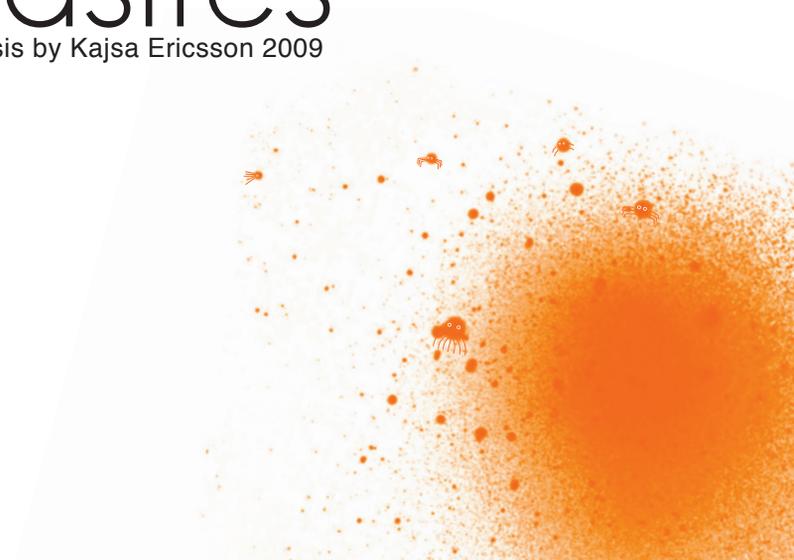


parasites⁵

Master thesis by Kajsa Ericsson 2009



parasites 5

By Kajsa Ericsson 2009
Master thesis from Lund University
Division of Industrial Design/LTH

Examiner: Claus-Christian Eckhardt
Supervisor: Andreas Hopf
ISRN: LUT-DVIDE/EX--09/05102--SE



LUND UNIVERSITY

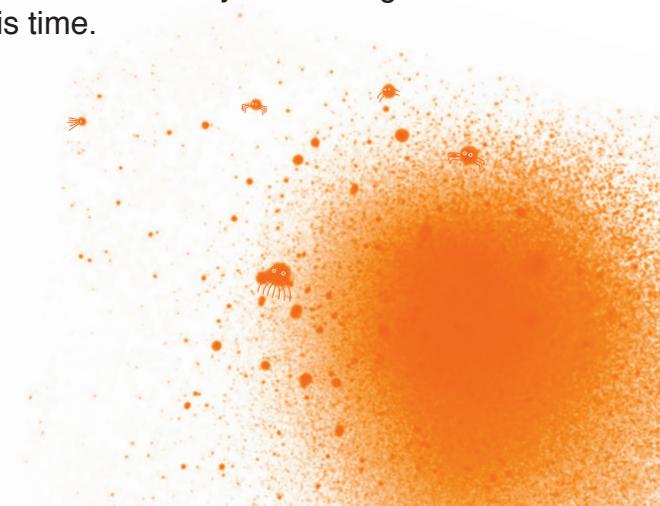
ACKNOWLEDGEMENT

In this project I have explored the nature through the eyes of a designer and found inspiration for a product line of parasites.

The project has been carried out at the department of Design Sciences and division of Industrial design at Lund University, with a lot of help from people at the university and others.

This project could never been realized without the help from my supervisor Andreas Hopf and my external tutors Anna Karlsson and Katarina Ivarsson at Boris Design Studio in Hong Kong.

I also want to take the opportunity to thank my examiner Claus Christian Eckhardt, Elin Algotsson for perfect modeling, my sponsors; Stickit, Horredsmattan and Backstigs Fabrik AB and friends and family for bearing with me during this time.



ABSTRACT

After 3,8 billion years of evolution nature has learned what works and what lasts. It has been facing and has solved the problem humans stand before today and who better to turn to then someone that already been through the same experience.

To find inspiration and to studies nature's best ideas and then imitates these designs to solve human problems is what Biomimicry is all about.

This was my starting point for my master thesis, to identify opportunities that our nature offers and use the gained information to design a line of products.

I made a journey from nature to refocusing on resources in our society and in the end finding my way back to nature. I did just like nature always does; I made sure that there is someone, or something, that takes care of everything, nothing should go to waste.

The result is five parasite product; the motion parasite, steam parasite, radiation parasite, waste parasite and water parasite. They all use unused recourses in our surrounding.

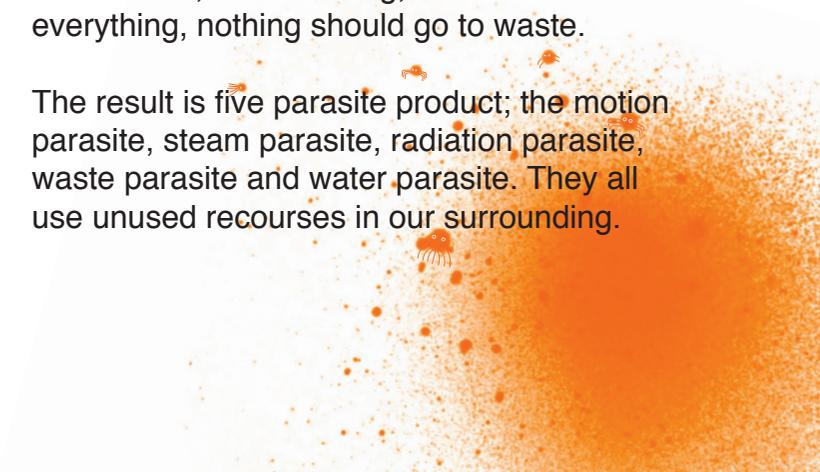
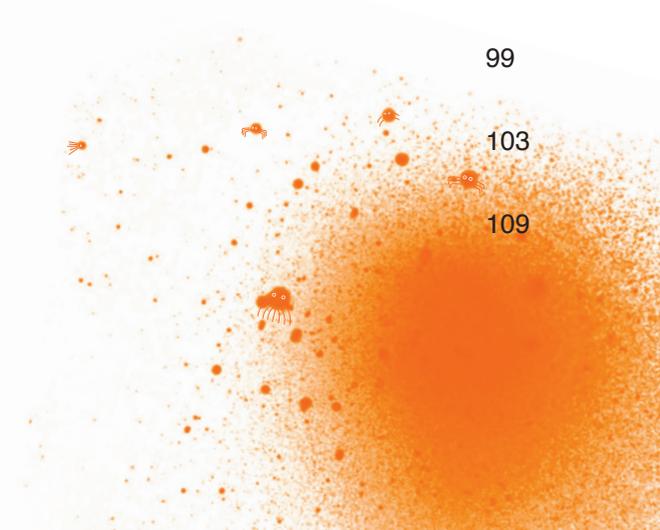


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INTRODUCTION

Before I started my final year at the master program in Industrial design I had the opportunity to practice the profession in two different companies during two years time. While working I learned to appreciate the artistic freedom and how few limitation you have while studying. I decided that when I do my master thesis I will do something I feel

passion for, something joyful and where I take the time to work with shape and materials. I want to take the last opportunity to design what for me is FUN!

Last summer a friend of mine introduced me to “the world of Biomimicry”. She had been studying the subject for some time and talked very passionate about it. Since I always have had an interest in nature and science I got interested in knowing more about the subject. That seed of curiosity was the start of my diploma work.

Biomimicry [From the Greek bios-life and mimesis-imitation] ¹

There has always been a connection between design and science and the fact is that the two disciplines once were one and the same. Leonardo da Vinci was the typical designer-scientist. His sketches of a “flying machine” were based on bird wings. In 1876 Alexander Graham Bell applied for a patent for the first telephone, a technology partly based on his research on the human middle ear. The inspiration from nature has penetrated science and design from the beginning of mankind. Through time the two disciplines separated

¹ Janine M. Benyus, *Biomimicry, Innovation Inspired by Nature*, 1997

² Massimo Negrotti, *Where the Future Doesn't Come From: On the Logic of Naturoids*, Massachusetts Institute of Technology Design 2008

as the science became more complex. The industrial revolution commercialized design and this widen the charm. Today both scientist and designers see that they have removed themselves to far from one another.

An umbrella term for nature inspired devices is Naturoid. A Naturoid “refers to all devices that are designed with natural object in mind”². A relatively new science that concerns the design of naturoids is Biomimicry. Biomimicry is an innovative method that tries to find sustainable solutions by imitating the nature. After 3,8 billion years of evolution nature has learned what works and what lasts. It has been facing and has solved the problem humans stand before today and who better to turn to then someone that already been through the same experience?

There are different ways of working with Biomimicry; using it to solve an existing problem or by exploring its possibilities to find an idea from nature and then translate and adapt that into a product, system or strategy. The science of Biomimicry can be categorized under the discipline of sustainable design, however this will not be the main focus of my project as I rather would focus on innovation and work with conceptualization.

Biomimicry- (from bios, meaning life, and mimesis, meaning to imitate) is a new science that studies nature's best ideas and then imitates these designs and processes to solve human problems so man and nature can live in a sustainable symbiosis.

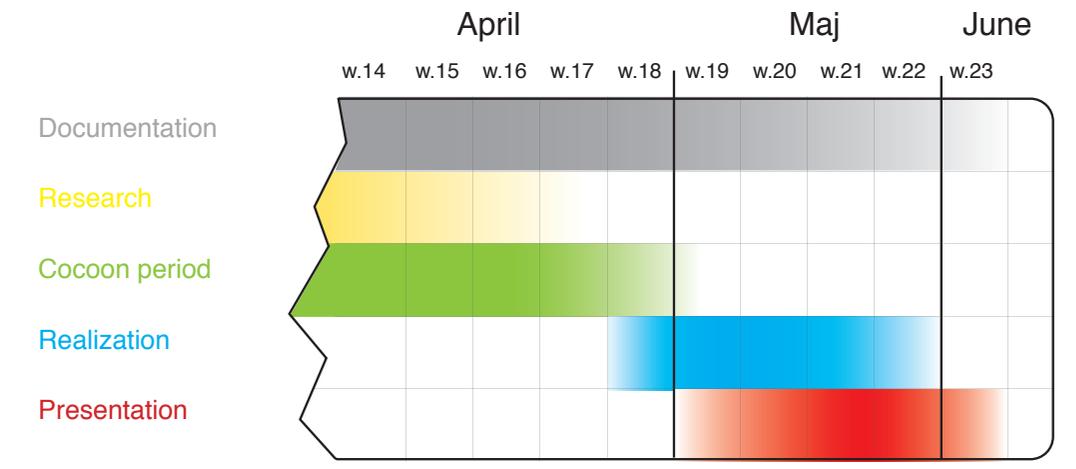
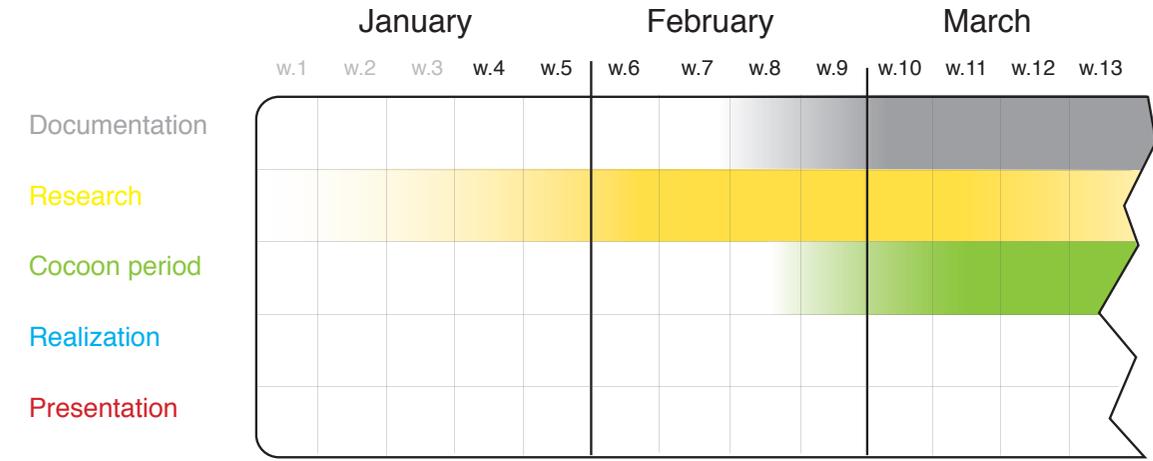
BRIEF

The aim with my master thesis was to explore the science of Biomimicry, to identify opportunities that our nature offers and use the gained information to design a line of products. All products will tell a story about the interaction between human and nature.



TIMEPLAN





Exhibition in September

RESEARCH PHASE ONE



How would nature...

When using Biomimicry as a method you have to biologize your problem and ask yourself "How would Nature solve this". By asking you this, new ideas and possibilities will occur. Life has learned to do some amazing things such as fly, living on top of mountains and bottom of the ocean, solar energy, how to light up the night and create material as skin, horns and hair. The nature has done everything we humans want to do without polluting the planet or mortgaging the future.

When I started I did not have a specific question to ask nature so I began to read about Biomimicry, talked to scientists and looked at the nature itself. What I learned I sorted into four categories; Technology, Material, Shape and Structure and Behavior.

