeybees living on the rooftop.

goal: happy urban bees

program: create good living conditions for the urban honeybees, by creating a green roof.

design: a box adapted to the roof environment will create good growing conditions for plants.



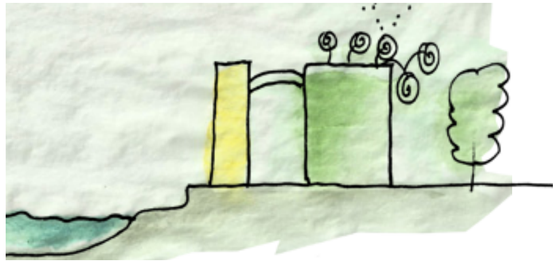
Fits into the lift.

Easy to move around on the roof.

Easy to fill the box with soil.

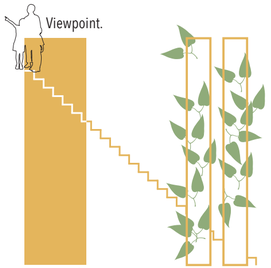
Vegetables for bees and people.

A specially designed box will make it possible and fun to grow vegetables at the rooftop.



the green beehive

The green beehive brings the plants and vegetables, pollinated by the honeybees, over the river, into the park and the city.

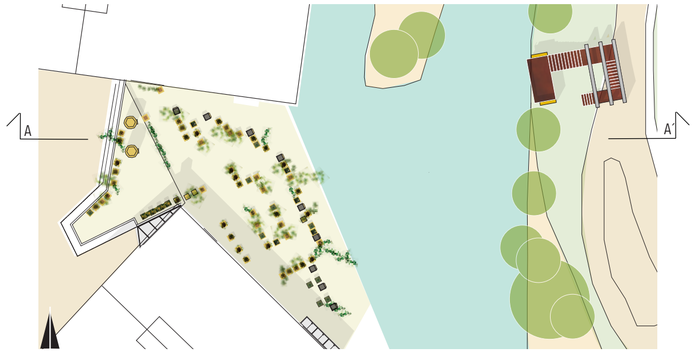


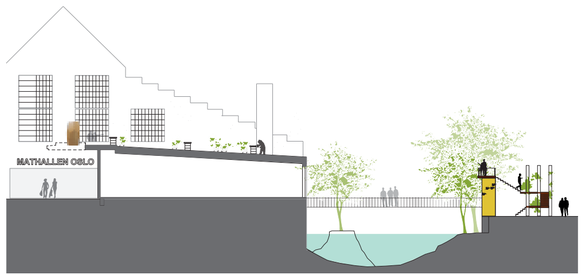
goal: a new perspective on urban farming, connected with the honeybee and their pollination.

program: create a new urban space filled with bee friendly plants, overlooking the bee city at the rooftop.

design: inspired by the beehive the design will have a vertical production system (frames) and a horizontal subdivision.

