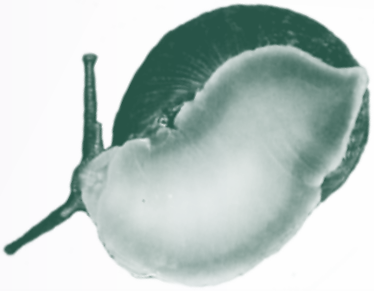
more-than-human data interactions in the city

Project Reflections



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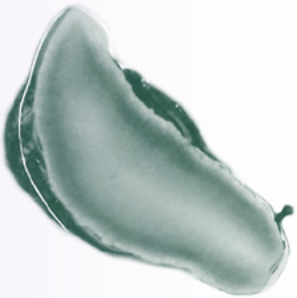


Introduction

Sara Heitlinger and Alex Taylor

How might we design urban spaces to be more hospitable for a fox? How might a worm or a nettle plant experience the neighbourhood we live in? What kinds of urban data might a parakeet find useful? And how might digital infrastructure help us create more equitable living spaces for all of London's inhabitants, human and non-human, big and small? These are some of the questions that we asked in the More-than-Human Data Interactions in the Smart City – or MoTH Cities – project. A research collaboration that involved academics across five institutions as well as two community organisations, the MoTH Cities activities took place between May to December 2021.

There are many different ways data is collected about people, services and resources in our cities. Some of this data helps organisations make key decisions about the ecological health of urban spaces. Much of this data is managed by local authorities or environmental organisations and not always available to local communities seeking to improve their neighbourhoods with a diverse range of species. Data collection technologies and sharing strategies have also been designed with a focus on human behaviours and interactions.

In this project we used creative methods to decenter the human and instead draw attention to the ways in which humans and non-human others—such as soil, trees, foxes, weeds and insects—rely on each other to flourish in urban spaces. We explored what it means to design for data interactions through what we call a more-than-human perspective. This is to imagine other ways data could be collected, repurposed and interacted with to support diverse forms of life and enrich the ways that different species live together in the city. This booklet presents some initial reflections from the project.

What we did

In July 2021 we brought together a diverse group of around 50 researchers, activists, community organisers, gardeners, artists, landscape designers, policy-makers, and other interested citizens to explore these questions and concerns in two workshops in east London. We organised ourselves and our thinking using a series of design probes and proposals. These were intended to be used as a way to help people move beyond a human-centred perspective and consider the city from the perspectives of other species. In addition, workshop participants adopted a non-human species to roleplay throughout the workshop. Species included urban animals such as foxes, parakeets, earthworms and bumblebees; plants such as lime trees, dandelions, and tomatoes; and microscopic life such as nematodes and bacteria.

Workshop 1:
Pets and pests in the community garden

We worked with Kate Poland and Debbie Mitchener from partnering organisation Cordwainers Grow to develop a workshop that focused on multispecies urban planning, asking how we might

↓ Participants gathering in the Garden of Earthly Delights in the first workshop

design our urban spaces for flourishing multispecies relationships. Building on Cordwainers' practices of participatory walking and mapping of community gardens in Hackney, east London, we planned a workshop that involved walking and mapping of community gardens, structured around an activity booklet that included some of the probes and proposals.

We began in a community garden in Hackney (the Garden of Earthly Delights), situated on disused land and turned over for cultivation by local people. We explored where we, as our different species, might go about our daily business looking for food and love, raising our young. A listening activity prompted thinking about the different kinds of data that might be available or useful in that space for different species. We walked to the Haggerston Community Orchard, in Haggerston park, full of old-growth trees and wildlife areas. Here we tried to understand the different issues of urban space for other species by completing a FixMyStreet complaint, which triggered discussions around the different, conflicting needs of multispecies inhabitants in urban space. We looked at a London planning map, and explored different types of data that might be useful for different species. Finally, we gathered around a large map of the area to imagine combining data sources with different species to map out and imagine new services for different non-human inhabitants.

Workshop 2:
Life and death in the cemetery
For the second workshop we collaborated with Hari Byles, Ellie Doney and Melissa Thompson from the Roving Microscope to focus on our relationship with other species across different scales, including the microscopic. The workshop was set in the Tower Hamlets Cemetery Park, an overgrown Victorian cemetery that

One of the probes in the activity booklet completed by a lime tree participant in the first workshop

is home to many rare species. We built on the Roving Microscope's practices of collecting soil samples and viewing microscopic life through community microscopes as a way of paying attention to different species across different scales and considering ways of making the invisible perceptible. We also incorporated the design probes and proposals to generate ideas for new smart city services and infrastructures to repair interspecies relations and create more equitable cities.

Where do we go from here?
At a final event in December 2021 we wrap up the project with an evening celebration of talks, demonstrations, multispecies games, live music, food and drink amongst the plants, animals, and microbes that live and pass through Spitalfields City Farm in east London. We have also created a Discovery Box of ideas and probes that have been developed out of ideas generated in the workshops. We would like to explore how the Discovery Box might be used by different people in their work and daily lives, as a way of expanding our relationships with other species in the city. A website is also on the way at: **mothcities.uk** where we will present all the materials and reflections from the project, for others to build on.

About this booklet
This booklet presents reflections from team members, project partners and participants from the workshops. Andy Boucher and Bill Gaver describe the series of design probes and proposals, which were used in the workshops to help us think about how we might develop empathy with non-humans species, asking about whether data could be used by other species directly, rather than mediated through humans, raising issues of equality and power. Rachel Clarke takes inspiration from the roleplay elements of the workshops to explore the workshop sites from the perspective of four different species. Kate Poland from Cordwainers Grow discusses how the first workshop changed the way she experiences the city and her ongoing work with other gardeners and policy-makers. Helene Schulze ponders all the lives of different species that inhabit our cities and whether having data about them could change planning decisions to protect community growing spaces such as the Garden of Earthly Delights. Hari Byles and Ellie Doney from the Roving Microscope discuss how the activities in the second workshop developed out of their participatory microscope project and reflect on issues of inequality and power dynamics in research projects such as this one. Cagatay Turkay wonders in his text how much we are missing in our data systems, and considers what it would mean to visualise the under-represented, unseen, forgotten, and thus "unvisualised", such as the movements of non-human species in the city. Viktor Bedö, a researcher and educator who participated in both workshops writes about how he adopted some of the workshop activities in a new workshop he ran with design students. Alison Powell concludes the booklet with reflections and a poem composted from TS Eliot's The Waste Land to consider non-human inhabitants of the city from a relationship perspective, from the ground-up – literally.