Technology

By studying nature a range of new technology solutions has been developed. The new field of nanotechnology has opened many new doors in how nature has managed to construct some amazing thing. Here are just some examples of how nature has inspired to new technology.

Delisea pulchra- this red seaweed effectively avoids a large percentage of bacterial infections without breeding any bacterial resistance to its defensive chemistry. This has been used for biofilm control technology. “Biosignal technology prevents or disrupts resistant biofilms without killing bacteria. This unique approach to bacterial control is aimed at delivering effective treatments whilst sidestepping the issue of bacterial resistance.”³



Thorny devil- can gather all the water it needs directly from rain, standing water, or from soil moisture, against gravity without using energy or a pumping device.

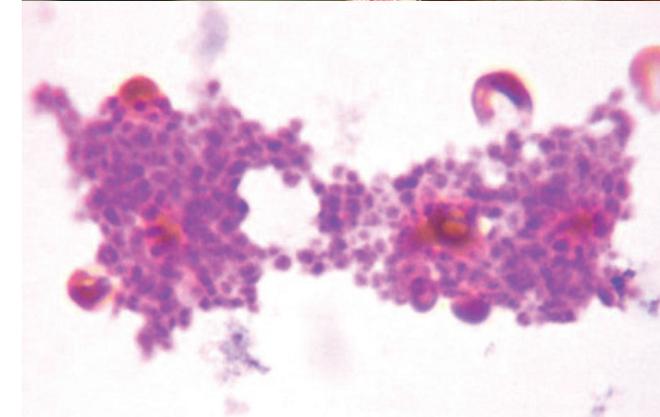


Earthworms- skin repels soil adhesion with a thin water film, created by electro-osmotic flow. By mimicking the worms soil-moving equipment that is Soil-shedding surfaces and reduces cleaning and operating costs has been developed.



Gecko- can support its entire weight on a horizontal wall with just a single toe. Scientists has mimicked the gecko and developed a tape covered with nanoscopic hair. This could in

³From Company homepage, <http://www.biosignal.com.au/index.php>



its extend allow humans to walk on walls and ceiling.

Elephant hawk-moth- eyes are anti-reflective due to nanoscale structure. An anti-reflective and anti-glare film has developed by mimicking the moth. These films reduce energy usage and can today be seen in displays for items like computers and cell phones

Human blood platelets- prevents blood loss from wounds by blocking the hole. Today there is an innovative concept that uses this technique. “Oil pipelines can now transport special polymers that ‘clot’ oil at the site of a leak.” “The Platelets® are transported downstream with the flow in the system and when they reach a leak fluid forces entrain them into it thus providing a seal. Heal wounds and can be optimized for a wide variety of fluid flow applications.”⁴

Blue mussel- has sticky proteins that serve as glue and make them stick on rocks in wave-battered intertidal seashores without use of toxic chemicals. Columbia’s PureBond® is a soy-based formaldehyde-free technology used

as wood glue in the construction of hardwood products.

Bluefin tuna- has a tail that makes it possible for it to conserve energy by using thunniform swimming.

BioSTREAM™ is a tidal power system that mimics this way of swimming. The system is anchored to the bottom where, it can rotate with the incoming or outgoing tide to collect energy.

Blue Whale- has no teeth; instead they have a sheet of feathered horn, or baleen. They feed from tiny shrimp-like crustaceans, krill. “The whale takes a huge mouthful of water in the middle of the shoal of krill, half-shuts its jaws and then expels the water by pressing its tongue forward so that the krill remains and can be swallowed.”⁵ This technique can be used for filtering various sizes of particles out of water.

Frogs- The male frog chooses a breeding place and then call to attract the female. Each species have their unique call. Some frogs can call so loud so it can be heard more than a kilometer away. Membranes of



⁴From Company homepage, <http://www.brinker-technology.com/>

⁵David Attenborough, *Life on Earth*, 1979



skin that distend during the call amplify their sound. These membranes are located under the throat or on the corner of the mouth that distend during the call.

Baby beetle- has inspired scientists to design a “boat” powered by surface tension. They looked at the aquatic wriggling of beetle larvae that harnesses the energy within the water’s surface. “The technique destabilizes the surface tension surrounding the object with an electric pulse and causes the craft to move via the surface’s natural pull.”⁶

Long-eared owl- has fake “ears”. The “ears” on its head are not ears, just decorative feathers. When hunting the owl mainly relies on its hearing, its ears are asymmetrically placed on either side of its head, which make it possible for the owl to map sounds three dimensionally. By studying the owls hearing the futures hearing aids, performance spaces and microphones could be developed.

Material

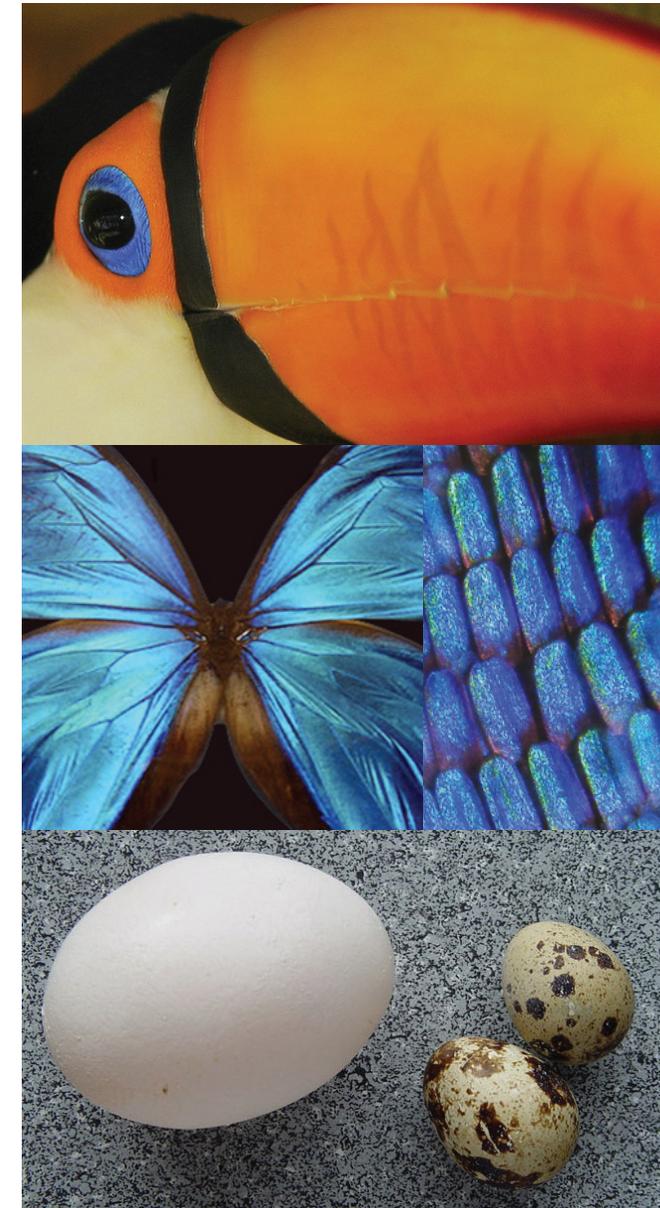
In nature there are no waste ground all materials are degradable and perfectly developed to fit its purpose.

⁶From University homepage: http://www.engr.pitt.edu/news/article_view.php?id=2210

Zebras and horses- have bones with remarkable strength despite having holes in them for blood vessels to pass through. This strong and lightweight construction could be of benefit for increasing strength of airplanes, boats, automobiles, and other structures that have holes for wiring or fuel and hydraulic lines.

Canada goose- down feathers of geese insulate through special architecture. The message is that the architecture of down feathers is probably more important than material properties in determining their advantages over synthetic materials create more effective insulation instead of man-made polymers, both in construction and clothing.

Cuttlefish- skin changes color of their skin, in order to escape predators and to communicate by using elastic pigment sacs called chromatophores. Future application of this technique could be to eliminate toxic pigments in commercial coatings and products, including paints, textiles, paper, and building products.



Toucan- beaks are built lightweight and strong thanks to a rigid foamy inside and layers of fibrous keratin tile outside.

The structure of the toucan beak teaches us principles of composite material design for lightweight strength and stiffness. Despite its large size (a third of the length of the bird) and considerable strength, the toucan beak comprises only one-twentieth the bird's mass.

Morpho butterflies- remains a vibrant blue color throughout their lives, without ever needing a coat of paint. The scales on their wings are made of many layers of proteins that refract light in different ways. The color we see is due entirely to the play of light and structure rather than the presence of pigments. Teijin Fibers Limited of Japan produces Morphotex® fibers. No dyes or pigments are used. Color is created based on the varying thickness and structure of the fibers.

Hen egg- is the ultimate degradable package. It protects its content for the time period that is needed, then break and the crown birds are eating the shell and the circle is complete. We do recycle some of our package but

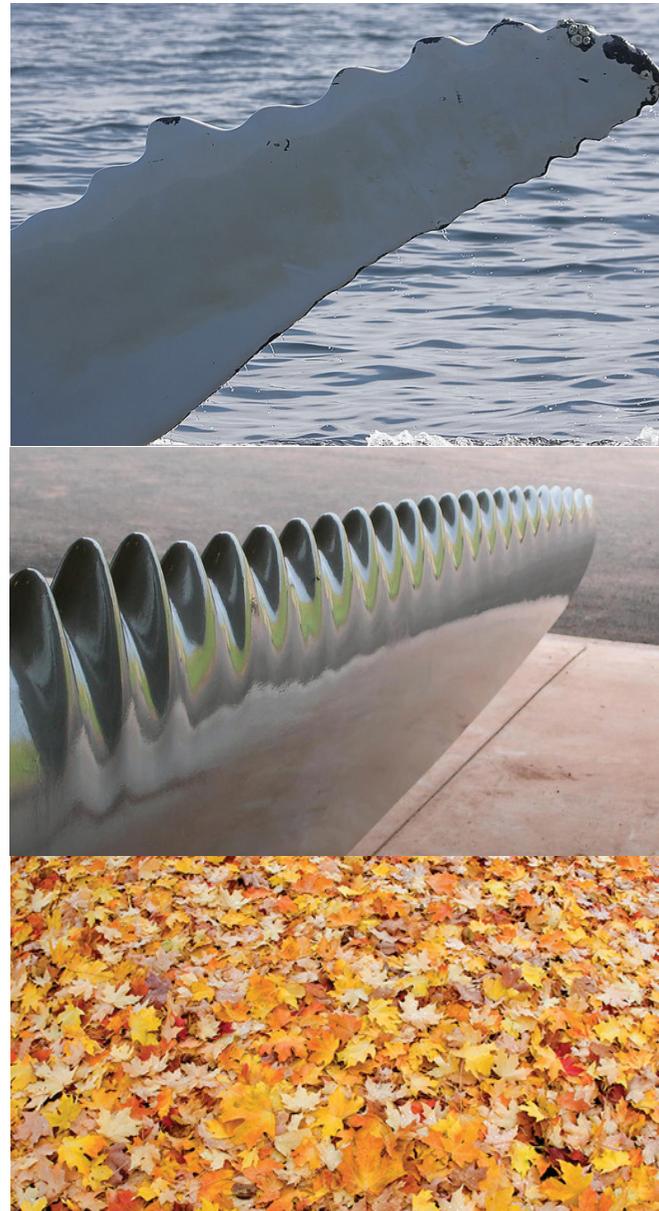
imagine how much less waste we would get if our packages worked as well as an egg.

Shape and Structure

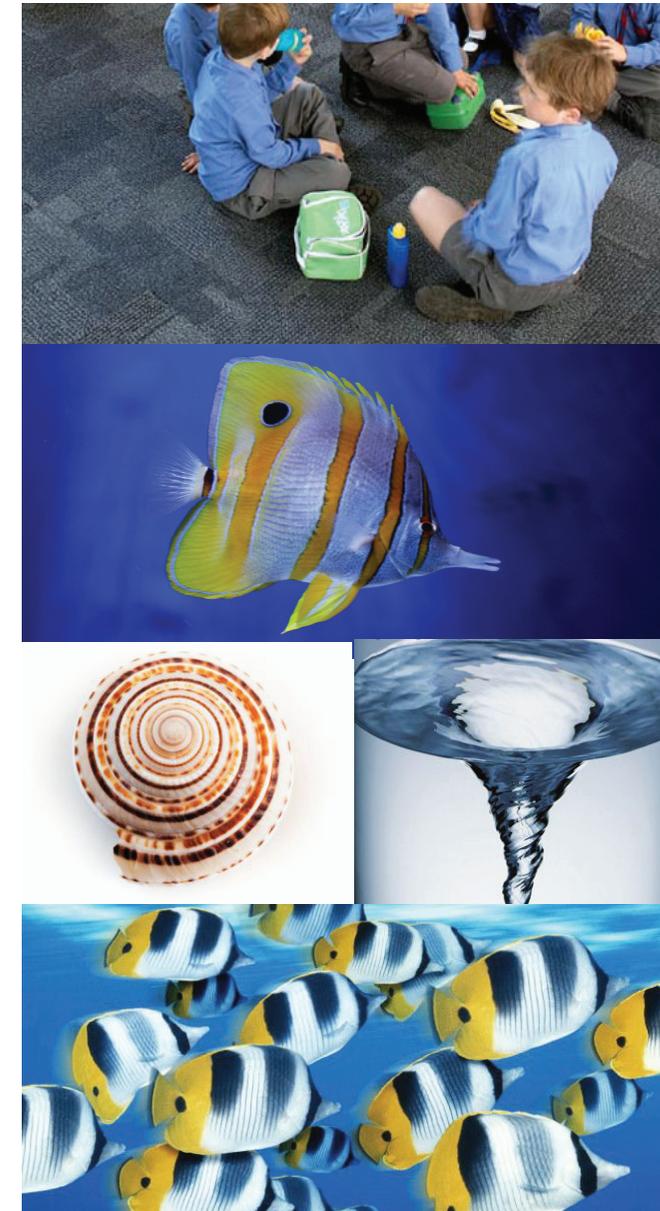
There are not many straight angles in nature, everything is shaped and structured to be as effective as possible.