Plan & section A-A´ - the roof & the park 1:400



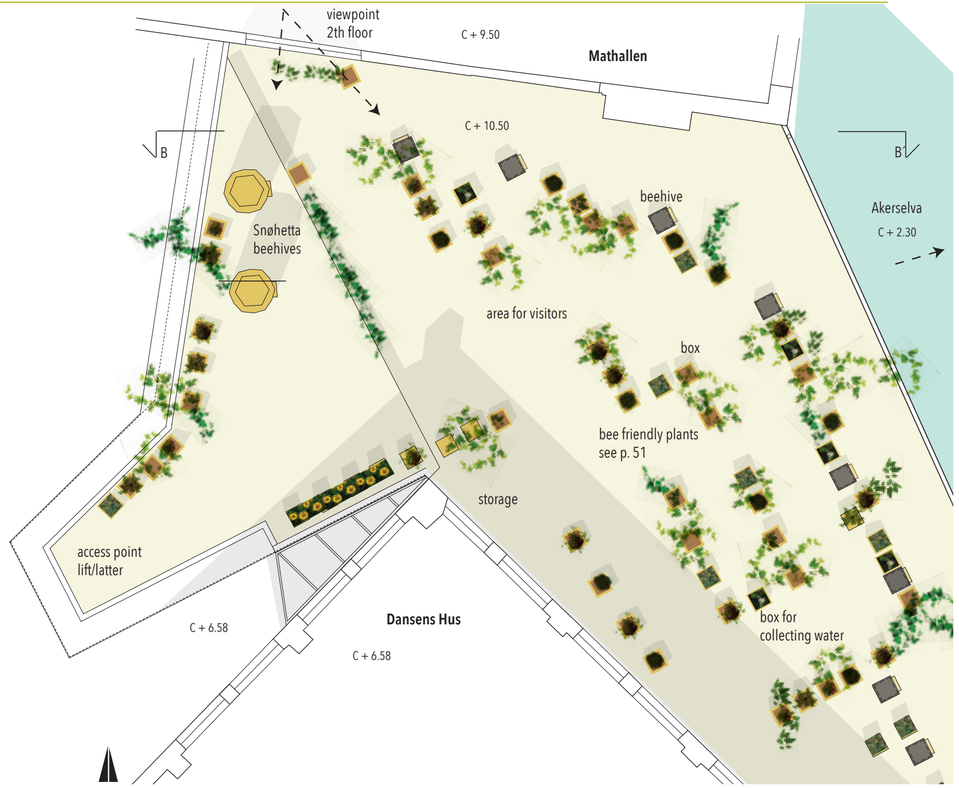


The bee city

Plan 1:100 one possible layout

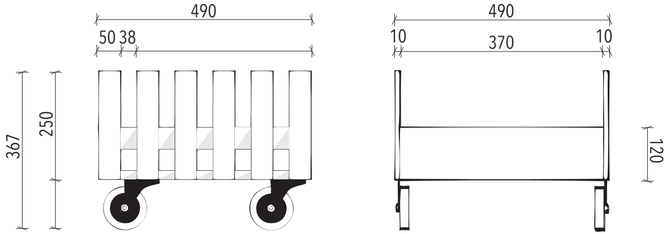
The roof will no longer be a flat, black, asphalt area, but rather filled with happy honeybees, vegetables, flowers and herbs. The new green roof will reflect the honeybee's life and connect the roof with the green beehive across the river.

The urban honeybees will have access to pollen and nectar throughout the season, and Heier Du Rietz can sell vegetables and hereby emphasise the important role the honeybees play in our food production. Because of the bee's constant pollination, the plants here will be crammed with vegetables and berries. The layout of the roof is flexible, thanks to the movable boxes and allows Heier Du Rietz to change the layout of the roof, depending on the on-going activity. They can still take groups of people up to the roof, give them a close up look of the bee-city and educate them on the honeybee and food production. Schools, kindergartens and people working with these questions are some examples of people that could visit the roof. Companies in Oslo will have the possibility to own one beehive and the honey produces here. People working at these companies could also visit the roof, or maybe put up a web-cam to follow their honeybees. A professional gardener will have the main responsibility for the plants, flowers and vegetables.

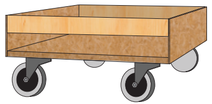


Section B-B´ 1:100

Construction concept 1:100



The box without panel can be filled with water and water plants, providing the bees with fresh water.



The wheels include a locking structure so the box won´t move around on the slightly tilting rooftop.

A bag of soil, some seeds and a pipe for water collection is what is needed to start the production in the boxes.

Honeybee friendly plants

When practicing urban bee keeping, it is important to know which plants that will ensure the best living conditions for your bees.

Honeybees rely on a steady source of nectar and pollen to be able to live and reproduce at a certain place. The plants around their hive should vary, and provide nectar and pollen throughout the season (April-September). A good variety in plants also provides the beekeeper with honey that varies in taste and colour.

I have made a selection of some of the plants that will be perfect for my project. They will provide the bees with pollen and nectar throughout the season and they will produce high quality food for people, thanks to the steady pollination (BuzzAboutBees, 2014).