Naho Matsuda's magic touched all aspects of the project. She was involved in the design of the initial probes, produced the activity book and all the other visual materials for the project, helped to plan and deliver the workshop activities, and designed and produced the Discovery Boxes. She also designed this beautiful booklet.

Workbooks

Andy Boucher and Bill Gaver

Early in the project, we worked with our design team (Dean Brown, Naho Matsuda Liliana Ovalle, Andy Sheen, Mike Vanis) to produce a series of probes and proposals to help us all think about what more-than-human* smart cities might mean.

To us, probes and proposals are different. Probes are tasks we give to people to help them tell us about themselves and the topics our projects address, while proposals are suggestions about what directions our design work might take. This distinction is often blurry in practice, however. Reactions to probes can help us think about what we might do, and reactions to proposals can tell us about the person reacting. So here we don't labour the differences but present a few examples from the 50+ probes and proposals we designed.

These explore issues such as how we might develop empathy with more-than-humans, how they might be represented politically, what services and infrastructure might suit them, and how data might be used for more-than-human benefit. Underlying them all, we explore questions such as whether more-than-humans can use data directly, or just if it is mediated by only-humans, and what it might mean to share the smart city with more-than-humans not as dependants or interlopers, but as true equals.

For instance, asking people 'where do you go to…' while thinking of different non-humans reminds us of the things they do and the places they go that we don't see and might not think about. Imagining a leaflet drop from non-human neighbours spurs us to think about how such information might be made more easily available. Listening to Moondog's fabulous 'Enough about Human Rights' puts us in our place and helps us see crushed snails with more sympathy.

Other proposals question how we can share power and the benefits of technology more equitably with neighbouring species. How can they be better represented – or even represent themselves – in government? Can we rethink technologies, like self-driving vehicles, for their benefit? How can we create signals that they can read directly? Or should we just relinquish half our space to them? Just how serious are we about sharing cities with the myriad of more-than-humans around us?

Proposals like these are simple and evocative, rather than detailed and prescriptive, creating a space for designs that can be elaborated by ourselves and others. Each is a simple pointer to a direction of design, opening possibilities and questions for future development. Some are serious, some impractical, some might be important, others not. More significant than the individual proposals is the design space they create, with each proposal a kind of temporary settlement within it, that can be further explored, expanded or focused.

* These days, some researchers use 'more-than-human' to refer to inanimate agents such as algorithms or furniture. In contrast, others – including us – use the term to refer to the different living beings with whom we share the planet.

Choose your species. Find your location.
Where do you go to:

a) Find food
b) Find water
c) Sleep
d) Keep a lookout
e) Meet enemies
f) Hide
g) Escape
h) Have sex
i) Give birth
j) Raise young
k) Recover
l) Die

Non-human Neigbours
Leaflet Drop

Local ‘pests’ are recontextualised as neighbours we must learn to get along with. People and animals are first introduced via a monthly leaflet drop. In this case David the fox explains a bit about himself, including how long he’s lived around here and what he likes and dislikes about the area. Overleaf is contextual data and information resources about other non-human locals.

What about snail rights?
Leaflet Drop

Listen to Moondog (over and over) and think about why nobody seems to care about all the snails crushed against the tarmac.
https://youtu.be/-dLPsw3i_P8

Non-human Members of Parliament

Each borough in London (or in any other city) could have its own non-human local MP. The NHMP would be elected by humans and work closely alongside the human MP. They would be emblematic symbols and subjects of debate as to which species deserved representation in a particular area. When viewed collectively they would embody the broad non-human constituents that reside within London.

Driverless Hedgehog Bus

A network of autonomous vehicles could pick-up stray hedgehogs, taking them from dangerous urban areas and dropping them off at nearby green spaces. Concerned citizens could report hedgehogs, which would dictate the route of the Hedgehog Bus.


___ yds


Water feature
300 yds


Empty shed ____

Proposed rules for sharing the city:
1. Animals get outdoor spaces.
2. Humans get indoor spaces.

In large wildlife preserves like the Kruger, it is unsafe for people to wander freely. The land belongs to the animals and we can only visit. In cities like Toronto, the harsh winter weather has led to an indoor network of skyways and tunnels that allows people to traverse the city without going outdoors. If we genuinely want to share cities with animals as our equals, we could build on this logic by choice rather than necessity.

Workshop filth and seeds

Rachel Clarke

I started to piece together memorable fragments from the workshops and then thought: "What could this feel like if I was something else?"

I am worm
The containers in the garden are high. The ground around them is hard and rough for my sensitive skin. I've heard there are other pots in the garden, but I stay in the containers, feeding, gorging, twisting and turning, dancing in the soil. I go up down, left, right in the dark. I'm not looking for a mate, just feeling way through the glorious filth of people's rotting left overs, the leaves from the autumn trees, the carcases of dead insects and animals, the ground down grit and grime of the city.

If someone comes along, we'll have sex, sure I'm friendly like that. Anyone will do. I'll create a cosy slime duvet to cuddle up with my beloved until we're done. It's not lonely down here. We're all friendly, making more of us, squirmy wriggly new versions of ourselves, lots of us, if we're happy. I don't listen to the muffled voices above, just feel the vibrations of footsteps, trains, cars and rain. The rain is good when it comes. I head to the surface to feel it fresh and hard on my back, but have to avoid the tricky birds. The blackbird in spring is good at finding me, even when it is hot and dry, she will dig and turn over the dirt leaving a trail of destruction. In winter I need to avoid the robin. There is less cover to hide and I am more easily discovered.

I am nettle
I am nowhere to be seen on the concrete streets, roads, gardens or in the park. The pristine pedicured grass with summer excitement, people playing football, having picnics and stomping around. I can not see my own kind, not even at the dark edges, where I like to hang out. But beneath the canopy of the trees there is a giant forest of friends, sitting and protecting the roots of the very old trees. Deep down underground I am healing the soil, changing it, fixing nitrogen for the trees to help them grow and stay healthy and calm and whole, so they don't drop their branches like leaves. We are cordoned off. Our spot is separate from other people so they don't get stung by me. Stay away and don't spend time in the dark spiny forest where I have been allowed to prosper with the trees and crawlies.

I can't wander freely at the surface as I am contained, but underneath the ground I can do what I want. I can spread and spread my roots until something hard like a fence means I find a new route. I can spread and spread my seeds in summer across the grass, when the wind shakes them free and birds and insects feed, and carry them out and about. If I wander too far across the grass they take me away before I can take hold. I hope at least when they do this they are making me into refreshing tea.