Humpback whale- flippers channel flow and increase aerodynamic efficiency due to tubercles or bumps. Looking at the humpback whale flippers resulted in “Tubercle Technology – which is more than just another blade design: It is a fundamental advance in fluid dynamics which will transform a host of machines built on that challenging science. Just when the world needs it most, Tubercle Technology offers new options. Turbines, compressors, pumps and fans will never be the same again.”⁷

Leaves- on a forest floor creates aesthetically seamless surfaces by an organized chaos. This inspired InterfaceFLOR designers to create a line of carpet tiles with a random pattern. This randomness means that when any tile gets worn, it can be quickly replaced without worrying about mismatching



⁷From Company homepage, <http://www.whalepower.com/drupal/>



dyes or patterns. This reduces waste and manufacturing costs.

Copperband butterfly fish- has a snout which is tubular shape and with bristle-like teeth. It uses it to search for food in the crevices of the reefs. Some ideas of how this shape could be applied is luggage design to fit storage compartment, new vehicles or harvesting equipment for fruit trees.

Spirals in nature- have always intrigued scientists and artists. Jay Harman, CEO of PAX Scientific, is the first scientist to isolate the geometries that underlie the natural flow. “If fluids always tend to follow a particular path, is there a way to design equipment that takes advantage of this fact?”⁸ By applying this geometry on products such as; fans, turbines and mixers you get at increased efficiency, reduce material usage and reduce the motor size.

Butterfly fishes- is a group of conspicuous tropical marine. Many of them have a spot on the rear part of the body and a black vertical line that runs down their eye. The rear spot acts as a false eye and result in a predator

⁸Jay Harman, CEO of PAX Scientific, <http://www.paxscientific.com>

confusing the rear end of the fish for the front end.

Honey bees- structure their hives based on honeycombs. The honeycombs are composed of hexagons shape that tiles the plane with minimal surface area.

The honeycombs are a structure and geometry that has inspired many constructions and materials.

Box fish- has a rather large body, but is able to swim very fast because of its low co-efficient of drag and rigid exoskeleton. Mercedes-Benz found inspiration from the boxfish for a new aerodynamic concept car. The car got an unusual form and looked much like a boxfish and after testing proved to have one of the lowest co-efficient of drag ever tested for a car.

Kingfisher- has a long, sharp, pointed beak that just makes a little splashing when hunting in the water. The shape of the Kingfishers beak inspired the engineers working on the world's fastest train, the Japanese Shinkansen. The first design had a noise problem, they turned to nature they found a solution. The new design did not just make the



train quieter, it also made it go even faster and use less energy.

Lotus leaf- the complex surface topography on the leaf interacts with the water molecules. Lotusan® exterior coating uses these same micro-structural principles to regain its cleanliness automatically after the mere rinse of a rain shower.

Shark- is one of nature's fastest aquatic creatures. The structure and shape of its skin has the ability to reduce drag. Scientists has mimicked this for the outer surface on boats and submarines and also developed a human swimsuit that reduces the friction in water up to four percent.

Peacock- is a known for its colorful plumage. The brilliant colors of its feather are due to an optical interference phenomenon, which is based on a nanostructure found in the feathers. The color effect depends on the angel of the light; different colors correspond to different length scales. Scientists have developed a color that work in a similar way as the peacock.

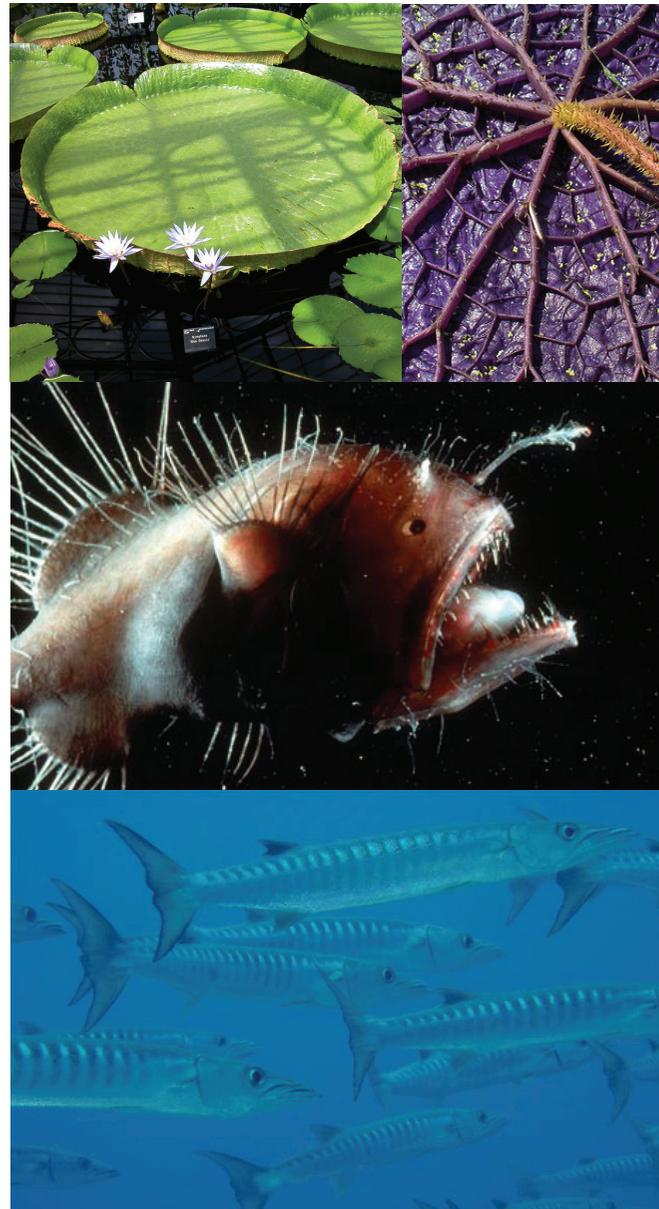
Giant lily pads- can reach a diameter of more than a meter and support the weight of more than one person. Their surface has constant exposure to sunlight and the underside has a pattern of ribs that help to support the giant leaf.

Behavior

As well as we humans many other species in nature have their own unique behavior that could work as an inspiration source for us.

The deep sea anglerfishes- lives deep down in the ocean and is one of the most strange and elusive creatures on Earth. An environment with no natural illumination surrounds them so they cannot rely solely on their eyesight for locating prey and mates and avoiding predators. There for they have developed a fishing-rod-like, light-producing adaptation from its face. Through a chemical process known as bioluminescence, this adaptation can produce a blue-green light. The fishes use this like a fishing lure, waving it back and forth to attract its prey.

Barracuda school- is one of many fish species that is a closely-knit group of



the same specie and swim in a highly synchronized and polarized manner. There are scientists that believe that cruising in a close group minimizes energy consumption, one fish utilize the pressure field created by the next fish. The benefits the fish gain from school behavior is: stronger defense against predators, better success in search for food and good odds in finding a mate.

Remora- is a fish which commonly can be found attached to sharks, manta rays, whales or turtles. It has an oval sucker-like organ with slat-like structures that open and close to create suction and take a firm hold against the skin of the larger animal. The host they attach to gains nothing from the relationship, but also lose little. The remora benefits by using the host as transport and protection and also feeds on materials dropped by the host.

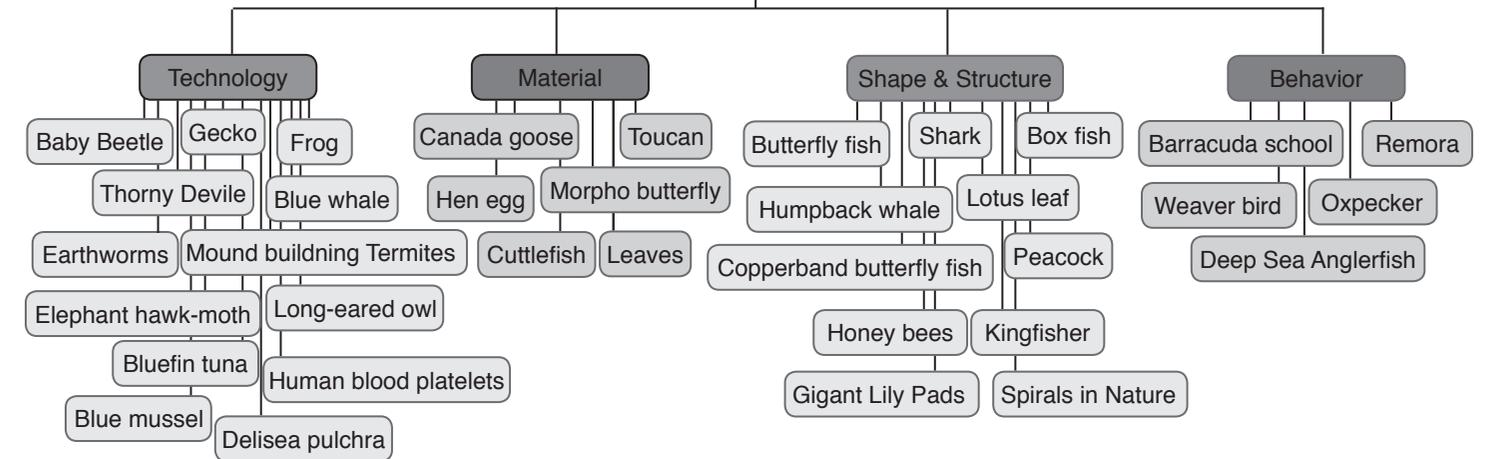
Oxpecker- lives on the sub-Saharan African savannah. They feed from insects taken from large mammals such as rhinoceroses, giraffes and buffalos. It is a symbiotic relationship between the oxpeckers and the mammals. Though they rid

animals of pests, oxpeckers also take blood from the sores.

Weaver birds- got their names because they make remarkable woven nest. The sizes of the nest vary between the species but most of the make their nest with a narrow entrance that is facing downward. They build their nest together for protection, the African sparrow weaver build apartment nest with up to 300 pairs of chambers.



Biomimicry



COCOON PERIOD

After studying the nature and how it solves its problem I saw that many of the species and solutions were very technical and complex. In a number of cases it is a matter of altering a surface or working on a nanolevel, which are parts where the designer has no or very little impact. I had to make a selection from my research that followed the direction of my project. The project should result in a line of

products and I wanted to focus on ideation and creation. While reading about so many different species and ideas I came to think about a game “gömma nyckel”, hide the key, which was popular when I was a child. One person hides a key and the person searching for it get a clue, “bird”, “fish” or “something in between”, depending on how high or low in the room the key is hidden. When you find the key it is your turn to hide it.

I liked the way it sound “fågel, fisk eller mittemellan”. It has a connection both to animals and biology and it is something everyone associates to play and fun.

Selection I

With a direction, “fågel, fisk eller mittemellan”. I choose ten different species to keep working with.

Remora- Would it be possible to create a product that “lives” in commensalism with another product? Commensalism is a relation between two species where one benefits from the other without harming the latter.

Frogs- Could you amplify sound of a product in the same way the frogs distend their skin to

amplify their call?

Oxpecker- Products in symbiosis with each other, like the oxpecker and the larger mammals?

