

# RESTORE

DESIGN RESEARCHERS  
IN RESIDENCE

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FUTURE OBSERVATORY  
THE DESIGN MUSEUM



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# RESTORE

GEORGE KAFKA

What happens if the designer occupies a restorative, rather than a creative, role? That of the upholsterer or the mechanic, rather than the inventor or the entrepreneur?

In the fields of design, restoration typically describes the act of fixing or mending an object: a salvaged piece of furniture, a cracked screen, a rusty bicycle. This reparative act involves using tools at hand to prolong the life of a pre-existing object, to stave off its transition to waste.

Faced with the climate crisis, the act of restoration might also serve as a lens through which the designer and researcher can frame their work. As environmental degradation continues on multiple fronts, we grow wary of the novel solution: the invention just around the corner that will solve all our problems. Instead, we seek restorative relationships with minerals, materials, our bodies, each other, other species and the planet.

Throughout their residency at the Design Museum, the Design Researchers in Residence 2021/22 have been applying this restorative lens to their respective fields and projects. In keeping with the residency's precursor, the esteemed Designers in Residence programme, a cohort of four were selected via an open call to pursue a design research project that would culminate in an exhibition and this accompanying publication.

That open call, set by my predecessor Sumitra Upham, asked for a radical rethink of the 'tools and systems needed to reduce consumption and protect our planet for all lifeforms now and in years to come'. The resulting research grapples with these 'tools and systems' from multiple perspectives expressed in this book, through essays and scripts, drawings, diagrams, interviews, photographs and much more.

For Thomas Aquilina, whose work occupies the first chapter of this book, the restorative lens is quite literally a way of seeing. Trained as an architect, Thomas has applied his voracious curiosity to the cityscape surrounding the Design Museum. Kensington and Chelsea is among the most socially unequal boroughs in the United Kingdom, making it rich ground to understand how spatial, racial and environmental justice can be observed and understood. Using walking as a research methodology, Thomas has wandered the borough cataloguing landmarks such as the Westway A-road, Grenfell Tower, Holland Park and the Design Museum itself as moments to consider how power is distributed in contemporary London. 'Who gets to determine what a building holds and what it represents?' asks writer and curator Ekow Eshun, during the ambulatory conversation with Thomas that is transcribed in this catalogue. In addition to this conversation, readers are invited to follow Thomas' walks through printed routes and his own vivid photographs of the unjust landscape.

The second chapter takes us further afield to a not too distant, not too comfortable future, projected by Delfina Fantini van Ditmar and her crew of collaborators. Inspired by a deeply felt scepticism for the UK government's techno-solutionist net zero agenda, Delfina's project explores speculative designs for the lifestyle changes we will need to make for a low carbon future in rapidly changing environmental conditions. In this scenario, the responsibility for bodily heating is renegotiated between buildings and clothing. Light-touch architecture, built from the recycled detritus of late-capitalism, acts as an easily transportable shell that houses new domestic objects: furniture that is worn for warmth; garments that double as seating. As well as provocatively redesigning our notions of individual comfort, Delfina's project is an exercise in systems thinking and multidisciplinary collaboration. The process of working

with architects Thiermann Cruz, fashion designer Timothy Bouyez-Forge, as well as a talented group of students from the Royal College of Art, is expounded in the essay, images, annotations and conversations that fill her chapter.

Ways of collaborating are similarly central to Samuel Iliffe's work, which operates within the productive space between science and design. 'What role can artists and designers play in the sciences – like biology, material science and ecology – that we traditionally have not been part of?', he asks James Bridle in their conversation for this book. The answer is played out in Samuel's research, which addresses the pressing but little-acknowledged issue of phosphorus pollution in the UK's lakes and rivers. Currently the number one cause of freshwater pollution in the country, phosphorus is flowing from agricultural runoff and human waste into lakes and rivers, causing eutrophication: algae blooms that have profoundly damaging consequences for water-based ecosystems. Samuel's chapter is a crucial education on the history of phosphorus and culminates with his design for a seaweed farm that sits at the centre of a proposed move from an extractive present to a restorative future.

Farming also draws us into the last of the residents' chapters where Sanne Visser asks, 'What if hairdressers are the farmers of the future?' As her research has progressed, Sanne's corner of the residents' shared studio has slowly filled up with bags of human hair, much to the intrigue of museum visitors. Currently, the majority of waste hair is directed to landfill although it is gradually being acknowledged as a versatile material that can be worked into a yarn or textile, or broken down to its chemical components for other industrial uses. Anticipating an increase in demand by designers, processors and manufacturers, Sanne has worked with a group of high street hairdressers local to the Design Museum – active participants in her research – to consider how the future of this industry might benefit hairdressers. Her project, *Locally Grown*, expands on her previous experience as a designer working with human hair on specific products to speculate on the broader ethical and economic implications of a future hair recycling industry. In her chapter, Sanne makes a firm case for a fair industry of hair recycling that resists exploitation of people and planet, while introducing us to some of the neighbouring hairdressers and barbers.

The publication is bookended by two contributions from the Future Observatory team. Opening the book is an in-depth and engaging discussion between Cher Potter, our curatorial director, and the four residents on ways of conducting design research and its role in the context of climate crises. Closing the catalogue is an astute essay by our assistant editor Lila Boschet, in which she discusses solarpunk, the burgeoning utopian literary movement, and asks what the design field might learn from its depictions of solar-panelled, car-free cities as backdrops to profound social and cultural change.

Collectively, this book presents a snapshot of design research in action. The contributions show ways of making, collaborating and thinking that are in motion, incomplete and ongoing. Like the research it contains, the publication is designed to be picked up, read, re-read and shared. It is our hope that it, too, might serve as a tool to open up ways to research, design and ultimately construct restorative futures.

# SHOWING YOUR PROCESS

A DISCUSSION ON DESIGN RESEARCH

CHER POTTER WITH THOMAS AQUILINA,  
DELFINA FANTINI VAN DITMAR,  
SAMUEL ILIFFE AND SANNE VISSER

CHER  
POTTER

I've often thought that design research borrows from lots of disciplines. It includes design-led research and design theory, but then you have design history as well as critical theory in relation to design. They all come at design research in very different ways.

Samuel, in your research into how algae can remove harmful pollutants from freshwater bodies, you describe that you find it helpful to go to experts with some kind of design prompt. That way, you get more productive responses or answers from them. How would you define design research?

SAMUEL  
ILIFFE

When I think of design research, I think of it in relation to academic research. For me the difference is: academic research is problem solving through analysis, while design research is problem solving through synthesis.

THOMAS  
AQUILINA

Haven't you got a problem with problems? I have a problem with problems. I don't think design is set up to solve problems, I think it's all about synthesis.

SAMUEL

I understand what you mean, it can be naïve to think that you can ever solve something. Maybe it's addressing issues rather than solving problems. It's like throwing things at a dartboard and seeing what sticks. You produce some design objects or ideas and that's your way of making a pathway through a subject, rather than head down analysing until you get somewhere. I try to emphasise that this is another way of working and researching.

CHER

**Thomas, would you say that design research as an act of synthesis operates in your work?**

THOMAS

Absolutely. I suppose I'm still trying to figure out if it's research by design, or design by research.

CHER

**And it probably oscillates between the two.**

THOMAS

In my case, I see critical observation as the catalyst for design, which might mean you don't always have to design something. That's really quite important because it's about knowing what your mandate is for design. And that comes from being embedded in the research, from being committed to the synthesis.

For me, it's about fieldwork, it's about working in the field. And that's something that isn't necessarily always the case with architecture – in architecture, the field isn't really conceived in that way.

CHER **It's more about the site, isn't it?**

THOMAS Yes exactly. So actually, if you think about the field as opposed to the site, you might start to think about the connections and the constellations between things and this seems like a really rich territory.

CHER **Sanne, were you inspired by the field, by hairdressers and the work that they were doing in collecting waste material? Or were you fascinated first by the material, and that led you into the field?**

SANNE  
VISSSE The material is where I started the fascination, but quickly it opened my view to the wider system around one element. This started when I was doing my master's degree in 2016. I was in a similar process of collecting hair. The interaction with hairdressers was similar to my current research process, but there was a pressure to create an outcome for the degree; to deliver something new, a solution. There is an idea from Keller Easterling that 'solutions are mistakes and ideologies are unreliable markers'.<sup>[1]</sup> She speaks about encouraging entanglement whereby media and design do not try to eliminate problems, but rather put ideas and problems together in productive combinations. That's very much what you're saying about these different elements, Thomas. Design research is linking the in-between, the grey areas.

[1] Keller Easterling,  
*Medium Design: Knowing  
How To Work On The  
World* (London: Verso,  
2020).

CHER **You point towards a tension with design research – that there's often an expectation for a tangible output at the end of the process. This is true even in this context. You have embarked on a deep research process and now you have an exhibition and you've got to put 'things on tables', so to speak. There's a kind of tension that arises with that: it stops your research, or curbs the research process.**

THOMAS That's why I'm not necessarily designing an architectural intervention. Instead, I'm designing an artefact, a narrative or a film. I see those still as design, but maybe not necessarily within the guise more typical of an architect. These hopefully will be compositional and they will suggest ways of intervening that can be taken up further.

CHER **Yes, so in effect these things are the research process.**

THOMAS Absolutely, the research is the process of making. To me, what it means to be a design researcher is to occupy a space of hybridity; being grounded both in the making and the visual.

DELFINA  
FANTINI VAN  
DITMAR Yes, in my PhD, new knowledge came out of the practice, but my PhD didn't solve the world's problems, it just opened up issues for discussion. I tried to show a series of consequences that might arise in the future smart home. By way of the design-based projects that were a part of my PhD, I proved that certain factors would become problems. I tested, and that's also why applied research was important. There was, however, one external professor who suggested I reshape my PhD and finish it with a toolkit, a set of solutions. I refused. My four-year investigation was not going to finish as a toolkit, sorry. I didn't want to simplify it to 'the ten steps to succeed in your smart home'.

THOMAS How do you then address the issue of an exhibition where oftentimes we have to really pare our research right back to the ten steps, five steps, or one line or one question?

DELFINA I think with all of us, what an audience will take from our exhibition is not a recipe for how to win or solve the climate emergency. There will be openings and reflections that will lead on to changes, but not in the manner of a shortcut. The exhibition should open a vision and make the audience aware of things, allow them to see possibilities through all of our propositions. I think we are producing propositions.

CHER **So, you believe in problems but you don't believe a design researcher's job is to solve those problems. However, it can be to unpack the problems.**

DELFINA I think in my case I am more of an unpacker and a problematiser. But, there are different approaches. For example, I'm currently working with innovation design engineers, where many designers actually solve problems. They identify a problem like methane gas being released by cows belching. They create a solution: a mask that captures the methane. Now it is being tested and Prince Charles may fund its production. So, they will solve a problem. But my role now is teaching and problematising. This approach doesn't address further environmental consequences of meat production pollution.

SAMUEL That's an interesting issue you raise, because some ecologists and environmentalists will say we shouldn't be trying to reduce the amount of methane that cows produce because then we'll simply farm more cows. This is said about phosphorus pollution as well: we should not be trying to create ways of cleaning up rivers and lakes because then that gives the incentive to farmers that they can keep polluting.

CHER **In this context, what is the role of the design researcher? Unlike the environmentalist, the design researcher may not understand all of the nuanced ecological implications of the methane cycle through its various stages. Is there an advantage to the design researcher being an outsider, a generalist?**

SAMUEL I think the designer becomes a specialist in their own project. He, she or they are essentially defining their own field through everything that they do. Sanne, for example, is a specialist in her specific area. Her specialism touches on other specialisms which may be considered in academia as expert fields. Design research may touch on such a broad range of other specialisms and therefore it is considered as generalist. But you will have acquired select pieces of knowledge at high levels that only other experts in related fields will know, without knowing all that they know.

SANNE Exactly, there are different experts in various fields with their lived experience, with their knowledge and with their training. As a design researcher our role is to be that hybrid person that can enter and understand these different sectors on a certain level, but who doesn't have to become the scientist or expert. This is where language and vocabulary become important as a way of speaking across fields. Within design research, there are no straightforward routes regarding how these collaborations work. Having conversations with anthropologists or scientists or hairdressers or composters – all of which I am having – requires a different language and a different approach to each. As design researchers, we haven't really been taught how to navigate this. I think we are all slowly figuring out that there are so many different layers to what design research is. It's great to design tools, but the processes in between are not straightforward.





- SAMUEL I think one of our key roles as design researchers is being a translator. I listened to a talk recently with a cross-disciplinary designer. She talked about the incommensurability of language, how words in different fields mean different things and hold different levels of importance. As a design researcher, one of the first ways that you can make an impact is by translating these different languages across fields and helping people from different fields to collaborate through that translation.
- CHER **Delfina, in your role as a teacher you discuss how design education doesn't necessarily teach you the art of cross-disciplinary collaboration or the complex nature of ethics in collaboration.**
- DELFINA Yes, I think it is really important to consider ethics as an umbrella of what we do – precisely because design researchers reach across so many fields and topics. It is not only a matter of understanding the ethics of collaboration and how to care for the complex information that collaborators have given you. Working with communities involves another set of ethics. Aspects of bioethics are important to design researchers whose work touches on ecosystems. Recently, some of my students were designing for people with traumas – this also involves a complex ethical understanding of how to approach those with psychological trauma and particular skillsets. Many of my students are working with AI systems that they have not created – they need to understand the biases implicit in these systems and the ethical issues this raises. Ethics is fundamental to design studies.
- SANNE Yes, this goes back to a previous conversation we had about co-creation and ownership; about how or whether the outcomes of the research – whether that's work I'm doing, or work I've inspired other people to do – belongs to the research. If you start to co-create, who is the designer and who owns the intellectual property?
- CHER **Thomas, your work is also based on conversations with fellow walkers who help to develop your thinking and inform your work. Have you found that you have the necessary tools to manage that collaboration?**
- THOMAS I have practised walking and talking previously in many places, and it centres around storytelling and observation. I think there are two ways of observing. There's the critical observation and there's the idle observation. To be an idle observer is to assume a background role that means that you can then sit back and see the world. Whereas through walking, I'm seeing the world through motion, through the eyes of this fellow walker.
- CHER **And do you think it is important as a design researcher to share or show this process of observation with your viewer or audience?**
- THOMAS I think if you show the research, in other words show your thinking, you engage the audience in the process of making – or unmaking. If you present a design and don't show how you arrived at that point – what influenced you, how you took certain decisions on the way – then you present yourself as an expert, but actually you are a translator, a generalist, a curator.
- SAMUEL The world is so full of post-rationalised ideas and projects and stories, neatly tied up. It's

horrible trying to enter into the world of designing, making and creating when your own work is imperfect. People need to know more about the process of making things work.

**CHER** So, would you then say that design research is about being explicit and rigorous about showing your process?

**THOMAS** Yes.

**SANNE** Yes. However, to be careful and rigorous and critical about communicating your process is challenging when there are expectations that the work be well packaged. As an example, a company might produce a regenerative textile, which is an amazing technology, and showcase the process behind it. However, that process is presented as a communications package, a neat process that masks what the design research process actually is.

**CHER** Which is far messier.

**SANNE** Far messier, and not to say that it's uncontrolled – there is a structure and a framework and chosen methods. Recently exhibitions have been showcasing this more, presenting complex processes and journeys and not only design objects on their own. But well packaged research so often seen in the media is less about the design research process and more about other topics like consumerism and selling an idea.

**DELFINA** I think that's the problem of reductionism – to be too linear, to be too clear about what's next and how it's wrapped up seamlessly. Design research is not about the simplifying strategies borrowed from advertising and marketing.

**SANNE** Yes, yet at the same time design research often aims to simplify complex issues and make them more accessible to a general audience – it's a fine balance.

**CHER** Which leads to a last question: what is the urgency for design research as a response to climate change - an issue so complex that many people struggle to engage with it.

**SANNE** The climate emergency is a complex issue and it should be presented as a complex issue. Design research can showcase the complexity of this, but it shouldn't exhaust people into thinking they are not going to bother with it. It is our role as design researchers to unpack that complexity.

**DELFINA** I think that the design profession itself needs to be re-understood. I don't think we can persevere with this industrialised mindset. There's a belief that our current design skills will not lead us to the healing outcomes that we need, so we need to re-equip our disciplines with the elements required to save this planet, which are way more complex and ambitious. We have to untrain designers and retrain them for the real challenges that we face. By addressing the need for design itself to be reconsidered, I think research is an essential part of the discussion. We need to question the design discipline itself to then really pursue the design research prospect. But we cannot ignore the first step, because the first step is very pressing.

THOMAS I also think the reason why design research is relevant to the climate emergency is because by its very nature it is propositional.

CHER And by 'propositional' you mean...?

THOMAS I think it is taking the research and these relational connections further. To be propositional is to visualise and represent an intervention. This might unsettle our sense of what we know and challenge established narratives, but we need new ideas to suggest alternative futures.

SAMUEL If I was going to be super reductive, I'd say we are now aware that there are urgent issues that need to be addressed, and design is good at proposing new narratives and new ways of addressing issues. We are doing that through a synthesis of new and existing ideas.

# THOMAS AQUILINA

SILENT AND SPEAKING sees Thomas Aquilina delve into walking as both a research method and a way of observing North Kensington. Over the course of his residency, Thomas embarked on multiple walks in the Royal Borough of Kensington and Chelsea, one of the most economically unequal boroughs in the country and home to the Design Museum. Sometimes walking alone, sometimes with a carefully selected cast of collaborators, the perambulations became a way of understanding and interpreting the city through his own and others' perspectives.

Particularly drawn to the North Kensington part of the borough, Thomas builds on his experience as an architect and his multicultural heritage to observe – while walking – how the city is put together. He notices sites of spatial tension and resistance, including Grenfell Tower and Powis Square, and draws our attention to the relationship between spatial and environmental justice in the everyday places of his research field.

In the pages that follow, Thomas invites us to join him on a walk: to follow his routes, to hear his conversations and to observe.



THOMAS AQUILINA is an architect and academic dedicated to building communities of radical thought and progressive practice. He is a co-director of the New Architecture Writers programme and is a co-founder of publishing collective Afterparti. He holds the Stephen Lawrence Day Foundation Fellowship at the London School of Architecture and is an associate lecturer at London Metropolitan University.