I am dandelion

The meadow is filled with colour and despite being bright yellow, I am well hidden amongst the weeds and grass. A cacophony of chaotic colour and shapes in a patch of well managed green. It is a bright summer's day and I am in full bloom. My thick roots run deep underground and my leaves sprawl and crawl across the grass when I can. Park rangers don't like this and like to spray me, but I am never too far away. I am resilient and strong and have been around the block. I can find ways to grow wherever I am, so you can't really stop me. I will be here when you have gone.

Small insects love hiding in my thin rectangular petals where there are layers and layers of time built up like a puff ball of yellow joy. Insects love climbing across the dome of my flower even though their black bodies become visible to feeding birds who swoop and peck them off my bright sunshine shaped cap. My stem is perfectly balanced to allow the heavy queen bumble bee to sit and rest for a while, to drink the nectar before she is on her way to set-up a new home. Pick me at your peril though. The white puss in my veins makes you piss the bed, or so they say. Better pick me when I have turned grey and fluffy with age and you can share my seeds with the wind.

I am rat

There is so much good food to be had in the city. I am never ever hungry finding human scraps is my daily buffet. People are so kind. Sweet and savoury treats in back streets and containers that are so accessible for me and my family to pick at. And my family is getting bigger every day so we have more and more mouths to feed. That doesn't seem to be a problem though because the food just keeps coming. I like it when it is that time of year when fresh fruit and veg start to appear on the trees and in gardens, people don't seem to mind that we take it. They sometimes put nets, traps, and fences, to try and stop us but we can work around these things; chewing holes, fooling traps or squeezing our bodies into the smallest of spaces. We need to watch out for the crows though. They are cunning and smart. They watch us from up high and know when we are out and chase us from the food. They like the same food we do, but they can travel for miles and see what is happening from up above. We sometimes learn from them, see where they are hanging out as this is usually where there is some good food to be had.

Could urban planners be less human?

Kate Poland

Sometimes when I'm walking around my allotment and nearly treading on a toad or beetle, I try to imagine what animal I would be in the wild – churning up soil, lumbering heedless of the smaller creatures at my feet, deracinating plants, turning things upside down but also providing nutrition and water. I usually compare myself with a large bovine beast grazing, plodding heavily, crushing habitats but often just standing around ruminating. This perspective has arrived since I did the More than Human walk with City, University of London. We arranged a group stroll from one community garden in Hackney to another taking on the 'persona' of a different creature – a bee, bird or butterfly for example. It seems like a simple and perhaps childish thing to do but it really has changed the way I look at the urban environment and how I might plan green spaces within that. And I want to pass that shift in perspective on to other gardeners.

As part of the walking tour, we looked at various tasks in the probe pack which I found beautifully creative and appealing. I love the sideways approach to the environment – how would you make signposts relevant to a bat? How would you advocate as a different animal? How can we put nature at the centre of decision-making rather than on the fringes?

Cordwainers is a small organisation that hopes to connect people with their environment and each other in similar creative ways. We support community gardens and gardening in Hackney, East London. Two years ago we set up a Union of Gardens to help make them more visible, combine and exchange skills and resources and advocate for these small but valuable spaces. We know the many benefits gardening – and community gardening in particular – provide for people and nature. They are safe spaces which can help reduce isolation and anxiety and improve social, physical, environmental and even political health. The Union hopes to promote their many benefits and make them more accessible for more people and creatures.

Over the years we have run a short course on how to set up and maintain a community garden. We start with design – looking at the space and designing it to take account of how people want to use it. Now I've explored the probes, I'm thinking about incorporating them into the early stages of garden design to look at how other creatures might use the space for food and water, rest, nest and procreation – and also putting more thought into the levels of sound and light. This would not only help those creatures by providing food and habitats, but will help us by making green spaces more resilient. I'm working with Hackney Council and residents to design and develop some spaces to turn into gardens on a couple of estates so will be putting this into practice straight away by brazenly copying some of the probes for the consultation.

On a bigger scale, the one thing that community gardens fear is Planning. One of the reasons gardens join the Union is if they are under threat and, usually being small and isolated, have little support in the wider community to protect or even advise them. There is understandable competition for space in this densely populated place. Housing needs to be built but if nature and community isn't incorporated into plans – at the very least – we will end up with a very unhealthy population which, in the end, will cost more (if cost is how we measure these things).

We have built up relationships with parts of the council we bump into like Parks, Housing, Regeneration, Resident Participation or Public Health. We meet them in person and they come to events. They understand the importance of green communal space. The department that NEVER comes out into the community is Planning. We are only likely to meet them if we have the time and courage to turn up at one of the intimidating planning meetings at the council when it's usually too late. It's no wonder they dismiss our concerns and only consult us after the plans have been submitted – often with nature and climate resilience as an afterthought. They really don't understand the environment they serve.

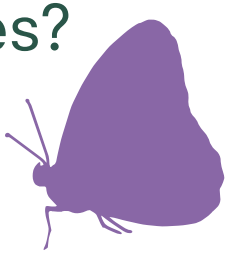
We tend to categorise nature into goodies and baddies (ladybirds, bumblebees, robins – Good; magpies, wasps, ivy – Bad) but all are as destructive or beneficial as each other, and each provides food for something else. If you let those aphids on your roses be, rather than zap them with pesticides, some blue tit will discover them and dispatch them within minutes. Similarly, if we were more tolerant of the moulds, beetles or caterpillars that find food or shelter on our plants we might start to see them as a positive indication of life. This is just a shift in perspective and helps us to see nature as a whole, interrelated thing. A question I ask myself now when I look at a pigeon or other familiar 'pest' walking around the streets is not 'what is it?' but 'what is it doing?'. It might be foraging, nesting, wooing or learning to fly, all in our busy, noisy, smelly, human-centric streets. The creature then becomes fascinating, almost wondrous (how can anything survive here?) and its status as a pest is irrelevant.

Gardeners often have to think outside ourselves because we need to put our plants' needs ahead of our own. We need to assess how water, nutrition, light, soil, space and aspect might affect the plants we raise – as far as possible from the plants' point of view – to make a healthy space. If we can extend this way of thinking to nature in general, the streets around us and us as animals within that landscape, perhaps we will allow nature the space, light and peace to survive or even thrive.

If nothing else I will be spending more time as a cow ruminating on it all.

Whose voice counts in protecting our green spaces?

Helene Schulze



"Care is a human trouble, but this does not make of care a human-only matter."
Maria Puig de la Bellacasa

I stared at the timber panels trying to imagine what might be going on behind them, in the safety of the rich, dark earth. We built the Forest Garden planter as a sort of demonstration site to show how all of the plants nestled within it interacted with one another, fulfilling different functions, building an ecosystem and supporting each other. Remembering this, I drew all the creatures I hoped were now thriving: munching, mating, ruminating, in the safety of the soil. Then I drew all the creatures I could see buzzing around the leaves and flowers. Then I thought of those critters that would only come in the safety of night, to burrow and forage, or at the very least those that weren't interested in the company of humans. I drew them all on a cross-sectional sketch of the Forest Garden planter as part of the Pets and Pests workshop.