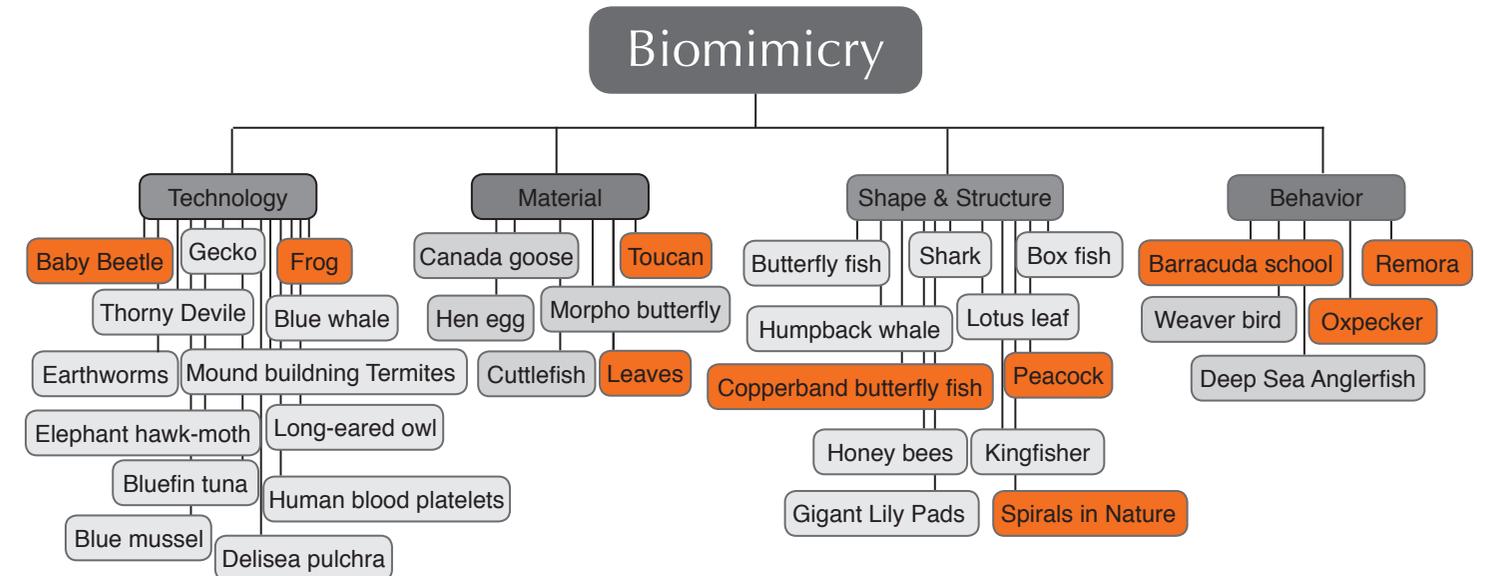
Spirals in nature- Could this natural spiral be used in a new way or in more applications?

Butterfly fishes- How could a false “eye” change the way the user interacts with a product?

Baby beetle- How does nature walk on water? Is this the answer and how can it be applied on a product?

Barracuda school- The barracuda benefits from staying together, could this behavior be implemented on a product? What difference does it make if you have one or hundreds of a product?

Leaves- Where in our everyday life do we have the same organized chaos that leaves create? What parallels can we make and how can we use it?



Toucan- Large does not have to be heavy; the beak of the Toucan is a great example of this. How can you elaborate with lightweight materials and volume and scale?

Peacock- The color you see is not always the true; the light plays a trick with your eyes. Is what you see always what you get? How can an object change depending on the observers point of view?

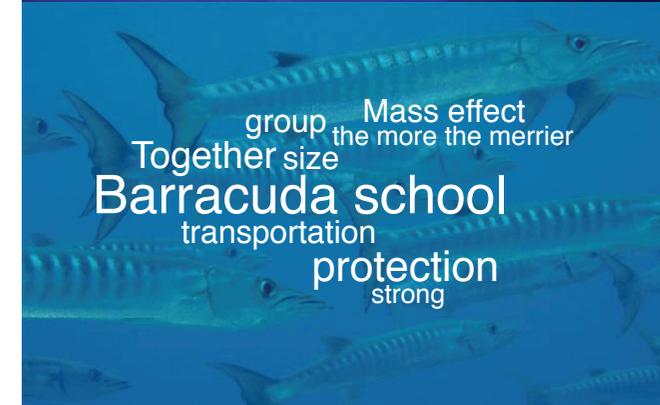
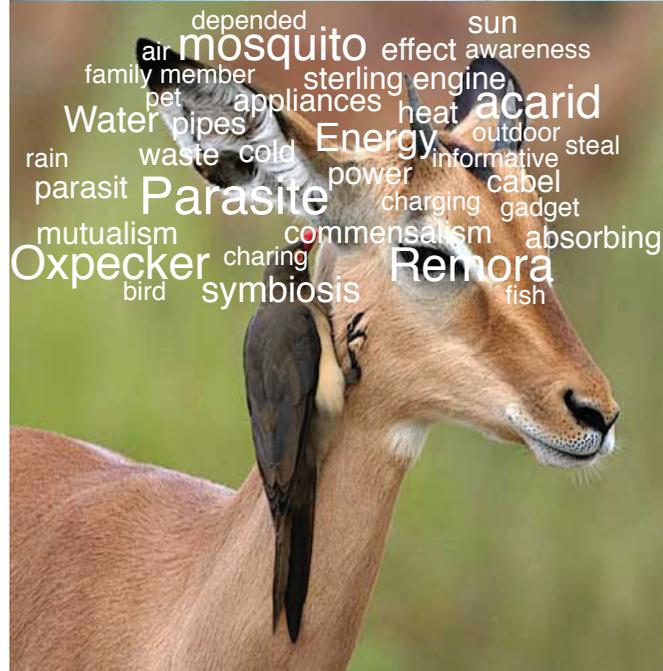
The selection resulted in small brainstorm around each species and animal. The idea of making three products connected with my bird fish or something in between felt interesting.

Selection II

When evaluating my selection I did a new selection where I found five areas more interesting than the other.

Remora & Oxpecker- The thought of making a parasite, a product depending on others, felt very interesting.

Butterfly fishes- To work with the illusion of an appearance and the interaction felt



appealing. The question was why should the user be confused? Maybe it could be used for the security area, confuse the thief but not the primary user.

Baby beetle- How does nature walk on water? It is a new technology with large potential but the project would need much technology research.

Barracuda school- What difference does it make if you have one or hundreds of a product? The mass effect interests me: how a simple product could change its appearance if it is displayed in hundreds.

Toucan- Proportion and scale, heavy and light are areas that I found interesting. Could something that appears to be big and heavy actually be light and fragile?

After evaluating my second selection I found that I did not have a strong case for my theme: "bird", "fish" or "something in between". The concept that felt strongest and with most potential were the parasites, remora and oxpecker. So the decision to proceed with the parasites was made.

RESEARCH PHASE TWO



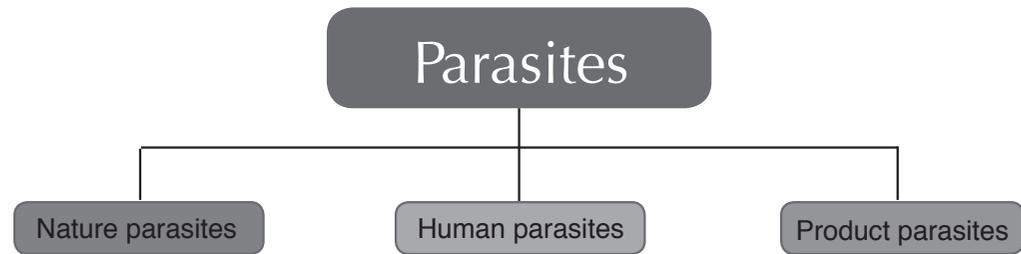
Parasite- something that exists by taking from or depending on another.

Parasites

What is the actual meaning of being a parasite or having a parasitic behavior?

Parasites are something that exists by taking from or depending on another. ⁹ With this explanation I started to explore the world of parasites. Three groups of parasites were identified: at a first you have the most obvious once, the nature parasites, animals that are

⁹Explanation from: <http://thesaurus.reference.com/>



a plague for us humans. It's mosquito, acarid and other small parasites that live on us humans and on other species.

Secondly there are us, humans, as parasites; parasites on each other and on the society. You have the newborn baby depending on the milk from its mother, the bachelor still living at home with his parents and the fortune huntress being a parasite on the older wealthy

man. Could designing for human parasites be a way to go?

Then you have the product parasites; product that are depending on others. It could be as simple as a book rest in a bookshelf or a magnet on the refrigerator. It could also be product that "takes" something from other products.



ANALYSIS

Exploring the world of parasites was a more complex journey than expected. We are facing the worst economical depression since the 20's and we hear about the global warming every day on the news. Could the parasites make a statement on what is happening around us? Could they be an awakening call that tells us to take better care of our resources? More and more are focusing on sustainable



design. This is great but there are also many who want to give the impression of sustainability but their product is just "bio-bullshit". Everything is green and environmental friendly, even bleach comes with a green flower on the package. The parasite could make a strong statement but not a green one because there are already

so many green statements made. The finance crises are affecting all of us maybe we could use the common resources better and benefit from what is already there? Statement parasites connected to how we humans are parasite was a direction that felt exiting. But after some idea generation and research all statements felt forced, it was not something I

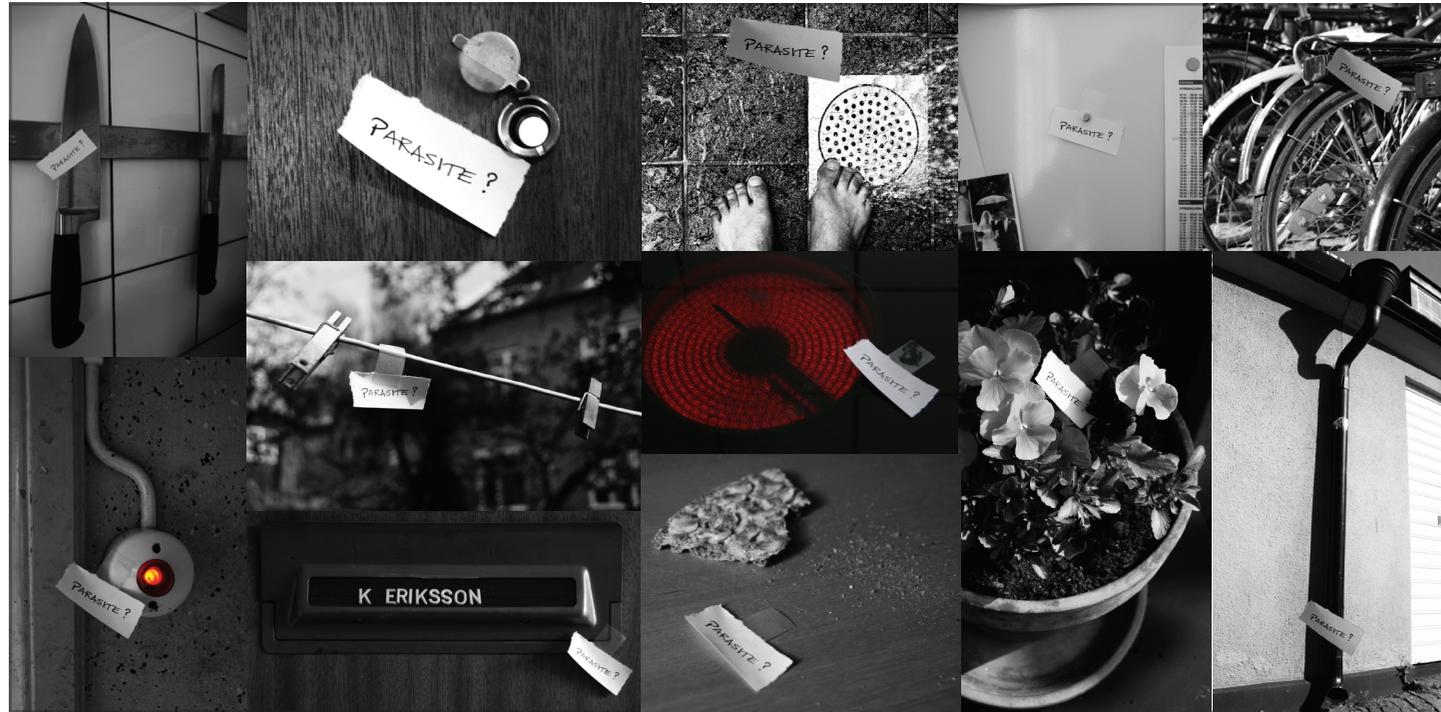


could stand for. I have strong opinions but I'm not the one in front of the protest march and what had felt exiting felt more like an obstacle. Sometimes you have to take one step back to be able to take two steps forward.