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AND  
SPEAKING

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# WAYS OF SEEING NORTH KENSINGTON

## AN ODE TO WALKING

I am still trying to arrive in a neighbourhood that isn't mine. The Royal Borough of Kensington and Chelsea can, at times, feel like a distinctly different world to the London I call home. Over the course of my residency, I've attempted to claim space in the borough for myself by grasping it underfoot. Walking has become a methodology and a storytelling device, a means of regular observation, of unexpected encounter and of shared conversations.

In walking the borough's streets, I aimed to engage with the ways injustice can be made visible as well as kept invisible. The Royal Borough of Kensington and Chelsea, where the Design Museum sits, is the most economically unequal borough in London. I believe having an awareness to the relationship between race and climate highlights the ongoing resonance of injustice and aspirations for repair. Justice can be built in small increments and revealed in the everydayness of things hidden to those moving swiftly through space.

My methods work towards a mode of design as a way of seeing rather than building itself. From my practice of research and architecture, I have come to understand multiple points of departure and arrival, informed by my work in African cities like Kampala and Addis Ababa. This residency has provided a place to test my methods and to investigate my own sense of belonging in London.

### THE STREET IS THE STUDIO

Architectural practice is usually concerned with a particular site, contained within a boundary of ownership. Similarly the studio is also constrained in terms of what can be seen and known through desk-based research or designing from a distance, often privileging top-down perspectives. Extending the studio into the street allows for investigations into more local issues as embedded in broader ecosystems. Street-level sensibility requires an interdisciplinary approach and a type of fieldwork that draws heavily on critical observation and meaningful engagement. The street offers a middle-ground perspective and becomes a vessel for spatial exploration.

Focusing on mobility, I can think and move through the points of departure and arrival, developing knowledge of who the users of space are and of their trajectories. Using walking as a method goes beyond street-level description, adding a layer of experiential investigation. This perspective shows how 'on the ground' observations reveal the growing distance between normative trajectories of development and how urban residents actually live.

At first, I walk alone to tune my senses to the facets of the place, often against the marked edges of the environment. These edges aren't always obvious, sometimes limits like city boroughs include hidden divisions or lost rivers. For example, in Kampala this meant walking along the railway line, a colonial relic repurposed as a slow-moving market. Reappropriation of spaces in African cities comes with large-scale improvisation, whereas the resident's manipulation of space and its uses are less obvious in London where there is more control and restrictions.

Across different contexts, the technique of walking can be understood as an extension of the architect's studio, moving the regulated interior to the spontaneous exterior. I've come to see walking not as a solitary exercise, but a way to be in community. In this project, I walk with various interlocutors to help me to read and unlock urban spaces through conversation.



Underpinning this work is the notion that walking constitutes a form of movement as method and is linked to a historic continuum. The movement from slavery with the extraction of nature and people; of arrival through Windrush generations and migration; of resistance in Carnival as Black celebration; and of protest as we mark the fifth anniversary since the Grenfell tragedy and the ongoing efforts for redressing neglect.

### WALKING AS STORYTELLING

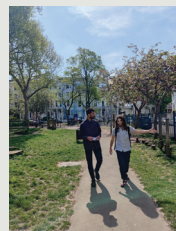
In Kensington and Chelsea, I walked along the edge of the borough, moving between motorways and cemeteries and the River Thames, until finding a home in the north of the borough. Tracing boundaries was not going to work for this investigation and instead, I followed the structural arteries and desire lines that are trodden through the borough. North Kensington with its mixedness, its history of Caribbean settlement from the Windrush generation and recent attention to the area's role in defining diaspora identity carries a current of nostalgia that influences my generation's notion of Black Britishness. When I first walked through the area, I looked for something to make tangible the tales of resistance. On a walk with the local guerrilla gardener Tayshan Hayden-Smith, I was introduced to Powis Square, where the first Black community members had settled on arrival to North Kensington. I absorbed these histories of diaspora from community spaces, such as, the Tabernacle, a church come community base for Carnival organisers. I visited the site of the now-closed Mangrove Restaurant set up by Trinidadian-born Frank Crichlow, home to activists known as the Mangrove Nine who were tried in 1970 for inciting a riot against police harassment after the restaurant was raided.

The Design Museum remained an anchor point for the research project. It is a contested site as the former Commonwealth Institute that was decommissioned in 2002. Working within this context, I inverted the colonial construct of expertise as being rooted in institutions by re-deploying the Global South and its forms of everyday mobility as well as hybridity to further investigate the 'mother city'. At street level, outside the museum is Holland Park and within the borough's long, narrow north-south boundary are a series of squares, parks, and gated gardens. Some of these green spaces are points of gathering for social movements and resistance, such as Powis Square, a site ostensibly serving a need for play and relaxation, where young people protested to claim their place even as the council attempted to 'curb the anarchy of activities there', or Emslie Horniman Pleasance Park where steel drum bands converge annually on the eve of Carnival, hosting up to 20,000 people in August. These environmental landmarks are negotiating spaces for racial and social justice.

Ducking under the Westway, the raging six-lane motorway and its adjacent tangle of railway lines, and slowly negotiating the neighbourhoods that were not swallowed by infrastructure, I observed the juxtaposing plaques marking Black and Victorian heritage, symbols and anti-gentrification graffiti, the residents carving out their own sense of home. In North Kensington, the manifesto 'Justice for Grenfell' marks bus stops, abandoned buildings and peeks out from residential windows. The tragedy is iconic, showing how a city can become vulnerable, fractured, exposed. Left shrouded is a building rising 24 storeys high, etching a fault-line between the city and its residents. Grenfell today is grappling with its own memory, aiming for justice and restoration of something that will be forever broken by the city's failures.

### COLLAGE AS RESTORATIVE METHOD

I capture my walks in mapped routes, sound recordings, film, photographs, and documents from local archives to make sense of the injustice that permeates the area. This is often about daily negotiation of spaces, through the work of residents, as explained to me on a walk with Labour counsellor Emma Dent Coad. While walking together, Dent Coad made me aware of



the local 'guardians' resisting the demolition of estates and removal of trees.

In reverse, my aim is to bring the street into the studio through a stitching of experiential fragments. Putting them back together is an effort in collage and is always incomplete. I edit in experience from conversations during my walks. Politicians, activists, residents, and non-residents create an embodied stream. Stories are passed like currencies, transacted in the collage as a way of animating the sites that make up the area. First-hand observations developed through this mode of fieldwork 'on the ground,' has allowed me to observe demonstrations of everyday resistance.

As manifestations of the research, film and collage are an embodiment of other urban textures, that invite audiences to listen to sound, to move through space, to invoke desire lines. The film is itself a collage in moving image. As a cataloguing of spaces in the borough, the film takes on an architectural dimension through an exploration of scale. That scale is between the city, the borough, and the street. The film conjures the atmosphere of places walked, and incorporates the voices of my walking partners: in conversation with the borough, making audible the notion of mobility.

Making research from the street tangible in the studio creates a third aspect to the process. I use film and collage as ways to edit and remix materials, conversations and observations. In this process some questions are answered and others born. The remaking of space in the studio is a restorative act, mending and repairing to imagine space, not as a grand gesture but as a collage of lived realities.



## REFLECTION

Through the residency it became clear that the studio is the street, but that I am also bringing the street to my studio, in this case the museum. My approach of leaving the studio behind, comes back to the idea that design must be born out of critical observation. With increased familiarity to the neighbourhood, my walks became more errant, as though I was willing myself to deviate. Finding a semblance of belonging in the borough has made me ask if this constitutes an arrival. Walking with others allowed me to hold difficult questions in conversation and to see more clearly a landscape of asymmetry. In a sense, this practice has caused me to recognise and even perform walking itself as a form of resistance. To resist straight lines.





Handwritten graffiti in teal ink, possibly a stylized letter 'B'.

Forever in our hearts  
No Justice  
No Safety  
No Agencies  
No Liberty  
Never listen to  
Never welcome  
Dark memories  
Rage and weep  
No Justice  
JUSTICE  
LaVanika



Small handwritten text in the bottom right corner, possibly a signature or date.



except for  
deliveries

GREEN HEART

# ‘WHO GETS TO DETERMINE WHAT A BUILDING HOLDS AND WHAT IT REPRESENTS?’

AN AMBULATORY CONVERSATION WITH EKOW ESHUN

*During my residency, I have invited a range of people to join me on walks through North Kensington, usually beginning at the Design Museum and heading up towards the Westway A-Road. One of those walking companions was curator and writer Ekow Eshun. Ekow became a mentor over the course of the residency, through extended discussions on the relationship between race, space and climate. Here we present one of our meandering conversations which unfolded through some key local landmarks. [TA]*

THE DESIGN MUSEUM  
51°29'57.0"N 0°11'56.7"W



THOMAS  
AQUILINA

We're going to walk northwards from here, through Holland Park and into North Kensington, keeping in mind the question: how is injustice spatialised in the borough? I am interested in what it means to be here in Kensington and Chelsea. And by walking I hope we can have a conversation in flow.

But perhaps we could pause here, to begin with, in front of the Design Museum. I find the Design Museum as the old Commonwealth Institute intriguing.

There are these museum plaques dotted around the building – although they're quite hidden. There's not much context about them, but I found out they form a Commonwealth Trail. For me, what's interesting isn't so much what is there, but what isn't there. I wondered what your reading of one of these plaques might be.

EKOW  
ESHUN



Look, the thing that most interests me – or that most immediately interests me – is that it says the Commonwealth Institute 'should reflect in its architecture...the Commonwealth of today and tomorrow'. There is nothing about the past in there. But there's a whole hinterland in terms of the Imperial Institute from 1888, which is about seventy years prior to the building of this place in 1962. There's that kind of weird lacuna of talking about today and tomorrow as a way to build upon, or build over, the past.

Then there's the other thing to think about which is the architecture of the building. It makes me think of Maxwell Fry and Jane Drew: kind of tropical modern architects.<sup>[1]</sup> This building echoes entirely their aesthetic. I was in Ghana last summer and I was looking at some buildings with copper roofs and an open kind of base. There's a lot of similarity to that.

[1] Architects Maxwell Fry and Jane Drew were proponents of modernism and pioneered the style in West Africa and India during late-colonial rule.

I suppose the question raised by any building is really about hierarchies of power in them. Who gets to determine what a building holds and what it represents? So anything beyond these particular architectural aesthetics aren't necessarily shared with those buildings that you might find in Ghana or elsewhere. But I think it's interesting how you might echo an internationalism. How that's bound up in the ethos, even, of the Commonwealth.



THOMAS

The plaque also states that the Institute was established to 'undertake scientific research into raw materials from across the British Empire'. This is extractivism. Whether through labour, trade or materials, all were resources to be exploited and extracted. It seems telling that this was written when the Design Museum opened in 2016. So much has happened in the last few years to make us rethink narratives.

E K O W  
THOMAS

Of course, because this isn't even a historic plaque! Which I find hilarious. Shall we start walking?

E K O W

Yeah, I mean, look there's no attempt there to go beneath the surface. There's a book that I like to use for reference sometimes when I think about 1950s Britain, called *The Tiger in the Smoke* by an academic called Lynda Nead. It's really about cultural politics of colour in the post-war period in the 1950s. Both colourising – the use of colour in film and advertising – but also colour racially as well. It's talking about the melding of those. So there used to be something called the British Colour Council, or something like that, which designed and determined and named colours, before Pantone. But these were all sorts of names. There was greige, which is a kind of grey and brown. There were things like Imperial Purple. But then there was one called Nigger Brown...

THOMAS

Wow...

E K O W

[2] Nigger Brown appeared in the British Colour Council's second edition in 1951.

...that you could buy. You could buy a pot of paint in Nigger Brown.<sup>[2]</sup> And that's always spoken to me about extractive resources. People become another resource. Historically, that's obviously the case but when you look at paint called Nigger Brown, that status, that's hierarchy. That's extraction. That's utilisation of people turned into raw materials.

THOMAS

And how often do you refer back to that book?

E K O W

I do actually use it quite often, as a way to think about that weird period of the 1950s and the invention of the Commonwealth. It's before my time in any sense and I'm interested in this period because of the motherland opening up and embracing colonies, but also, at the same time, this starts to trigger anxieties and hostilities. So it's just quite a good document in some aspects. I'm kind of fascinated by the way people arrived from the Caribbean and so on, and had to negotiate this Britain that was in the midst of lots of change.

THOMAS

As a child of the empire, I sometimes describe London as the mother city. And in many ways my residency is part of a larger project, which has a working title of Belonging and Blackness. I am inspired by your book, *Black Gold of the Sun*, which got me asking what it means to belong or be dislocated in London and its neighbourhoods? North Kensington, where we're heading, for example, is an important marker in London's Black culture.

As you advised me in our last conversation, I am trying to resist a straight line and want to see walking as a sort of spatial practice. Do you do much walking as part of your way of working?

E K O W      In fact, not terribly. I do a lot of sitting and looking out the window. But I can see walking as a tactic. I'm normally spending a lot of time trying to synthesise a bunch of information. It tends to be a slightly hermetic process. I do like the idea of being able to look, and think. Actually, I say that, but I feel like we've all done a lot of walking these last two years.

T H O M A S      How familiar is this area of London to you?

E K O W      Not at all. Not in the slightest. I approach it with slight trepidation, it has to be said.

T H O M A S      As we move through, it would be good to identify things along the route. I think there are different scales that physically encapsulate injustice – symbols and spaces and infrastructures. It makes me ask: what are the tools to observe these kinds of injustices? And then how do you make this visible? Can we make injustice visible in architectural design, for example?



E K O W      I can see all of that. Cities are such weird places because they spend so much time building on their own foundations and building on their own past. And even stuff that is visible, and not erased, becomes invisible. Even stuff that's physically present is often lost to sight just by familiarity. Now we're in a park. And, notionally, it's a kind of neutral space. But there are always little clues in there. I wonder who that statue belongs to?

T H O M A S      Which one?

E K O W      That one over there. That man sitting on there?

T H O M A S      Shall we actually go look at him...

E K O W      I have no idea. I mean, it could be anyone. Oh, I wonder who Lord Holland was. No idea.

T H O M A S      Lord Holland...a political figure of the nineteenth century,<sup>[3]</sup>

E K O W      I also wonder why they cast him sitting rather than standing. In a way it's slightly less stern if he's sitting, it's kind of slightly more avuncular? Well, who knows? Who knows what the truth of him is? Or what the various histories of him are.

[3] Lord Holland was the Chancellor of the Duchy of Lancaster and owner of 401 slaves in Jamaica.

T H O M A S      If we head this way, we'll exit out of the park.

E K O W      Describe to me the shape of your project as it's currently looking.

THOMAS I am in the process of making a film that will record these sites, symbols and infrastructures in ways that are both silent and speaking. This statue is clearly speaking to us, but I am also interested in the things hiding in plain sight. The film should follow a set of routes through North Kensington. Some of these are inherited: the route of Carnival and the silent walk for the Grenfell Tower, for example. Then there are other routes that I've started to uncover, such as a route moving between blue plaques installed by the Nubian Jak Community Trust. They are like English Heritage plaques, but these plaques commemorate overlooked important Black figures in the community.

The second aspect of my output is a paper-based artefact, really inspired by artist Carolina Caycedo's landscapes.<sup>[4]</sup> This should allow me to test drawing and collage and evoke this idea of walking and moving through the borough.



E K O W It's interesting thinking about the project in such nonstatic terms.

The landmarks of the city are fixed in place, but I think recognising an ability to move through, recognising the nature of flux involved in the thinking about any place is quite good. You know, that Carolina Caycedo's book is interesting, because it maps territory in a number of different ways. Spatially and archive-wise and found imagery and so on. It's a kind of collage but it has a linear form to it.

[4] Carolina Caycedo's book *Libro Río Serpiente* documents extractivism and territorial resistance of Amazonian river systems.

THOMAS Look, palm trees – we've found the tropics again to go back to your reading of the Commonwealth Institute as part tropical modernism.

E K O W And how did these get here? I was writing an essay, last year, about Hurvin Anderson<sup>[5]</sup> that got me thinking about flora and fauna of the Caribbean. How the landscapes of the Caribbean radically transformed to the extent that there is no natural, authentic nature to any of these places anymore. We always come back to these things that the Imperial presence doesn't go one way. You end up with things like this, because of the kind of inevitable rooting back that takes place through these things. What are these palm trees supposed to signify? What were they initially supposed to evoke? A kind of place? A memory?

[5] Hurvin Anderson is a British artist exploring his Jamaican heritage through paintings of Caribbean landscapes and city barbershops.

THOMAS This might happen when we start to see things along the way and make connections.

E K O W Oh, look. Heavy. This is Saint Volodymyr, ruler of Ukraine from 980 to 1015.

THOMAS Suddenly the statue becomes an icon of peace.

E K O W I think there probably aren't that many monuments towards Ukraine and its people in this city. I don't know anything about Saint Volodymyr. In a way, I'm more interested therefore in the living monuments and dedications than the statue itself. It clearly speaks to a moment and I think this just provides a space for that.



THOMAS So we're just going to walk across the avenue, then we'll head straight up Ladbrooke Grove. It's a straight line from here into Notting Hill.



E K O W

Where do you stand on beauty? The reason I'm asking that is because...look, I don't come this way so often. It's very beautiful out here. Nice wide streets, nice big houses. I have a sort of tentative feeling that part of a reclaiming of justice is also a right to claim beauty for ourselves. We might not be allowed inside these private properties but – what is this tree? A lotus tree? – we're allowed to have a say, both in appreciation and construction of beauty.

There's the poem by Lucille Clifton, an African American poet, called 'being property once myself'. It's a poem that linked her presence, her physical presence and connection to the land and landscape around her to her historical forebears: enslaved people in America. Because we're going to walk and we're going to be in the landscape, then we also have a right to claim that as ours. Being able to be in nature or appreciate it is part of being alive.

T H O M A S

Maybe we need to think more about trees rather than buildings. How, then, do we move through space and through Clifton's landscape?