The Garden of Earthly Delights, in its first iteration, was nestled behind the Iceland at Hackney Central Station, on a forever bustling, large connecting road. It had stood derelict for many years prior, earmarked for a future development expanding the station entrance. In the meantime: it was empty.

We occupied the site with the intention of building a 'pop up garden,' a vital, abundant green pocket. We wanted a habitat for local wildlife, as well as a warm, inviting space for local residents to relax, play, grow and eat together. Within a month, thanks to the tireless energy of many, we did just that: built a garden from scratch using almost solely repurposed materials and donated tools.

I drew arrows on the sketch to name the insects I knew I wanted to find in the soil (earthworms, ground beetles, springtails) as well as those that had caused us some trouble (slugs, snails, cabbage white butterflies). I marked on the few birds I'd been able to identify and had seen in the garden. I noted the local foxes, the rats, the bats that flitted across the sky in balmy summer evenings. I thought of the dogs visitors brought into the garden that enjoyed jumping and running freely. I thought of the local cats prowling, on the hunt. Eventually I drew myself, a little way off from the forest planter, perched on an old stool.

For several years the garden flourished. An evolving collective of growers, artists, architects, carpenters, local residents and activists looked after the space. We grew food offered for free harvest to all who wanted, hosted workshops for kids, learned from one-

another about the different ways of growing food. We held events around the fire and gathered to garden together over hot summer weekends. We hosted seed swaps and gave away plants. We taught people to build their own windowsill planters and gave many away during lockdown so that local residents could feel all the benefits of growing at the height of the pandemic, when the garden itself had to shut. We built a strong community, and the space was carefully maintained and dearly loved.

After drawing myself on the cross section of the planter, I realised I'd only drawn all the creatures I could easily identify with my eyes. I thought of all that unidentifiable to my imprecise eye, to the vibrant, pulsing microbial life. They must all be in the soil as well. And in my gut and the guts of many other animals I'd listed. How long this list now becomes.

We knew that we'd have to leave the space at some point. The station expansion was on the cards and the Council would want us out. All the same, it was sad when it did come. You become attached to a space, to the people you meet within it, to the way it makes you feel when you pass through the gates.

We vowed to work as closely as possible with the local council, so we could bring some flavour of this special place to the station development. Our arguments were plentiful: green spaces are essential for our wellbeing, they clean up polluted air, they are a space for our kids to play, they offer opportunity to learn about the natural world etc etc etc. The list is long and we rattled it off.

Yet we spoke primarily from a human perspective. Yes, we mentioned the garden as a habitat for local wildlife but we didn't have all too much evidence to substantiate this claim. We also weren't under the impression that even if we did indeed have this evidence, it would support our case. It seemed that only proof of bat habitats would impact the development process.

What about all the other creatures I drew on my cross section of the forest garden planter? What if I had come to the council meeting with a list of all the species and how they relied on the garden for their home or food?

How might our conversation have changed? 'Right, if we're closing the garden, then we're going to have to rehome these beings.' These are creatures that would have a much harder time on the concrete and glass surfaces of the new proposed entrances. Many of them we can't see so readily, or they come when we are not there, but they are also stewards of this space. They make and enrich the soil, they pollinate our flowers and create rich webs of life. The garden wouldn't exist without them. And yet they have no voice in decisions about their home, these species are hardly considered at all.

Care begins with paying attention, with training the eye to observe closely the things we might usually pass over. It's about really understanding the multitude of critters in the garden, getting to know them, seeing what they offer, what they need. I wish I had known them better earlier, so that I might have better brought them to the table in discussion with the Council. Whilst I can never speak fully for other creatures, I can learn to listen, and I can try, clumsily and forever imperfectly, to have their backs when it counts.

Changing our relationship with microscopic life

Hari Byles and Ellie Doney

The Roving Microscope team (Melissa, Ellie and Hari) organise events aimed at shifting relations between humans and microbial life through offering different perspectives for engaging with soil ecology, and its vital role within wider ecosystems.

A key tool for doing this work is the use of a shared microscope which we have made available for public use outside of lab settings, in workshops and "microscopic lunches" that we organise in community gardens and kitchens. This enables audiences to go deeper into the microscopic worlds that they inhabit and which inhabit them, mediating new connections and affections between humans and non-humans.

Our microscope is part of a knotty web of multi-sensory tools, strategies, methods and creative knowledge practices that include video-making, co-drawing, foraging, cooking, close writing, painting billboards, fermenting and compost-making. All offer different entry points for relating to microscopic life:

"it is very exciting - something you've never imagined in a lump of soil, and it's amazing to see that it's alive actually... even if things move, people think it's just the wind or something - it's very much alive the whole thing... "
(a previous Roving Microscope workshop participant)

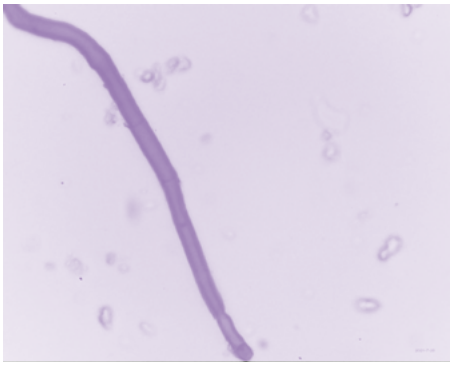
Reflections on the MoTH workshop, activities & collaboration

We were invited to collaborate on organising and delivering a microscopic lunch as part of a research workshop about life and death in the soil food web at the Tower Hamlets Cemetery Park. We used some of our previous multi-sensory methods and tools, to investigate some of MoTH's research questions, and contribute towards the project objectives to design new interspecies city services or infrastructures.

The first activity was a soil-food-web roleplay game in which participants were given info cards and identity stickers representing different members of the soil food web and a large ball of string. We threw the string between us and shouted across the field each time a connection was made, creating a beautifully knotty tangle of connections.

The graphic design of the cards and stickers helped people understand and visualise what for example, an arthropod or organic matter actually was. Even so, people weren't quite sure, and there were lots of questions thrown out to the circle, which the group and facilitators attempted to answer together.

The second activity was a game of hide and seek. Participants were asked to mark out a small area anywhere in the cemetery with a piece of string, looking out for members of the soil-food-web and any interactions or relationships they could spot. They were also asked to collect soil samples or interesting objects for examination under the microscope. People enjoyed having time to stand and stare, which resulted in some original insights and observations about the soil-food-web and inhabitants of the cemetery (this bit probably could have gone on much longer).