spring

hyacinths

crocus

summer

raspberries

oregano

tomatoes

fall

coneflowers

heathers

salvie

rosemary

strawberries

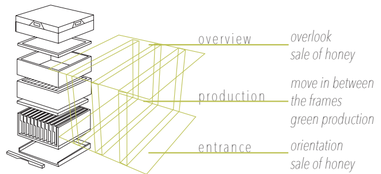
thyme

Source pictures: wildernessareana.com

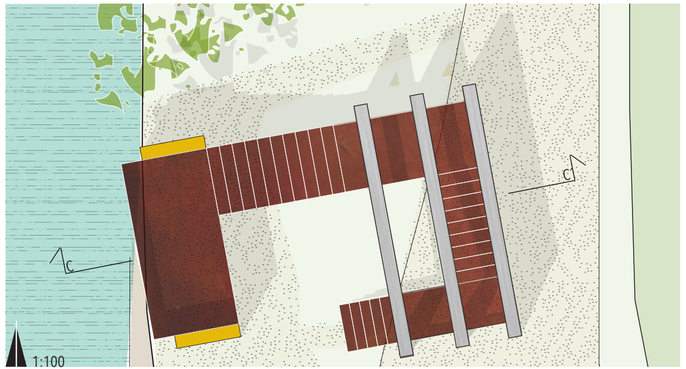
The green beehive

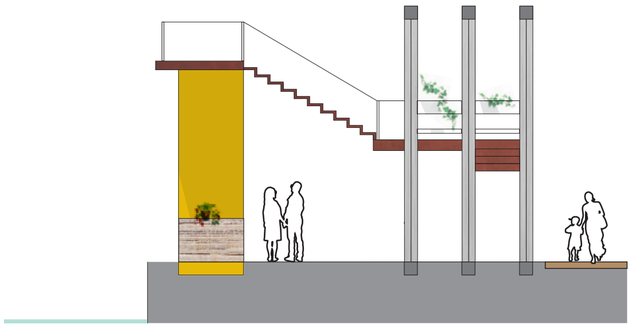
Plan & section C-C´ 1:100

This green beehive will create a space for farming in vertical direction, inspired by the honeybee's vertical production pattern on the frames inside the beehive. The ground will be where your orient yourselves, like the bees do on their entrance platform. When you reach the top of the green hive you can overlook the bee city on the roof and the green beehive, just like a beekeeper that keeps track of the bee community by lifting off the rooftop of the hive and glancing down.

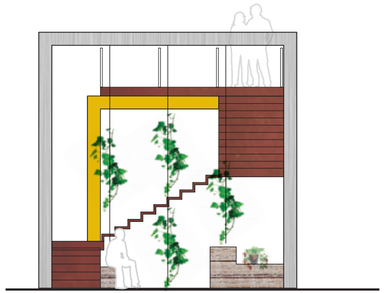


The green hive will be a place where Heier Du Rietz can sell honey, vegetables produced at the roof and arrange events. They can show a movie on one of the walls. They can invite school classes or kindergartens to play in the green hive, and at the same time tell them about the honeybee. The new restaurant that will open in this park can grow their herbs in the structure, ensuring locally produced food with high quality, thanks to the honeybees. This pavilion will bring food production from the rooftop over to the park. I suggest that this new park should focus on urban food production, in cooperation with the honeybees.

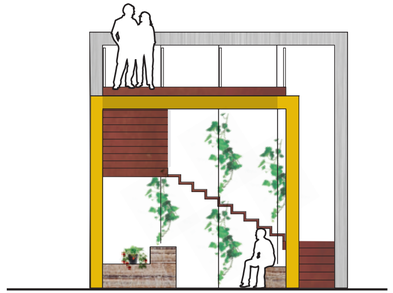




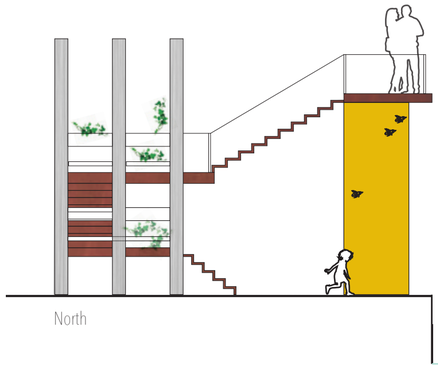
Facades 1:100



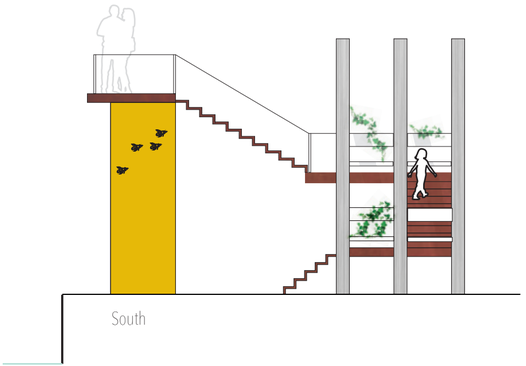
East



West



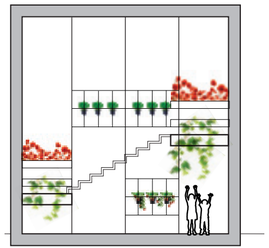
North



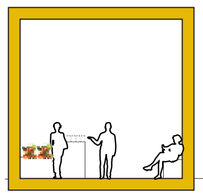
South

Construction concept

The structure consists of steel frames, with a corten staircase and resting platforms. The structure can look different depending on where you chose to place your plants, what kind of events that take place here or the seasons.



Three steel frames support the staircases, together with the steel wires.
In-between the vertical steel wires there will be horizontal wires. In these you can hang baskets for vegetables and plants.



The wider yellow frame support the staircase, as well as the platform overlooking the roof. The wooden boxes can be used to different things, such as sale of vegetables and honey, a place to sit down or storage.