[6] Akala is a British hip-hop artist and author of *Natives: Race and Class in Ruins of Empire*

E K O W

So that's our Akala<sup>[6]</sup> who's driving by in that Range Rover over there! He's making his own way through space, finding his own way through.

I think the thing of a Black person moving through space is a loaded endeavour. We can call it that. Just the fact of us being visible or present on the streets has all sorts of histories to it. I think on the most simple and basic level, the act of walking is an insistence upon personhood.

T H O M A S

To me the work of essayist Garnette Cadogan<sup>[7]</sup> is critically important. As a young architect in London of Jamaican heritage, it had a transformative effect: making me think of walking as spatial practice.

[7] Garnette Cadogan is a Jamaican urbanist and author of the essay *Walking While Black*

E K O W

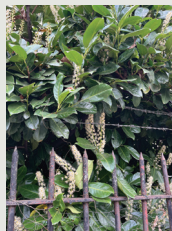
Historically our experience on the streets has been about negotiating power structures, and negotiating powers. Power infrastructures of people around us.

T H O M A S

What if these private gardens could be made accessible?

E K O W

It reminds me of a system where your power is determined by the physical space. It's right there. I don't know what the history of them is, or the wealth involved, but they are quite telling areas. The fact they've got these weird bars around them so you can look in, you just can't enter. It's one of the reasons why I found this part of town so odd.



T H O M A S

We've now drifted to Portobello Road. I always feel like a tourist in this part of the neighbourhood. Up there is one of the Nubian Jak Community Trust plaques, in honour of Claudia Jones, mother of the Notting Hill Carnival.<sup>[8]</sup>

[8] The Notting Hill Carnival was organised as a community response to the 1958 August Bank Holiday Notting Hill race riots.



E K O W



Yeah. That's really interesting. I don't know much about her. I grew up in the suburbs of northwest London. My siblings and I, children of African immigrants, didn't feel particularly connected to any community there. So we always used to rail against this mainstream notion of the Black community as a singular. I think what's interesting here is we have the same evocation of community – but can see its purpose of shared endeavour. And partly that endeavour is about a shared history of migration, but it's also about shared resistance to oppression. And these were things I couldn't particularly fathom when I was a child, and in fact, during those early years of coming to Carnival. What is it that brings these diasporic histories together, your family history and so on? They've all arrived at different points and we will have to grapple with these things, visible and invisible.

T H O M A S

As I'm not part of this community I was sceptical about approaching this territory. But never have I felt so deeply moved by the city's failure as the Grenfell tragedy. My project cannot ignore this reality.

E K O W

And you're allowed to engage with Grenfell. It's not about having to have an official version or having even a personal connection to your story. We're all allowed to think about these notions of community. Community is about some aspects of sharing and of continued lived experience. With these things we have to push against being overlooked, ignored, denied. That's part of what defines who we are. That's part of what makes the 'we' in all of this.



T H O M A S

These sounds here beneath the Westway are more distinct, reverberating from the concrete infrastructure.

E K O W

It's kind of heavy, isn't it? What's the history behind the Westway?

T H O M A S

It was completed in 1970 from Paddington to the outer west London suburbs. Designed as part of a larger masterplan that would include a similar flyover through Brixton that was unrealised. Maybe there's a pattern here as the Westway slices through the most mixed part of this borough. What interests me now about the Westway is how it can be considered a memorial. The closer we get towards Grenfell, the more and more this becomes apparent. On the flyover columns and between them, the words of 'justice' are inscribed. It is community testimony.

E K O W

This thing of making your voice heard, literally visualising that, putting that into words, fixing that on the wall.<sup>[9]</sup> I think it's kind of testament to some of the things we've been talking about. It's a very simple desire and need for us to be able to speak for individuals – to be able to speak in ways they weren't. This space is about how the community speaks. All these individual messages are actually saying the same thing. There's a real clarity around what happened. There's no sense of anything other than it was a clear injustice. Being under the Westway, it's not a space that has been given privilege. But it's a space where people

[9] The Wall of Truth is a memorial of first-hand testimonies in response to the Grenfell Tower fire that killed 72+ people.

PORTOBELLO ROAD  
51°31'05.2"N 0°12'24.3"W

A40 WESTWAY  
51°31'04.0"N 0°12'37.0"W

speak for space, where people have found space to articulate their feelings or their memories.

There's something interesting also looking across to these tropical plants as well. Given what we talked about earlier in relation to these.

MAXILLA WALK  
51°30'56.4"N 0°12'59.8"W

THOMAS

[10] *We Are History: Race, Colonialism & Climate Change* was an exhibition curated by Ekow Eshun at Somerset House in London in 2021.

This is Hope Gardens and is constructed by the community. It does feel as though we've been drawn into spaces for nature today. This makes me think of your recently curated exhibition *We Are History*,<sup>[10]</sup> which was able to synthesise climate and race. I wonder how you might begin to think about that in relation to what we've seen and walked through?

E K O W

Yes, the same magnolias from earlier, banana trees, cherry tree.

I mean, look, I would just come back to this: essentially all of this is what happens when people become another extractive resource. When people are regarded as nothing more than raw materials for capital they can, very crudely, end up being burned alive. One of the origins for the show *We Are History* is the work of people like Sylvia Wynter<sup>[11]</sup>, who thinks a lot about a search for humaneness. In fact, treasuring the planet has to go beyond the merely human to recognise that spaces are also shared with other species, including non-sentient beings. It is really about how we treasure each other. Now, that might sound a bit utopia, but within the context of a world where the words Black Lives Matter are apparent and controversial none of these things can really be taken for granted. When I'm looking out of the window I'm trying to find a way to put into words, how one can live as an individual or one can live as part of a community. And that community being, from my perspective, is about what Blackness can be. What can it look like? And how can it continue to kind of grow and modulate? Community is actually just making more space for others to gather within a kind of greater realm. And that's one of the things that I think of these different forms of mark making that we've looked at from the graffiti under the Westway to the blue plaques. They're all about that. They're all about how we recolonise spaces.

[11] Sylvia Wynter is a Jamaican cultural theorist addressing issues of race and legacies of colonialism.

THOMAS

[12] Toni Morrison's notion of 'rememory' evokes recovery and reassemblage to form new readings of history.

These appear, then, as acts of what Toni Morrison would call 'rememory' – her idea of bringing to the surface repressed memories.<sup>[12]</sup> From what we've seen, whether semi-official or unofficial, they're still about a claim to space. It turns out that's part of how we live. This is about a physical sense of being, but that is mapped on to the psychological as well.

E K O W

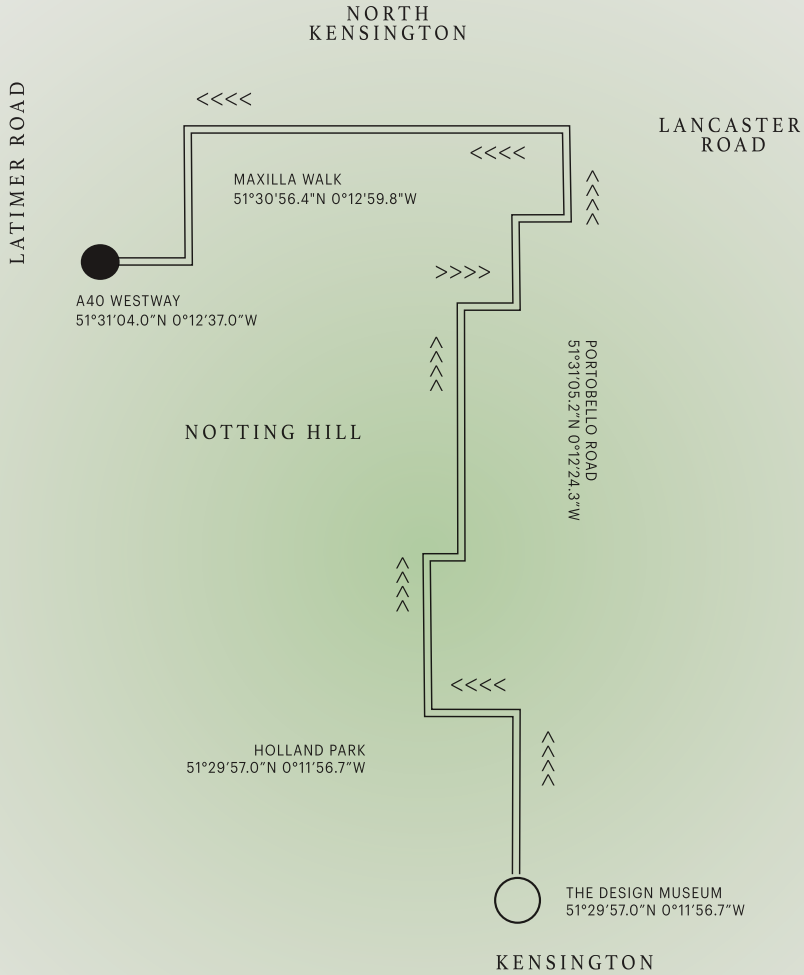
Because you've always got to. I mean, I think I always begin from a presumption that Blackness isn't fixed. So it's not like you're trying to define or describe the parameters; you're trying to give shape or voice to something that's inside you. And that also isn't a kind of nebulous, essentialised feeling. It is something real to do with lived and shared experience and collective memory. But also to do with the right of an individual to assert their own sensitivities, their own fragilities and their own hopes. So any form of expression, I think, becomes important in those respects.





# WALK NORTH

A ROUTE FROM THE DESIGN MUSEUM  
TO LATIMER ROAD









# DELFINA FANTINI VAN DITMAR

Our relationship with energy and heating is enveloped in layers of crisis. In UK, the cost of heating homes is rising, driven up further by war in Ukraine and the international reliance on fossil fuels to produce energy continues apace.

In the face of these dispiriting fronts, Delfina Fantini van Ditmar and her collaborators consider domestic heating anew. A NOT TOO COMFORTABLE FUTURE is a speculative proposal for a new way of living in which the responsibility for individual warmth and comfort is renegotiated between architecture and fashion.

Through the residency Delfina drew on her work as a systems thinker and convener to build two teams. The first comprised architects Thiermann Cruz; the second saw fashion designer Timothy Bouyez-Forge set a series of briefs for a group of RCA Fashion MA students. Together they conceived a new domestic environment set within an ultra-light-touch structure and populated with multifunctional clothing-cum-furniture pieces.

In this chapter, we learn more about Delfina's theoretical approach, encounter her teams and discover their working processes.



Delfina Fantini van Ditmar is a design researcher and senior lecturer at the Royal College of Art (RCA) on the Innovation Design and Engineering programme. Delfina has a transdisciplinary background linking design research, critical algorithmic studies, architecture and ecology. She has been a visiting lecturer and critic at several institutions, including The Bartlett School of Architecture, Architectural Association, Goldsmiths, University of London, Canterbury University, Liverpool University, Critical Media Lab Basel and TU Berlin. She holds a BA in Biology and completed a PhD at the RCA in 2016.



# A NOT TOO COMFORTABLE FUTURE

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# LIVING IN AFTER-COMFORT

## 'UP IN THE AIR': THE PREVAILING PROBLEM OF CO<sub>2</sub>

### PART 1: PROBLEMATISING NET ZERO

This project responds to the climate emergency by contesting prevalent ideas of technocentrism in the transition to net zero set out by the UK government. Attempts to remedy the climate emergency require ambitious transformational plans and radically different ways of thinking and making. Design has the responsibility to change prevailing standards and envision new ecological lifestyles. Considering the degeneration of the earth, an uncritical design ethos towards consumption and comfort appears insufficient.

Our reliance on fossil fuels, gas scarcity due to the war in Ukraine and the surge in energy bills suggest that we should reduce our dependence on the current method of heating our surroundings. Heating is a highly polluting service: according to the UK government heating for homes and workspaces accounts for almost one-third of all UK carbon emissions [1] In response to the rise in living costs, money-saving specialist Martin Lewis proposed a set of desperate measures to heat the body. In the introduction to an article published on his website, titled 'Heat the human not the home: save energy and stay warm with thermals, electric blankets & more', Lewis writes: 'This is a guide I really wish we needn't be publishing. The reason I asked Sarah and the team to put this together is due to my overflowing email bag of desperation from people who can't afford their energy bills [...] we're trying to help provide some options and information for those that may need to drastically cut down on energy usage due to financial desperation and some help for others who may want to do it out of a commitment to green issues.'<sup>[2]</sup>

Undoubtedly this is a terrible situation we find ourselves in. Lewis, in reaction to heating unaffordability and informed by the know-how of his budget-constrained audience, offers guidance on suitable warm clothing and an expanded range of heating devices (e.g. electric blankets, heat pads, foot warmers).<sup>[3]</sup> The guide also had behavioural-architectural recommendations, such as leaving one's feet on a stool or sitting down on top of a sleeping bag. This article, published in April 2022, exemplifies not only the need for a transition to alternative heating systems but also shows that, by necessity or because of environmental awareness, people are already heating themselves rather than homes. Yet, the government's *Net Zero Strategy: Build Back Greener* report, aiming to improve energy efficiency and reduce heating costs, doesn't aspire to reconceive the question of heating or reconsider the role that housing plays in keeping people warm. The government's techno-solutionist approach regarding heating is based on installing low-carbon technologies such as electric heat pumps and hydrogen boilers<sup>[4]</sup> This ignores the fact that heating homes would be much less polluting if the houses were better insulated.

Design has the privileged position of working across a variety of sectors and areas of society. Multidisciplinary captures complex issues, bringing new conceptual and methodological approaches to our common environmental concerns. Trusting this is the right lens through which to view this systemic environmental crisis, the team for my project is composed of fashion designer Timothy Bouyez-Forge with students from the Royal College of Art and architects Thiermann Cruz. Both disciplines embarked on a design research journey based on the idea of architecture (homes) giving the responsibility of the thermal package – the concentration of heat to warm the body – back to fashion (clothing). Aiming for truly decarbonised futures by

[1] HM Government  
*Net-Zero Strategy:  
Build Back Greener*,  
2021, p. 22.

[2] Patrick Butler, "Heat  
the human, not the  
home": Martin Lewis  
guide for "desperate"  
households'. *The  
Guardian*, 6 April 2022.

[3] Sarah  
Monro, 'Heat  
the human  
not the home'  
*Money Saving  
Expert*, 5 April  
2022.

[4] *Net-Zero  
Strategy: Build Back  
Greener*, p. 22.

turning away from techno-fixes, my collaborating architects and fashion designers explored means of catalysing transformative net zero design visions. The team proposed a conceptual design provocation that abandons the idea of living in well-tempered housing. The speculative collaboration explores a new dialogue around the 'primordial skin' as a reflection on the role of skin and thermal comfort: both the skin of a building and a person as a form of insulation. With this conceptualisation of 'skin' in mind, the house has no heating and clothing has been recast as insulation worn by its inhabitants. [5] The building itself has very little insulation and is in close proximity to vegetation and its natural rhythms, meaning thermal comfort has moved from the house's cladding to the body's cladding. The architecture of the house is simple but the inhabitants must change their living and clothing habits to live in a state of 'after-comfort'.

As an alternative to current net zero techno-utopic pledges, the proposition aims to reshape the discourse by exploring a paradigm shift thinking through low carbon solutions, dematerialisation and the notion of after-comfort. Design can make futures considerate and desirable while considering material ethics. By problematising the simplification of prevalent ecological net zero schemes, the project aims to unpick larger opportunities for 'design-led' strategies and imaginaries pointing out the new visions, skills and tools needed for this pressing transition.

*'...we will unleash the unique creative power of capitalism to drive the innovation that will bring down the costs of going green...this strategy shows how we can build back greener, without so much as a hair shirt in sight.'* [6]

Boris Johnson

*Net Zero Strategy: Build Back Greener report 2021*

The rhetoric of net zero and the journey to decarbonisation that implicitly follows is based on the idea that an equal amount of greenhouse gases emitted can be removed from the atmosphere. The carbon-centrism and obfuscation of the production and emission of carbon has characterised the debate. Current visions of net zero do not contest the causes at the heart of the climate crisis. With the increasing governmental pressure toward decarbonisation, two prevalent industrial net zero approaches are Carbon Capture and Storage (CCS) and Carbon Offsetting. CCS is a method of capturing CO<sub>2</sub> emissions where the carbon emitted from industrial processes is sequestered, transported and stored in deep geological formations. Carbon Offsetting refers to a reduction or removal of emissions of CO<sub>2</sub> to compensate for emissions made elsewhere. Carbon offset schemes and the carbon credit economy frequently result in environmental projects, such as newly planted forests, in developing countries. However, these two approaches don't tackle the urgent need for a radical cut on emissions and the creation of renewable alternatives to fossil fuels.

Comparing carbon offsetting to the sale of absolutions in Dutch culture in fifteenth and sixteenth century, George Monbiot argues that 'you buy yourself a clean conscience by paying someone else to undo the harm you are causing...it is pernicious and destructive nonsense'. [7] Pointing out how offsetting companies don't guide us toward a behavioural shift, but rather into being 'better consumers', Monbiot characterises offsetting as an excuse for carbon-intensive enterprises and its dubious measurements: 'BP launched its target neutral scheme, enabling customers to neutralise the CO<sub>2</sub> emissions caused by their driving. The consequences of an entire year's motoring can be discharged for just £20...while the carbon we release by flying or driving is certain and verifiable, the carbon absorbed by offset projects is less attestable'. [8]

[5] The speculative project doesn't undermine the need for insulating homes in the UK, as per demands by the Households Declare and Insulate Britain movements. Rather it is based on a propositional vision where fashion has the responsibility for the thermal package and humanity has chosen to live in after-comfort.

[6] *Net-Zero Strategy: Build Back Greener.*

[7] *George Monbiot 'Paying for Our Sins', The Guardian, 18 October 2006.*

[8] *Ibid*

This goes in line with the Design Council report *Beyond Net Zero: A Systemic Design Approach* which asserts that the reductive approach to the current Net-Zero agenda that it is not ambitious and comprehensive enough: 'Net Zero allows for the continued production of greenhouse gasses, said to be balanced out by other factors. It can create loopholes such as importing high-emission products from overseas and engaging in temporary offsetting solutions. Net zero plans often rely upon continued global inequality. Some of the approaches have been called "climate colonialism" ...despite pledging net zero goals, many countries are able to continue with a "business-as-usual" approach.' [9]

[9] 'Beyond Net Zero – A Systemic Design Approach', *Design Council*, p. 7.

