

- 1.6. THINKING OF THE GARDEN, AND ITS POSSIBLE REPRESENTATIONS
- 1.6.1. DEFINITION OF A NON-GARDEN LIKE OPEN GREENS
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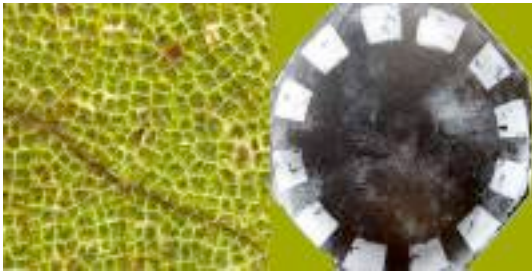
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## 1.6.1.a Travelling through *OpenGreens*



### Abstract

#550 [<http://opengreens.okno.be/plant.php?id=550>]

#557 [<http://opengreens.okno.be/plant.php?id=557>]

#558 [<http://opengreens.okno.be/plant.php?id=558>]

#570 [<http://opengreens.okno.be/plant.php?id=570>]

(salvia officinalis, lamiaceae)

Travelling through the OpenGreens. This is a series of personal sketches of working with the OpenGreens project. They stretch over the timeframe of 1 bio-rythm-cycle and are retold by observations of the city honeybees, along bio-TIK-time intervals. TIK-time differs from the regular time structures we use.

I feel like Alice in the OpenGreens: good intentions, bad habits.

Robert Ashley says it like this<sup>1</sup>: 'If you take a bunch of short ideas and arrange them so that they overlap, that's one long idea. That's a thought. One time a short idea is slightly ahead of another and another time it's not, but they always overlap, that's the rule. So you get a large number of different thoughts, because one time one short idea is slightly ahead of another and another time it's not.'

And that's what I did, that's how I wrote down these sketches. A mix of Thoughts and Talks.

There is no clear start, nor a well defined end. The Thoughts & Talks, this mix between reality and fiction, is ongoing.

Observations at the beehives' landing platform lead us through the text. The observations are classified by the colour of the pollen, collected by the bees during that specific observation or thought. The colour of the pollen refers to the flowers blooming that specific timeframe, and this extends to new thoughts as urban foraging, monitoring technology, tik-time, super organism-research, mushroom hunting, green tech robots and more.

OpenGreenReferences and OpenGreenKeywords are linked to pages with background information.

The OpenGreenIllustrations are all grouped in a gallery page. All pictures are created by AM and copyrighted under the CC licence: attribution-non-commercial-share\_alike. They are available on demand in high resolution. More of them can be found here: the Connected OpenGreens catalog [<http://so-on.be/SO-ON/OpenGreen/COG-catalog/v.1.0-smallspread.pdf>].

For all other pictures, the author and its references will be mentioned.

The '#000'-references in the subtitles stand for the specific ID of an item in the ConnectedOpenGreens database [<http://opengreens.okno.be>] (COG).

The links at the bottom of the sketches refer to video excerpts in the OpenGreens category of the oknopadma [<http://padma.okno.be>] video database.

A conversation:

Toby:

We're using up the earth, it's almost gone.

Vandana:

Staying Alive!

Robert :

See Nature as a process. We are working with a living ecosystem.

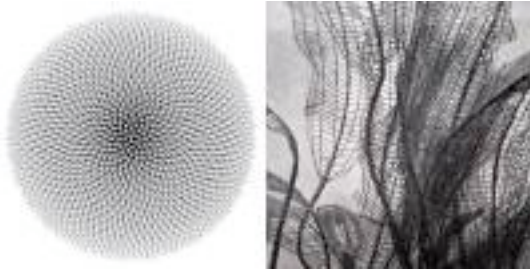
Richard:

The superweed is a favourite villain in science fiction.

The seeds of some alien plant-form reach earth, germinate in hours and quickly blanket the planet. Or worse, they hybridise with humans.

A GM crop passes on its herbicide and disease resistant-genes to wild oats and creates the ultimate botanical demon, which perfectly and ironically fulfils the anthropocentric definition of a weed: a rampant plant generated by human activity.

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## OpenGreens Definition

#122 [<http://opengreens.okno.be/plant.php?id=122>]

#124 [<http://opengreens.okno.be/plant.php?id=124>]

#125 [<http://opengreens.okno.be/plant.php?id=125>]

#333 [<http://opengreens.okno.be/plant.php?id=333>]

(tussilago farfara, asteraceae)

OpenGreens Research #01 [<http://padma.okno.be/Vsb5aud1/00:00:10.000-00:16:45.000>]

Possible OpenGreen definitions: the experimental Hortus, the OpenAir Laboratory, the Vivarium, the Kabinet of Wonders. OpenGreens are marginal zones where culture and nature overlap and enter into a symbiotic relationship. OpenGreens are temporary and experimental places.

The more people are involved in the OpenGreens, the more definitions there will be. The Connected OpenGreens are an organic network where 'gardeners' are active on a broad range of artistic, scientific and social levels. Nature as a curiosity shop: we are hacking life by re-interpreting the rules. The broad range of OpenGreens include a parking lot rooftop turned into a forest garden, the wild countryside reinterpreted, an urban edgeland described in a scrutinuous manner, a windowsill turned upside down.

Study, notes, documentation: we try to catch the beauty of nature in data. Classification, archiving: from nature into art. Connecting. Comparing: developing concepts. Interpreting: complex shapes and repetitive patterns. Model making or algorithms, analogue or digital: a lot of methods are convenient to study the Art Forms in Nature<sup>6</sup>). Formulating theories. Publishing.

Here, we introduce the City Honeybees, the great and selforganising super organism. A colony of little individuals, tightly knit by altruistic cooperation, by complex communication and by division of labor<sup>7</sup>). The wet dream of sociologists and psychologists.

In our urban rooftop lab we look for natural analogues to manmade environments. We investigate elements such as temperature, soil, humidity of the rooftop in contrast to its equivalent in natural conditions. We study species of plants that are adapted to shallow substrates and extreme temperature and moisture conditions. Mediterrenian ecosystems bear the same sparse characteristics and therefore they can be useful natural models for our urban green roofs.

Spring arrives with the Tussilago Farfara. Bright yellow little flower with dark yellow pollen. After the melting of the snow it pops up in small groups, provoking the bees that dare to leave the hive for the first time after a long winter.