Materials

Corten steel, originally named weathering steel, is a combination material of different steel types. This combination allows the corten steel to exhibit increased resistance to atmospheric corrosion compared to other steels. This is because the steel forms a protective layer on its surface under the influence of the Nordic weather (Armstrong, 2014).

Corten at Vulkan
Corten is a material used at the Vulkan area. It is used in facades, signs, flowerpots and sculptures. Vulkan is an area with a strong image and viewpoint regarding local food production, and I want the green hive to have a physical connection to the Vulcan area through the use of corten steel.

Heartwood from pine is an environmental friendly material. The colour of this wood type does not darken over time, but get a silver-grey appearance in rain. This is an important aspect since the honeybees get aggressive around dark colours, and in the middle of a city we want friendly bees! The material does not deteriorate and hence binds greenhouse gases. The wood is also free from maintenance (Aavatsmark, 2014).

Model study 1:50

I have used this model to study the spatial structures of the green beehive. I have explored how people should enter the structure and what they will see as they climb the stairs. I have focused on visual contact with the park and the river, as well as the rooftop.

Landscape model 1:200

This is a model I have used to explore the space around my design.

The model shows the green beehive in the park and the beehives at the roof.

This is a model meant to give an overlook over the situation, hence the simplified design.

The beehive & the seasons

The life in the beehive follows the seasons. The design will reflect this cycle, filling up with vegetables, plants, people and events during late spring to early fall. In the winter months the design will "go to sleep" together with the honeybees and wait for spring to come around again.

September

Since the honey is removed from the hive, the bee´s get a sugar mix they store in the cells.

October

November

December

January

February

It is important to secure good isolation around the hive, so the community survives the cold winter. The bees eat and wait for the spring.

Some beekeepers take their beehives to the mountain in this period so the bees can collect nectar from the heather.
The beekeeper can collect honey from the hive, using a technique called "slynging."

June

The bees swarm, if they need a new place to live or a new, stronger queen.

May

This is the most important month for the beehive. This is when plants start to blossom and the queen continues to lay her eggs.
The working bees build cells.

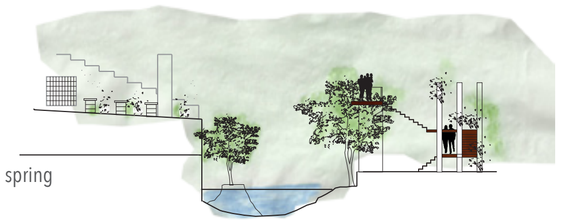
March

The bees fly out for their cleansing flight. The queen start to lay eggs and the need for water and pollen arises.

April

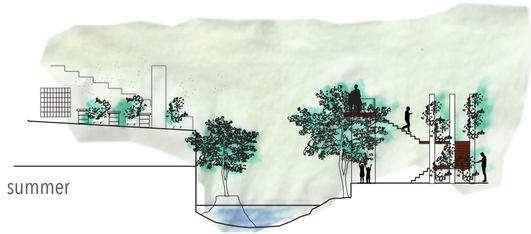
The bees should not be disturbed, but wax from the hive can be removed

The design & the seasons



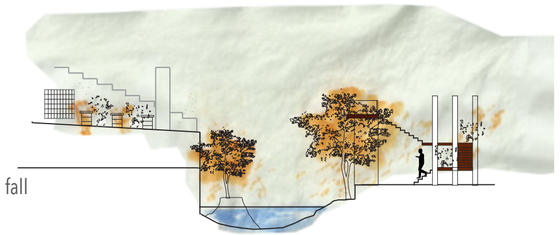
spring

In the springtime the design wakes up. The honeybees start to work, and the vegetables start to grow in the spring sun.



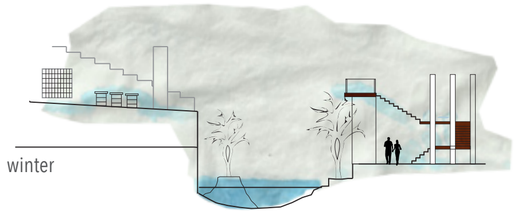
summer

In the summertime the design is at it´s greenest. Filled with fresh vegetables, flowers, honeybees and people.



fall

During fall the activity level will start to decline. We can harvest the last vegetables and prepare the honeybees for the wintertime.



winter

In the wintertime the design goes to sleep together with the honeybees. The rooftop becomes a quit place, and the green beehive fills up with white snow.

discussion & conclusion

From theory to design guidelines

Early in this process I stated some design tools that would help me frame the research towards the design. The five design tools will be the frameworks of this conclusion.

The beehives at the rooftop are made visible through plants and vegetables. The green beehive in the park enables people to get up and look over to the bee city, something they are not able to do today. The green beehive expresses itself through vertical green elements and enhances the bee's important role in food production. The structure is a starting point for urban food production in the park.