Obviating the need for a comprehensive approach to the climate emergency, UK prime minister Boris Johnson argues in the Government report *Net Zero Strategy: Build Back Greener*: 'for years, going green was inextricably bound up with a sense that we have to sacrifice the things we love [...] Instead, we will unleash the unique creative power of capitalism to drive the innovation that will bring down the costs of going green'. [10] But can the creative fuel of neoliberalism and the industrialism of the 'green industrial revolution' allow radical alternatives to the deep rooted problems and principles that brought us here in the first place? Without restricting greenhouse emissions, material production or our unecological lifestyles, the prevalent net zero discussions are masked by unfeasible techno-fixes. More than anything, these visions and agendas prolong fossil fuel reliance and distract from a much-needed shift in lifestyles, consumption culture and necessary emission-cutting environmental policies.

[10] *Net-Zero Strategy: Build Back Greener*, p. 8-9.

The problem goes beyond the proposed governmental agendas: it has also been the result of our human-centred unethical and extractivist material culture. As Joanna Boehnert stresses in her book *Design Ecology Politics: Towards the Ecocene*, there is a causality between the unecologically designed world, our self-centred belief systems, our carelessness towards our dependency on ecological systems and our detachment from non-human nature. Boehnert depicts this as a 'highly reductive intellectual tradition and anti-ecological worldview in profound denial of our fundamental interdependencies'. [11]

[11] Joanna Boehnert, *Design, Ecology, Politics: Towards the Ecocene*, (London: Bloomsbury Academic, 2018).

We need a more ambitious ecological plan that relinquishing from prevalent net zero techno-fantasies.

## PART II: CASE STUDIES

Problematising the simplification of prevalent ecological problem-framing is critical. Since the beginning of this residency, I have come across three case studies that exemplify the short-sightedness and failures of reductive techno-solutionist paths. The selected examples expose the profound dysfunction of the seemingly effective functioning of the net zero techno-utopic agenda. More than anything else, they demonstrate that dominant net zero strategies prevent us from responding appropriately to the ecological emergency.

### a. 'McDonald's is the first building in the country which fits into the UK Green Building Council's (UKGBC) Net-Zero carbon buildings framework' [12]

According to *Dezeen*, for a building to be net zero, it must remove as much carbon dioxide from the atmosphere as it emits throughout its lifespan. Hence the McDonald's at Market Drayton was built using natural or recycled materials and powered by a combination of wind turbines and solar panels. Yet McDonald's confirmed to *Dezeen* that consumption-based emissions associated with its beef-heavy menu have not been taken into account – meaning that the restaurant overall is not Net-Zero even by loose interpretations. The neighbouring residents of St Mary's Garden Village in Ross-on-Wye, Herefordshire fear this sort of remark shows Herefordshire council is not taking the climate crisis seriously enough. [13] One resident expressed deep concern at the number of light vehicles expected: 2,444 a day... 'This is completely at odds

[12] Nat Barker, 'McDonald's opens "UK's first net-zero restaurant"', *Dezeen*, 20 December 2021.

[13] Steven Morris, '2,444 cars a day: McDonald's plan sparks climate row in Herefordshire', *The Guardian*, 27 September 2021.

with Herefordshire council's own declaration of a climate emergency and stated commitment to net zero carbon. [14] What this article highlights is that net zero accreditations by the UK Government is absurd, contradictory, superficial and more than anything far from shedding light on meaningful long term ecological and social remediation.

[14] Ibid.

### **b. Blockchain fantasy: Cryptocarbon cowboys and colonisation**

In an interview for The Crypto Syllabus, environmental science researcher Pete Howson analyses the crypto-carbon economy and green branding. [15] Discussing Reducing Emissions from Deforestation and Forest Degradation mechanisms (REDD+), otherwise known as carbon offsetting schemes, Howson lays out an underlying contradictory narrative. 'It's worth remembering that when you offset your emissions flying to Benidorm or wherever, no one actually goes out and plants trees on your behalf. You're effectively just donating money to a conservation project that claims to have prevented trees from being cut down. And it's super difficult, perhaps impossible, to ever really know if those trees being protected were ever in any actual danger of being cut down. Or whether the trees still exist, or if they're now just someone's hardwood decking when you donate your money. Or whether your donation is just going to some cowboy in Indonesia who claims to own a forest, but actually it's just a golf course and he lives in Benidorm.' [16]

[15] Evgeny Morozov, 'Conversation: Pete Howson on Cryptocarbon', *The Crypto Syllabus*, 19 December 2021.

This article evidences the ongoing offsetting distraction and the pressing need to tackle our deep-rooted consumption habits with meaningful correlated environmental actions. Accentuating that removed offsetting visions are founded on uncritical beliefs on smart contracts detached from reliable environmental remediation, the interview highlights the colonial aspect and the need to understand that the surroundings of the emission source have to be addressed.

[16] Ibid.

### **c. Ineffective techno-innovations: Carbon capture facilities emit far more than what they capture**

According to a CNBC article, Shell Quest plant in Alberta, Canada, is one of the largest planetary facilities that uses Carbon Capture and Storage technology (CCS) to reduce the emissions of hydrogen production. The plant has been found to emit far more greenhouse gases than it captures. [17] The article refers to an investigation by the watchdog group Global Witness, which found that while 5 million tons of carbon dioxide had been prevented from escaping into the atmosphere at the plant since 2015, it also released 7.5 million metric tons of greenhouse gases over the same period. The report specified that this is equivalent to only 48% of the plant's carbon emissions being captured. That's far short of the 90% carbon capture rate promised by the industry for these types of projects in general. [18]

[17] Sam Meredith, 'Shell's massive carbon capture facility in Canada emits far more than it captures, study says', *CNBC*, 24 January 2022.

Shell's unconvincing CCS case is a perfect example of how distracting techno-visions perpetuate our dependence on fossil fuels evidencing the ineffectiveness and measurement limitations of carbon capture technologies.

[18] Ibid.

## **PART III: CONCEPTUAL LENSES: AFTER-COMFORT, DEFUTURING AND DEGROWTH**

After analysing fundamental problems with reductive net zero frameworks, I selected three conceptual lenses proposed by specific thinkers who have influenced my design thinking: Daniel Barber and after-comfort, Anthony Fry and defuturing, and Timothée Parrique and degrowth. These frameworks make us reflect on the various systems we rely on: systems of destruction, systems of comfort and systems of extractive practices linked to consumption.

As part of the residency and in collaboration with RCA colleagues Dr Rob Phillips and Alon Meron at the Design Products + Futures Programme, I was able to invite these three thinkers to a symposium in order to share their ideas. All of the conversations influenced my reflection on current net zero agenda reductionism. They clarified the agenda's deficiencies and shed light on elements and system shifts we must consider for a truly net zero future.

## After-Comfort

*'The experience of comfort inside is predicated on the global acceleration of climatic instability outside'*

Daniel Barber [19]

[19] Daniel Barber, 'After Comfort', Log 47: *Overcoming Carbon Form*, pp.45-52.

[20] Ibid

[21] Ibid

[21] Ibid

In his article 'After Comfort', architectural historian Daniel Barber postulates design's role in aestheticising the relationship between comfort and carbon, calling attention to design's role in the climate crisis. [20] In Barber's words, comfort implies that 'one has risen above the inconsistencies of the natural world and triumphed, not only over nature and the weather but over chance itself'. [21] Arguing that comfort is integral to interiors and that it is directly linked to consumption, Barber asserts that 'comfort is destroying the future'. [22] In response, Barber argues that architects will need to construct an absence of comfort in the built environment, stressing that we will have to adjust to the much-avoided sensation of discomfort as a society.

My research considers Daniel Barber's notion of 'after comfort' as one of the fundamental attitudes the world should adopt in redefining the net zero agenda. In the project, after-comfort is the basis from which I address how design could approach spatial design and dwelling to significantly break the vicious carbon economy chain. In the face of the climate crisis, using Barber's notion of after-comfort, the project is an attempt to reconceptualise and redesign dwelling. Using Barber's identification of comfort as a crucial 'figure of thought', the project aims to reduce expectations of architecture in providing a well-tempered environment and to use less material in the first place by proposing a connection with the ground through a floorless home. [23]

## Defuturing: the vast and complex equation of creation and destruction

*'Without having a critical reflective ethical moment of interrogation, the myopic instrumental design is characterised by the dominant thought of driving things forward.'*

Anthony Fry [24]

[24] Anthony Fry, RCA symposium 'The Cost of Change', 16 March 2022.

[25] Anthony Fry, *Defuturing: A New Design Philosophy*, (London: Bloomsbury, 2020).

[26] Anthony Fry, RCA symposium 'The Cost of Change'.

[27] Ibid

In *Defuturing: A New Design Philosophy*, design theorist and educator Anthony Fry proposes the notion of defuturing as a mode of inquiry for design. [25] By taking temporality as its major preoccupation, methodologically, Fry argues that designers have to project themselves and their projects into the future, and design back from that future to the present. [26] To paraphrase Fry, we need to place causality and consequences before the focus on the new object under consideration. Whatever is brought into being by designing for the future needs to allow for retrofit before being brought into existence. [27] In his talk at the symposium Fry noted that creativity is a 'mantra of our culture', but destruction is omnipresent, stressing that creation and destruction are dialectically indivisible. He highlighted that most of what we design is

made on the back of the violence of the extractive industry. Fry emphasised that recognising what we destroy is a way of knowing a directive or practice as it provides the basis to develop a possibility to the basis of material ethics.

In the face of material histories, Fry's promise of defuturing is to reinterrogate and reimagine the world of our making, because 'then we are more ethically contemplating its remaking'. Fry specified that the fact that destruction is unavoidable does not mean that destruction cannot be mitigated: 'in a fundamental sense defuturing creates another way of seeing and another way of acting'. Fry trusts that design is a critical field for comprehending why we have left sustainability out of our systems, how it can defuture and what we need to think about if we need to create a sustainable future. [28] For Fry, the climate emergency cannot be addressed with a 2020 vision. Embracing defuturing in design means confronting and removing the authority of the foundations on which narratives of 'future', 'production' and 'progress' stand.

[28] Fry, *Defuturing*, p.2.

### Degrowth: the need for alternative systems

*'We have constructed the system that is now the source of our own demise'*

Timothée Parrique [29]

[29] Timothée Parrique  
RCA symposium 'The  
Cost of Change', 16  
March 2022

Timothée Parrique described his experience in the economics department at his university as a feeling of being stuck within one specific economic system that clouded his ability to imagine an alternative system. [30] Parrique indicated that in the economics of the future, the ecological economics perspective is not prevalent: 'they train you to be the obedient little dentist of capitalism; there's somehow no effort in training and educating and in researching the palette of available economic systems'. On wanting to design a new economic system he noted, 'what we do as economists is forecasting. We study the dynamics of the present and then through our models extend it into the future'. Parrique addressed a double future cancellation in terms of the ecocide and our ability to imagine the future. He noted that the idea of futuring an alternative economy that is not capitalism is considered unrealistic: 'it makes me think that pragmatic realism has never been as dangerous as today'.

[30] Ibid.

Parrique stressed that the effort we've been putting in up until now, despite more than 2,300 climate laws implemented globally, is really insignificant in comparison with the task ahead. Expanding on the growth-centric economies, he stressed that they are not only based on more production and consumption; when monetary economy gets bigger it consumes more natural resources and it also emits more pollution. Parrique stated that it is not about stopping the economy: 'you could still produce and still consume but it would just be a complete reorganisation and rethinking of production, based on values, not based on exchange value, and founded on the ability of production to satisfy concrete needs and not on striving to accumulate money'.

### Against the cancellation of futures

The three lenses I discussed offer designers a valuable set of critical concepts to reconsider future design practices and the relationship between their practice and the natural world. They point towards a radical systemic approach to contest design's dominating unsustainable causal chain. Following an approach of critical action and radical directional change in material cultures, the research brings awareness to this relationship from the inception of the design by

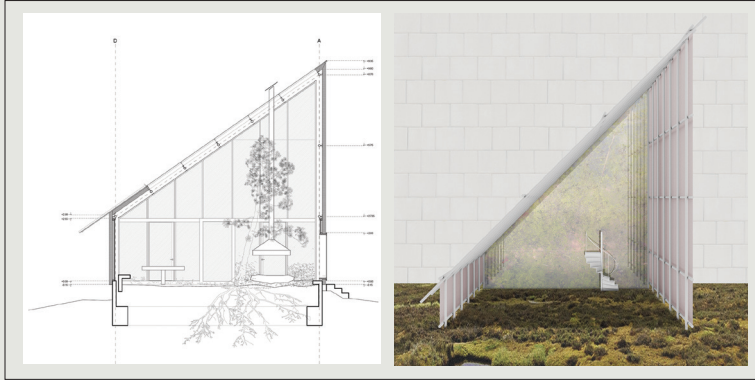
The three lenses I discussed offer designers a valuable set of critical concepts to reconsider future design practices and the relationship between their practice and the natural world. They point towards a radical systemic approach to contest design's dominating unsustainable causal chain. Following an approach of critical action and radical directional change in material cultures, the research brings awareness to this relationship from the inception of the design by envisioning the consequences of the proposed designs. By urging designers to ask fundamental questions about their practice, my collaborators and I encourage a reflection on comfort standards, the environmental degeneration caused by creative processes, and the need for alternative economic systems. These principles of radical reconsideration of design apply in the context of rethinking net zero. In view of this, the transition to a net zero economy should be based on substantial changes in the way we live and a radical cut in industrial toxicity.





# THE HOUSE AT THE END OF THE WORLD

ALFREDO THIERMANN AND SEBASTIAN CRUZ




*The dematerial angle of my research resonated with a house that our collaborators, architects Thiermann Cruz, were building in Aysén, a region deep in the south of Chile. The house, known as Casa VIII, has an entirely floorless section and became the basis for our speculations for the house in the not too distant, not too comfortable future. Here, architects explain the backdrop to the project. [DFvD]*

Good houses are artefacts that are crafted to conquer land as much as they are devoted to distance their inhabitants from it. This has been clear in Chile since the time of the colonies in the eighteenth century, and one of the few truly Chilean inventions, the so-called Casa Chilena, is its built manifestation. These houses embodied the specific typology of a courtyard house and were used to organise the territory based on agricultural production, while also separating domestic life from the land. After the second half of the nineteenth century, this type faded away, not so much because of the obsolescence of its spatial configuration, but more due to the banishing of the specific kind of life and land that it previously organised.

In the early 1990s, the brutal dictatorship in Chile – which had lasted for almost two decades – ended, leaving in its wake a radical reconfiguration of the way in which natural resources are administered. The nation's water systems were completely privatised and large concessions for mining exploitation were granted to international corporations, impacting the way that land was subdivided. It is impossible to think about the production of architecture, and specifically of houses, in Chile without considering these phenomena. The forces of global capitalism entered, accelerated by the neoliberal ethos of the dictatorship, and modified the territory beyond recognition. And thus, since the 1990s it has not been tenable to imagine the Chilean landscape as the last untouched and unpolluted corner of the world. Rather, Chile is a ruin, a capitalist ruin emblematic of broader planetary problems.

Ruins have long been a source of inspiration for architecture, a locus where the past leaves its traces, but also a void where fantasies and imaginations are projected. As architects, we cannot resist this projective impulse, and it is through projects that we reflect and act on these



conditions. To think about this problem through the house type – in architectural terms – means to suspend the idea of a ‘solution’ and to think of ourselves instead as part of the problem. How do we still act? We must ask what is the place for architecture in that new context – if there context – if there is any – and acknowledge that solutions are not necessarily part of our field of action.

Casa VIII is being built in a remote area in Chilean Patagonia. It is conceived as an ensemble linking two traditional – yet imported – building typologies: the shearing shed and the winter garden. This house is located at the end of the world; however, the end of the world is not what one initially imagines. Nature here is young; in fact, there is nothing truly natural about this context. The colonisers began lighting fires here at the beginning of the twentieth century to turn thousands of square kilometres of rainforest into productive grasslands. Thus, the relatively young forest surrounding the house is a fragile and recent ecosystem. Situated in this context, the plan of the house is organised in three squares. One contains sleeping rooms, the other houses collective spaces mostly for cooking and contemplation.

Contained between the two, the third square preserves a nine-by-nine-metre fragment of the fragile forest inside the house. It has no heating, almost no insulation and the existing vegetation remains untouched. The trees and plants inside the house are as old as they are outside, and inhabitants make their lives standing on the very ground of the earth. The natural soil of the site is left untouched, and it is now covered and protected only from the rain. The single-pitched shed housing different landscapes and its climates change from season to season. The colours of the leaves inside vary, and the texture and smell of lichens and moss also change according to the light and heat.

The house is constructed from simple ready-made steel frames clad with a thin and translucent layer of wired reinforced glass. More literal than symbolic, this house traps a relatively large amount of air, and within it, cares for a fragment of a fragile and manufactured territory. With no insulation and in close proximity with vegetation and natural rhythms, thermal comfort has moved from the cladding of the house to the cladding of the body. The architecture of the house is simple, but the inhabitants must change their living and clothing habits to live in a reconfigured relationship with comfort. It is not that the architecture has given up on the questions of thermal comfort, but rather clothing has become a new form of architecture. Afforded by this condition, vegetation will continue its path inside the house, and people will do what they like to do, but yet in an intimate relation with the kind of nature manufactured at the so-called end of the world.