Birth of a Honeybee [<http://padma.okno.be/Vugv503g/00:00:00.000-00:02:30.000>]

Buzzzzzzing bees, I hear them but I don't see them move.

The sound comes from an invisible background, from a distance. A brown yellowish colored bee brood nest is nicely ordered in rows of 6-angular formations. Horizontal lines go slightly down left to right. 300 bee cells, more or less. Half of them are filled with white-yellowish stuff, nearly 30 of them are translucent and a few are dark brown. In some cells something moves. In a center cell, in the lower part of the image, a bee crawls out of its hole. A second one, on the left of the first cell, is moving but staying in its hole. We can see an estimated 300 cells. Most of them are sealed, about a hundred or so are open. Through the cells we see other cells, the backside. In two of the cells bees are breaking out. There is a constant sound of buzzing bees. The one bee is coming out of its hole, it takes like 15 seconds. It starts crawling around. The second bee is just moving its antenna's. The one active bee crawls around, takes a few steps to the right, turns upwards, and goes further to the left till it hits the image frame border and it leaves the scene. Same sound of buzzing bees, the second bee is moving its antenna's in its hole. The second bee escapes from its hole, it takes 31 seconds. The bee is now walking to the right side of the frame, it walks as if it has difficulties, as if the surface is sticky. Still bee buzzzzing sounds. The crawling bee takes a turn to the right, it is going down the frame with a hesitating pace, makes one stop, looks around, and then it leaves the frame. The first bee walks into the frame again, (of course it can be another bee, but that would make no sense) it walks into at the very same spot from where it walked out before, it goes up to leave the scene again in the middle of the upper border of the frame.



## TIK Time

#277 [<http://opengreens.okno.be/plant.php?id=277>]

#372 [<http://opengreens.okno.be/plant.php?id=372>]

#496 [<http://opengreens.okno.be/plant.php?id=496>]

(taraxacum officinale, asteraceae)

What is TIK-Time? TIK or Time Inventors' Kabinet is an investigation into time relations within circumstantial ecologies, seen through the lens of system aesthetics. We, from TIK, use media technology and electronics as research tools in our shared laboratories, the OpenGreens. We collect data from various ecosystems over periods of time. We study the data and make networked interfaces to interpret and document them on the TikTak server and the connected OpenGreens database.

The artistic output is based on the data collection, exploring time related poetics and developing a common language about time.

Grab TIK-Time [<http://padma.okno.be/Vh6eypfu/00:00:02.000-00:03:48.000>]

It's actually so simple as if you would figure out a subway trajectory.

For this art decision it's the same: it's about travelling.

The idea in this beautiful graph is that at one side we have windclocks. These instruments are connected to arduino's and linked via the JSON protocol and the internet to the TAK server.

They enter their data into the server so that clients can receive the tiks from the clocks and display the windtime.

The server is an xmpp server, which interacts to go to the clients.

XMPP is better known as a Jabber protocol. It's something pretty practical, if somewhat hard to set up.

Clients can be anything, ranging from a browser, to softwares such as Processing or Max/MSP, Supercollider, PureData...

We want to have stats on the entire system, so we know which clock sends what type of tik and windtime and what are the relationships between the clocks.

But that's not for this week, because we want to start on getting the above chained for now.

We started by dividing up the work, we made a list of priorities, who would be working on what. One of the most important things was putting the programs on the server itself, instead of in a test environment. To program a windclock with the right scripts. And this works.

Maybe it's better if I just give an overview of what works and what doesn't work. What works is: we have a script for the arduinos which can connect to the server.

Which is already good. It also gets connected to the XMPP, which is also very nice.

The XMPP connects to the clients, but it doesn't connect the right thing to the clients yet.

This we hope to solve tomorrow.  
We have a processing script which gets more or less the right data  
but we don't really know what to do with it yet.  
But, we'll fix that tomorrow.  
It's propaganda! You have to say it works!  
Nearly, nearly, nearly! Tomorrow it will.  
So we took the decision to start working again tomorrow very early.  
8)9)10)

Leonardo Windclock [<http://padma.okno.be/Vtolhiyi/00:00:01.000-00:02:18.000>]



## the Garden's Golden Ratio

#574 [<http://opengreens.okno.be/plant.php?id=574>]

#575 [<http://opengreens.okno.be/plant.php?id=575>]

(sempervivum tectorum, crassulaceae)

Le jardin, c'est un tapis où le monde tout entier vient accomplir sa perfection symbolique, et le tapis, c'est une sorte de jardin mobile à travers l'espace. Le jardin, c'est la plus petite parcelle du monde et puis c'est la totalité du monde.

Le jardin, c'est, depuis le fond de l'Antiquité, une sorte d'hétérotopie heureuse et universalisante ...

11)

OpenGreens Research #02 [<http://padma.okno.be/Vharo2q7/00:00:02.000-00:01:35.000>]

The OpenGreens project blends organic and technological matter into one. Through analogue and digital means we conduct long term observations on the growth, blossoming and decay of plants and (social) insects, exposed to natural elements such as wind, sun, rain and pollution in an urban context.

We monitor and extract data from these processes both on a micro garden level as on a macro city level. We make the data available online in realtime. We research the connections between people, technology and the possible use of the urban greens.

The OpenGreen is an artificial environment, a hybrid of nature and culture. The harvest is about collecting data of any kind from the gardens and using them for organic and media applications.

Can the OpenGreens' evolution be generated, controlled, enhanced or imagined in artworks? Does the fusion of natural and artificial matter produce new organisms, new environments or new forms of nature? Can technology animate nature and vice versa?

One of the fascinating and recurrent shapes to study in the gardens, are the Voronoi<sup>12)</sup> cell patterns. The fat leaves of a cactus, the seed head of a sunflower, the hairy leaf of the Salvia Sclarea: under a looking glass they transform into design wallpapers of the sixties – one just needs some homegrown cannabis to start a mindblowing realtime visualisation.

I love to see my rooftop garden as a set of Voronoi cells. Actually, a Voronoi cell is defined by all the points in a plane that are closer to the seed as to any other seed in the plane.

This can be translated as follows: Imagine your garden as a plane in space. In the garden you mark specific spots. Every square centimeter, closer to one specific spot than to another (marked) spot, belongs to that specific cell.

A similar natural demarcation happens in the cells of honey-comb. The only difference is that the honeycomb cells are very regular compared to (for example) the Voronoi cell division in a plant leaf.