Selection I

Looking at the three groups of parasites

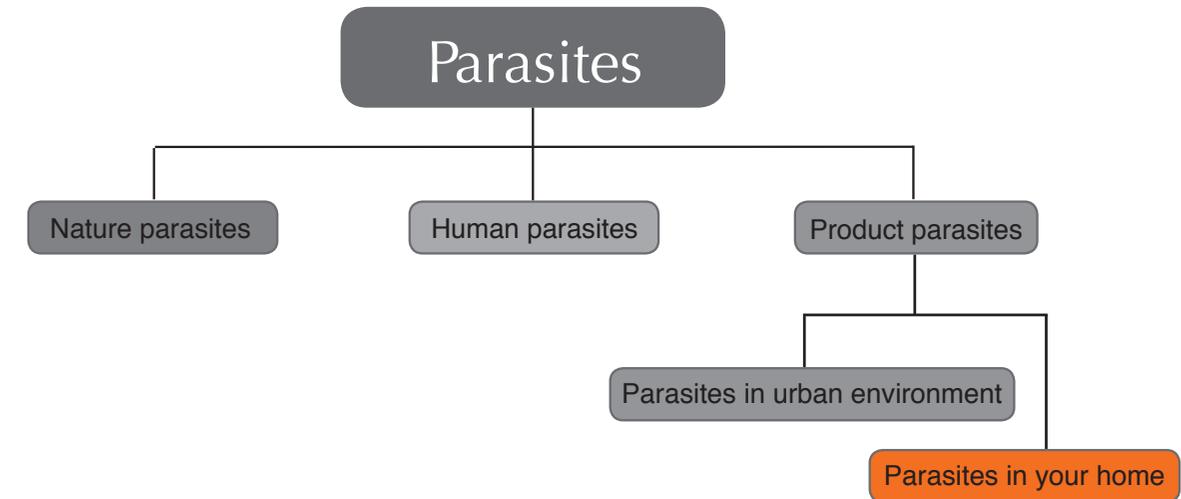
and at my initial intentions with the project the conclusion was drawn to proceed with the group of product parasites. This would give more room to work with form and the expression of the products. The group of product parasites could be divided in to two minor groups; parasites in the urban environment and parasites in your



home. What in our surrounding could we make better use of? What hidden resources do we have? A search for parasites was made in my surrounding. What could be of use for a product parasite?

After this exploration and to keep the project condensed and in that way easier for the observer to understand I choose to focus

on parasites in your home. Parasites that is taking advantage of something we face everyday without noticing. A period of ideation and sketching followed this decisions and a range of concepts where developed.



PARASITE IN THE URBAN ENVIRONMENT

- SUN → SHADE ON A TREE
- WATER → GYM - THERMUM
- ELEVATORS → ESCALATORS
- HEAT → BOTH HOUSE
- GRAVITY → BILD BOARDS
- BIKE → KANON
- TRASH BINS → WEIGHING
- INFORMATION SCREENS
- FURNITURES → USE TREE OR SOMETHING
- BY BRING HALF → USE SOMETHING TO BECOME OTHER HALF
- PEDES → SWIMMING POOL

Tobenthal

Heat shrink tubing
Parasite to classic (depending on) → become something new
Heat from computers
Pollen
Doppio remove condense in refrigerator
Draft by the window
More depending products

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PERSONAL PARASITE
USE SOMETHING FROM THE PERSON

JEWELLERY

- EARPLUGS → mobile phone
- BRUSH → MAKE UP
- NECKLACE → MAKE UP
- CUFFLINKS

THE HAT

USE PERSONS ENERGY

- KINETIC ENERGY
- BODY HEAT
- VOICE → SOUNDS
- BREATH
- HEARDIN SIGNAL

FOOD WE EAT

- GIVE INDICATION ON FOOD OR BOD

BACTERIA

- HEART BATT
- STATE OF MIND
- RELEAS

BREATH

- COLLECT WATER
- CONDENSE

PARASITE IN YOUR HOME

PIPES

- WATER
- WIND PIPES
- CO → WATER

BOOK RESIS

- WINDLOW COORDIN

NEARINETS

- ATTACH
- CANISTER WITH FOLLOW WITH
- HEAT SOUND
- FRIDGE

CHOLES

- SHOWER WATER
- HEAT
- MOVEMENT

CLEANING

- WASHING
- WIPE

AFTER HEAT

- WHEN COOKING
- WHEN COOKING
- STOVE
- SWEET
- POPS

ROCK PAPER

- KINETIC ENERGY

CONDENS

- CONDENSE

MOVEMENT

- TILES
- CARPET
- SLEEPERS

KEYBOARD

- WASHING
- CLOTHES

HANDLES

- TOOK
- CUPPER
- DRINKERS

REMEMBER THE FUTURE
MORE PEOPLE AND O

Dekorative

Värma
andra färg
gamal block
Kjudd
Hörrelskadade → Arrog. Svensk.
parasit → produkt i. statement.



Selection II

Making parasites for your home turned out to be more challenging than expected. I looked at what we do in our home: we eat, we sleep, we move, we work, we communicate, we relax, we clean etc. What is in our surrounding and how can we "parasite" on it? Are there resources that are not used in the full extend that they could be?

The biggest challenge was to make the product a clear parasite and to keep it simple. To clarify what the parasite should stand for and as help to make the final selection of parasites some keywords with a mood board where defined; simplicity, recognizable, quick and flirtatious. Simplicity- to keep the ideas clean and simple, both in color and shape.



Recognizable- in the realization use iconic shapes. Quick- the idea should be smart and use an unexpected resource. Flirtatious- the products should be executed in a charming way that attracts the curiosity in the observer. These words were used as criteria when evaluating the ideas and making the final decision.

The project varied from being just two

parasites to a collection of seven. The final evaluation resulted in five parasites: we eat- the waste parasite, we clean- the water parasite, we move- the motion parasite, we communicate- the radiation parasite and we wear- the steam parasite. The mood board was also used as a guide when sketching and help to make the decision on how to design the parasites.

CREATION

The selection of five parasites took me in to next phase of my project, the creation. Some methods that were used during this phase was brainstorming and sketching.

All parasites was processed parallel. Working parallel with five products was both positive and negative. It never got boring and if lack of creativity for one product you can take a brake and work on another. The argument against



working with so many products at once is that it is easy to forget and keep track of them all.

We move

“We move” is in it self an energy resource but the main question was how a parasite could use this motion? The “energy parasite” would benefit from the motion of another in the same way the birds benefit from flying in a v

formation. I looked at how we move and why to be able to develop the motion parasite.

We wear

To wear clothes and to maintain there shape and color demands resources such as heat, steam, water, detergent and sometimes cold. It is not just we who wear, the nature dresses different depending the season and so does



some species. To help maintain the clothes the “steam parasite” where developed.

We communicate

The radiation in our air is a result of our increasing mobile communication. The brainstorm around this communication resulted in the “radiation parasite”. It is not just our communication that is complex, scientist

are very intrigued by the natures way to communicate. Take for example the dolphins who communicate with eachother with echo sound.

We eat

The brainstorming for the first parasite, “we eat”, where filtered down into six resources that the parasite could use. Of these