# NO BEIGE PLEASE

## MULTIDISCIPLINARITY AND THE RESEARCH PROCESS

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DELFINA FANTINI VAN DITMAR,  
TIMOTHY BOUYEZ-FORGE, SHANTI BELL,  
SAVVAS ALEXANDER, ROSA AVILEZ,  
JOYCE ADDAI-DAVIS, ALFREDO THIERMANN  
AND SEBASTIAN CRUZ

*In the Design Council's report Beyond Net Zero: A Systemic Design Approach the authors describe the role of the 'system thinker': someone who can see the big picture, can understand how everything is interconnected and has the ability to move between the micro and the macro, and across disciplinary silos. This also relates to the role of the convenor: someone who connects people with shared goals and designs the platform for these encounters. The report emphasises the significance of both of these roles to comprehend and act on the uncertainty and complexity of the climate challenge.*

*In my research proposal for the residency, I wanted to explore how subtraction could be integrated into a dematerialised design for net zero futures. As a reflection of my pedagogical practice in the context of environmental collapse, I was interested in articulating a multidisciplinary collaboration through critical speculative experimentation. Thus, the roles I decided to explore in the project was that of the system thinker and the convenor.*

*The group that I convened consisted of two teams, defined by discipline (architecture and fashion), which worked collaboratively across different media and working methods. The following pages illustrate our ecosystem and the ways of working that emerged during the process through notes, experiments, prototypes, calls and more. [DFvD]*

# METHODOLOGY

## CONVENOR / MULTIDISCIPLINARY TEACHING

Delfina Fantini  
van Ditmar

## FASHION LEAD

Timothy Bouyez-Forge

## ARCHITECTURE OFFICE

Thiermann Cruz Architects:  
Alfredo Thiermann  
Sebastian Cruz

## COLLABORATORS

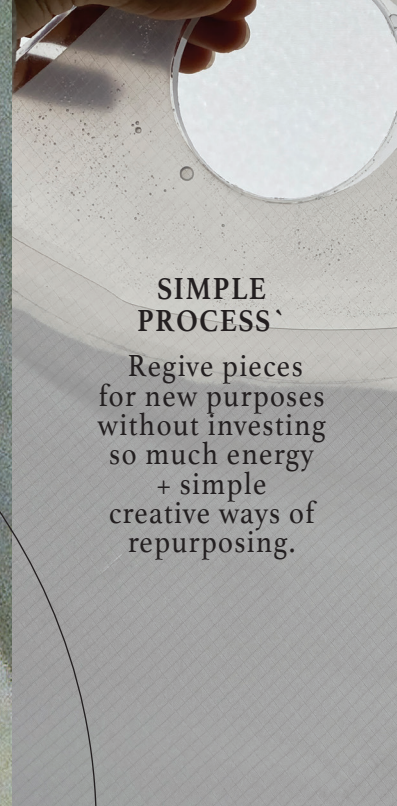
Shanti Bell (MA Fashion RCA)  
Savvas Alexander (MA Fashion RCA)  
Rosa Avilez (MA Fashion RCA)  
Joyce Addai-Davis (MA Fashion RCA)  
Nikolai Aarre (MA Design Products RCA)

## SIMPLE PROCESS`

Regive pieces  
for new purposes  
without investing  
so much energy  
+ simple  
creative ways of  
repurposing.

## MATERIAL APPROACHES

Using less  
(dematerialisation) +  
regenerative materials  
+ upcycling / reuse of  
synthetics material.



**SPECULATIVE-EXPERIMENTAL  
MULTIDISCIPLINARY  
COLLABORATION**

Creative weaving of ecological  
propositions.



**SPATIAL-MATERIAL  
NEGOTIATIONS:**

Fashion designers challenge  
architects and vice versa.  
Open briefs: where are you  
gravitating towards?



**AN ECOLOGICAL FUTURE DOESN'T NEED TO BE BEIGE**  
Beige is violently neutral — Luxury is beige — Comfort is beige —  
Beige is an anti-extravagant colour



**EXPERIMENTATION THROUGH  
DEMATERIALIZED DESIGN  
IN THE CONTEXT OF  
AFTER-COMFORT**

# MATERIAL APPROACHES

## FURNITURE & HOMEWARE

Play with discarded garments and form them into new typologies of furniture. Create a new typology of furniture that helps insulate the home and is aesthetically pleasing.

## FABRIC & CLADDING

Turning discarded clothes into a cladding that should help the house. Think of the 'thermal package' and the protection from water/wind. What other function could it provide while being part of the architecture?





#### THE INHABITANTS AND THEIR GARMENTS

Set of dolls inhabiting the house. What will they wear? What are they made of? Figure a language of clothing for these future humanoids that reflects the eco-ethical future. Reinterpret a transhumanist approach and consider that the inhabitants live in a semi-nomadic manner: The house is simple (technologically dumb); it is the inhabitant and clothing who have technologically advanced. We look different, not the house: Technology is inserted into garments and the body. The thermal comfort coming from the house is regressive. Inspired by Rossi Braidotti's and Ron Wakkary's post-human rationale; the posthuman subjectivity of the inhabitants is based on humility and cohabitation rather than the universalising model of humanism and anthropocentrism.



post comfort/reality  
 → Behaviour change  
 → Rethinking our comfort  
 → Temperature change in the space.



"After comfort"

Fabric

"IDENTITY IS MULTILAYERED AND COMPLEX, SOMETHING A BEIGE COLOUR PALETTE DOES NOT EXPRESS. IN REJECTING, A GENERALISED PERCEPTION OF LUXURY AND MODERNITY AS BEIGE, WE PRESENT A MULTILAYERED AND VARIED PALETTE REPRESENTING A BRIGHT FUTURE + COMPLEX BEINGS WITH COMPLEX PROBLEMS TO SOLVE."

— ROSA AVILEZ



→ LIGHT



clothing as boundaries  
 clothing as insulation

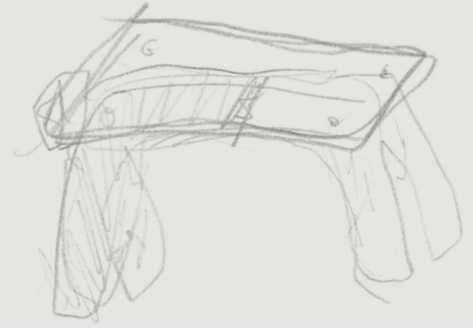
→ BASIC PRIMAL CLOTHING

→ clothing inside the domestic space





into the furniture.



house

End Points?

→ Repurposing ~~fabric~~ <sup>Clothing</sup>  
Back into ~~Clothing~~  
fabric.

Repurposing glass  
into sculpture  
+ drinking  
glass.

design for discomfort



Primal  
Shelver / clothing.



# REWET, RESTORE, REPEAT

AN INTERVIEW WITH SALTYCO

*The Restore residency has been a great platform to extend conversations with designers working on regenerative design initiatives, a topic I am exploring in my teaching practice at the RCA. I was interested in bringing material science company Saltyco into the project for their multidisciplinary team architecture and my belief that Saltyco's investment in conceiving a healthy supply chain is an exceptional design-led approach that demonstrates how design can participate at a societal and environmental scale toward an impactful net-zero transition.*

*Saltyco is a composed of a multidisciplinary team: Mechanical Engineer Julian Ellis-Brown, Chemist Finlay Duncan, Integrated Designer Antonia Jara and Business/Design Strategist Neloufar Taheri. Tackling global overconsumption of freshwater, Saltyco initially developed textile fabric from salt-tolerant plants (freshwater-free fabrics) as an alternative to organic or recycling strategies. Focusing on living systems-societal interrelationships, they evolved their material innovation strategy by engaging with regenerative agriculture. Saltyco worked with farmers and conservation groups to develop BioPuff while aiding in preserving the most efficient natural carbon-capture natural sources: the peats. [DFvD]*

DELFINA  
FANTINI VAN  
DITMAR

**How would you describe your regenerative product? What are its properties?**

SALTYCO

BioPuff is a plant-based fibrefill used as an insulation material for the apparel industry. BioPuff is composed of 100% raw cellulosic plant seed-fibre clusters and wholly sourced and manufactured in the United Kingdom. This alternative to animal- and petroleum-based products resembles down with its cluster structure; it is lightweight, warm and naturally water repellent while also being biodegradable and cruelty-free.

DELFINA

**Who do you sell it to?**

SALTYCO

Saltyco's main target customers are sustainably-driven apparel brands. These range from performance and outdoor-wear brands to luxury and contemporary fashion houses. What Saltyco customers have in common is their mission to replace the existing damaging fibrefill materials they use with healthy alternatives.

DELFINA

**How would you define the main strategies of Saltyco regarding fostering carbon insetting?**

SALTYCO

As Saltyco's supply chains have been designed and built from the ground up, we have been able to completely rethink how resources and emissions are managed throughout our product's creation. Our main method of doing this is through the origins of our textiles—plants grown on peatlands. Peatlands are a form of wetland ecosystem which, when healthy and wet, can store a huge amount of carbon. However, much peatland is over-exploited and damaged, meaning that carbon is being released and contributing 5% of global

[1] "Peatlands and climate change", *International Union for Conservation of Nature*, [online], accessible at <https://www.iucn.org/resources/issues-briefs/peatlands-and-climate-change> (Last accessed 8 June, 2022)."

anthropogenic carbon emissions.<sup>[4]</sup> By rewetting the UK's peatlands to grow plants that can be transformed into textiles, we can sequester huge amounts of carbon, contribute towards biodiversity goals and make some fantastic products.

**DELFINA** I am very interested in the community work you are doing with 'experimental farmers' in the context of regenerative design. Can you tell us more about how this method regenerates the peats and creates benefits for farmers?

**SALTYCO** Globally, huge areas of peatland have been drained in order to support conventional agriculture. This creates a problem as it allows the peat to degrade aerobically and produce huge amounts of carbon dioxide. According to the International Union for the Conservation of Nature, annual emissions from drained peatlands are nearly 2 gigatons CO<sub>2</sub>, roughly double those of the aviation industry.

Many farmers who operate on these lands are therefore seeking alternative agricultural methods that will allow them to decarbonise their farms without losing income from cultivated crops. To stop the emissions the peat can be restored to its wet state and new crops can be used that thrive in such conditions. Saltyco then utilises the unique properties of these crops in order to produce our materials.

By providing a viable market, we are able to work with farmers who are rewetting their land. We are an active part of a growing movement to do this, joining cross-industry discussions and making the case for a shift towards more sustainable practices.

**DELFINA** As part of your company's responsible use of natural resources, you harvest a specific part of the plant while keeping the roots that sequester carbon. Can you describe the process?

**SALTYCO** In order to ensure carbon stays locked in the ground, it is important to ensure that there is minimal disturbance to the peat once it has been re-wetted. We therefore plant perennial crops that regrow year-on-year without the need for tilling and replanting. By allowing roots and other biomass to remain, we can eventually start to produce new peat, creating long term storage for sequestered carbon.

**DELFINA** Saltyco is part of a broader ecosystem of brands, designers, researchers producing products and materials that have more restorative relationships with the planet than previous production methods – does this give you cause for hope going forward?

**SALTYCO** Devastating climate impacts, a global pandemic and now the Russian invasion of Ukraine have created huge levels of destabilisation and uncertainty around the world. One of the most evident consequences throughout this is how we must detach our reliance from fossil fuels and their derivative materials. The sustainable and restorative solutions being explored by brands, designers and researchers around the world are critical if we are to create a global ecosystem that has the resilience to thrive in the coming decades. We are emboldened by our colleagues and one of the true pleasures of our work is the opportunity to engage and collaborate with those working towards this same mission. The Shellworks, Notpla and Piñatex are fantastic examples of great materials startups. Shadey. club is also a new startup on the scene looking at changing our fashion consumption practices to be more sustainable. Same mission, different approach, which we love to see!

# SAMUEL ILIFFE

Not a single river, lake or estuary in the UK is classed as 'in good health' according to a recent study from the UK Government's Environment Agency. The number one reason for these water bodies not achieving good health is phosphorus pollution.

Phosphorus is an essential mineral for all living things. It helps us make bones and teeth, and to store and use energy. For centuries, phosphorus has also been used in fertilisers to grow food and other crops, but the increased use of synthetic fertilisers and population increase since the 1950s means more of that phosphorus is filtering into lakes and rivers via human waste and farm run-off.

In PHOSFARM, Samuel Iliffe has been researching how certain species of macroalgae (seaweed) might play a role in removing the polluting phosphorus from the UK's water bodies. Through the residency Samuel has been digging into the historic uses of phosphorus and speaking with groups of scientists who are tackling the issue.

In this chapter, Samuel shares some of these findings through conversations and republished articles.



Samuel Iliffe is a design engineer focused on the use of innovative materials and processes to address everyday problems. He studied a double masters MA/MSc in Innovation Design Engineering from Imperial College London and the Royal College of Art, and a BEng in Mechanical Engineering from Queen Mary University. In 2020 he was designer in residence at the Royal Academy of Arts, London, in association with Algae Platform, a programme of Atelier Luma.

# PHOSFARM

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## *WE BROKE PHOSPHORUS*

JULIA ROSEN

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## *‘THEY ASKED QUESTIONS THAT THE SCIENTISTS WOULD NEVER THINK TO ASK’*

AN INTERVIEW WITH JAMES BRIDLE

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## *EXTRACTIVE TO RESTORATIVE*

TWO PHOSPHORUS FLOW MAPS

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## *BLOOM*

PHOTOS OF A SINGLE ALGAL BLOOM

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## *THE PHOSPHORUS LEGACY*

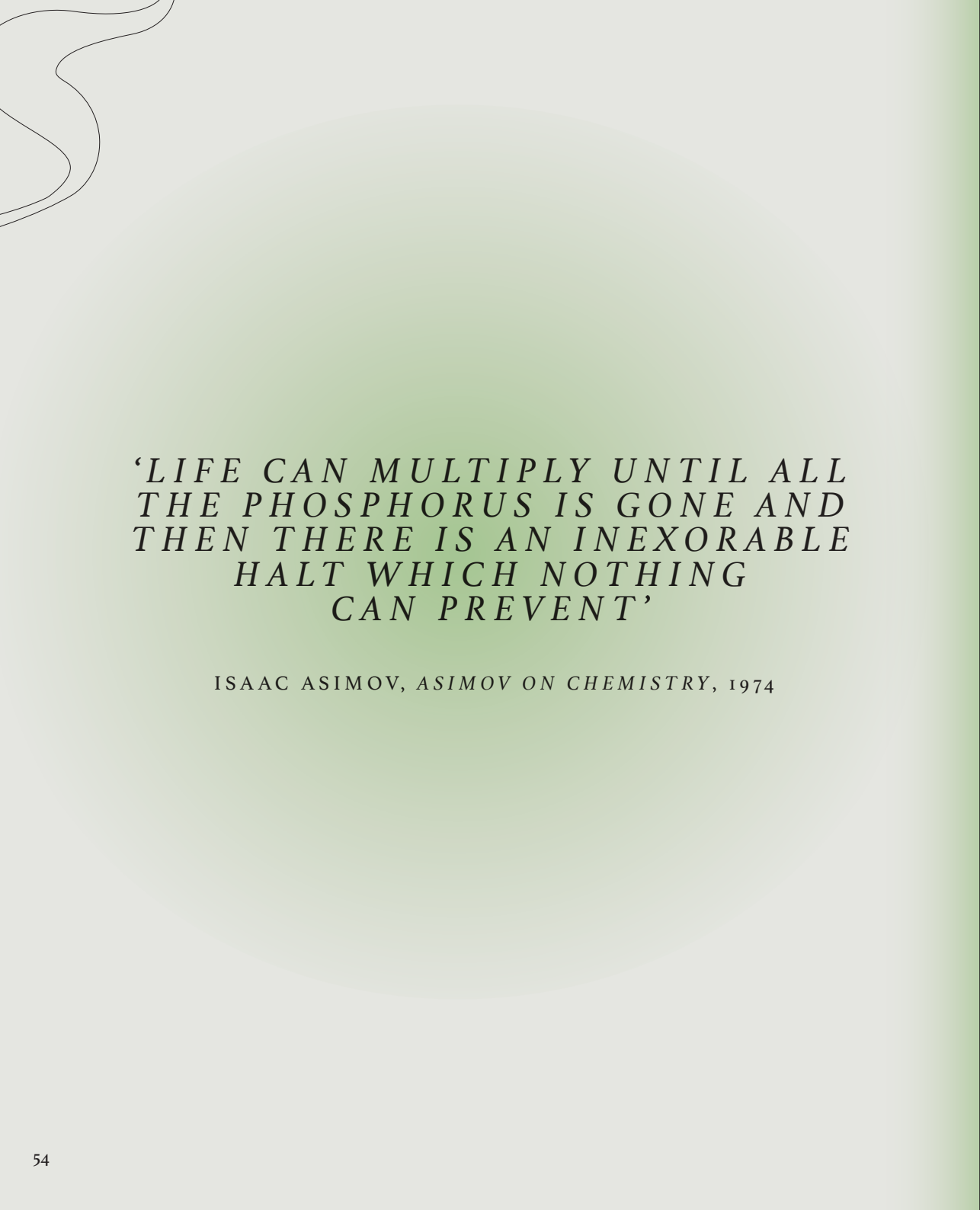
AN INTERVIEW WITH PAUL WITHERS

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## *PHOSFARM*

A LIGHTWEIGHT, TRANSPORTABLE SEAWEED FARM

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*'LIFE CAN MULTIPLY UNTIL ALL  
THE PHOSPHORUS IS GONE AND  
THEN THERE IS AN INEXORABLE  
HALT WHICH NOTHING  
CAN PREVENT'*

ISAAC ASIMOV, *ASIMOV ON CHEMISTRY*, 1974

# WE BROKE PHOSPHORUS

HUMANITY IS FLUSHING AWAY ONE OF LIFE'S  
ESSENTIAL ELEMENTS

JULIA ROSEN

*In this article, originally published in The Atlantic, journalist Julia Rosen helps us understand the history behind humanity's use of phosphorus. At the beginning of the residency I was setting the scene for myself, uncovering and piecing together stories, statistics and quotes to help me understand the context and generate new ideas. Rosen's article is a clear encapsulation of the issues we face with phosphorus going forward. [SI]*

Life as we know it is carbon based. But every organism requires other elements, too, including nitrogen and phosphorus. Nitrogen is the basis of all proteins, from enzymes to muscles and the nucleic acids that encode our genes. Phosphorus forms the scaffolding of DNA, cell membranes, and our skeletons; it's a key element in tooth and bone minerals.

Too little of either nutrient will limit the productivity of organisms, and, by extension, entire ecosystems. On short timescales, nitrogen often runs out first. But that scarcity never lasts long, geologically speaking: the atmosphere – which is about 80 per cent nitrogen – represents an almost infinite reservoir. And early in the course of evolution, certain microbes developed ways to convert atmospheric nitrogen into biologically available compounds.