Small steps towards a greater meaning will lead to empowerment and control. The stairs in the green beehive are maximum 19 centimetres high - easy and not scary at all to climb!

Building on the already existing beekeeping in Oslo, introducing people to something that is already a success, removes negative feelings like stress and anxiety. By creating a structure that allows you to look over to the bee city, without walking around on the roof, I remove stress from the honeybees and the spectator.

I have reflected on the term "optimal contact" between people and honeybees. You can´t get to know the honeybee by petting it, and there will always be a natural distance between honeybees and people without the beekeeping outfit. I have decided to work with this distance, and focus on how we can see the result of the honeybee´s pollination in green elements and in the honey we buy.

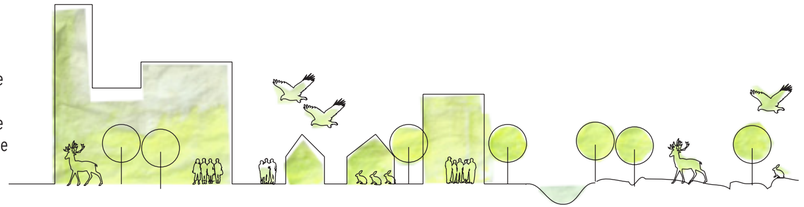
The green beehive is inspired by the honeybee's vertical production system on the wooden frames. This will provide a new view on urban farming and open up our eyes to the importance of locally produced food for people and the honeybee.

Personal reflections

I never knew that after handing in my master´s thesis in architecture, I would be left with this much information and affection towards the honeybee. For me that is the real beauty of my thesis - the combination of architecture and the honeybee and how these two together can help us to reconnect with the natural world and make us more aware of where our food comes from. The simplicity of the honeybee community has inspired me in the complex jungle of literature and thoughts around human/nature connection, human psychology and behavioural change. The honeybee has also opened up my process to people from outside the field of architecture.

I have had a lot of giving and interesting conversations with my friends, starting with the question: How can you do a master´s thesis in architecture about honeybees?

My starting point for this master´s thesis was the rooftop where we find the two designer beehives of Heier Du Rietz. The two beehives, designed by Snøhetta, do not improve the living conditions for the honeybees, since they are only a shell surrounding a normal beehive. The two designer beehives got a lot of attention in 2014, and started an important discussion, but we need to ensure that the discussion continues for years to come. With my project I hope to show that architecture can be more than just a pretty shell. Architecture can, with a simple design, change how we relate to the natural world in urban environments and ensure natures right to develop in our cities.



The aim for this master´s thesis then became to explore how architecture can create a space where people and honeybees can meet, strengthen the human/nature connection and inspire people to take better care of the planet we live on. I decided to work in an urban environment. So in addition I explored the question "how architecture can create a common ground for people and honeybees in the urban environment they share."

This project is part of a bigger discussion regarding sustainable city development. We need to create cities liveable for nature, animals and humans. Cities with biodiversity and ecosystem services will not only increase the living conditions for the nature, but also bring us humans closer to the natural world we once belonged to. By looking to the natural world, and for instance including urban beekeeping in modern city planning, we will bring new and existing starting points into urban planning, and develop liveable cities.

The aspects on human psychology and our ability to change are vital to understand when working with these questions. There are aspects of our brain that work against us making more environmentally friendly choices or grasping the climate changes we currently are going through. These aspects are complex and have shaped our brain for a long time. But even so, we do have the ability to change rapidly. Just look at the cultural and industrial revolution - how rapid the human brain shifted into a new direction.

This thesis has explored how architecture can be a part of changing our mind-set, with focus on how human/nature reconnection will foster environmentally friendly behaviour. By creating better habitats for urban honeybees we will also create healthy urban habitats with food production for humans. This will remind us that we are in the same ecosystem as the honeybee and by taking care of them; we also take care of ourselves.

Exploring the term "optimal contact" regarding people and the honeybee has been an important aspect in my master´s thesis. When we want to achieve contact with an animal we normally strive to make the distance between us as little as possible.

We put animals behind fences and glass, so we can move closer to them. In my project I want the honeybees to be able to fly freely, and if someone should be restricted by a space it should be us. For many people the honeybee and other insect feels scary to be around. So by placing a natural distance between the honeybee, and us this fear will not stand in the way for a new respect for the honeybee.

In your garden or in the park, you don´t see the honeybee close up. My project challenges this natural distance between us. We must be able to appreciate the honeybee's existence at a distance.