We could use a Voronoi diagram to visualise the mobility of plants through the

garden and even through the city. How fast do the seedlings move away from the motherplant? How do they spread? Which crooked path do they design? Some nice examples are the travels of *Salvia Pratensis*, *Agastache Foeniculum* or *Verbena Bonariensis*.

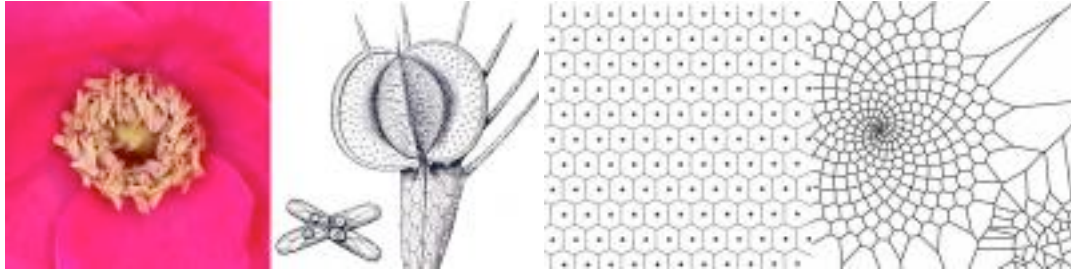
Also Fibonacci<sup>13)</sup> is omnipresent in the garden. We find traces in growth patterns or phyllotaxis<sup>14)</sup> of many of the plants. The natural world is ordered by the laws of math. This symmetry in plants relates to the so called Fibonacci sequence. The relation of the numbers in the sequence approaches closely the Golden Ratio proportions. Several famous botanists –as for example d'Arcy Thompson<sup>15)</sup>– studied in depth the importance of this kind of growth and forms in nature.

The bees and their hives form an entire part of the OpenGreens. In a series of workshops and expert meetings<sup>16)</sup> we examined the distributed intelligence of these social insects : their behaviour, ecology and sociobiology. By monitoring the bees and beehives with different sensors, we study the colony as a community. Our research is documented with various types of media and we use the collected data to make artworks based upon the bees' behaviour over time. We try to connect nature and technology in a new relationship of interconnections.

A circadian rythm analysis of the bees' movements could produce a nice soundscore when drawn on a timeline. Would it be cyclical? Expressed in waves of action? Swelling, traversing and absorbing time, finally fading away in the heat of the late afternoon light? Meteorological facts certainly influence the bees' behaviour. A windy day makes them nervous, and an upcoming thunderstorm makes their dances even wilder as if they were all pogoing on some eccentric punk music. After a while they all stick together at the entrance of the hive, exhausted.

Bees as Architects [<http://padma.okno.be/vfsom73j/00:00:00.362-00:03:07.000>]





## the Taste of Time is Honey

#466 [<http://opengreens.okno.be/plant.php?id=466>]

#562 [<http://opengreens.okno.be/plant.php?id=562>]

(rosa rugosa, rosaceae)

Beekeeping is from all times. As a matriarchal society, bees are closely associated to the feminine.

In ancient times, this art was related to goddess worship. The bees were perceived as the female strength of nature. Not only they produce the golden honey, appreciated for its preservation properties, but as well they pollinate the flowers and increase as thus plant fertility and the plentifulness of nature.

In Aphrodite's honeycomb-temple at Mount Eryx, the priestesses were the Melissae (the bees) and the goddess was Melissa, the Queen Bee.

Aphrodite herself worshipped the bees as her sacred creatures because of their architectural capacities to create perfect hexagons.

The hexagon was for the Pythagoreans an expression of the spirit of Aphrodite, whose sacred number was six. The Pythagoreans, trying to explain the secrets of nature through geometry, made drawings starting from the sixty degree angles of the hexagon, and extending the sides of the hexagon till the center of the next hexagon (cell). This results in an endless triangular grid and it was for the Pythagoreans a revelation of the underlying symmetry of the cosmos<sup>17</sup>).

Foraging Honeybees [<http://padma.okno.be/Vdx5xyai/00:00:00.362-00:11:53.000>]

Two green beehives. One with a blue landing board one with a green landing. Bees trip in and out the hives.

A lot of bees are crawling on the frontside of the hive.

The hives are surrounded by flowers with long greens stems and purple-blue flowers.

While the bees fly in and out most of them are flying in.

The camera shifts to the right and focuses on the entrance of the hive. Now it's clear that some of the bees have yellow pollen on their hind-legs.

Some bees wait on the board a longer time, they seem to be looking for something or smelling something.

The pollen-laden ones go straight in.

Some bees are walking horizontally over the metal entrance bar.

Sometimes the bees land on top of each other.

Quite a few bees have pollen on their legs. They all enter the hive one after the other at exactly the same place

making it seem as if the film is in a loop.

The honeybees transform raw material resources into food products. They forage nectar and pollen from blooming plants within a more or less 3km flight range from their hive. To help them find the necessary pollen and nectar, we in the OpenGreens project, green the city by guerilla gardening.

We organise walks and throw seedballs on wastelands, construction sites and road verges. The seeds will germinate at the right place at the right time. The flowers

grow out of a Tübinger seedmix, composed for foraging insects. The nectar-rich flowers will bloom till late in the season. The main species are Phacelia, Boragio Officinalis, Fagopyrum Esculentum, Calendula Officinalis and Sinapis Alba. They are, among many others, called honey plants.

The transfer of pollen grains to the female reproductive structure is called pollination. This transfer can be mediated by the wind, in which case the plant is described as anemophilous or wind-loving. Entomophilous -insect-loving- plants produce pollen that are relatively heavy, sticky and protein-rich, for dispersal by insect pollinators which are attracted to their flowers.

Bees collect pollen in their pollen baskets and carry it back to the hive. In the hive, pollen are used to raise the brood and to feed the young bees.

The pollen laden bees go in at random places.  
The screen is split into two halves: green at the top, blue at the bottom.  
Two bees stay on the board and seem to be inspecting it.  
Then they go inside.  
Four pollen laden bees in a row.  
A lot of bees are crawling on the outside of the hive.  
There is the sound of an airplane passing.  
You can see the sky. It gives a sense of space. It's a sea of blue.

Honey is primarily fructose and glucose, in that order, with a very little sucrose and less than 10% other sugars, and about 17% water. The low water content is important to many of the honey's properties. It makes it thick but is enough to keep it liquid. Because there is so little water in honey, micro-organisms that encounter honey die, as the water in them is removed by osmosis.