Alas, there is no analogous trick for phosphorus, which comes primarily from the Earth's crust. Organisms have generally had to wait for geologic forces to crush, dissolve, or otherwise abuse the planet's surface until it weeps phosphorus. This process of weathering can take thousands, even millions, of years. And once phosphorus finally enters the ocean or the soil, where organisms might make use of it, a large fraction reacts into inaccessible chemical forms.

For these reasons, the writer and chemist Isaac Asimov, in a 1959 essay, dubbed phosphorus 'life's bottleneck'.

One of the lingering mysteries about the origin of life, in fact, is how the earliest organisms got hold of enough phosphorus to assemble their primitive cellular machinery. Some scientists think they must have evolved in environments with abnormally high concentrations of phosphorus, like closed-basin lakes. Others have suggested that bioavailable phosphorus came to Earth in comets or meteorites – a celestial gift that helped kick-start life.

A chronic shortage of phosphorus might also explain why it took so long for oxygen to build up in Earth's atmosphere. Phytoplankton (microscopic marine algae) first began belching out the gas about 2.5 billion years ago, with the advent of photosynthesis. But they might not have had enough phosphorus to ramp up production, because the element kept getting bound up in iron minerals in the ocean, helping trap the world in a low-oxygen state for more than a billion years longer.

That we breathe oxygen today – and exist at all – might be thanks to a series of climatic cataclysms that temporarily freed the planet from phosphorus limitation. About 700 million years ago, the oceans repeatedly froze over and glaciers swallowed the continents,



chewing up the rock beneath them. When the ice finally thawed, vast quantities of glacial sediment washed into the seas, delivering unprecedented amounts of phosphorus to the simple marine life forms that then populated the planet.

Scientists have proposed that this influx of nutrients gave evolution an opening. Over the next 100 million years or so, the first multicellular animals appeared and oxygen concentrations finally began to climb toward modern levels.

Scientists still debate exactly what happened, but what's clear is that after this explosion of life, the phosphorus vice clamped down again. Geologic weathering kept doling out meagre rations of the nutrient, and ecosystems developed ways to conserve and recycle it. Together, these geologic and biologic phosphorus cycles set the pace and productivity of life. Until modern humans came along.

Long before phosphorus was discovered, humans had invented clever ways of managing their local supplies, says Dana Cordell, who leads the food-systems research group at the University of Technology Sydney, in Australia. There and in the Americas, for example, Indigenous people managed hunting and foraging grounds with fire, which effectively fertilised the landscape with the biologically available phosphorus in ash, among other benefits. In agrarian societies, farmers learned to use compost and manure to maintain the fertility of their fields.

But human waste was perhaps the most prized fertiliser of all. Though we too need phosphorus (it accounts for about one per cent of our body mass), most of the phosphorus we eat passes through us untouched. Depending on diet, about two-thirds of it winds up in urine and the rest in faeces. For millennia, people collected these precious substances – often in the wee hours, giving rise to the term ‘night soil’ – and used them to grow food.

Then came the so-called Sanitation Revolution. In the 1700s and 1800s, Europeans and Americans moved to cities in unprecedented numbers, robbing the land of their waste and the phosphorus therein. This waste soon became an urban scourge, unleashing tides of infectious disease that compelled leaders in places like London to devise ways to shunt away the copious excretions of their residents.

This created what Karl Marx described as the ‘metabolic rift’ – a dangerous disconnect between humans and the soils on which they depend – and effectively sundered the human phosphorus cycle, reshaping its loop into a one-way pipe.

It forced farmers to find new sources of phosphorus to replace the nutrients lost every year to city sewers. To make matters worse, agricultural research in the late 1800s suggested that plants required even more phosphorus than previously thought. And so began a frantic race for fertiliser.

In the course of these exploits, humans reached across vast distances to secure phosphorus. Mining allowed humans to reach back in time, too, seizing nutrients from another era and short-circuiting the geologic phosphorus cycle altogether. We saw a way to turn the stubborn trickle into a torrent, and that's exactly what we did.

Deposits of phosphate rock became increasingly important in the twentieth century, during the Green Revolution. Plant breeders developed more productive crops to feed the world and farmers nourished them with nitrogen fertiliser, which became readily available after scientists discovered a way of making it from the nitrogen in air. Now the main limit to crop growth was phosphorus – and as long as the phosphate mines hummed, that was no limit at all. Between 1950 and 2000, global phosphate-rock production increased sixfold, and helped the human population more than double.

But for as long as scientists have understood the importance of phosphorus,



people have worried about running out of it. These fears sparked the fertiliser races of the nineteenth century as well as a series of anxious reports in the twentieth century.

There were also cautionary tales: large deposits of phosphate rock on the tiny Pacific island of Nauru bolstered Australia and New Zealand's agricultural progress during the twentieth century. But by the 1990s, Nauru's mines had run low, leaving its 10,000 residents destitute and the island in ecological ruins.

These events raised a terrifying possibility: what if the phosphorus floodgates were to suddenly slam shut, relegating humanity once more to the confines of their parochial phosphorus loops? What if our liberation from the geologic phosphorus cycle is only temporary?

In recent years, Cordell has voiced concerns that we are fast consuming our richest and most accessible reserves. US phosphate production has fallen by about 50 per cent since 1980, and the country – once the world's largest exporter – has become a net importer. According to some estimates, China, now the leading producer, might have only a few decades of supply left. And under current projections, global production of phosphate rock could start to decline well before the end of the century. This represents an existential threat, Cordell says.

Many experts dispute these dire predictions. They argue that peak phosphorus – like peak oil – is a spectre that always seems to recede just before its prophecy is fulfilled. Humans will never extract all of the phosphorus from the Earth's crust, they say, and whenever we have needed more in the past, mining companies have found it.

But simply extracting more phosphate rock might not solve all of our problems, Cordell says. Already, one in six farmers worldwide can't afford fertiliser, and phosphate prices have started to rise. Due to a tragic quirk of geology, many tropical soils also lock away phosphorus efficiently, forcing farmers to apply more fertiliser than their counterparts in other areas of the world.

The grossly unequal distribution of phosphate-rock resources adds an additional layer of geopolitical complexity. Morocco and its disputed territory, Western Sahara, contain about three-quarters of the world's known reserves of phosphate rock, while India, the nations of the European Union, and many other countries depend largely on phosphorus imports. And as US and Chinese deposits dwindle, the world will increasingly rely on Morocco's mines.

The cost of breaking the phosphorus cycle is not just looming scarcity, but also rampant pollution. At nearly every stage of its journey from mine to field to toilet, phosphorus seeps into the environment. This leakage has more than doubled the pace of the global phosphorus cycle, devastating water quality around the world. One 2017 study estimated that high phosphorus levels impair watersheds covering roughly 40 per cent of Earth's land surface and housing about 90 per cent of its people. In more concrete terms, this pollution has a tendency to fill water bodies with slimy, stinking scum.

Too much phosphorus – or nitrogen – jolts aquatic ecosystems long accustomed to modest supplies, triggering algal blooms that turn the water green, cloudy, and odorous. The algae not only discourage people from recreating in lakes and rivers but also can produce toxins that harm wildlife and disrupt drinking-water supplies. And when the algae die, decomposition sucks oxygen out of the water, killing fish and creating devastating dead zones.

Indeed, pollution may be the strongest argument for reducing our dependence on mined phosphorus. Some researchers have calculated that unchecked human inputs of phosphorus, combined with climate change, could eventually push much of the ocean into an anoxic state persisting for millennia. Such events have occurred numerous times over Earth's history and are thought to have caused several mass extinctions – for instance, when land plants evolved and sent a pulse of newly weathered phosphorus into the ocean.

The clear consensus among phosphorus experts is that humans must start mending the phosphorus cycle to reduce the environmental damage caused by pollution and to waste less of an increasingly scarce resource.

Recycling human waste offers the most direct way of closing the phosphorus loop. A Canadian company called Ostara has installed systems to extract phosphorus from wastewater at municipal treatment plants in more than twenty cities around the world, including Chicago and Atlanta. Switzerland and Germany have even passed laws mandating the recovery of phosphorus from sewage that will take effect over the next decade.

The potential of recapturing phosphorus from animal manure is even greater. That's because there's a lot of it. And because the last great disruption to the phosphorus cycle involved livestock.

Throughout most of human history, farmers raised crops and animals side by side, which allowed them to easily recycle manure as fertiliser. During the twentieth century, however, agricultural specialisation separated livestock operations and grain growers, often by distances too large to transport manure.

This geographic rift effectively severed the last remaining strand of the human phosphorus cycle. And it led to a surplus of phosphorus in areas of intense animal agriculture, exacerbating pollution problems in places like the Chesapeake Bay, the waterways of Wisconsin's dairy country, and Lake Erie. According to a recent study by Metson and others, 55 pounds of phosphorus are released into the environment for every pound of phosphorus consumed in US raised beef, more than half of which comes from manure. (For wheat, the ratio is roughly 2 to 1.)

In theory, recapturing this phosphorus could make a big difference. Researchers estimate that the waste of American livestock contains more than enough phosphorus to support the entire US corn crop; another analysis found that recycling all manure could halve global demand for phosphate rock. We have to change our mindset, says Graham MacDonald, an agricultural geographer at McGill University. 'These aren't waste streams,' he says. 'These are resource streams.'

To that end, researchers at Washington State University are developing a mobile recycling unit to extract phosphorus from manure, and over the past several years, they have towed it to dozens of dairies across Washington for trial runs. It sucks liquid manure into huge plastic tanks, where it mixes with other chemicals and begins to form struvite, a pearly white phosphorus-bearing mineral.

Struvite is one of several promising phosphorus fertilisers made by recycling human and animal waste. And it has numerous advantages: it's portable; it doesn't contain pathogens and other contaminants common in waste; and, according to farmers, it works great as fertiliser.

Ostara has also been testing its struvite, marketed as Crystal Green, for fifteen years, with encouraging results. Their trials have found that, when blended with conventional fertiliser, struvite increases the yields of many crops, including canola and potatoes. Ahren Britton, Ostara's chief technology officer, says growers have noticed: 'Frankly, the demand for the product has outstripped the amount that we can recover.'





# THEY ASKED QUESTIONS THAT THE SCIENTISTS WOULD NEVER THINK TO ASK

AN INTERVIEW WITH JAMES BRIDLE

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*Through this residency I've been lucky to receive mentorship from artist and author James Bridle. Our conversations have often circled around the relationship between artists or designers and scientists, and how they might collaborate more effectively. We've also talked at length about working with non-human living organisms, something which forms a prominent part of Bridle's practice. In this conversation, we delved further into some of these topics. [SI]*

SAMUEL  
ILIFFE

**What role can artists and designers play in the sciences – like biology, material science and ecology – that we traditionally have not been part of?**

JAMES  
BRIDLE

My attitude to the role of designers is that there is always an opportunity to rethink the ways in which materials and processes are used and can interact. This often emerges from bringing in new information or through being able to cross disciplines. I think we have two complementary skills, one being cross-disciplinary practice and the other is an ability to create new narratives.

In my experience, a lot of people who work in the sciences, academia and industry tend to be quite siloed. They tend to be focused on quite narrow definitions of problems. They tend to understand a particular section of it, which makes it hard for them to see alternative uses or processes that might be possible. And it's just generally hard for them to be aware of, or make connections with, people who might be working on something that actually connects quite well but doesn't fit within the language of their discipline. That's where artists and designers can come at this from quite a cross-disciplinary perspective, and talk to people who wouldn't necessarily talk to each other.

Designers are particularly good at imagining new scenarios or narratives that make those connections not just possible, but desirable, something that makes them interesting to people. By that I don't just mean communicating a prettier picture, as useful as that can sometimes be. It's actually figuring out what this would actually look like, and what would be the outcomes of this?

Part of the siloing and disciplinary nature of a lot of this research in the sciences is that it tends to arrive with its own fixed questions. If you're in industry, you will have a concrete vision or constraints on what people's needs are. So it can be about rewriting the nature of those constraints.

For me, it's about fieldwork, it's about working in the field. And that's something that isn't necessarily always the case with architecture – in architecture, the field isn't really conceived in that way.

SAMUEL

**When have you succeeded in collaborations with scientists and what does a successful collaboration look like?**

JAMES For me, success is if I make the thing that I set out to make. I don't think it's reasonable to peg an artistic project to some kind of industrial level of success, because I don't have the resources or the scale to make any kind of claims to large scale success. But making a thing that works and that wouldn't have existed had you not embarked on the project seems to me like a marker of success. If it catches on, if it's replicated, if it causes material changes in the system, that's a huge win.

One way of measuring successes in collaborative projects is to ask, what are the outcomes for the other collaborators? Did the researcher I collaborated with go on to research this subject further? Did they go on to do further collaborations in this line? Have you also intervened in the system of research and collaboration and disciplinary sciences, in a way that leaves some ongoing process happening there as well? I think that is super valuable.

I've been talking quite a lot recently to optics scientists working on solar panels. And one of the guys has been working with an artist for a few years, developing new dyes which have different kinds of chromatic optical properties for capturing solar energy. It seems from talking with them that this wouldn't have come about if the artists hadn't said, 'our aim here is not just to capture the maximum energy, but also to make an object that has a certain aesthetic appearance, and resonates in certain ways with the work that we're trying to do.' They asked questions that the scientists would never think to ask.

SAMUEL **This resonates closely with my project, and my approach to water pollution as a designer. From the outset, I've known that the speed and efficiency at which seaweed can filter phosphorus from lakes is not very fast. But viewing the problem from multiple perspectives I find myself asking different questions, like can the result of this removal be a useful material? Does it help seaweed farmers reduce the prohibitive costs of farming in the UK? Could the result be something beautiful?**

JAMES The science or industrial position is just 'how do we most efficiently remove phosphorus?'. Whereas your position is, how do we reduce it, but at the same time, provide a material that there's actually a need for elsewhere? That's a powerful reframing of the constraints and it comes from an understanding of circular economy or a more ecological redistribution of these materials.

SAMUEL **What have you learned from the process of working with living organisms?**

JAMES Mostly that they exist outside the timeframes that humans and human institutions are very good at dealing with. It's difficult participating in something like an exhibition, which takes two years, when a plant's life cycle is five years, for example. As more artists and researchers go into work into these areas the institutions and structures that provide for that possibility, whether that's exhibition timelines, the length of research projects, or the length of funding timelines, they need to adjust to fit better with other organisms.

The second thing is that it requires a kind of care and attention that is not often associated with a gallery. This goes beyond environment and ecology, it resonates quite strongly with artists and researchers, with political practices. It's often not enough just to put a final object or documentation in an institution if the institution isn't engaged with supporting that practice more broadly. It's not just a matter of saying this year, we're accepting proposals about plants rather than AI. It's saying, as a result of this, we're

changing our institutional structure and the timelines and expectations, to acknowledge that we're working with a very different set of constraints.

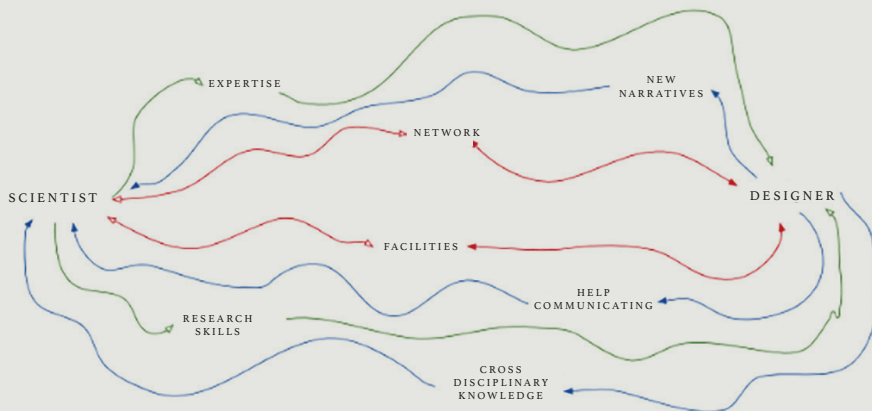
SAMUEL Perhaps there should be a new role for someone at the Design Museum, of organism caretaker?

JAMES Exactly, absolutely. Or even think, the museum has a garden and gardeners looking after it, so how do you give these types of people a more valued institutional status? What are the roles that the institution values?

SAMUEL How do you see the role of designers and artists, who have traditionally been makers, when there is a rising call for degrowth?

JAMES It's a super important question, though I think it is important not to make a false equivalence between the productions of artists and designers and the productions of industry, or agriculture, that there is a different scale at work. There's always got to be a role for prototyping and making things. But it behoves us to be responsible.

The way that I'm looking at it is that all the works I make for exhibitions either need to be useful in an ongoing way, i.e. they will continue to live beyond that exhibition, maybe through selling them as objects, or if there's some more practical thing, or, they need to be completely reusable and recyclable. It's almost impossible to achieve this, but it has to be the goal of essentially a zero waste policy on art. You also must pay more care and attention to every step of the process. Like, can I construct what I want to make out of materials on site rather than shipping things? Or what's the lightest possible touch I can have in this?

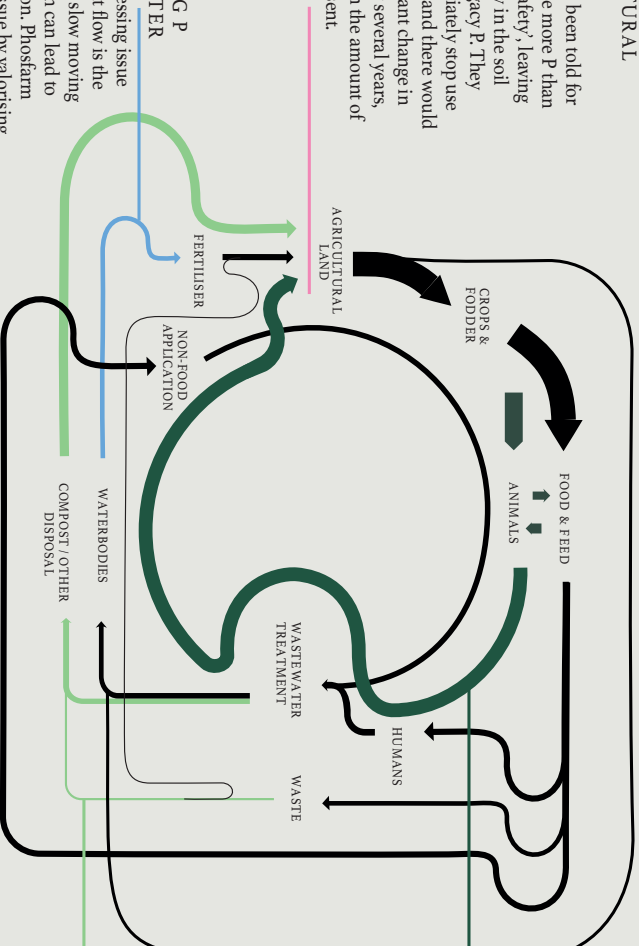


Map showing the collaborative relationship between scientists and designers, drawn by Samuel after the conversation.