By reconnecting with the honeybee, we will also reconnect with ourselves.
We will get a greater understanding of where our food comes from and what it takes to get it on our dinner table.
If we can open up our minds to the honeybee and let go of our fear and separation, we can use this mind-set to face the questions and life style choices the global situation need us to face.

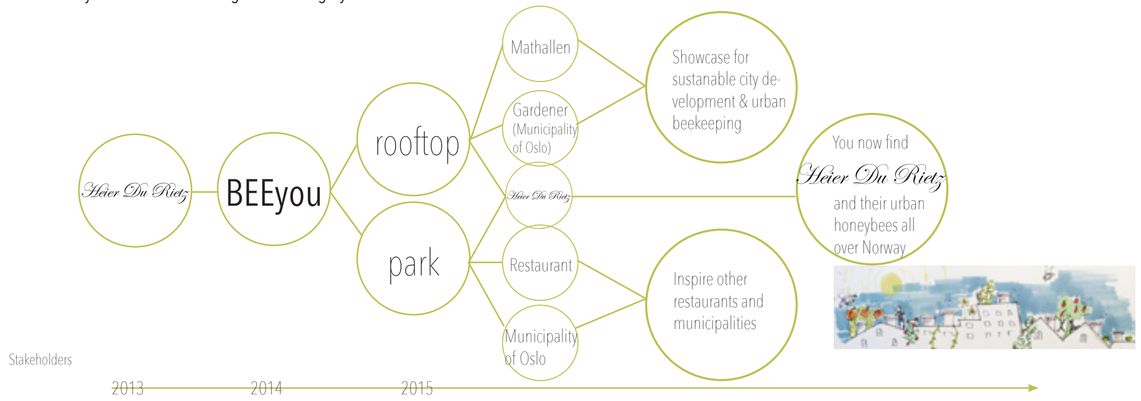
By opening up our minds we can rediscover the beauty of the honeybee, the natural processes we share and gain a greater respect for the common place we all call home.

The project & the future

It´s already decided that the roof will be populated with several new beehives during the spring. Hopefully, inspired by my project, Heier Du Rietz will also start vegetable production. Urban beekeeping in Oslo has a great growing potential, and Heier Du Rietz has already created a platform for learning and inspiration. Hopefully we will see rooftops all over Oslo and Norway filled with happy, urban honeybees within the next couple of years. There are also a lot of other people that could benefit from this project. See the sketch over stakeholders.
Not all projects needs to be built to make a difference. I believe that my master´s thesis belongs to this category.

The conceptualisation and the illustrations can open up a discussion about the human/honeybee connection and lead to other smaller projects, like minor bee cities across Oslo or other urban farming projects close to urban beehives.

This project has without doubt defined the direction I wish to continue when I start to work as an architect. The relationship between the build environment and the natural world holds great opportunities for the reconnection between humans and nature.



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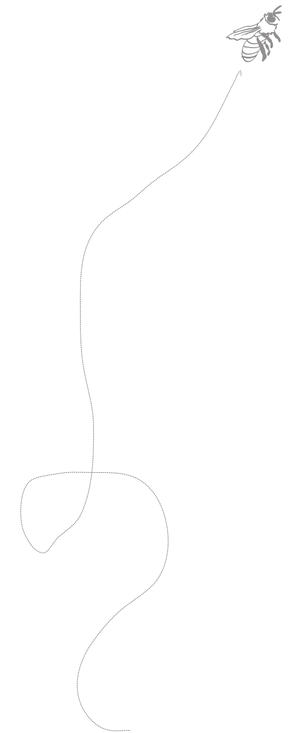
Pictures/illustrations:

The sources for the different pictures are mentioned at each picture in the rapport.

Where nothing else is mentioned, the author is the photographer and the creator of the illustrations.



attachments

Vocabulary

Bee dance:
Language used by bees to convoy information about the location of food.

Bee friendly plant:
A plants size, the depth and with, colour, pattern called nectar guides that are only visible in ultraviolet light, scent, amount of nectar and composition of nectar are all different factors that make a plant attractive for the bees.

Brood:
Eggs, larvae.

Cell:
Hexagonal structures build by the bees.

Colony Collapse Disorder:
A phenomenon in where whole honeybee communities disappear from their hive.

Compound eye:
Eyes on each side of the bee´s head made up by 4000 facets, which gives a bee 360o field of vision.

Honeycomb:
Wooden frames with a wax plate where the bees build their cells.

Nectar:
Sugar-rich liquid produced by plants in glands called nectaries, which attracts pollinating animals.

Pollen:
A powdery substance containing the microgametophytes of seed plants, which produce the male gametes (sperm cells.)

Pollinator:
A pollinator moves pollen from the male anthers of a flower to the female stigma of a flower.