Strand of hyphae, protozoa and bacteria from cemetery soil (400 x)

"I was looking for Fungi. I couldn't find any, but I did find a beer can, so ...we were wondering about, you know, what would be detrimental to the environment there. Like, would the beer itself be ok? Would that provide sugar? Would that be acceptable or not? And then the can itself. We were talking about the fact that the paint finish of the can could be very damaging, the metal itself might rust into the soil. I saw some insects there. I saw some leaves there. And you know, that a leaf will take weeks or months to biodegrade compared to a beer can that would take possibly centuries, is quite striking contrast really. It would make a nice home for someone. And beer is a fungus! Yeast is a fungus. So I did find some fungus!"
(workshop participant)

Microscopic lunch, eating and looking together

We set up the projector so not everyone needed to look down the microscope and prepared samples of cheese and pond water for people to look at along with their soil samples and other finds. This enabled participants to visualise the

microscopic inhabitants of the park that they would later be designing for. The intention for this workshop was to bring together a wide ranging community to respond to the research questions, however this wider engagement was tricky given the constraints of the project, and many workshop participants came from academic backgrounds.

Non-academics in the group voiced some confusion, that they felt out of place or that their knowledge (of gardening or landwork) was not valued. This made us reflect on the role that academics and academic projects play in defining the questions and themes for projects like this, that are concerned with land, the future of urban space, and addressing injustice/exclusion. We have since wondered how this power/knowledge matrix could be distributed differently, so that wider communities are involved from the beginning in designing research which responds to their needs and interests.

In our group design session after lunch, we discussed the ways in which inequalities between humans are upheld by design interventions, consultations, and local decision-making processes. And suggested that, when addressing the deep inequalities between human and more-than-human interests in urban design, it also feels important to acknowledge and interrupt inequalities between humans.

How can we make new inventions which challenge these power imbalances; democratising, co-designing and commoning? Before driverless hedgehog buses and non-human members of parliament, perhaps we need to speculate about smart inventions for designing, thinking and dreaming together in ways which reroute and disrupt the systems of inequality which frame urban life?

We can do this in small ways too, through designing workshops that bring many different people together and give lots of space for emergent ideas, reflection and action. Reflecting on the fullness of these workshop activities, we wonder if the microscopic lunch would work well in future as a social "way in" to connecting with human and more-than-human life. For participants to gain a more detailed understanding of soil health, dedicated time and focus would be needed. Going forward, we want to prioritise time for workshop attendees to look through the microscope (if they want to), contribute their questions and perspectives to the discussion, connect with each other, challenge us and develop insights as agents in the activity.

Collaborating with the MoTH team on this project has helped us to gain new perspectives on our own methods and tools. It was exciting to be part of such a large project with so many creative and passionate thinkers. We also expanded our understanding of what 'data' can be, learnt about the tensions surrounding 'smart cities', and encountered some amazing creatures under the microscope we'd not met before.

Workshop 2 participants looking for evidence of the soil-food-web

Out of sight, out of mind

— visualizing the unseen/forgotten/invisible

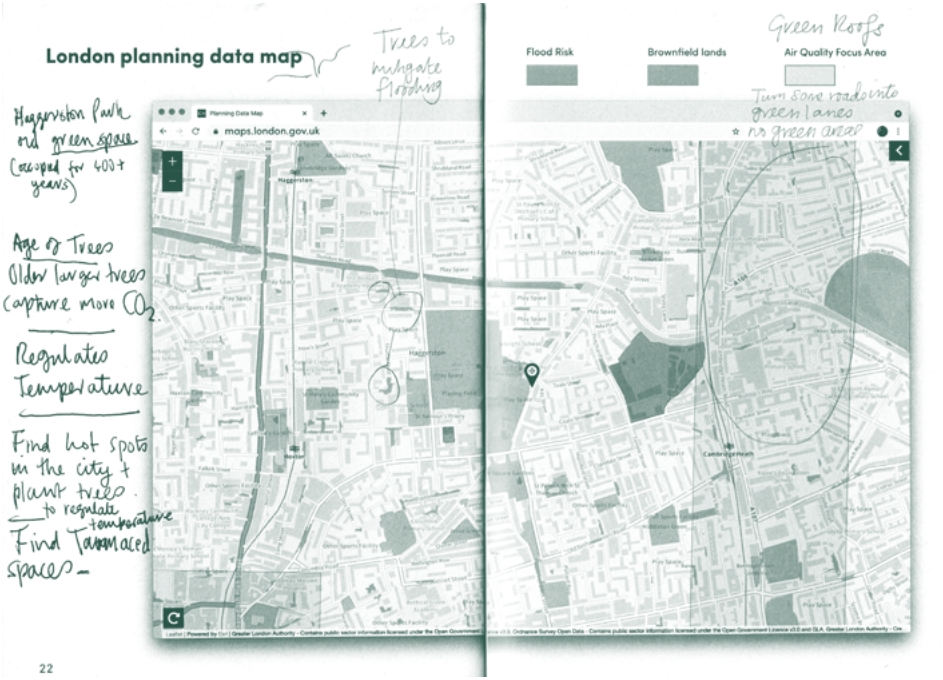
Cagatay Turkay

Data visualisations are lenses that we see data through, devices through which we make meaning of data and the phenomena they relate to. They depict data visually in one form or the other, sometimes as static charts, sometimes as interactive digital mediums that we can engage with. They are ubiquitous now in our smart cities -- we come across them as maps and charts that tell us stories about the places we live, help us consider data in different forms of planning in our everyday lives, and they are put to use as "efficient mediums" that distil large volumes of information for decision-makers to reach decisions on the future of our cities. Visualisations are often perceived as complete, objective representations of data and the reality that the data relates. But how can visualisations be complete, when the perspectives one could surface are missing from the data, or even worse, when there is no data to begin with? Can the role of visualisation be to visualise the missing, what is not seen, left out?

One of MoTH project's starting points was to point at the missing more-than-human-perspectives in our understanding of the urban and the data that are missing that can operationalise such perspectives. In her work, Mimi Onuoha talks about "missing datasets", which she describes as "blank holes in otherwise data-saturated systems" -- holes most often relating to the most vulnerable in our society, and holes that should be filled, but not yet -- for one reason or the other.

One realisation that emerged from the discussions at the workshops was how much we are missing in our data systems — many species and many intertwined mechanisms between multiple species happening around us are under-represented, unseen, forgotten, and thus "unvisualised". What would it mean to be able to see the routes that the urban foxes are taking during the night, the microbial populations in different city parks, the number of spider homes on our street, along with the data that we generate and collect about our own presence in cities, would we plan our actions differently, make decisions differently?