# PROPOSED

## IMPROVING AGRICULTURAL P USE

Farmers have been told for decades to use more P than needed for 'safety', leaving a large supply in the soil known as Legacy P. They could immediately stop use of P fertiliser and there would be no significant change in crop yield for several years, depending on the amount of Legacy P present.



**REMOVING P FROM WATER**  
The most pressing issue of the current flow is the loss of P into slow moving waters, which can lead to eutrophication. Phostarm tackles this issue by valorising

## INCREASED USE OF WASTE AS FERTILISER

Waste in the form of sludge and Struvite, a mineral formed in waste management, can both be used as fertilisers containing P. Struvite could be used on a larger scale.

## REDUCING ANIMAL PRODUCTS

For the same nutrition meat and fish require more P use than vegetables. By reducing the consumption of meat products we can reduce our phosphorus requirement.

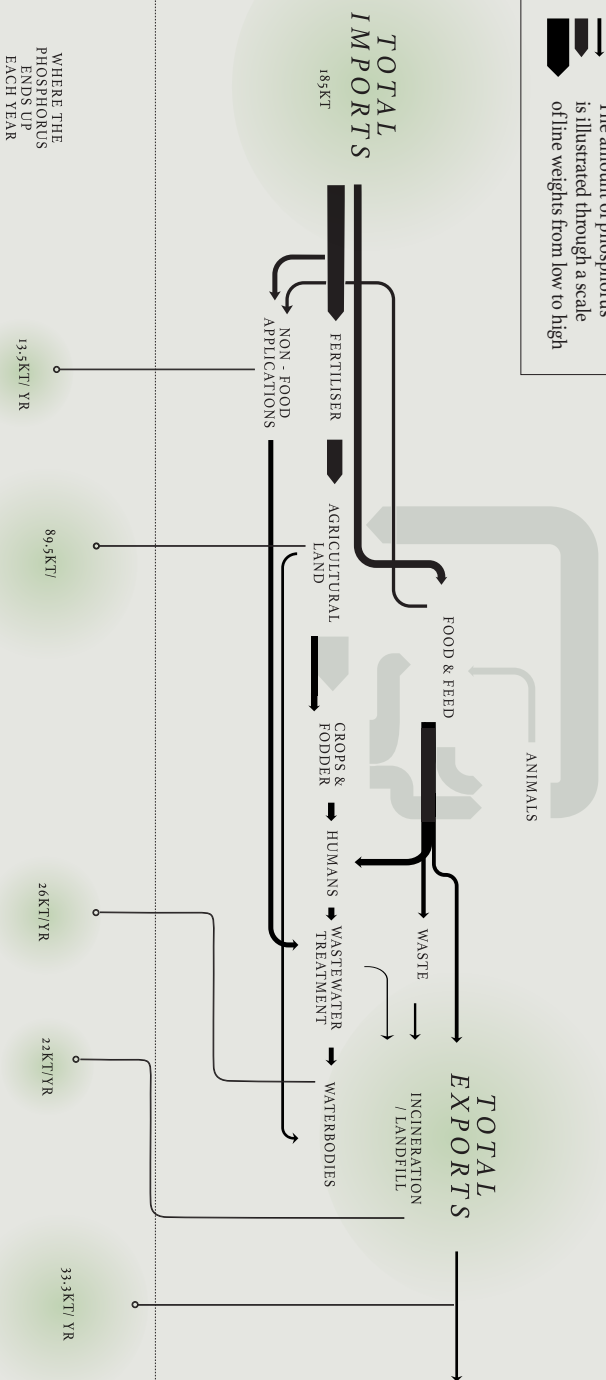
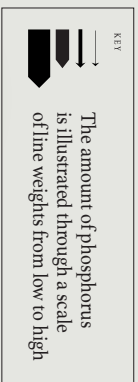


# EXTRACTIVE TO RESTORATIVE

## TWO PHOSPHORUS FLOW MAPS

### CURRENT

The Phosphorus Flow Map shows the amount of phosphorus that enters the U.K. each year and where it travels through the system.





# THE PHOSPHORUS LEGACY

AN INTERVIEW WITH PAUL WITHERS

*After immersing myself in papers on the UK's phosphorus cycle, from its problematic sourcing through to its polluting effects on our water bodies, I wanted to engage with the most up-to-date knowledge possible. I spoke with Paul Withers, lead on the RePhoKUs project, a research program uncovering the UK's relationship with phosphorus and how we could achieve a circular model, reusing as much phosphorus as possible. [SI]*

SAMUEL  
ILIFFE

**Can you tell me about RePhoKUs?**

PAUL  
WITHERS

The aim of the project is to make phosphorus [P] use more efficient and sustainable. One aspect is looking at the phosphorus flows in the whole food system at different scales. The second is looking at how well the catchment buffer handles the phosphorus pressure exerted on them. The third aspect looks at what makes people change. We need to better understand what motivates various stakeholders in the food system to actually to make the change. We are also publishing a national strategy for transforming phosphorus use in the UK food system, based on the circular economy.

SAMUEL

**Have there been any surprising conclusions or insights from your work?**

PAUL


One of the key things that has been demonstrated to us is that you have to use phosphorus more efficiently because when it's in the catchment you can't expect to completely stop phosphorus or nitrogen leaking into the waterways. The emphasis so far has been, 'We'll just put in the buffer strip,' or, 'we'll just put in a pond or do some erosion control'. Whereas now we're saying you've got to do something about the amount of phosphorus you are using; you've got to reduce the inputs.

SAMUEL

**It seems that if a river or lake is very polluted, it must be the fault of a company or farmer whose factory or farm respectively are in the catchment area. Is that correct?**

PAUL

It's actually quite difficult to pin the blame on one single stakeholder. There's usually a multitude of different wastewater, agricultural and urban sources contributing phosphorus and nitrogen into water. Traditionally, it's been wastewater which is the main phosphorus source in the UK but we are becoming better at controlling wastewater effluent, so the attention has switched to agriculture.



Some of the pollution is due to what farmers are doing now, but a lot of it has been happening on the landscape over the last 50 to 100 years. The landscape has been accumulating phosphorus for a century because of our farming practices. Every time it rains, there is a piece of that phosphorus, which we call “legacy P”, that enters the water bodies. So it’s very difficult to actually say, ‘it’s your fault, you should be farming the field in this way or you should be treating your effluent’.

Our project has been trying to provide the evidence base so that stakeholders can see where they fit into the food system, and get them to think about what they can do to become more efficient, sustainable and resilient in their phosphorus use.

**SAMUEL** Can you say anything on the effectiveness of removing phosphorus after it enters rivers and lakes?

**PAUL** I think the most sustainable approach is to control the source and transport to the waterbody, rather than trying to remove the phosphorus once it’s in the water.

**SAMUEL** But if there’s this legacy P, which is from 100 years ago, presumably there is still 100 years of legacy P still polluting water bodies?

**PAUL** Yes, absolutely. It’s a long term problem. But it’s not very practical to remove phosphorus from the water, certainly not for rivers because the water’s flowing. The phosphorus pollution is occurring episodically, and the rate depends on the severity of the pollution in the catchment area. It also depends on how severe the rainstorm is, and where, which route it is getting into the river. That governs what your loads are going to be like. When a river is flowing it’s going to be difficult to manage that flow to actually remove the phosphorus effectively and consistently. With slow moving rivers and lakes, I suppose you might be able to do something. But it’s not easy.

Most of the efforts for lakes is to actually try and lock up phosphorus in the sediment and make it unavailable. That’s been tried. But it is very, very difficult. I don’t know of anybody who’s successfully removed phosphorus when it gets into the water.

**SAMUEL** Phosphorus pollution often causes algal blooms because algae grow on phosphorus and grow quickly. This leads to a number of problems (they can be toxic to humans, animals and the ecosystem they inhabit). If you removed the algal bloom, would that also remove the phosphorus?

**PAUL** Algal blooms are very variable. In some cases, they stay around for quite a while. And you might be able to do something. But you’ve still got the issue of how you remove the algae from the water body.

**SAMUEL** Right now political tensions in Russia are putting the security of our source of imported phosphorus into doubt, and fertiliser prices are increasing. Do you think this increase will have a positive effect on the reduction of phosphorus use?

**PAUL** Oh yes. If you look back to 2008, the fertiliser price went up seven or eight times. Farmers stopped putting phosphorus on. And it’s unlikely to go back down to the level it was before

2008. The other thing we found is that this legacy P that's in the landscape in the soils can keep the crops producing as they normally would for quite a few years without putting on any new fertiliser whatsoever.

**SAMUEL** Do you think part of addressing the overuse of phosphorus is simply informing farmers that they don't need to use as much phosphorus fertiliser?

**PAUL** Yes, certainly. If you look at the amount of phosphorus in some of the soils in the UK, I think 40% have more phosphorus than they actually need. For the last 40–50 years, the guidelines have always been saying farmers will just put on a little bit extra, just in case.

**SAMUEL** How important do you think the issues around phosphorus use are?

**PAUL** The water quality issues associated with phosphorus pollution are pretty severe. I think we are at crisis levels. Up to 75% of the failures to achieve good ecological status in our waterways is due to phosphorus failures. I think that is a very serious issue. And it looks as though it is getting worse.

I don't believe we're at a crisis in terms of the other big issue, which is that we're depleting a finite resource. There's a lot of rock phosphate still available to mine. It's just how expensive it's going to get to mine it. It's not going to run out for quite a few hundred years yet, but I think we owe it to future generations to preserve as much of the rock phosphate in the world as possible. We think that better stewardship of phosphorus in the food system will address both the pollution and scarcity issues.

A water catchment is an area of land through which water from rain, melting snow or ice drains into a waterbody. Nutrients like phosphorus will drain along with it. The buffer is any wildlife in the catchment that takes up these nutrients before they reach the waterbody.

## **A: THE FARM**

Optimum conditions for algal bloom growth occur unpredictably during short periods and in different water bodies. For this reason, Phosfarm is designed as an inflatable, floating object that is easily storable and transportable.

The farm floats in a fresh water body when an algal bloom is anticipated. A starter culture of macroalgae (or seaweed, see point E) grown throughout the year is placed in the farm and feeds on the excess phosphorus in the water. The macroalgae grows into large leaf-like structures which can be easily removed from the water, in contrast to the sludgy, naturally occurring microalgae that typically bloom.

## **B: MATERIALS**

The farm will be made of Polyvinyl Chloride (PVC). PVC is the most common material for airtight, water resistant inflatable structures.

The material requires considered end-of-life planning since PVC can be very harmful. The most harmful chemicals are dioxins released from burning PVC, but there is little chance of the inflatable burning during use.

The farm will be cleaned and upscaled into apparel at the end of its use.

## **C: PHOSFARMERS**

Currently, the biggest barrier to starting a seaweed farm in the UK is securing permission to occupy coastal waters. These waters are owned by the Crown, and there are multiple other stakeholders to get on side before gaining permission, such as fishermen. The process can take around two years and involves high legal costs.

Rivers and lakes have different, simpler ownership models. Most lakes are owned by private landlords. This lowers the barrier to entry for would-be seaweed farmers in the UK in terms of time and cost.

## **D: WHEN AND WHERE DOES ALGAE BLOOM?**

Several parameters impact when and where an algae bloom will occur: the residence time of the waterbody (how slow the water moves through it), water temperature, the concentration of phosphorus and the sunlight duration.

## **E: ALGAE**

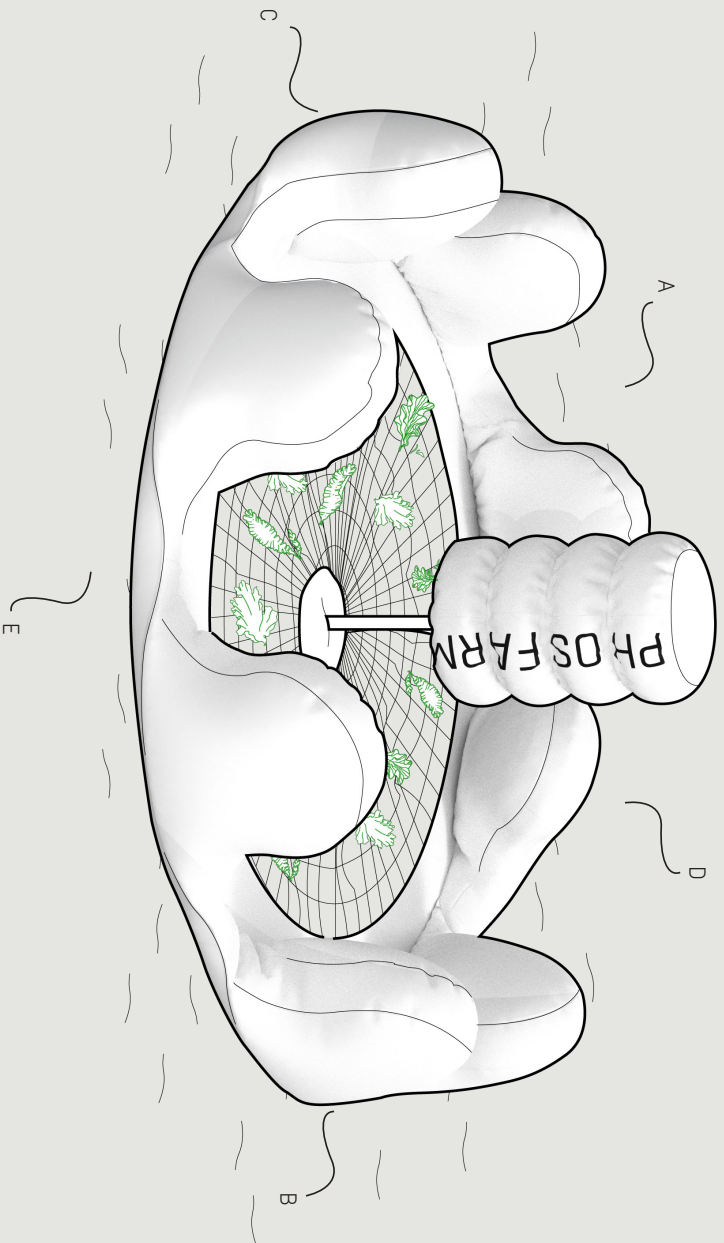
Macroalgae (the technical term for seaweed that grows in freshwater, as opposed to saltwater) from the genus *Ulva* will be used to remove excess phosphorus in the waterbody. Certain species of *Ulva* often grow in polluted stagnant waters and can grow incredibly fast: up to 40% a day in optimal conditions.

Encouraging the growth of macroalgae in a farm means the algae can be easily removed after blooming. Many algae blooms that naturally occur are microscopic species, which are almost impossible to remove without harming the ecosystem.

Today there is a rapidly growing seaweed economy, with companies and designers using refined seaweed products to make bioplastics, vegan supplements and more. Phosfarm is an environmentally friendly source of seaweed for producers.

# PHOSFARM

A TRANSPORTABLE SEAWEED FARM



# SANNE VISSER

There are ninety-seven hairdressers and barbers within one mile of the Design Museum. On average each of these will cut off 2.4 kilograms of hair every month, most of which will end up in landfill. If we take into account every hairdresser on every street in the borough, or all of London, or the whole of the UK, the extent of the waste stream becomes clear.

Yet hair is a highly versatile material. Like wool, it can be sorted and processed for use as a yarn or textile. It can be broken down to its chemical components for medical uses and even as a plastic alternative. It can be reused, recycled and diverted from landfill.

In **LOCALLY GROWN**, Sanne Visser has worked with a group of local hairdressers to imagine a future infrastructure for hair recycling. Building on her previous work producing rope, nets and other objects from human hair, Sanne's research draws on ethnographic methodologies to envisage a system that benefits rather than exploits hairdressers.

In the following pages, Sanne lays out the complex questions that this speculative recycling system raises and brings us into the salons where so much of her research has taken place.



Sanne Visser is a material design researcher and maker. She is a PhD researcher and Associate Lecturer at the Centre for Circular Design at Chelsea College, University of the Arts London (UAL), and runs her own design practice, Studio Sanne Visser. She graduated from Material Futures at Central Saint Martins in 2016. She has exhibited her work at major institutions worldwide, including the Textielmuseum, Museu del Disseny de Barcelona, Science Gallery Dublin, Tate Modern and the Design Museum.