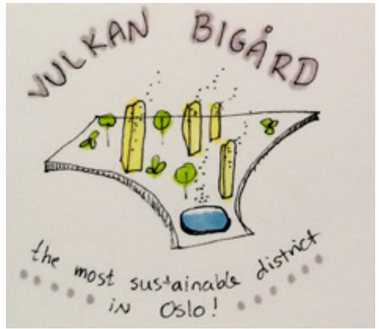
Round dance:
Circular dance performed by the worker to communicate the discovery of a source of food less than 100 meters from the hive.

Smoke:
When bees smells smoke they strive to take with them their precious belongings. In their case that is their honey. So they eat as move as they can until they are numb from all the honey and then they stay calm .

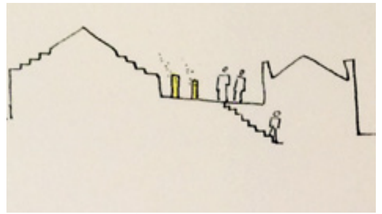
Urban beekeeping:
Cities all over the world experience increasing interest in keeping bees in urban landscapes.

Waggle dance:
Dance performed by the worker to communicate the discovery of a source of food more than 100 meters away from the hive.

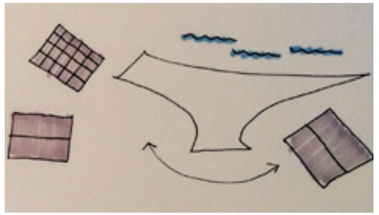
Sketching



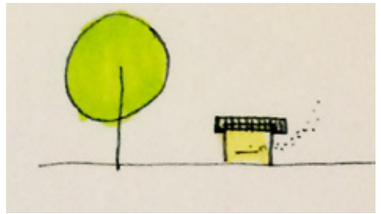
The roof could be a case study in sustainable living! Compact living, eating locally produced food, local food production, a strong community are some of the aspect of the bee live style with a high standard of sustainable living.



Opening up the roof to the general public will create a stressful environment for the bees and the beekeeper. The bees will feel pressured if people get to close and the beekeeper would have to be responsible for where people walk on the roof.

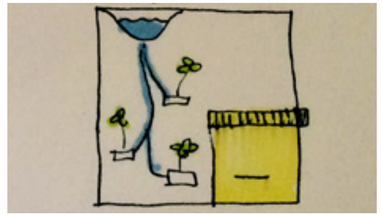


… and where would the access point be? A river and main entrances surround the roof. So it will be difficult to add a stair in this space without conflicting with current flow of people.

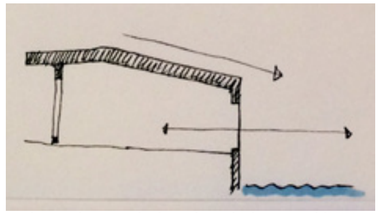


So maybe the bees could be moved to a park in the area? This would remove the access problem, but bring on a new set of challenges. The bees would be in danger of vandalism and the beekeeper will not be able to control his hives as he can on the roof.

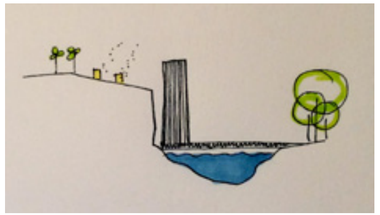
Maybe if I make a protection skin for the beehive? And the skin could contain plants and vegetables. And people could observe the bees through glass. But by putting a piece of glass between the bee and the viewer I would only highlight the distance between us. And that is the exact opposite of my intentions.



But the concept of mixing beehives with vegetables and plants is exciting. I could emphasise the importance of pollination by connecting bees and plants. And make a self-water system, so the plants can be self-sufficient. A beebox! But this construction would make it unnecessary difficult for the beekeeper to access the inside of the hive

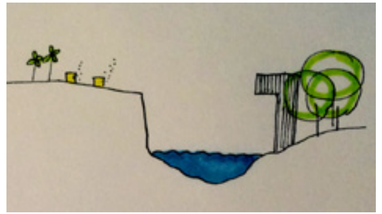


So then I take a new look at where the best possible access point to the roof would be. The roof tilts towards the river. And this area on the roof is also the biggest area. So this would be a good place for more beehives and vegetables. The other side of the river then! The distance is not to big, and there is also a visible connection between this side and the entry hall (Dansens Hus.)