Reflecting on how we understand and gather data in our urban data systems is a good first step. Citizen science projects across the UK and the world where members of the public gather records of various species — birds, butterflies, moths and bats are some of the first few that come to mind — have contributed tremendously to biodiversity and conservation projects, and have shown the power of these approaches. But, how do we expand on these experiences to various other unseen species, how do we innovate in our methods of data collection? Through playful role-playing methods and data walks, the workshops have shown us fresh perspectives in how we can look differently to our surroundings, use these perspectives to generate unconventional forms of data and pushing us to find ways of putting different species "on the



Map of Haggerston Park and surrounds from workshop 1, showing relevant planning data from the perspective of a lime tree

map". The species-perspective-maps emerging from the workshops are exciting examples of how different forms of data can take shape -- what a parakeet might be thinking at different parts of a park, what a cabbage-white butterfly might find useful, dangerous, or interesting to explore. Such data might not always be collected for modelling, for running systems more efficiently, but could be collected to reflect, create a dialogue, to become aware — a form of "slow data" — in a similar vein to how Giorgia Lupi and Stefanie Posavec refer to their hand drawn data sketches in their Dear Data project.

Gathering and making such data available is a crucial first step, and then comes transforming and making that data visible and understood in ways that we can comprehend, discuss about, and reflect on. This is where visualisations can come into play, but there are some interesting challenges. Much of the activity in and around us are happening at various different scales without us noticing or unable to comprehend, so the data will reflect that framing. These can be scales that are not visible to the human eye, or scales not easily relatable to the human mind. For instance, how can we understand a 5mm journey of a soil nematode in a planter on our street, and how does that translate to our morning commute? Another such scale is time — how can we appreciate processes that happen in different temporalities? How do we see the mechanisms at play on a decaying piece of wood, which species consume which parts and at what speeds? How do we build bridges between how we and different species experience time, bringing us closer to understanding them?

These questions emerging from this project are fascinating to reflect on as

a visualisation researcher. What are some visual lenses that can show us stories at different scales, similar to a microscope, but helping us see data at multiple scales while revealing the complex relations between them. How to design data narratives that relate, for instance, the fast-moving people of cities with the slow-moving processes of other species, in ways where both are valued and related? How can visualisation be a medium of interaction and communication between us and such unseen, forgotten, and invisible species and mechanisms in the urban, so that we can recognise, appreciate, and understand them, and build on these reflections to find better ways of cohabiting the urban spaces?

Helene Schulze's piece — that is also in this booklet — reflecting on her interactions with the Council on the Forest Garden planters is a vivid example of why we should do more to make multiple species visible and give these perspectives a voice in discussions that shape how urban spaces are transformed. It is essential, and also exciting, to explore further how we can broaden our understandings of data to make our urban data systems inclusive and agile to accommodate multi-species-perspectives; to further develop innovate ways of recording that encourage us to look differently to our surroundings; and to find new ways of seeing (data) that can help unravel the intertwined, multi-scalar, and multi-temporal multi-species relations happening around us. These questions and the discussions above are all framed from a human meaning-making perspective -- so possibly the more important question that we need to ask is: how do we extend the meaning of "us" in these questions to other species, what would that mean to think not only about data and visualisations "of" but "for", and even "with" other species? We don't have the answers to these challenges yet but we have some very good questions to begin with.

The Garden of Earthly Delights from Workshop 1 as mapped by a white cabbage moth

I am a nettle:

approaching more-than-human service design

Viktor Bedö

The struggle of shifting perspective

The workshop title 'Data Interactions In The More-than-Human Smart City' on the first reading suggests questions about sensor types, algorithms, interfaces, devices, apps, mobility solutions and what they afford to hedgehogs. I would argue that the workshop goes far beyond that in not only investigating knowledge embodied in design, but the frontiers of the knowable for designers' bodies.

Feminist thought foregrounds the stakes of de-centering from an exclusively human perspective for the survival of the planet. Philosophy of mind wrestles with humans' capability of accessing others' minds and adopting others' perspectives; be it other humans, bats or thermostats. Performance studies acknowledges that although enacting non-humans does not allow humans to turn into non-human but that qualifies as a potent pre-representational tactic for turning to them. More-than-human design speculates about and struggles with adopting perspectives of other-than-human beings or things to grasp other-than-human needs and affordances.

I am a nettle in the Garden of Earthly Delights. Standing on the asphalt, I am surrounded by plant boxes, vegetable beds, bushes, trees. Around me a

Workshop materials for the student workshop: MoTH City probe pack, Futurice IoT Service Kit

worm, a rat, a bird, and other creatures are trying to find their place in the garden, just like I do. I am motivated, but clueless. I know that I eat water, soil and sun. I know that I am larval food for several species of butterflies. I gather that the grassy patch around a small tree could be a good place for me. Then it hits me: how am I going to move there? … I long for interaction with others. Do I see them? Do I smell them? What physical or chemical exchange will alert me about their presence and what will we exchange. Enacting a nettle is a struggle. I am set up for failing, but there is no way around failing forward.

3 steps of non-human service design

The strength of the MoTH City workshops lies in roleplaying other-than-humans in order to probe and reflect on how the city could meaningfully interact with them. One of my takeaways from this inspiring workshop was that thinking about more-than-human data requires speculating about services for non-human beings.

The experience of adopting other-than-human perspectives at the MoTH City workshop together with my inclination to explore service design pathways, motivated me to develop a new workshop setup that combines the probes from the MoTH City project with a toolkit for designing IoT (internet of things) based services. I hosted a three-hour workshop for bachelor students in my experimental design practice course called 'Grasping the Future City' at the Critical Media Lab Basel. The IoT Service Kit is an open access card set developed by the innovation agency Futurice* to facilitate the conversation between technologists and diverse stakeholders about IoT-enabled services in homes, industry sites and the city. The cards depict sensor types,

Traffic signs

*iotservicekit.com

interaction types, devices, users, data sets, all of which are building blocks of IoT services. I incorporated the MoTH City probes in the 'Grasping the Future City' class as a way to enable students to shift from an exclusively human perspective and to create an 'other-than-human extension card set' for the IoT service kit.