In addition, as honey is diluted with water, a chemical reaction between glucose, water, and oxygen produces small amounts of hydrogen peroxide and gluconic acid. The slow release of hydrogen peroxide makes honey a mild antiseptic. The acidity of honey also reduces the number of organisms that can live in it<sup>18</sup>.

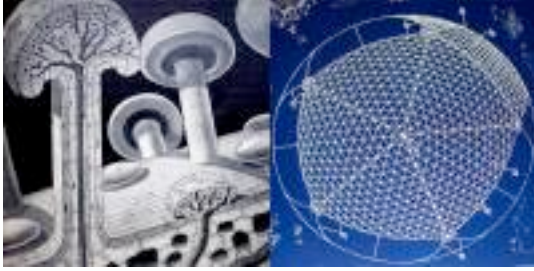
We have two honey harvests a year, one in the spring and one in the summer. In the Cari Bee-research center, at the University of Louvain la Neuve, Professor Bruneau developed the odour and aroma wheel for honey<sup>19</sup>. After analysis, our OpenGreen summer honey is classified 'Toutes fleurs' or 'Flower Diversity' and its botanical origin traces back to Linden (Tilia, Malvaceae), Evodia (Tetradium or Bee tree, Rutaceae), and different fruit trees. The honeywheel defines its taste as 'Miel acidulé aux notes fruitées et épicées', or in a free translation 'Slightly sour with a fruity and spicy touch'.

The spring honey traces back to pollen of Willow (Salix, Salicaceae), fruit trees and Blackberries (Rubus Fruticosus, Rosaceae). The wheel defines: 'Miel tannique aux notes de zeste' or 'Tannin honey with a touch of citrus'.

By buying a pot of our OpenGreens honey, you foster a cluster of our Brussels honeybees. Bees are an essential link in our food- and flora ecosystem. They pollinate a third of what we eat. The loss of biodiversity threatens the survival of the bees.

Due to monocultures and pesticides the bees get weaker and they become more sensitive to bee diseases as varroase and colony collapse disorder.

The biodiversity of the city -the balconies, parks, streets, wastelands and city gardens- shapes a perfect foraging area for the creation of a superb and delicate honey from the neighborhoods, in our case of the Kanal and the Brussels' inner-city.



## Mushroom Experiments

#176 [<http://opengreens.okno.be/project.php?id=176>]

#579 [<http://opengreens.okno.be/plant.php?id=579>]

(pleurotus ostreatus, tricholomataceae)

The growth of the Pleurotus Ostreatus [<http://padma.okno.be/Vh5b7ps5/00:00:00.000-00:00:30.000>]

For two weeks now, my livingroom is a surrealistic studio.

Every half an hour sharp lightflashes wake me up, day and night.

There is a faint smell of moist wood and moss,- difficult to describe in detail.

Close to a pharmaceutical smell.

A big transparent plastic bag is set on a small pedestal.

The plastic bag is filled with fresh willow woodchips, the woodchips are mixed with pleurotus ostreatus spawn.

It took 4 weeks for the mycellium to overgrow the woodchips.

The white and windy network grow daily deeper and deeper into the bag.

The 5th week, the mushrooms popped out the fissures in the plastic bag.

During 5 days and 5 nights I made every 30 minutes a picture of the growing mushrooms.

We can see them grow at a steady pace.

The resulting timelapse movie is a nice example of a natural time bending process, compressing 5 weeks in 1 minute.

Where is the litterature which gives expression to Nature?

He would be a poet who could impress the winds and streams into his service, to speak for him; who nailed words to their primitive senses, as farmers drive down stakes in the spring, which the frost has heaved;

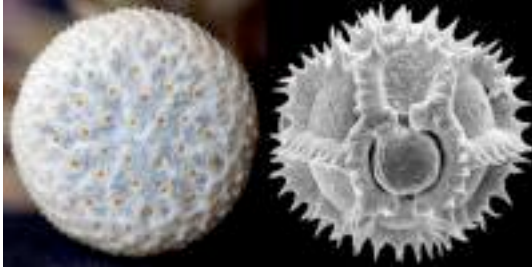
who derived his words as often as he used them – transplanted them to his page with earth adhering to their roots;

whose words were so true and fresh and natural that they would appear to expand like the buds at the approach of spring,

though they lay half smothered between two musty leaves in a library – aye, to bloom and bear fruit there,

after their kind, annually, for the faithful reader, in sympathy with surrounding Nature.

20)



## Flight Routes

#277 [<http://opengreens.okno.be/plant.php?id=277>]

#372 [<http://opengreens.okno.be/plant.php?id=372>]

#496 [<http://opengreens.okno.be/plant.php?id=496>]

(*taraxacum officinalis*, asteraceae)

#310 [<http://opengreens.okno.be/plant.php?id=310>]

#208 [<http://opengreens.okno.be/plant.php?id=208>]

#406 [<http://opengreens.okno.be/plant.php?id=406>]

(*calendula officinalis*, asteraceae)

I am obsessed by the mobility of my honeybees. Their take-off from the landing platform is so fast that I can barely notice the direction they pick to reach their foraging patches. On their way home on cloudy days the small bodies struggle head-wind and they persist to reach the hive before the rain bursts through the dark skies. Sometimes, they just seem to be downy feathers carried by the windstreams.

The flight mechanism of a honeybee is comparable to a miracle of robotics. It is extremely difficult to simulate their natural flight movement. A lot of scientists studied the wings, the wing muscles and the 8-pattern up/down, back/forth movements they make during flight. Etienne Jules Marey<sup>21</sup>) was one of the first scientists to capture instants of this 8-shape figure-movement with his electric photographic gun.

I try to understand the Old Beekeeper's secret innovation, but till now but till now I could not decypher his guidelines.

The wings of the honeybee have a very specific, finetuned design. A bee carrying a load of nectar and pollen would require a wing too large to allow it to enter many of the flowers it collects from. Therefore the honeybee is equipped with a double wing. Flying, the two parts hook together with some kind of velcro-system. And they fold neatly into one wing when reaching the flower to collect the nectar.

Their wings beat up to 200 times a second. The vibrations are sustained by a muscle-hinge made out of a very resilient material called resilin. The wings can flex millions of times without breaking. When the wings are literally used up, the honeybee dies a silent and lonely death, by preference far away from the hive.

The skyline of Brussels.