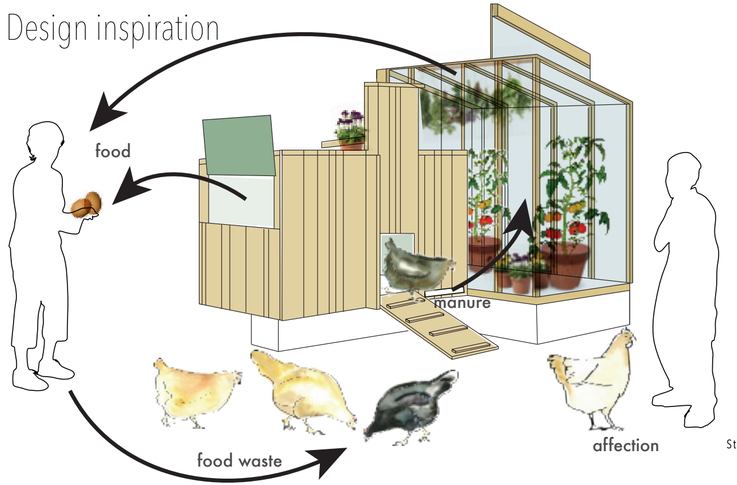
So now the distance between people and the bee is a physical condition – a river. But building a bridge can eliminate this distance. And by adding a vertical volume, people can view the bee city close up. Here humans will be the ones protected inside the glass, and the bee will fly free.

Could the bridge be enough itself? Could the beehives be placed on a construction that takes them down toward the ground? But making a construction to get the bees closer to us is not the strongest statement. It seems better to let people come nearer the bees and their environment.

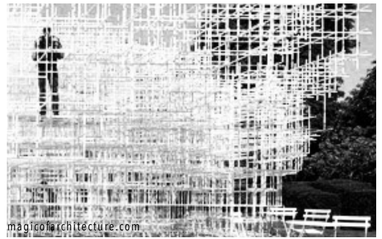


So back to the idea of the distance. It seams like a complicated challenge to increase the physical distance between the bee and us. So maybe it is better to make the most of the distance. Since the bees will always be at a certain distance due to their size and natural conditions, the design can focus on what this distance can give back to us.

Design inspiration



Student project, Hens of Tidaholm by myself, Johanna Saleryd & Johan Marklund.



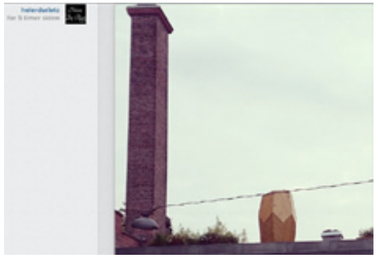
Process

5.th of September - Oslo

The Snøhetta bee hives gets attention from the Norwegian architecture review magazin.

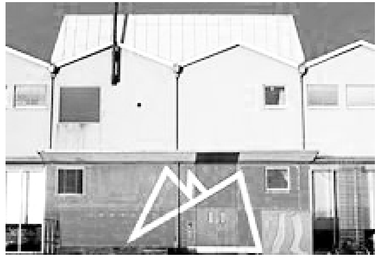
10. th of September - Oslo

First meeting with beekeeper Alexander Du Rietz



12.th of September - Oslo

Helping Matahallen and HeierDuRietsz to create their stand for "Matstreif" - a food festival in Oslo.



17.th of September - Oslo

Meeting with Alexander and Carsten (Snøhetta).

3.th of October - Oslo

Checking if the bees are preparing for winter, with Alexander.

25.th of September - Oslo

Laboratory tests shows that honey made from city bees has the same quality as honey from the countryside. The city honey is even better because of its high level of minerals (potassium, calcium.)

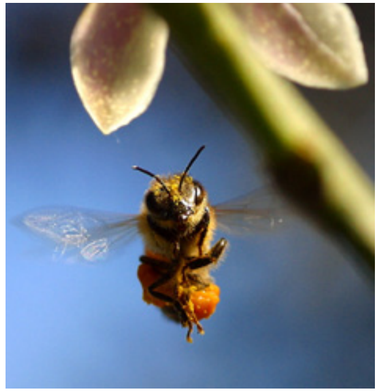
8.th of October - Gothenburg

BEEhearing-if the bees could decide how Gothenburg should look like.

26.th of September - Oslo

Aftenposten writes about the new plans for the park across from Mathallen and the roof!

Bee a part of the solution



Buy honey from a local beekeeper that care about their bees.

Eat organic. Eat local. Grow our own food. Then you help save the bees and the world´s food security.

Make your garden bee friendly, and enjoy lots of herbs, berries and fruits from their pollination. You don´t need to overthink it-old fashioned wild flowers is perfect for the bees! The bees also appreciate some fresh water.

Understand that honeybee's aren´t out to get you. They are vegetarians.

Don´t use insecticides in your garden and don´t buy seeds from garden centres that use pesticides. Use bird boxes instead!