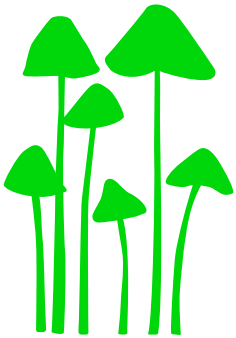
In the first stage of the workshop, we attempted to embody non-humans such as worms, snakes, bees, lime trees by roleplaying their sensing and sensibilities. Students had 10 minutes to research the internet about the urban being of their choice: What does it like? What does it dislike? What does it like to interact with? What does it produce? What does it consume? After this quick research, we went out on the campus to roleplay this being while interacting with the environment and other beings.

In a second stage, we used the 'Sign posting for non-humans - Traffic rules' exercise from the MoTH City probes. The students produced simple traffic signs with relevant information for their species, placing them in the environment or on themselves. Signs involved directions, warnings and bans such a warning for bees to fly on to more interesting plants, a ban on activities that cause vibration or a welcome note for insects on a lime tree.

In the third stage of the workshop, we used the IoT service design kit to design services for some of our non-human species, such as worms, bees, or snakes. In doing so, we introduced new cards for a future 'more-than-human' extensions card set for the IoT service design kit.

One service was a temperature drop early warning system for bees and snakes. This speculative service used regional weather data and local temperature sensor information to predict radical temperature drops to which snakes and bees who–as far as our imperfect research suggested–would react sensitively, and would issue an alert. While the availability of weather data is straightforward, the means of delivering the alert to bees and snakes called for introducing new kinds of devices and interactions to the more-than-human extension pack. The choice that day fell on hormonal and scent-based messaging delivered either by a drone-mounted vaporiser or to the soil via water solvent.

The closing discussion of the workshop session touched on the insufficiency of human capacities for speculating about other-than human existence in the city. But also, how the awareness of this insufficiency should not stand in the way of incorporating other-than-human needs into designing cities. The paper prototype of the 'temperature drop early warning system' triggered a discussion about solutionism, mindfulness about invasive technologies, and the responsibility that comes with intervening. The whole experiment made evident the need for strategies for designing meaningful more-than-human services and the identification of meaningful data sources to fuel those services.



→ String activity from the second MoTH Cities workshop: Life and Death in the cemetery

Waste lands within: unreal city

a composted version of TS Eliot

by Alison Powell
November, December 2021

This poem is a recasting of TS Eliot's "The Waste Land", published in 1922. "The Waste Land" is a modernist masterwork, weaving together social commentary and elegiac observations of a burgeoning City of London overwhelming itself, its people and its natural environment. Eliot was attentive to the visceral angst of city life, while also weaving fragments of other poems, stories and songs together to evoke the interconnections between past, present and future, and the connections between very disparate protagonists. Its passionate language and striking structure hit at the heart of the difficulties of modernity and urbanity: alienation from others, pollution and waste, gender inequalities, and an always inchoate set of other possibilities for being, which Eliot explored through reference to an enormous range of cultural material, from Ovid to the Buddha, as well as through a character, Tiresias, who unites youth and age and transgresses gender boundaries.

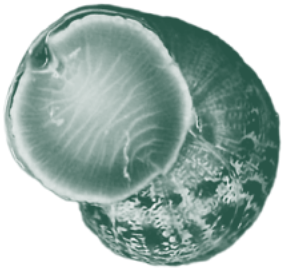
Many London dwellers of 2021 would recognize the century-old angst and ennui in "The Waste Land". For many readers, the horror of the poem is revealed in the devastation it sketches about a world with too little water, a barren earth, a delayed thunderstorm that didn't seem to nourish the ground as it should have. Among this environmental horror (mirrored with the social horror of alienation and difference), so many contemporary concerns are already carried in the original poem.

What seemed worth exploring, especially as a result of the MoTH project, was a more relational view of urban life. "The Waste Land" is full of 'more-than-humans' – animals, trees, the river Thames, as well as the infrastructure of the modern city (bridges, boats and barges). Yet the perspective still comes from 'outside and above: the God Eye' as Donna Haraway calls it. What kinds of new emotions and reflections might be produced by taking a more relational perspective? Furthermore, what kinds of claims about a meaningful life or meaningful connections to place and to others might be made from this perspective?

In reworking (or perhaps digesting) this poem I wanted to explore how the emotional relationships that Eliot sketched between people could be viewed from the ground up, or more specifically, from inside the living soil. The hybridized (or composted?) poem is told from the perspective of the organisms living in the city's soil: earthworms, nematodes and fungus. In the MoTH research, we explored how relationships unfolded between different species living in cities, and created speculative design material that foregrounded what we imagined

might be the needs of our non-human neighbours: undisturbed soil, clean rain, organic material. Where our reflections encountered more difficulty was in trying to imagine what our non-human neighbours might WANT – what might be the desires of a fox, a bee or a fungus?

This poem uses the depth and power of "The Waste Land" to try to create an entry point to this question of desire. It blends together lines from the original poem with original writing to hint at a different kind of collective, a living 'we' that tries to foreground other-than-human experience. Like compost, this broken down, re-created and perhaps decayed poem is an uneven, partially digested version of the original, consciously placing the non-humans of the soil in prime speaking position. Hopefully, like compost, it is also nourishing and rich.



Waste Lands Within: Unreal City

Unreal city; stirring, we awake
Moving to our desires, entwined and enveloping
All of your afterthoughts within.

Are we alive or are we not? Breeding
Bodies from bodies, earth from scraps
The brown fogs to hot rains
The cries of ravens in the night.

All things are on fire,
All rivers bear empty bottles, sandwich
papers, cigarette ends of City directors.

Will it bloom this year?
We hold the echoes in our skins,
The corpse, the sudden thaw disturbed.

We are decay.

Where the nightingale? She departed
Yet we remain; what are the roots and which are us?
Amongst the rock one cannot stop or think
If there were rock
And also water

We were there. Neither alive nor dead.

Your shadow at morning;
Memory and desire.
We revive faster than you know
Out of this stony rubbish.
We are the possible.

HURRY UP PLEASE ITS TIME

We foretold, for being long here
Away from the light.
I think we are in rats' alley
Where the dead men lost their bones.

We keep the bones.

For the rain.
If it comes.
When.

Hold the river sweats, the grimy spoils
The hopeful spoor, the dust and angst
Remade

Under your feet, before the thunder
In epic time, we die.
Passing into the bodies of friends
Or lovers, deep beneath

While you count
Exhausted wells,
Manage the deluge
Connect nothing with nothing

We swallow, hold, connect.

ONLY CONNECT.

In the waste land
Shored against ruins.