The sound of the wind is hitting the microphone in slow waves, after a while this rumble is mixed with the cry of a lonely bird and a faint hum of an insect.

Occasionally one or more bees enter the picture and circle around the flowers.

The skyline is at a distance, a static camera, wind noise in the microphone.

Birds whistle far away, more birds enter the soundscape, police sirens in the back.

The noise of wind is mixed with the humming of the bees is mixed with the distant sirens.

An abrupt switch to the skyline, police sirens, no more bee sounds, wind noise in microphone, no more bees, airplanes are taking over.

In 1992 the DARPA (US Defense Advanced research Projects Agency) sent out a call for the design of 'micro aerial vehicles, mobile microrobots. Their target was to develop a flying vehicle that could fit into a 15cm sphere, weight no more than 140 grams and could fly up for at least 2 hours in a range of 10 km and operate in winds of 50kph. The robot had to be able to manoeuvre independently, without a remote pilot-operator<sup>22)</sup>.

At Harvard University, scientists are developing the ideal robot honeybee, called the 'robobee'. The researches' website<sup>23)</sup> states that 'the collaborators envision that the nature-inspired research could lead to a.) greater understanding of how to artificially mimic the collective behavior and intelligence of a bee colony; b.) foster novel methods for designing and building an electronic surrogate nervous system able to deftly sense and adapt to changing environments; and c.) advance work on the construction of small-scale flying mechanical devices'. More broadly, the scientists anticipate the devices will open up a wide range of discoveries and practical innovations, advancing fields ranging from entomology and developmental biology to amorphous computing and electrical engineering.

The Harvard experiments are highly theoretical. In practice a few global corporations patent GMO's and enhanced seeds and destroy by their actions the local food cultures. Food security is in the diversity of the seed, but here they create hunger with monocultures. Alternative cultivators and urban farmer collectives continue to organize alternative seed-exchange<sup>25)</sup> events to secure the diversity of their crops and to secure a diverse and safe supply for the honeybees. City dwellers train themselves more and more in urban foraging<sup>26)</sup> for survival.

This spring, nature is generous. The bees' hind-legs are loaded with red pollen from the horse chestnut and the taraxacum officinale.



## Edgelands

#341 [<http://opengreens.okno.be/plant.php?id=341>]

#556 [<http://opengreens.okno.be/plant.php?id=556>]

#580 [<http://opengreens.okno.be/plant.php?id=580>]

#581 [<http://opengreens.okno.be/plant.php?id=581>]

(daucus carota, apiaceae)

Edgelands, canals, vacant lots, post-industrial wasteland. Waste dumps to which we ascribe an aesthetic potential. Nature in the post-industrial era is a secondary nature, a second hand nature, a post-cultural nature.

Weeds. Immigrant weeds. Exotic plants.

Immigrations happen anyway – it is more important, even essential, to learn how to approach what is foreign, and how to deal with it. Edgelands are debatable zones, neither city nor countryside. In-between places, passed-through but never really noticed. Unnamed places, ignored, but at the same time the wild place right at your urban doorstep. Allotments, railways, roadside verges, wasteland and standing water, they all show us a strange beauty, all of their own.

28)29)

The site of Thurn&Taxis is one of the biggest edgelands in the center of Brussels. Close to the canal, it's situated in an industrial area that is in full development.

A silent soundwalk was taken by 8 participants starting from the front door of Okno, and concluding at the most northern section of the Thurn & Taxis edgeland. Such a soundwalk involves all the participants walking without talking and eliminating any other distractions –mobile phones, cameras, etc. Each

participant walks behind one another at a distance so as to avoid listening to each others footsteps. This soundwalk was 45 minutes in duration, passing along busy city streets, the canal, through the Entrepot Royal building of T&T, and across the former trainline, which is now open and abandoned and transformed into a thriving grassland ecosystem.

The goal of a silent soundwalk is to get participants to think about the sonic properties of moving through marginal land, and about the difference between passive hearing and active listening. A series of questions were posed before the walk to get people thinking and to stimulate post-walk discussions. For example: are sounds encountered incidental to other phenomena, or are they designed to be heard? How do spatial properties of an environment effect the ways in which sounds are heard? Or, inversely, how do sounds effect spatiality? How do sounds interact with our other sense perceptions?

Silent Soundwalk [<http://opengreens.okno.be/project.php?id=441>]

We started our walk from Okno.

The noise from the busy street was very loud and oppressive.

As soon as we arrived near the water, it became less oppressive even though the sound level stayed more or less the same.

Apart from the rustle of the tree leaves there were hardly any natural sounds.

Luckily this changed as we went into the Thurn & Taxis site. Once the noise dropped it became clear to me how big the influence of sound is on your state of mind. I'm constantly (subconsciously) trying to keep out the noise. This means you can't open up and relax. Entering the wasteland, this changed and I could feel myself again. Hearing the rustle of plants and the sounds made by the surface I walked on it felt like coming home. An intimacy returned, I could reconnect with the environment.

What stroke me was that while we were walking in the urban area the noises were mainly generated as by-products from activities. The noise of cars, drilling, constructing things... The noises generated to communicate, like talking, music, the beeping sound of a truck driving backwards or a sirene were minimal. From the moment we entered the grassland zone in Thurn & Taxis it all got reversed. The birds took over. We could still sometimes hear airplanes or trains, but mainly the sounds were generated by natural elements. The by-products, eg. the sound of the wind through the grasses was quieter than man-made sounds. It was also interesting to realize that when we were standing a bit lower, next to the canal, the sound of the cars was less overwhelming, and we started to hear sounds generated by the water of the canal. When walking under tunnels, the sounds also changed, we could hear the height of ceilings. In the urban landscape entering a building worked as a shield for the ever present traffic noises. Thinking about this I realize that when we were walking close to a wall in the city the sounds were really oppressing, but when we crossed that same street and started to walk next to the canal, they were less annoying. As if the openness of the field would flatten the sound. Maybe it's also that stone walls reverberate the sound, whereas grass, earth just absorbs it...

Having arrived only two days ago to Brussels, I was interested in the sonic properties along the silent soundwalk as an outsider. I kept relating the sound environment on the walk to soundscapes that I usually encounter where I live. For example, along the canal the sound of car tires on cobblestones is a sound that represents much of my sonic experience in Edinburgh. Also, I paid more attention to the human voice. than I normally do during such an activity, as not understanding the languages spoken meant that I could listen to the voice as sound, rather than as communication. Of course the transition from the city streets to the grassland ecosystem was sonically stark, but what interested me was the ability to act as a composer of the soundscape, as I was in control of regulating the direction and pace of walking. Every time I undertake a silent soundwalk I feel that I understand better how I relate to the sound world, and how I am an active participant in the making of that world.