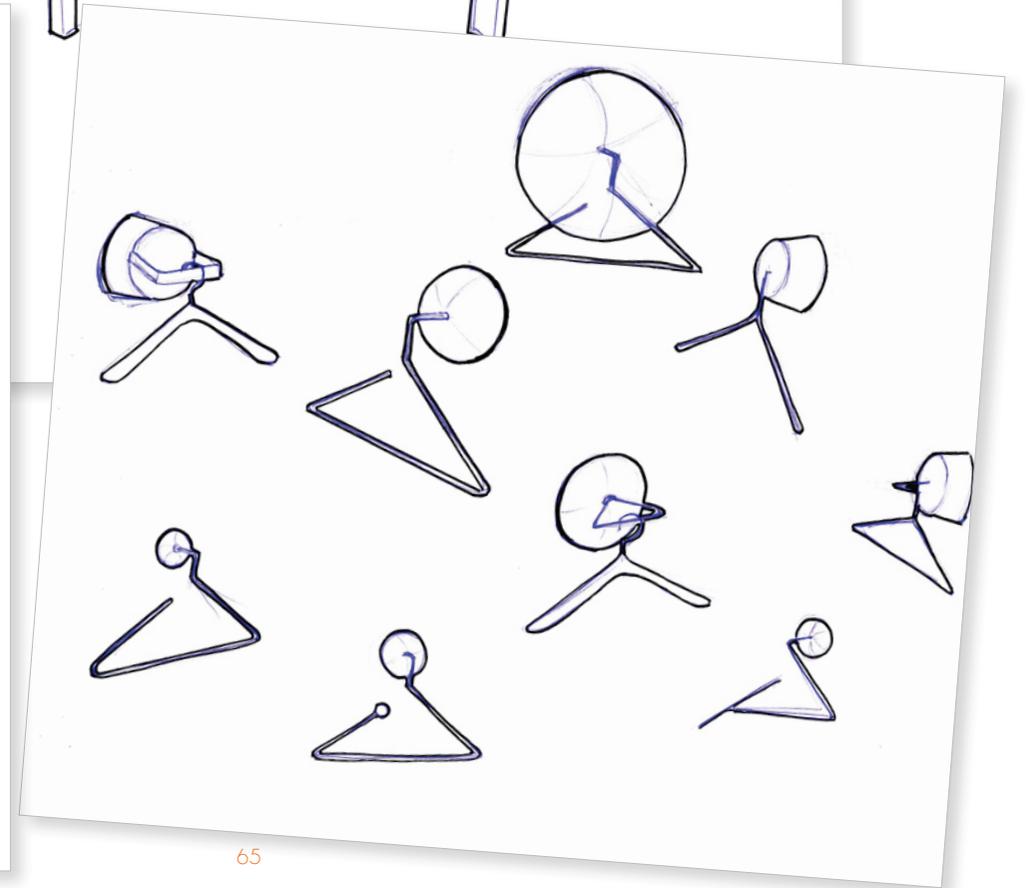
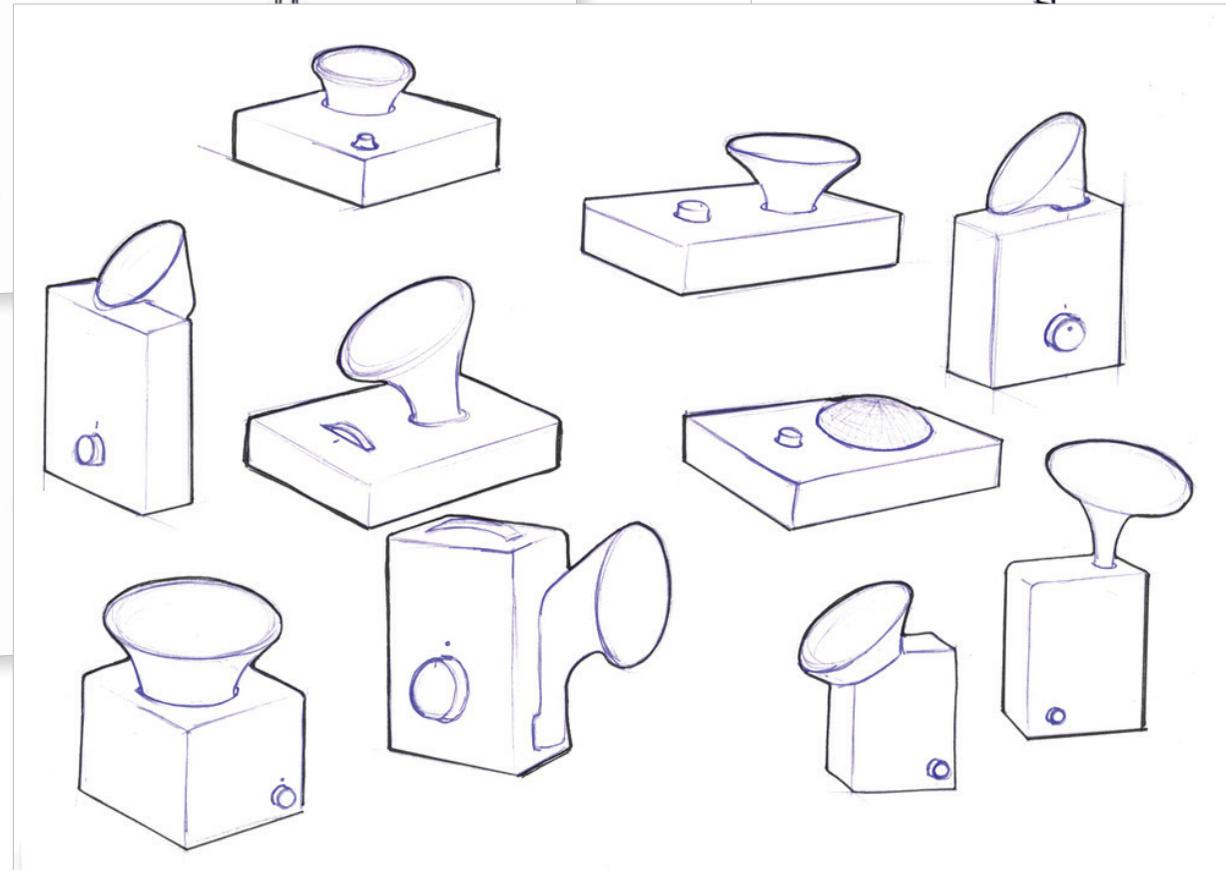
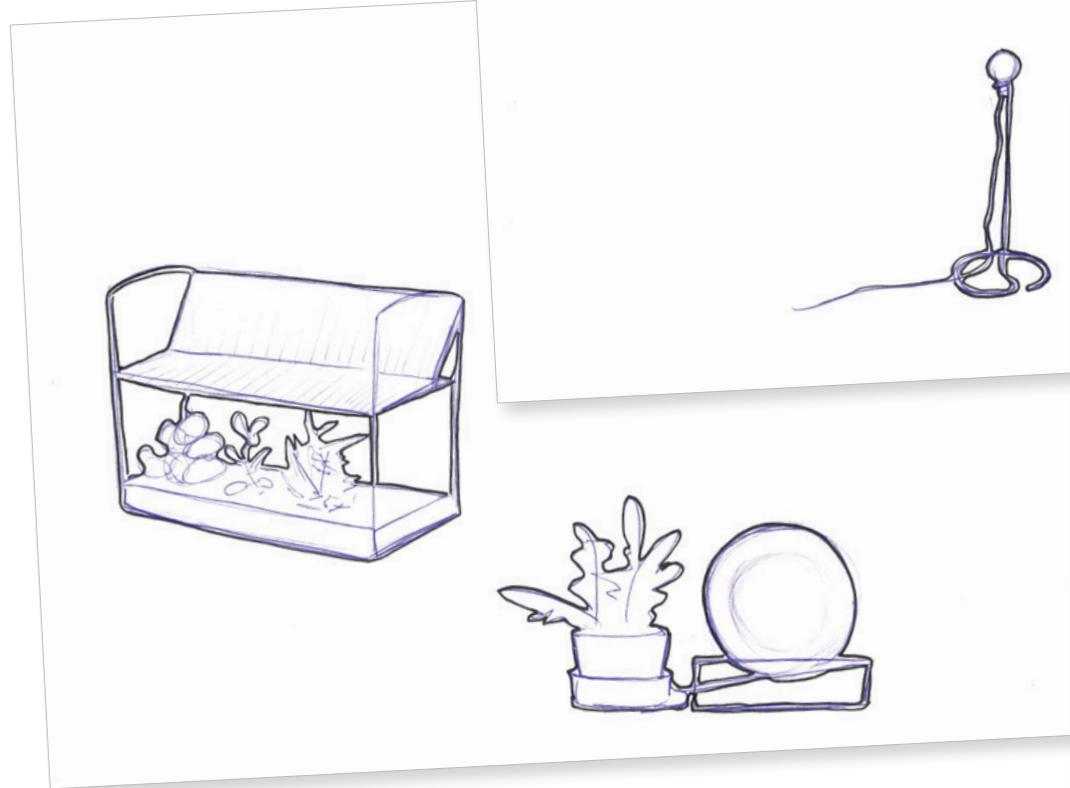
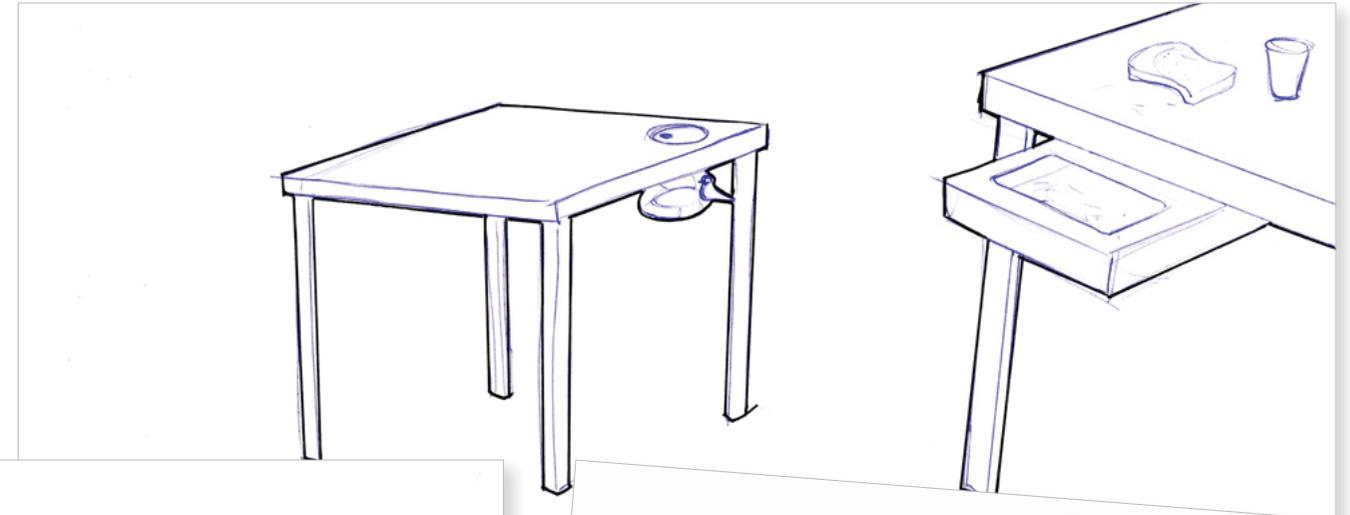
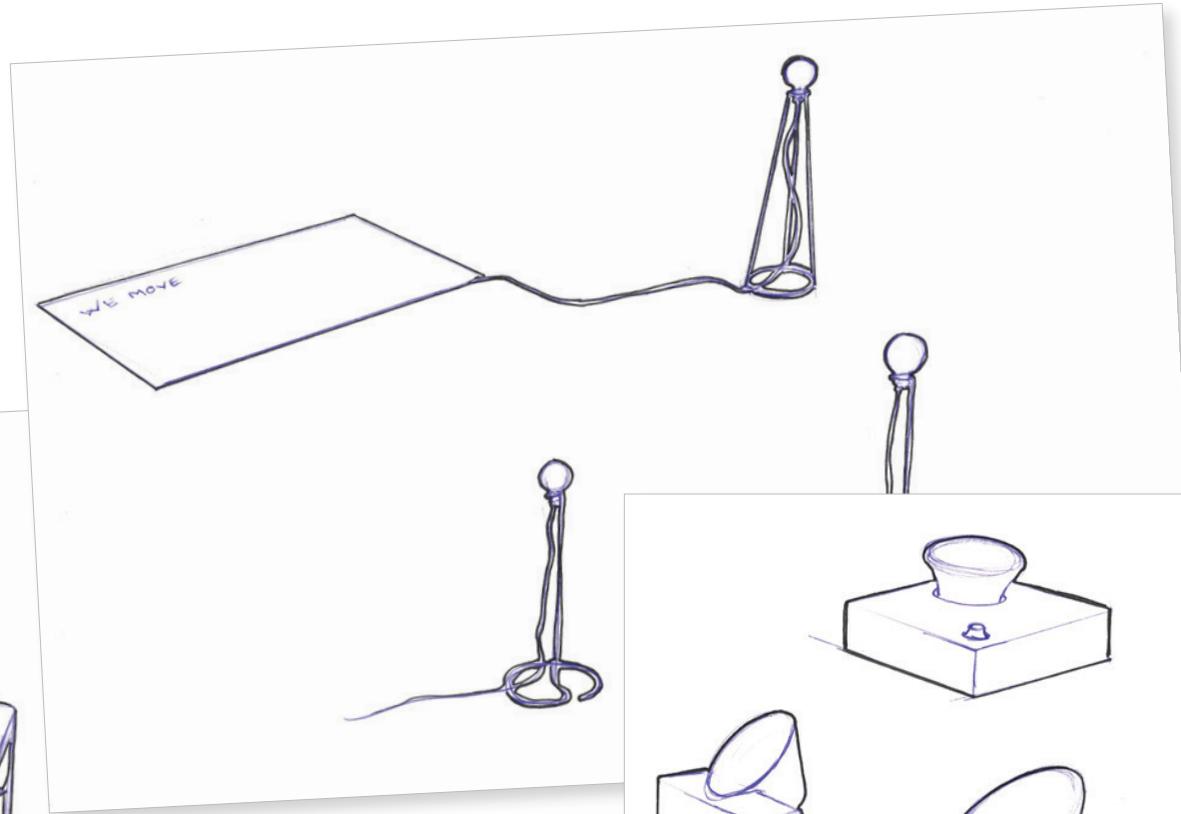


resources the one with most potential was waste and the “waste parasite” was born. A parallel on how nature deals with waste could be made. Take for example the vulture who feed from dead animals and in that way take care of the waste.

We clean
The brainstorming around “we clean” did not

result in as many resources as “we eat”. The main resources used when cleaning is water, so the “water parasite” was a natural result, a water parasite that use the water for its own benefits. In nature there is the oxpecker who nurture from its host while cleaning it at the same time.





REALIZATION

With the keywords in mind the collection of five parasites could take shape. The products should be simple and recognizable. The limited timeframe was an issue and a lot of decisions had to be made fast and some had to be made during the work process. To strengthen the feeling of a range of products I chose a shared color scheme, one base color and one



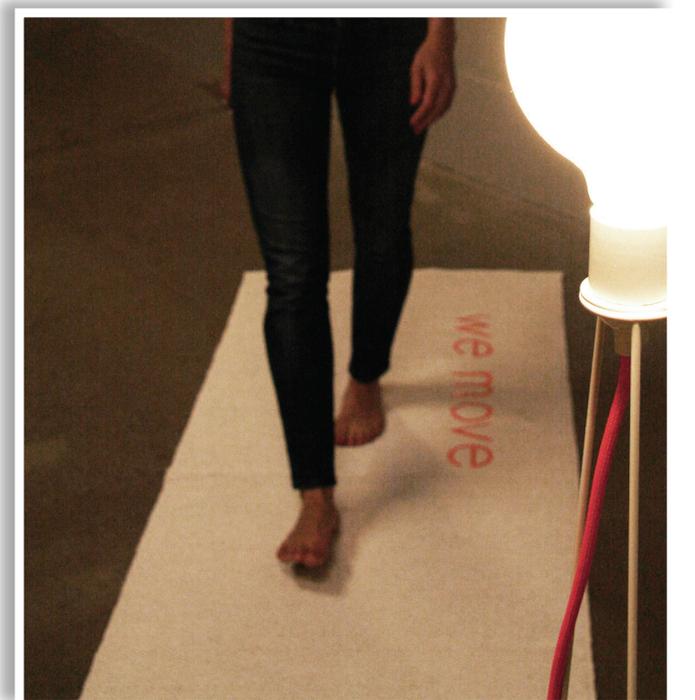
accent color. White was chosen as a base color to give a simple and clean look. For the accent color I wanted a color that stood out and worked as a contrast to the “hidden” resources that the parasites are using. Neon orange is a signal color that often is used for warning signs and during construction work, a color that stands out so it is the perfect accent

color for my project.

Work in progress

When chosen the color scheme I could start with the creation of the five concepts in the workshop. It was a challenge to make five models at the same time and everything had to be planed to fit the tight timeframe.