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Garden of Earthly Delights
The Garden of Earthly Delights now lives just 300m down the road at 161 Graham Road, E8 1BT.
www.facebook.com/gardenearthlydelights

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The Roving Microscope is a community microscope club in Bethnal Green, that has been exploring human and soil ecologies.
@roving_microscope
elliedoney.co.uk/projects/roving-microscope/

Colophon

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Sara Heitlinger

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The academic team includes:
Sara Heitlinger, Alex Taylor, Rachel Clarke, Alison Powell, Cagatay Turkay, Andy Boucher and Bill Gaver.
Research Associates: Naho Matsuda, Andy Sheen, Mike Vanis, Liliana Ovalle and Dean Brown.
Project partners included: Kate Poland and Debbie Mitchener from Cordwainers Grow, and Hari Byles, Melissa Thompson and Ellie Doney from the Roving Microscope.

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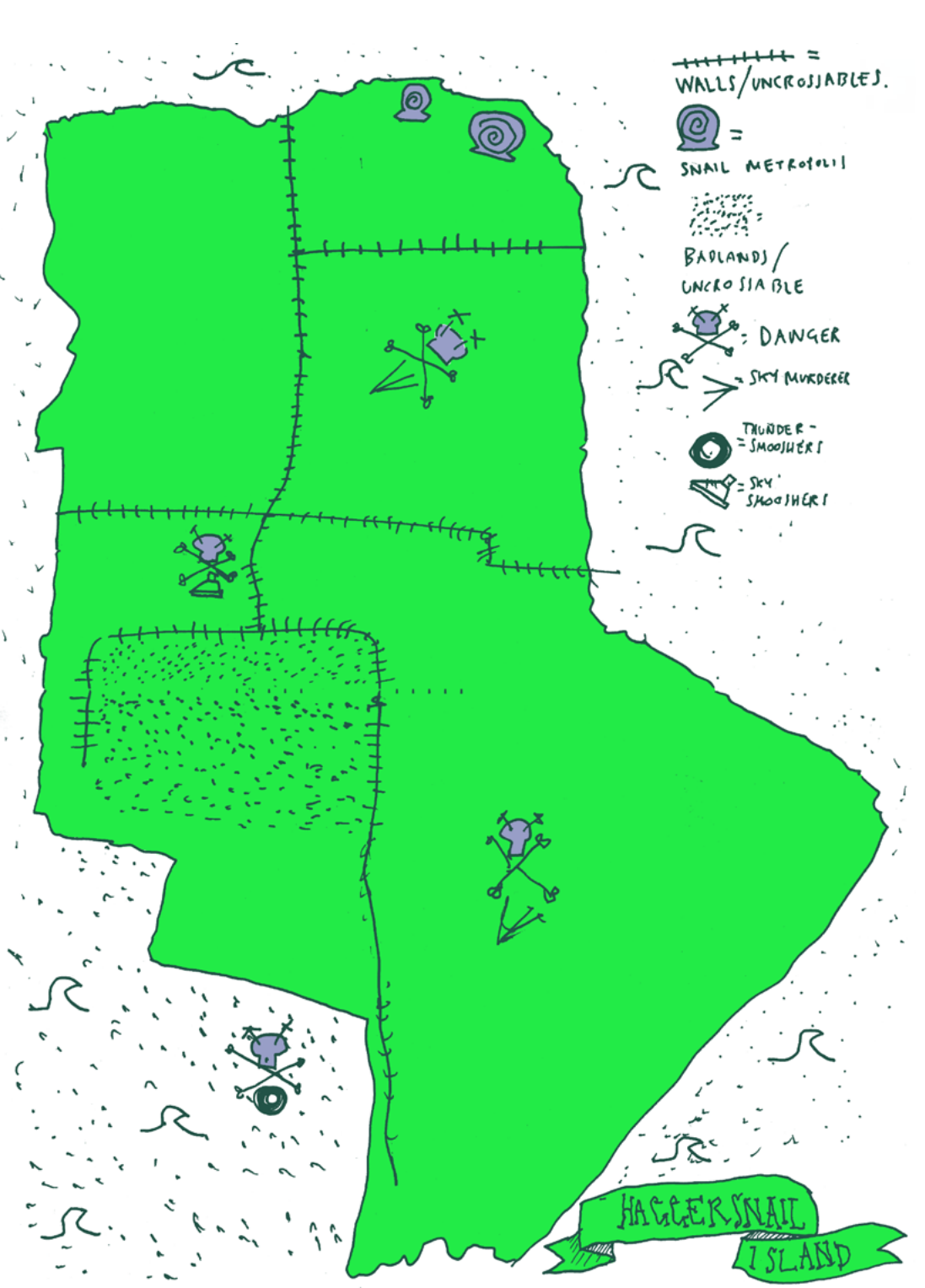
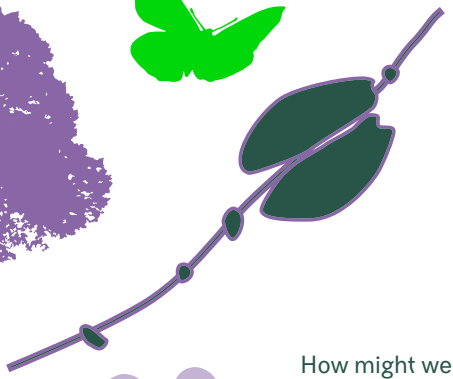
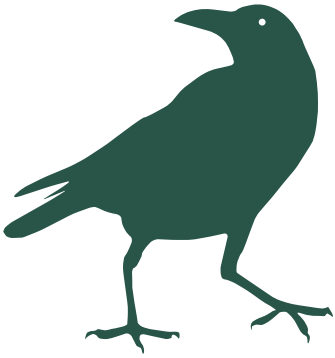
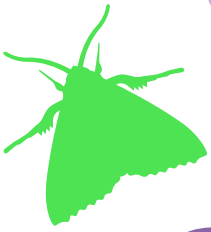


A participant's drawing from the first workshop activity of mapping Haggerston Park



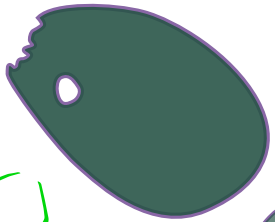
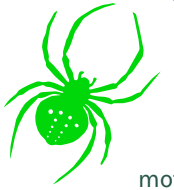










How might we design and plan urban spaces to be more hospitable for foxes? How might a worm or a nettle plant experience the neighbourhood we live in? What kinds of urban data might parakeets find useful? And how might we design new technologies for more equitable living spaces for all of London's inhabitants - human and non-human, big and small?

This booklet brings together reflections from a research project called "More-than-Human Data Interactions in the Smart City." Through a series of probes and proposals, and two workshops in east London with participants that included community organisers, growers, policy-makers, activists, academics, educators and artists, we explored questions about who we share our city with, and how we can better live together with our non-human neighbours with the help of digital infrastructure and data.

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