Thurn & Taxis Edgeland [<http://opengreens.okno.be/garden.php?id=23>]





## OpenGreen Technology

#422 [<http://opengreens.okno.be/plant.php?id=422>]

#582 [<http://opengreens.okno.be/plant.php?id=582>]

#583 [<http://opengreens.okno.be/plant.php?id=583>]

(papaver rhoeas, papaveraceae)

End of autumn. Noon. The temperature is suddenly raising to 17.5°C, unusual for the fall. The foraging bees leave the hive and return with the last pollen.

Ivy. A range from deep orange to greenish yellow. The bees are very nervous. Young worker bees –yet the winter bees– make their first flights around the hive. Their dances are directed by the suns' warmth and (non) presence. Bees are sun-loving animals, they adore the warmth.

In 1977, Joseph Beuys created a monumental installation for documenta 6 in Kassel, Germany. Entitled 'Honeypump in the Workplace', it pumped two tons of honey through plastic tubing, using motors lubricated with over 200 pounds of margarine. Honeypump was the embodiment of Beuys' idea that energy (in this case, honey) and heat (generated by the machine's motion) are symbolically connected to the notion of social sculpture. Beuys often cited energy and warmth as important concepts in his sculpture. The two are closely connected physical phenomena: heat is in fact a kind of energy and is often produced in tandem with other kinds of energy, such as light and motion. But for Beuys they also were powerful metaphors suggestive of the transformation, both spiritual and physical, that he felt contemporary culture needed to undergo <sup>30</sup>).

Thermographic Camera [<http://padma.okno.be/Vi7ig8uI>]

We decided to experiment with OpenGreen Technology and started to build small robots with electronics and organic material of the rooftop garden. The most simple way to create and build 'life like' machines or robots is by using analogue oscillator circuits. Thus simple neuronal network-behavior can be simulated.

We built different kind of robots. In combination with tiny motors and piezo loudspeakers the robots make small movements and generate soft sounds. All these machines are based on extreme low energy circuit designs and are powered by the electric energy from very small solar-panels or DIY honey-batteries. Honey has conducting qualities. The analysis of our spring and summer honeys points out that the summer honey is twice as conductive as the one produced in the spring<sup>31</sup>).

All the completed robots are placed in the garden. Some of these creatures are connected to botanical or fungal organisms. The system-design recycles and reuses elements straight from the garden: leaves, thin twigs, wax from the beehive, beautiful poppy seedpods.

And there are also candlelight robots. These tiny mobile robots are based on the suneater-circuit. They can be driven with just the flame of a candlelight. The light of the candle is transformed into electric energy that is stored in a capacitor and then released to a motor, producing movement. The circuit and motor are cast in beeswax, with just the motor shaft and the solar panel sticking out. The robots

resemble suicide bomber-terrorists, with the capacitors stuck close to their body, a blinking green led and a wick to be lit.



## Textual Garden

#487 [<http://opengreens.okno.be/plant.php?id=487>]  
#488 [<http://opengreens.okno.be/plant.php?id=488>]  
#489 [<http://opengreens.okno.be/plant.php?id=489>]  
#542 [<http://opengreens.okno.be/plant.php?id=542>]  
#543 [<http://opengreens.okno.be/plant.php?id=543>]  
#544 [<http://opengreens.okno.be/plant.php?id=544>]  
#545 [<http://opengreens.okno.be/plant.php?id=545>]  
#546 [<http://opengreens.okno.be/plant.php?id=546>]

(thymus serpyllum, lamiaceae)

Dark blue, nearly black pollen: Papaver Rhoëas.

Dark purple pollen: Phacelia and Echium Vulgare.

Dark green pollen: Geranium Palustre and Geranium Sanguineum.

Textual Garden [<http://padma.okno.be/Veeoqm2v/00:00:11.000-00:01:05.000>]

A long hot spring, a short rainy summer, wild flowers are exploding. Plant names appearing and disappearing, some larger, then smaller, appearing obscuring and slowly being obscured, grown over, disappearing in time, time growing over them with new plant names, time occurring latticed with plant names effacing the past occurrence of plant names, time effacing itself remaining visible through small traces of plant names, obscured by density. Areas of acquired density occurring, plant names swarming around invisible criteria, Verbena and Thymus being exceptionally pertinent to this criteria. The simultaneous registration of ephemeral change and movement, the appearance and disappearance of plant names from the visible field. The recurrence of certain plants, recurring and polarising, collapsing under streams of other data in the form of plant names appearing, swarming over it, disappearing behind the time signatures of the appearance of plant names, a lattice of occurrence and recurrence.

How sustainable is the city?

The New York Times reports that German airports use Biodetective Honeybees to monitor air quality. This year the first tests were conducted in early June at Düsseldorf International Airport, and the bees rated well.

A German lab tests these honey samples twice a year and looks for compounds like hydrocarbons and heavy metals. Airplane, taxi, bus and car emissions, as well as local industry contribute to poor air quality around airports.

The latest tests showed remarkably interesting results:

the airport honey was comparable to honey produced in areas with no industrial activity. The use of bees are one way to track those toxins because their honey would have clear signs of pollution. If they use nectar from flowers produced by toxin-exposed plants, that would show up in the honey. Members of a local beekeepers' group keep the bees. The honey, Düsseldorf Natural, is bottled and

given away as gifts.

About 200.000 bees are involved in the Düsseldorf program. The work is a simple way for public understanding of the effects of pollution.

According to Albert Einstein, If all the bees disappeared of the surface of the globe then man would only have four years of life left. No more bees, no more pollination, no more plants, no more animals, no more man<sup>32</sup>).

Honeybee populations are declining around the world and so far there seems to be only one other way of pollinating mass numbers of plants. It involves employing people to go round with feather dusters, brushing the insides of plants with pollen. They are already doing it in parts of China to pollinate pear trees in areas where the insects are extinct.

Universities in the UK are currently trying to work out how feasible it would be to employ people to hand-pollinate plants.

It's being estimated how much an apple would cost if you paid someone to hand-pollinate earning the minimum wage. Early estimations suggest it would be more than double the price. When you consider a single hive of fifty thousand honeybees pollinate half a million plants in one day it is clearly not a practical solution. But maybe an alternative for unemployment? In any case better than the futuristic scenario of the pollinating robobees of Harvard University!