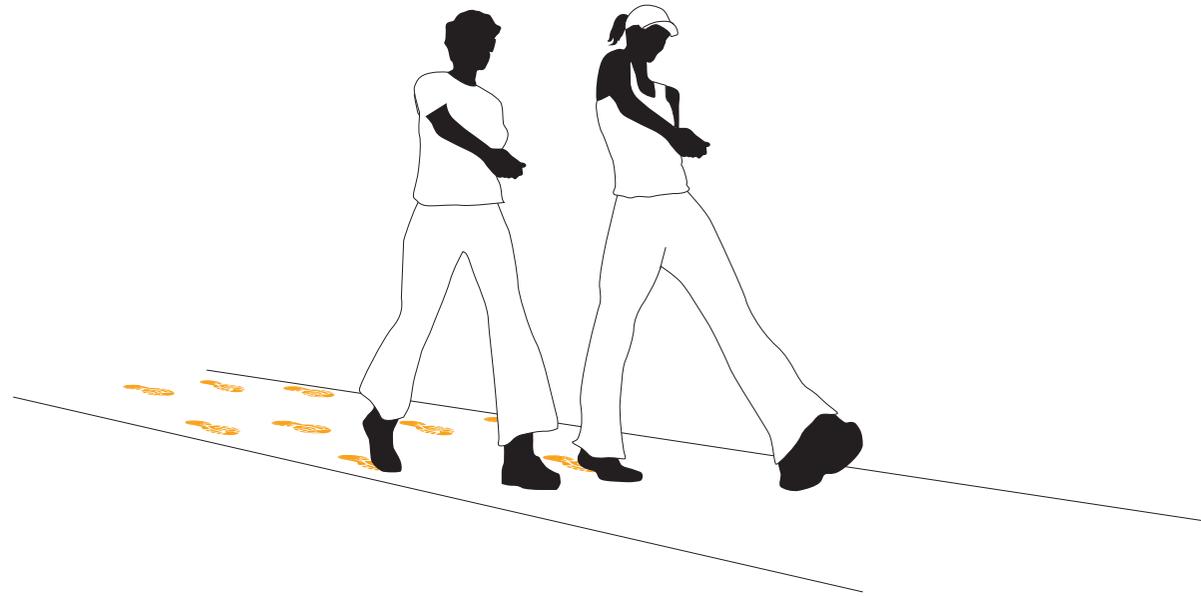




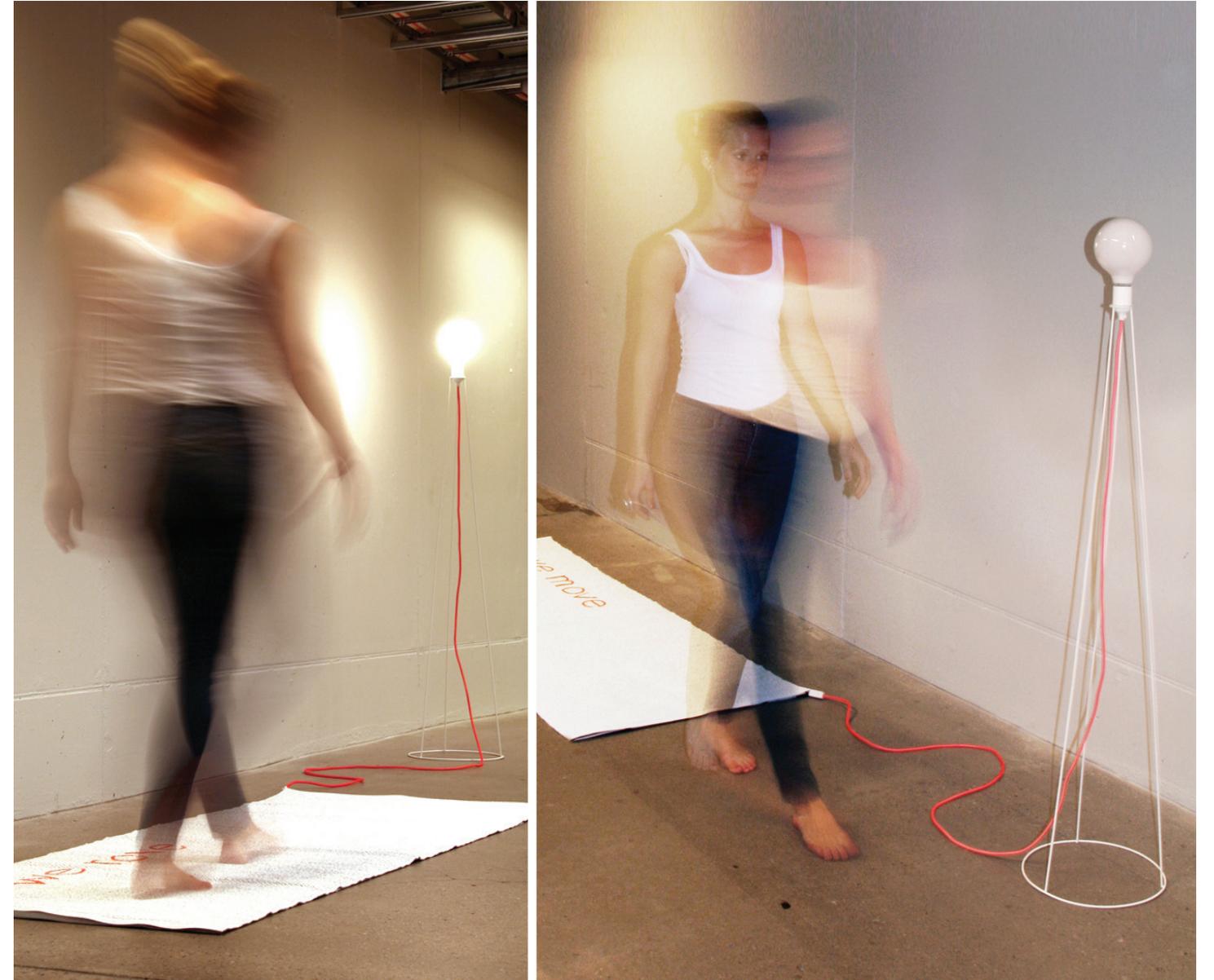
We move- energy parasite

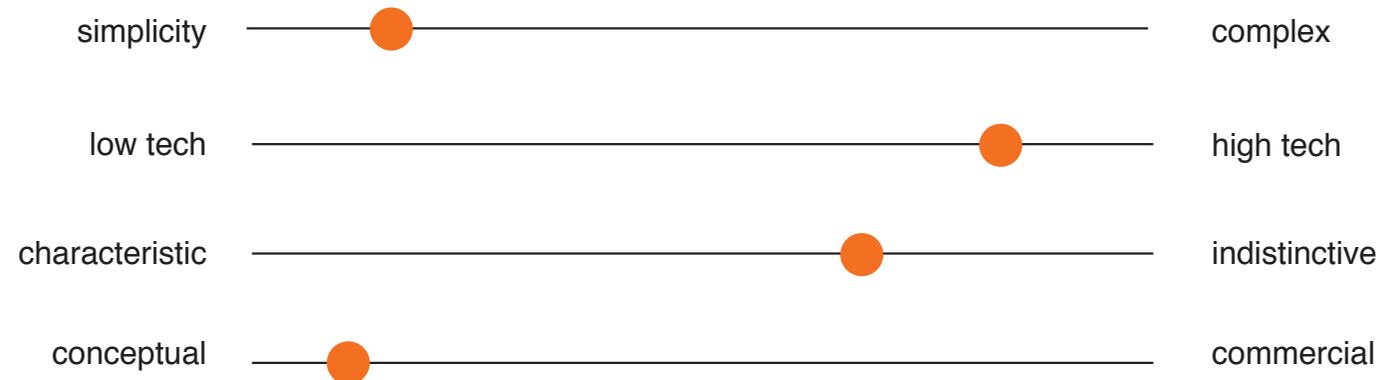
Every time we take a step we leave energy behind. One way to capture this energy is by using piezoelectric materials . These materials generate electricity when deformed. We frequently move around in our homes , why not use this energy? Collecting this energy, as a clean energy source, is the task for the

¹³Principles of Instrumental Analysis, *Holler, F. James, Skoog, Douglas A; Crouch, Stanley R , 2007*



energy parasite. Since this is based on a new technology the energy parasite is a concept that could be realized in a near future. The energy absorbed by the motion parasite could be used for any application. To make a clear illustration a lamp was chosen to illustrate the energy outcome when some one is walking on the carpet.





Aesthetic references chart

As a complement to the mood board, with the key words, an aesthetic references chart was made. This tool would mainly be used to evaluate the concepts and see how they differ and fit together. The aim was to keep the products simple, low tech and as characteristic as possible.

Since the motion parasite is based on a new technology you could see it as very advanced product. But its expression is simple and straightforward. The characteristic of a carpet and the clean lamp to visualize the energy captured gives the product an overall expression of simplicity.

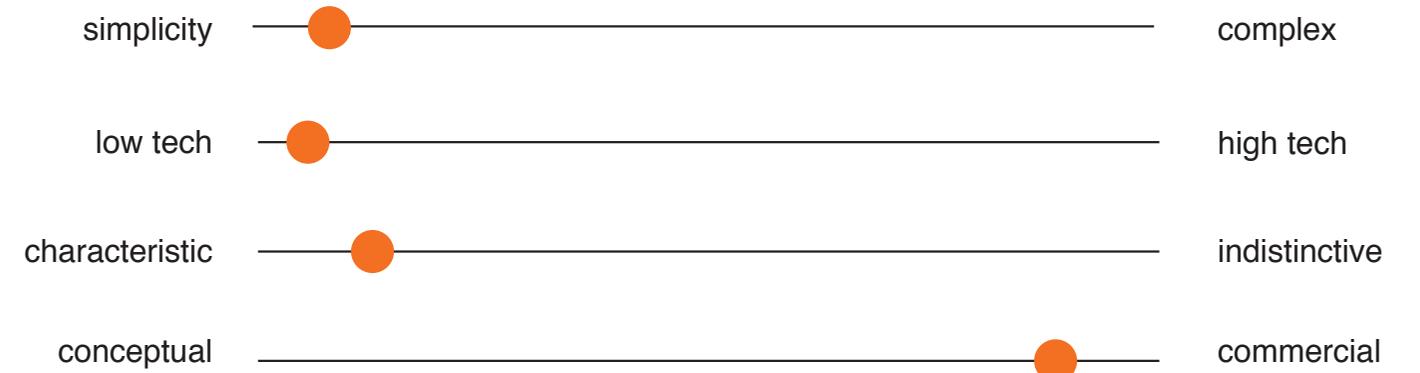


We wear- steam parasite

Most people change their outfit every day and a lot of clothes are just lying around after just been used for a single day. They get wrinkled and sometimes they even end up in the laundry basket without being dirty. Every time we wash our clothes it wear on them, so to get longer lasting clothes you should not wash



them if it is not necessary.
 When you clean yourself by taking a shower the bathroom is filled with steam. This steam is an unused resource, a resource that the steam parasite uses. It refreshes and straightens your clothes by using the steam from the shower, no need to wash or iron.



Aesthetic references chart

The initial idea for the steam parasite came from an old housewife trick where the steam was used for making your sabbaticals fresh and straight. The concept and shape is really simple and by having the parasite hanging in your bathroom you keep getting reminded of the resources we use and not use.



We communicate- radiation parasite
Our dependence of fast communication has drastically increased the last ten to fifteen years. 2008, 94 percent of the Swedish population in the age 16-74 years had a cell phone and 89 percent in the age 16-40 years use the Internet everyday¹⁴. We can always be reached and people use the Internet with

¹⁴Svenskarnas användning av Telefoni & Internet Individundersökning 2008, TNS Gallup: *Per Löfqvist, Dennis Stenberg & Maria Rönnberg Post- och telestyrelsen: Camilla Jönsson*



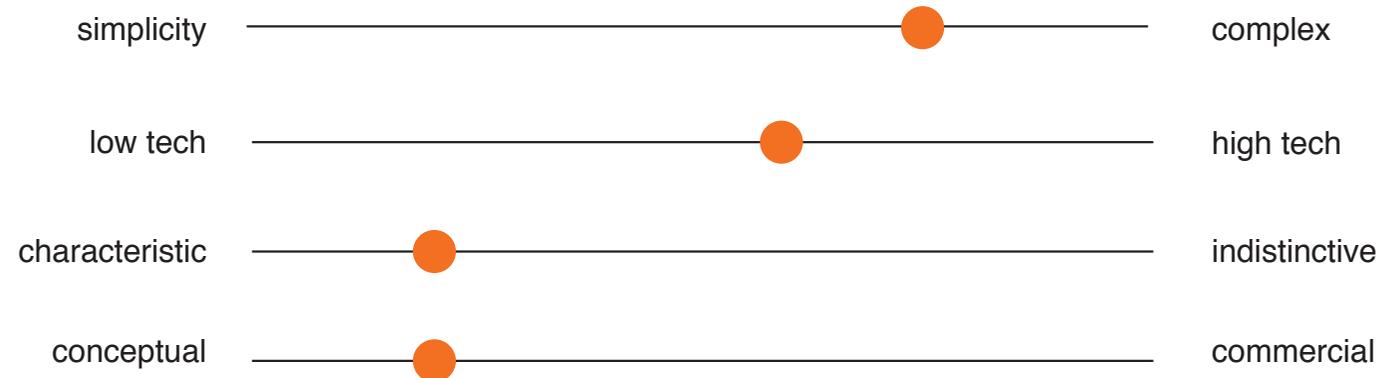
blogs and other sites to keep their friends updated with what they are doing. The new technology has led to new behaviors. Ten years ago you could make an appointment to meet a friend days in advance and then actually stick to that plan. Today everyone has a cell phone and you just decide to call when getting to the area where the person you



are meeting is and then decide where to meet. The result of the new technology and the new behavior that comes with it have resulted in that our air is filled with radiation, radiation from our cell phones, laptops, computers and other electronic appliances. The “radiation parasite” is using these signals as a resource. By combining the technology of an old-fashioned



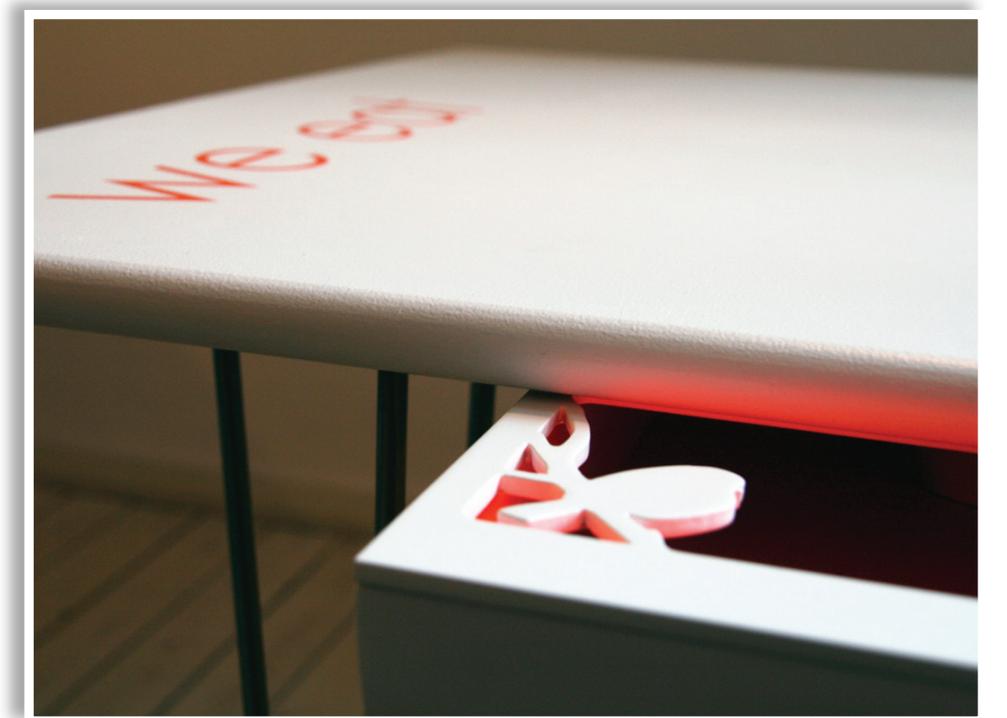
crystal radio with new modern software the radiation parasite uses the radiation in the air and transforms it into “music”. The software creates unique melodies according to the current location and the radiation activity at the time.



Aesthetic references chart

To emphasize the radiation parasites function of playing music I used the iconic shape of a gramophone horn. This funnel shape was combined with the “cigar box” that was used to make crystal radios in the past. This gives the parasite a simple and characteristic look. The radiation parasite is a concept that is feasible

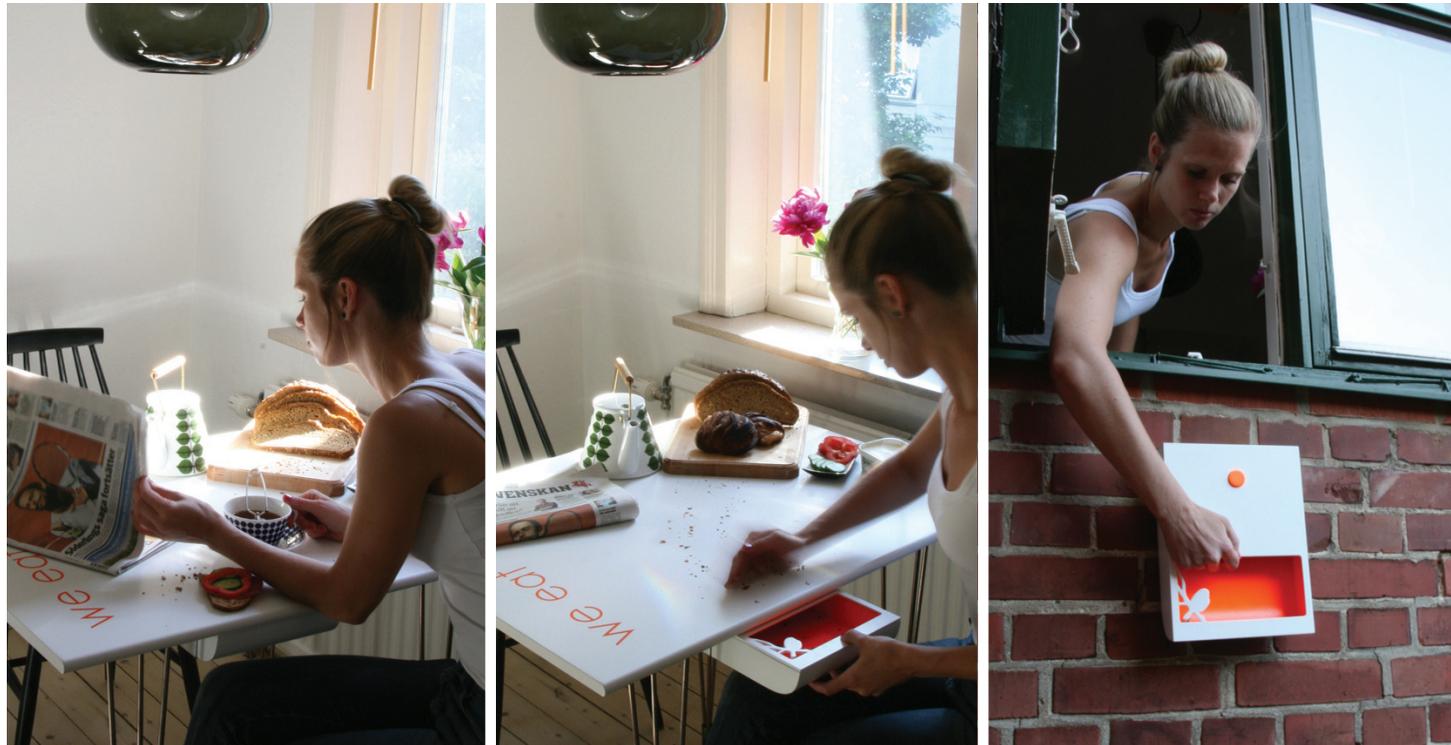
to construct but despite this I would classify it as conceptual. To make it more commercial a thorough market research is needed.



We eat- waste parasite

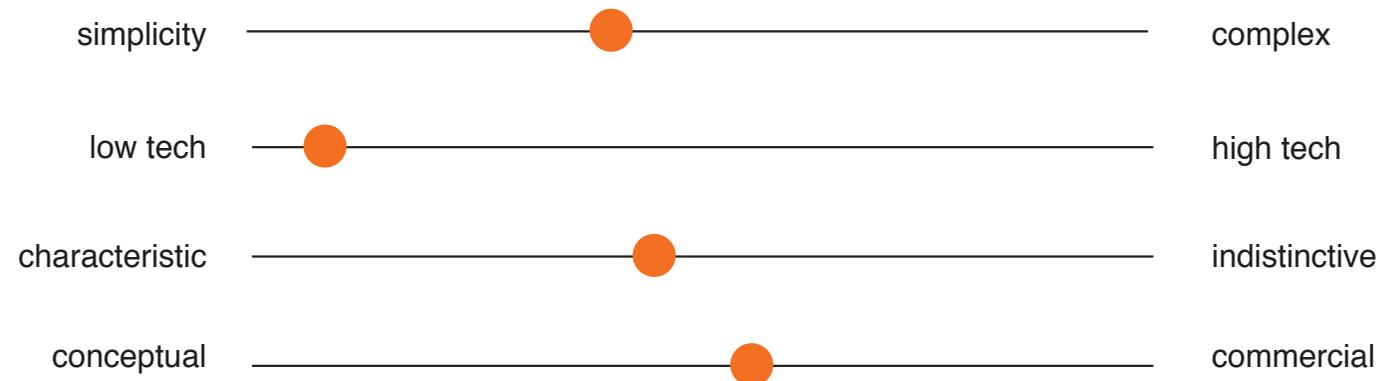
Every year the Swedish households are throwing away 900 000 ton of food waste.¹⁰ If everyone were to use a compost this number would decrease remarkably. The waste parasite is a comment to our behavior and shows a way to take care of a small part of our food waste.

¹⁰Klimatavtryck från hushållens matavfall, Study made by SIK for Konsumentföreningen Stockholm, August 2008



The waste parasite is discreetly attached to your kitchen table and after eaten you easily pull out the waste parasite and wipe down crumbs and other leftovers. After a couple of days you can take the parasite and hang it outside your window and let the birds dine on your waste.





Aesthetic references chart

The waste parasite is made without the need for any technology. The construction is simple and when you have used it once you know how it works. There are some characteristic details such as the hole which can be found in all bird houses. The outline of a bird reminds the user that the birds will benefit from our waste.



We clean- water parasite

It is common for people to eat at least two meals at home every day, which for them without a dishwasher results in having to do the dishes twice a day. After cleaning your plates we rinse them in water and place them in a dish rack for them to dry. The water that drops from the items is just going down the

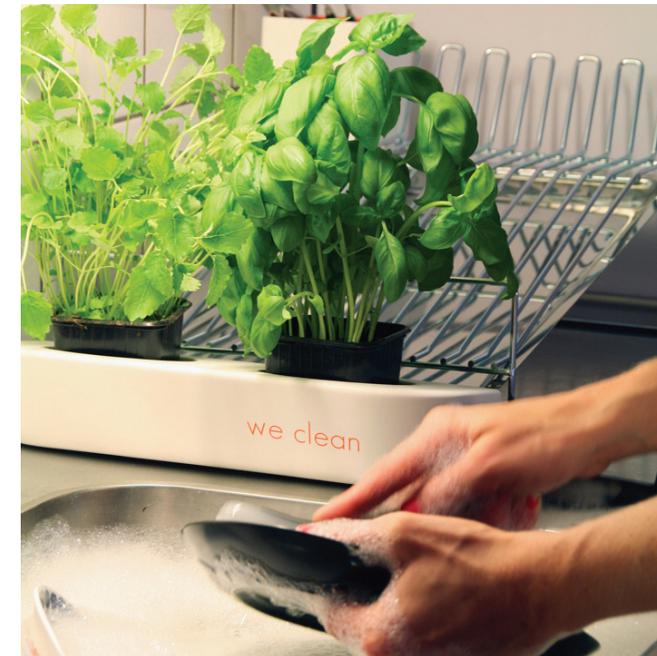


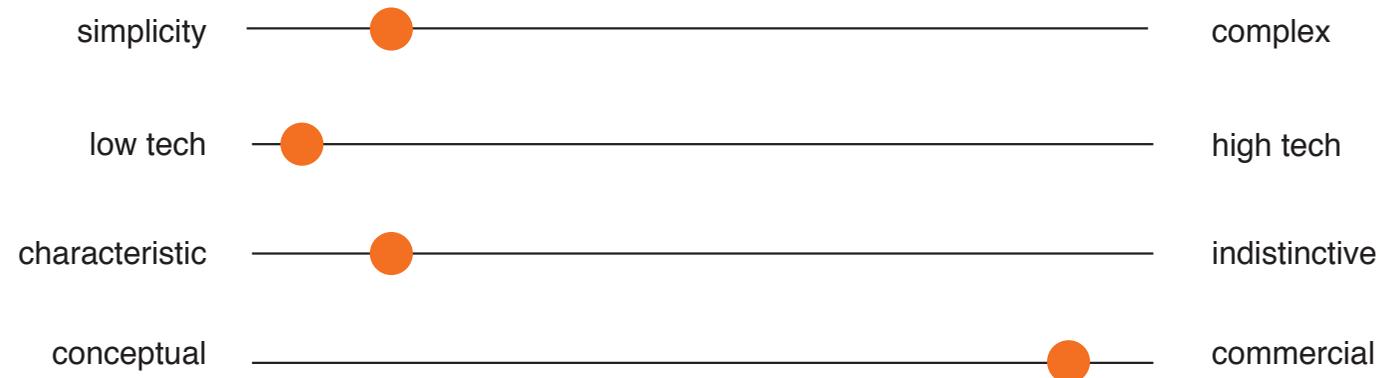
drain
 To buy fresh herbs from the supermarket or having a small herb garden in your kitchen has become popular. Most herbs should be kept in damp soil¹¹ for best growth. So if the herbs need damp soil and most people do their dishes after eating twice a day, while wasting water, why not combined them?

The result is the water parasite, a dish rack that keeps your herbs alive. The small amount of detergent that might get in to your plants will not damage the herbs or make them dangerous for us to eat. The detergent contains phosphates which is also used as fertilizer.¹²

¹¹Skötselråd för Kryddväxter, *Blomsterlandet* www.blomsterlandet.se

¹²Interview with agricultural specialist Lina Pettersson, April 2009





Aesthetic references chart

The water parasite has a strong connection to the image most people have of a dish rack. This makes the product very commercial. The product is very recognizable but with a twist, something new which adds value to the product.

CONCLUSION

Just a few days before my presentation I received a email from my supervisor saying: "I think you realize now, how much more you could have done - the ideas of all these hundreds of parasitic product possibilities are in your sketchbooks; keep them and see if you can develop this later on for yourself. I think it is worth it."¹³ That I could have done more maybe is not what you wanted to hear

¹³Supervisor Andreas Hopf, *email correspondent 5 June 2009*

in the end of a project but I could see what he meant. The area of product parasite has a large potential and I would love to develop it more. But this project was not as much about the final product as it was about the journey getting there. To start with such a large area as Biomimicry and to be able to narrow it down to a line of products without losing my starting point in nature was the biggest challenge.

I got some good feedback on my presentation and I can see how all of my products can be developed further as my opponent Fredrik Hyltén Cavallius said: "The products you present are maybe not the optimum products for each area but they are good examples of possibilities that make us aware of resources normally considered as waste. So as a awareness project I think it works perfect."

¹⁴ Opponent Fredrik Hyltén Cavallius, *Opposition 8 June 2009*



DISCUSSION

My diploma work has been a journey processing odd animal species, sneaky human behavior and a struggle to make strong statements. Resulting in finding my way back to my initial will to make something joyful. When I at one point had lost my inspiration in my work a friend of mine gave me a quote that I would like to pass on to everyone else.

“Too many people spend too much time trying to perfect something before they actually do it. Instead of waiting for perfection; run with what you’ve got, and fix it as you go.”

Paul Arden

More than anyone we as designers strive for perfection. My experience is that you can always do something a little bit better, make that finish more perfect or just add a few more slides to the presentation. But it is not about making that utopia project, it is about making the best project according to the time and resources you have and taking the hard decisions along the way.

THANK YOU



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