A formula to calculate the Economic Value of the Honeybee:

$$V_{hb} = V \times D \times P = \text{€}$$

the total amount can reach more than 50.000.000 ! yearly.

$V_{hb}$  = Value HoneyBee

$V$  = the yearly amount in € that the crop produced on the vegetable auction

$D$  = the part of the insect in pollination

$P$  = the part of the HoneyBee in pollination

How sustainable is the city?

Can we provide for our own food, our own energy, our own media ecology? Can we grow a selection of fruits and vegetables in rooftop gardens or collect wild edible plants in wastelands and on building sites – enough to live on?

We, the inhabitants of the OpenGreens, we propose another view on space, time and everyday life. We offer small solutions for living in the cities in a different way ...

We wish to alter our habits, so we have different ideas on what is most essential and necessary in our lives. We break with the common rules, we deviate from the norm and we create dynamic structures. We are living in these temporary places, called the OpenGreens.



## Bee Politics

#585 [<http://opengreens.okno.be/plant.php?id=585>]

(*valeriana officinalis*, valerianaceae)

#224 [<http://opengreens.okno.be/plant.php?id=224>]

#365 [<http://opengreens.okno.be/plant.php?id=365>]

#402 [<http://opengreens.okno.be/plant.php?id=402>]

(phacelia, boraginaceae)

the Swarm [<http://padma.okno.be/Vs623ohg/info>]

On a beautiful day early june, the carnica bees started unexpectedly, without any signs, to swarm.

They gathered in one of the olive trees in the rooftop garden, and after a few hours they formed a perfect cluster, ready to move. This followed a collective decision on where to go.

To raise new queens the workers build queen cells. Shortly before the first of the new queen emerges from her cell, the old queen leaves the hive accompanied by half of the community. The other half of the population stays in the hive, with a newborn queen.

The swarming bees settle around the queen in a large cluster. Scout bees are busy looking after a suitable nesting site. They inform the waiting swarm in bees' language –by dancing on the swarm's surface– in what direction and at what distance the new home is to be found.

All age groups of bees are represented in a swarm, so there will be no shortage of building labor.

Can we humans learn something from the behaviour model of social insects? Concerning decision making processes and true democratic approaches, bee colonies are far ahead of us humans. In swarm situations bees display a strong pattern of direct democracy. All the scout bees – the ones looking for a new home for the colony– have the same goals or interests: find the best home possible. Slowly, over a few hours, the swarm is building a consensus all together. This compared to human democracy (in which actors often have different interests), democracy mostly means a process of majority voting.

In a 'local' knowledge (the scout bees interact mostly with only a part of the swarm and they often don't know what the scouts at the other side of the swarm are up to) vs. a global knowledge (humans are able to have an overall view, to study every argument or proposal from every representative in detail) the control of the group's actions is distributed instead of being represented by the words of a few leaders<sup>33</sup>).

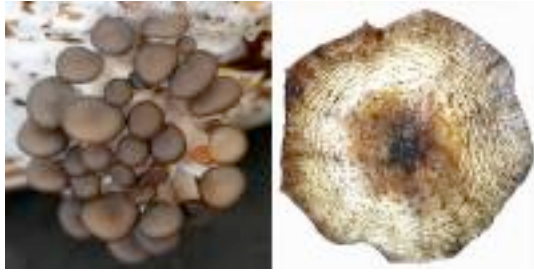
We can compare this process to a dynamic network vs. an hierarchy, or e.g. the bottom up Reseau Citoyen City Network in Brussels vs. the topdown worldwide Internet. An open competition among the proposed ideas is a smart solution for a decision making process that is based upon a mass of information dispersed across a group of individuals. A super organism compared to an active collective of

individuals, it's still a huge difference. Bee-qualities are a model for nonlinearity, small tactical units, network oriented models of action, distributed intelligence and complex behaviour.

Can we make links between insect behaviour and media technology? Translations between biology, entymology and technology? Render their creative behaviour in generative patterns and shapes? Learn from their coordinated actions for living and foraging in the cities? Interpret their buzzy actions into dynamical and inspiring sources for the realisation of new artworks? Biomimetics for locomotion solutions, navigation and last but not least for panoptical vision...

**Robbery in the Apiary** [<http://padma.okno.be/Vtol3xkd/00:00:01.000-00:08:30.000>]

The girls at the flighthole are nervous and defensive, there is no more food, no work, the situation is unstable.  
After extracting the last honey of the season, I was feeding the bees with sugarwater and gave them their own honeyframes as a desert, on a spot away from the hives.  
While half of the colonies discovered quickly the new foodsource, other bees attacked one of the weakest colonies of the apiary.  
Suddenly they all charged the food resources of the green hive, whose guard bees could not stop this sudden attack.  
As a beekeeper, it was my responsibility to intervene and help the green-hive-bees. I tried to set up a barricade, to tighten the entry at the flighthole. Only after 5 hours was the situation back to normal.  
Why this sudden aggression? A search for food in times of scarcity? Maybe I should try to understand. After 18 months of non-smoking, I'm still craving sometimes for a cigarette ...



## Mushroom Double

#565 [<http://opengreens.okno.be/plant.php?id=565>]

#75 [<http://opengreens.okno.be/project.php?id=75>]

(*stropharia rugosa annulata*, strophariaceae)

The mushroom hunter's toolkit: an open basket, some plastic containers for protecting delicate, small or poisonous mushrooms, a sharp knife, a looking glass, a camera, a notebook, a fieldguide and a hat<sup>34</sup>).

I went to hunt at the Jardin Experimental Massart, one of the former fieldwork locations of the biology department of the Free University of Brussels. The garden was created in 1922 by Jean Massart, professor of botany. It has an extremely rich variety of medicinal plants and a humid zone with ponds and marshes. There is also a small patch with wild plants native to this environment and exclusive to the Brussels region. And of course many many mushrooms.

City dwellers don't have to travel to the countryside for picking mushrooms. They can easily find them in urban environments, in parks and gardens, on cemeteries and road verges. The best known metropolitan mushroom is the Morel. It is thriving in the forest bark mulch that covers the municipal flower beds. There's even a mushroom species called the Pavement Mushroom! But one has to be careful for increased risks of pollution and concentration of soil residues in these urban mushrooms.

On my way over to the Jardin Experimental, I was thinking about one of the 20th century pioneer artists, John Cage.

John Cage was not only a major figure of the musical avant-garde but also an avid mycologist, collector and consumer of mushrooms. His knowledge of the fungal world was legendary. *Indeterminacy* was a lecture/performance work in which Cage recited a series of one minute stories and anecdotes in no particular order. Many of these stories related to his love of mushrooms and his experiences of collecting and studying them.

In the experimental garden I picked some of the mushrooms to study them in my studio. The movie 'Mushroom Experiments with John Cage' gives random impressions of the research of the species under the microscope, accompanied by an excerpt of *Indeterminacy*, read by Cage <sup>35</sup>).

**Mushroom Experiments with John Cage** [<http://padma.okno.be/Vhqxb16m/00:00:04.000-00:08:17.000>]

This summer I'm going to give a class in mushroom identification at the New School for Social Research.

Actually, it's five field trips, not really a class at all.

However, when I proposed it to Dean Clara Mayer, though she was delighted with the idea, she said, "I'll have to let you know later whether or not we'll give it."

So she spoke to the president who couldn't see why there should be a class in mushrooms at the New School.

Next she spoke to Professor MacIvor who lives in Piermont. She said, "What do you think about our having a mushroom class at the New School?"

He said, "Fine idea. Nothing more than mushroom identification develops the powers of observation."

This remark was relayed both to the president and to me.

It served to get the class into the catalogue and to verbalize for me my present attitude towards music: it isn't useful, music isn't, unless it develops our powers of audition.

But most musicians can't hear a single sound, they listen only to the relationship between two or more sounds.

Music for them has nothing to do with their powers of audition, but only to do with their powers of observing relationships.

In order to do this, they have to ignore all the crying babies, fire engines, telephone bells, coughs, that happen to occur during their auditions.

Actually, if you run into people who are really interested in hearing sounds, you're apt to find them fascinated by the quiet ones.

"Did you hear that?" they will say.

Walk through the Kravín Forest [<http://padma.okno.be/Vgczk2np/00:00:06.000-00:01:58.000>]





## Windflower

#587 [<http://opengreens.okno.be/plant.php?id=587>]

(hedera helix, araliaceae)

Time Flies [<http://padma.okno.be/Vsriilax/00:00:00.000-00:02:22.000>]

Just a perfect day. Indian summer. The bees bring in pollen in abundance, from dark yellow to greenish blue. I notice for the first time the immense ivy covering the whole backside wall of la Bellone, the art center. Winterfood for the bees. The thousands of umbels made up by its small yellow flowers makes me think of toy propellers. If they would start to rotate all together they could lift the building and gently deposit it some meters further away ...

Today I started to note down the inside hive temperature every hour, and compared it to the outside temperature and the outside humidity.

In the mild afternoon sun I read Indeterminacy. Cage was a well-known mycologist. Crazy about fungi. Short stories and mesostics about mushrooms.

And later, in the afternoon, I met Thoreau. Walden & the civil disobedience. Wild is exiting, he says. And tame is dull.

Writing the wilderness. Can a poem give expression to nature?

Later, before sunset, I clean out the rotten tomatoes but I harvest their seeds for next year and I sow some winter lettuce in the cold greenhouse.

The olives are slowly ripening and the figs are big and sweet.

I do some more measurements inside and outside hive#01. The in- and outside temperature values go up- and down on a relational basis.

I expanded the observation by adding a digital thermometer to the hive#03, which is situated next to hive#01. I put the sensor in both hives right in the broodnest. The average outside temperature is much colder yet, at night the temperature often drops down to 4 degrees.

I notice the immediate rise of inside-hive temperature, now that the sensor is in the center of the broodnest. In daytime (no immediate sun) the hive temperature is rising till 36 degrees, at night the temperature drops to 23°. There is a difference of  $\pm 3$  degrees in the average inside hive temperature of hive#01 (less) and hive#02 (more). I don't know (but should find out) if this temperature difference is due to the (still) high varroa contamination of hive#01, even after 2 treatments with Thymovar.

## references

- 1) Robert Ashley, Dust
- 2) Margaret Atwood, the Year of the Flood
- 3) Vandana Shiva, Staying Alive
- 4) Robert Smithson, Collected Writings
- 5) Richard Mabey, Weeds
- 6) Ernst Haeckel, Art Forms in Nature
- 7) Bert Hölldobler and E.O.Wilson, the Superorganism
- 8) <http://www.arduino.cc/> [<http://www.arduino.cc/>]
- 9) <http://www.json.org/> [<http://www.json.org/>]
- 10) <http://xmpp.org/> [<http://xmpp.org/>]
- 11) Michel Foucault, des Espaces Autres. Hétérotopies
- 12) [http://en.wikipedia.org/wiki/Voronoi\\_diagram](http://en.wikipedia.org/wiki/Voronoi_diagram)
- 13) [http://en.wikipedia.org/wiki/Fibonacci\\_number](http://en.wikipedia.org/wiki/Fibonacci_number)
- 14) <http://en.wikipedia.org/wiki/Phyllotaxis>
- 15) Philip Ball, Shapes
- 16) [http://timeinventorskabinet.org/wiki/doku.php/bee\\_monitoring\\_workshops](http://timeinventorskabinet.org/wiki/doku.php/bee_monitoring_workshops)
- 17) Eva Crane, the History of Beekeeping and Honey Hunting
- 18) <http://en.wikipedia.org/wiki/Honey>
- 19) <http://www.cari.be>
- 20) Henri David Thoreau, Writing the Wilderness
- 21) Picturing Time, the works of Etienne Jules Marey
- 22) Peter Forbes, the Gecko's Foot - Bio-inspiration engineered from Nature
- 23) <http://robobees.seas.harvard.edu/>
- 24) <http://www.seed-sovereignty.org/EN/>
- 25) <http://www.wildfoodschool.co.uk/>
- 26) Lois Weinberger, catalogue
- 27) Paul Farley & Michael Symmons, Edgelands
- 28) <http://www.walkerart.org/archive/4/9C4311B2C56C80996167.htm>
- 29) [http://en.wikipedia.org/wiki/Conductivity\\_%28electrolytic%29](http://en.wikipedia.org/wiki/Conductivity_%28electrolytic%29)
- 30) Thomas Seeley, Honeybee Democracy
- 31) John Wright, Mushrooms
- 32) John Cage , Indeterminacy