# LOCALLY GROWN

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## *THE ENABLERS*

*THE TOOLS AND PEOPLE OF THE  
HAIRDRESSERS AND BARBERSHOPS*

SANA BADRI

*74-91*

## *THE SPACES BETWEEN THE ELEMENTS*

*75*

## *'SO HOW MUCH IS A HAIRCUT HERE?'*

*THREE DIALOGUES*

*78*

## *HAIR HARVESTING*

*WHAT IF HAIRDRESSERS BECOME THE  
FARMERS OF THE FUTURE?*

*87*



# THE SPACES BETWEEN THE ELEMENTS

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*'You think that because you understand "one" that you must therefore understand "two" because one and one make two. But you forget that you must also understand "and".'*

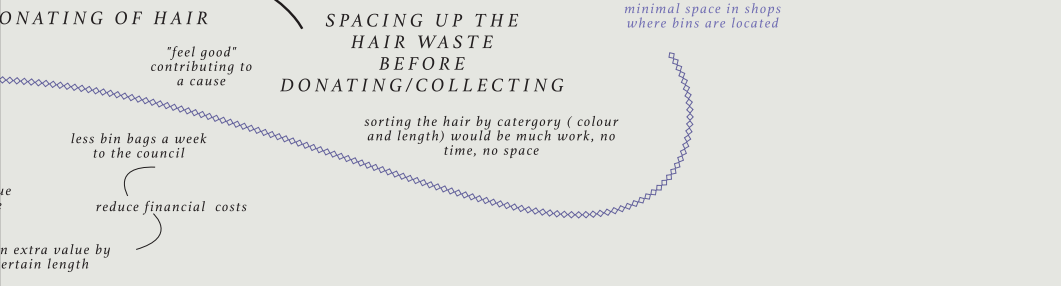
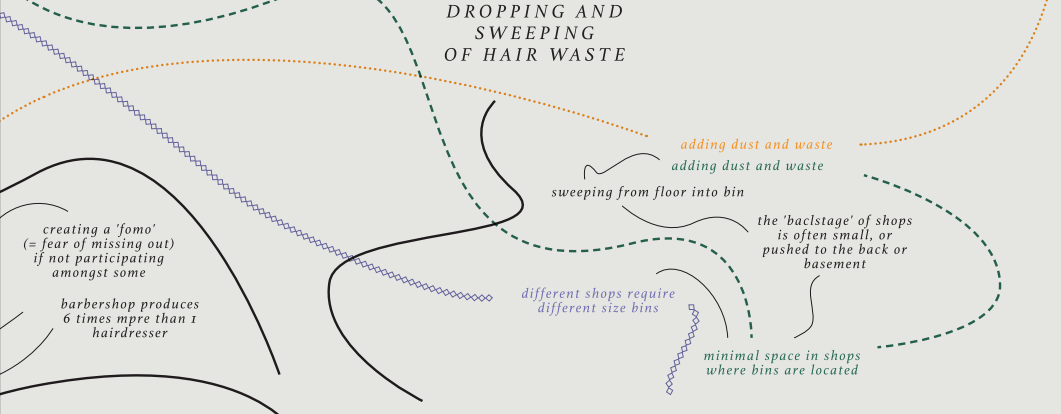
*This sketched map shares my observations of a hyperlocal waste stream of human hair, encountered through interaction and engagement with hairdressers and barbershops. These observations have focussed on the process of cutting hair, the collection of hair in the salon and my steps towards processing the hair. The map highlights the complex interconnections, opportunities and, specifically, the barriers that exist between the elements in this ecosystem. I take a post-structuralist approach to design and systems, thus the diagram maps the technical and material elements of my research as well as the social and experiential. In this sense, I follow the approach laid out by researcher Christian Nold: 'Systems are not obvious because they do not look like technical or organisation mega structures. Instead, systems can exist in vastly different forms, domains and scales – even at the level of hand, eye and brain coordination.'*

*Why do I want explicitly to highlight the barriers in this system? While hairdressers and barbers 'farm' the majority of the hair waste stream, one of the first barriers for hair recycling that I encountered early on in the research is that the collected hair is often contaminated with other waste (i.e. tissues, dust) and not sorted by length, colour or type. The new design applications for hair that are being developed by me or others – whether that is for use as a yarn, a textile or insulation – require specific lengths, types and specific overall hygienic conditions; in some cases the hair even needs to be sterilised.*

*This is far from the only obstacle I have come across, and arguably one of the easier ones to overcome: my prototype chair, bin and cape shown in the Restore exhibition begin to address these obstacles. There are many other barriers in the process of recycling hair, from hair growth all the way through to the material's 'end-of-life'. These barriers raise economic, political, and even social and ethical issues which, by extension, raise yet more questions than answers. In this sense, as I continue to unravel obstacles and connect problems in the hair waste stream, I find the following by Keller Easterling highly resonant: 'designing is entangling'. [SV]*

[1] Cited from Donella Meadows, *Thinking in Systems: A Primer* (Vermont: Chelsea Green, 2008), p.12. Original source unknown but often attributed to 13th century Sufi poet, Jalaluddin Rumi.





# 'SO HOW MUCH IS A HAIRCUT HERE?'

## THREE DIALOGUES

*During my research and fieldwork I have spent countless hours at eight barbershops and hair salons in the streets surrounding the Design Museum. I have observed the experts in these spaces – the hairdressers and their customers – watching their routines, how they use their tools and hearing their stories. In these three scenes, composed from fragments of real conversations, I highlight certain themes that have emerged and re-emerged during my research. [SV]*

### CHARACTERS

(IN ORDER OF APPEARANCE, ALL NAMES HAVE BEEN CHANGED)

- LEILA      Design researcher. A young Dutch woman with a curious mind. White, late twenties. Long, blonde, wavy hair. She recycles hair.
- PAWEL      Customer. A young man in his early twenties, soft spoken and gently smiling. Short, dark blond hair.
- THEO      Barber. An elderly barber (mid-seventies), white with a southeast European accent, mumbles, has a love for whiskey and chats, simply dressed. Short, grey hair with a bald patch.
- JOHN      Barbershop owner. A middle aged man, with a muscular posture and gentle smile. Shaved head and small goatee.
- JO      Salon manager. A young woman, born and bred in London. White, early thirties, well-dressed, always friendly. Long, blonde styled hair.
- PEDRO      Hairdresser. Spanish man, early forties. Loves hair colouring and meeting new people. Short, dark brown hair.
- SUMANA      Hairdresser and beautician. A woman in her mid forties, born in Thailand. Wears reading glasses. Runs a family hair and beauty business and loves her job. Dark brown hair, tied in a ponytail.
- YING      Customer. A woman in her late fifties, with a straight talking attitude. Loves to chat and is curious. Medium length, dark brown styled hair with blonde highlights.

ACT I SCENE I

*An afternoon in west London, just off High Street Kensington in a small barbershop. The shop is busy with people. There is no music being played, mainly people calling, laughing or talking about the news; it feels rowdy. LEILA walks in, takes a seat in the waiting room and starts putting questions to the barbers that are working.*

LEILA How often do you go to the barbershop?

PAWEL Oh once a month, or less. Not very often.

LEILA Well. That's more than me. I cut it every six months if lucky.

THEO [nods his head and smiles]

LEILA Do any females come here?

THEO A couple. Maybe like two or three.

LEILA I guess it depends which haircut?

THEO Well we don't really encourage it, you know. Look, we don't do long hair. Obviously. You see, hairdressers don't know how to do short hair, so they come to us.

LEILA So how much is a haircut here?

THEO It depends. We do all sorts of cuts; skin fades, short cuts, beard trims. You name it. It depends on the price. We have it around £15 you know. It's a good price. People normally spend around 15-30 minutes. But it depends on the cut as I said.

LEILA May I ask you how long you have been doing this for?

THEO [looks up surprised and then smiles]

THEO Me? Oh I have been working since I was twelve. I am now 74!

LEILA Do you like it?

THEO [pauses a second and sighs before answering]

THEO I have been doing this all my life... I don't know any better. It's just a job.

LEILA It has a social element though... right?

THEO Absolutely! My friends are my customers. My friends bring me stuff [He points to his wide selection of whiskey bottles in front of the mirror next to his tools] You know, my drinks are free. [He turns to his customer] Would you like a drink sir? I got plenty of whiskeys, you see.

CUSTOMER 1 No thank you.

THEO OK, that's fine. [He turns to Leila.] I couldn't see myself doing anything else really, like working in an office all day behind the computer, or in factory! No. A shop is pleasant. [He smiles] It's a good job. I mean, it doesn't make you a fortune, but you make a good living. As simple as that.

LEILA And have you been affected by the pandemic?

THEO Oh, the pandemic! It nearly destroyed us. We had a thriving shop, and then the pandemic came along and we lost half of our business. You know, we lost lots of people. I don't know where they went to, if they're all dead or alive, but they just didn't come back.

[JOHN, the owner of the shop, looks over and gives a gentle smile to THEO and LEILA as he listens in to the conversation]

LEILA And do you think they will come back again?

JOHN Well. You know, if the pandemic only lasted seven weeks or so we would have been OK. But two years is a difference. People will have changed habits. It's a culture shift. Instead of getting a haircut every three to four weeks, it is now six to eight weeks, or even longer. Where we used to have two big bin bags of hair, we now have one bag a week. Many are working from home, or have left the city.

We have never been really affected by anything really, ever since I had this shop since 1993, but this pandemic changed a lot. We are slowly, slowly building back our clientele, but I don't know if it will ever be the same.

## ACT I SCENE II

*A rainy, but warm afternoon back on Kensington High Street. A bright and modern looking hair salon. The salon is well lit and has mirrors across both walls from top to bottom. A man and woman are working while a customer sits in the shop. Five chairs remain empty. The shop is new and well looked after. The one customer is getting her hair washed by PEDRO. Pop music plays on the radio in the background, LEILA is sitting in front of the mirrors having a conversation with JO, who is on reception.*



LEILA Do you never think about where the hair goes?

JO I have never really thought about where it goes. But there is a lot of it, that's what I know.  
[JO laughs, pauses and thinks]

LEILA I guess nobody really thinks about it?

JO Yes, I think, once the rubbish is gone, no one...  
[JO looks around]  
Well it's gone now! I have always thought about recycling and stuff, but never really thought about the rest.  
  
[PEDRO looks over and joins the conversation]

PEDRO I once met a lady who used to knit with hair, she used to make blankets. People in Spain, where I am from, find it really creepy. Because in Spain there is a perception of hair as something that keeps strength. So wearing someone's hair, you know...

JO It does sound creepy if you say 'I got a jumper made from hair'.

PEDRO I find it very interesting. I mean, I'm a master colourist so I love hair. The chemical structure of hair too, I loved learning about it, how hair is made up of keratin and melanin, it's so interesting.  
  
[LEILA lights up as soon as she hears the words keratin and melanin.]

LEILA Oh, can you tell me more about that, the melanin?

PEDRO Well, hair is completely different based on the keratin and melanin people have in their hair. The shape and colour changes based on where you have more pheomelanin or eumelanin.

LEILA Did you have to learn that to understand the colouring?

PEDRO Yes, we had to learn all about hair structure, it's a very scientific process. It might look like magic but it's actually very technical and mathematical.

LEILA It gets really into the chemical composition of hair eh?

PEDRO Yeah.  
[He thinks for a moment]  
So I always wanted to be a sculptor but I couldn't go to university to study sculpture. So I ended up choosing hairdressing, 'cause I thought of hair as a material, like you! I thought what if I specialise in this material as a

sculpture without becoming a sculptor. You know what I mean? And I make it practical, more than just expecting someone to admire my work of art and getting paid for it. My parents weren't very convinced that art would be enough to sustain me. I had to be creative and think, what can I do practically to make a living and at the same time keep it as an art? That was how I got into hairdressing. I can bring you some more information if you want for you to read. There is a course I did, it's called Sexy Science. It taught me about the scientific side of hair.

LEILA                      Sexy Science?

PEDRO                     Yes. Sexy Science.  
[JO jumps in the conversation while she is speaking with a customer]

JO                            Great name isn't it!  
[JO turns around to help the customer who needs to pay, PEDRO and LEILA continue talking]

JO                            So that's £91 please.

CUSTOMER 2            OK. Can I pay by card?

JO                            Of course you can. It's ready for you. Do you want to book for next time?

CUSTOMER 2            Yes. I was also thinking- what does a Brazilian Blow Dry cost?

JO                            That is...  
[JO checks the computer] £179.

### ACT 1 SCENE III

*A sunny morning in west London, just off the high street in a busy hair and beauty salon. The salon is busy with women, mixed age, predominantly Asian backgrounds, getting their hair highlighted, nails done or heads massaged. Some are just eating lunch. There is a strong smell of acetone and bleach coming from the manicure corner. The women are smiling and laughing, chatting to one another. LEILA is sitting in the only unoccupied washing chair, and starts a conversation with one of the ladies brushing dye on layers of foils, while the customer is getting her nails shaped.*

LEILA                      How long have you been hairdressing?

SUMANA                    Thirty-one years  
[LEILA turns to a customer]

LEILA                      And you, how long have you been coming here?

CUSTOMER 3            Oh.. twenty-one years?  
[CUSTOMER 3 looks over to SUMANA to check, and nods]

Yes I think twenty-one.

LEILA That's a long time. Do you live nearby?

CUSTOMER 3 I live in Wimbledon.

LEILA That is quite a trip, and you come all the way over here?

CUSTOMER 3 Yes. I don't mind  
[CUSTOMER 3 speaks to SUMANA in a different language]

LEILA What language do you both speak?

CUSTOMER 2 Thai. But also Vietnamese. There are all sorts of languages that come in here. Japanese, Chinese, Thai, Vietnamese, English.

LEILA Can I ask both your names?

CUSTOMER 2 Sure.  
[Points to SUMANA]

Her name is Khun Sumana. Thai people, when they respect someone, they call Khun. Spelled K-H-U-N.

LEILA Khun?

CUSTOMER 2 Yes, Khun. Khun Sumana. And my name is Ying.

LEILA Nice to meet you. So...  
[LEILA looks over to the lady brushing the dye mixture on to YING's head]  
what do you like so much about hairdressing Khun Sumana?

SUMANA I enjoy everything in my job! Haircuts, highlights, perms.  
And...  
[SUMANA pauses and smiles]

I like to make people happy and beautiful.

YING That's the main reason why I like to come here. All the people are so lovely. They are very polite. We enjoy our time together. We laugh all the time.

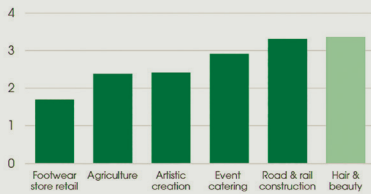
SUMANA When you come in here, you're supposed to relax. You know, for some people getting a haircut is very practical, but for me it is more than that. This is a family business. I wouldn't know how to do it any other way.



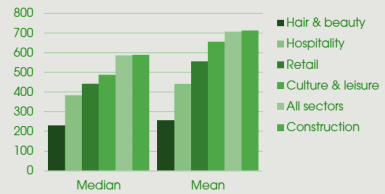




Approximate gross value added for select sectors  
United Kingdom, ONS data, 2018, \$ billions



Gross weekly pay for full-time workers in key sectors  
United Kingdom, ONS data, 2019, \$



# HAIR HARVESTING

## WHAT IF HAIRDRESSERS BECOME THE FARMERS OF THE FUTURE?

As a designer and researcher I have been using and researching human hair for over six years, by developing it into new materials and products. Over the last decade, human hair has been extensively used and explored by other researchers, artists, designers and scientists, with applications ranging from furniture to wigs, clothing and even medical uses. While it is clearly abundant, the majority of the hair cut off is seen as low value and is therefore discarded. However, recent research has focused on new properties of hair that point towards more sought-after applications.

In my current practice and through my PhD and residency research, I have been looking into these developments, some of which might provide the most needed applications in industries such as textiles, construction and packaging.

At first, this seems like a good thing, right? But how much 'better' are these applications? As Alexandra Daisy Ginsberg asks, 'What is better?', 'Whose better?', and 'Who decides?'. Through my research I have come to realise that hair as a waste stream or 'material flow' is not currently set up for recycling or regeneration. Nor are the current applications designed with existing feedstocks in mind. Which prompts necessary questions around who is benefiting from these material innovations and whether they come at a cost.<sup>[1]</sup>

Put simply, where does this hair come from and how is it being processed?

[1] Alexandra Daisy Ginsberg, *Better* (2017).

### OUR WASTE STREAM RESOURCE

Where does it start? Where does our hair come from? With our continuously increasing population we are 'growing' collectively around 6.8 million kilograms of hair per year annually in the UK, based on estimated average hair growth and population. Where does this hair go? Naturally we shed around a hundred hairs a day. We keep our hairbrushes clean by throwing it 'away', it is poured down the drains after a shower or sucked up in vacuum cleaners. <sup>[2]</sup> While a fraction of this might naturally degrade on our streets, most of it ends up in our sewage system or is sent to landfill. But before it ends up in landfill, the majority of our hair waste passes through one well-established ecosystem. An infrastructure that has existed since the fifth century, if not before, hasn't changed its design for decades and currently employs over 287,000 people in the UK: the hairdressing and barber industry.<sup>[3]</sup>

[2] Katie Treggiden, *Wasted*, (Brussels: Ludion, 2020), p. 20.

My project, *Locally Grown*, thus situates itself between this burgeoning movement of hair reuse, recycling and regeneration and the pre-existing infrastructure that hairdressers might provide to process this material flow on a larger scale. The hairdressing industry, a well-oiled machine, is already dealing with hair in high volumes. Many people handle the material on a daily basis. Hairdressers are thus a crucial component in any potential system for hair recycling and their place in this system – as those collecting and sorting the material – will fundamentally shape how that infrastructure emerges. If human hair becomes the new polyester or cotton – the new gold of the materials industry – what would this mean for hairdressers? What if hairdressers become the farmers of the future?

[3] 'Hair, beauty and the pandemic: An industry at the sharp end', *NHBF* (2021).

### ENVISIONING THE FUTURE BASED ON CURRENT SYSTEMS

During my field research, and while collecting hair from different shops, some of these questions started to appear. One hesitant and sceptical hairdresser asked '...but what do my

underlying concern for how new uses of human hair could turn into something more extreme and potentially exploitative if it isn't addressed in an ethical or ecological way.

If we do start to imagine this future where hairdressers become farmers, what would it look like? Based on the current system, a capitalist, extractive and exploitative society, this might not be a very positive thing.

Without further design research or a systems thinking approach, we can easily imagine a scenario where designers, artists, recycling and other companies could take the hair, process it, use it for new products, make it marketable and most likely profitable. What is the role of the hairdresser in this system? Do they benefit or are they exploited?

To take it one step further, if hair becomes more valuable to designers and industry – as seaweed or mycelium have become in recent years – how would its production or farming be incentivised and regulated?

Professor Rebecca Earley mentioned a similar challenge during the Future Observatory symposium in early 2022. 'With the increase in popularity in utilising agricultural waste (in other words cow shit and straw) for making regenerated materials, it has led to something of a "war" on this resource, giving rise to the question, who is able to use what, for what end, and who decides?' [4]

Would people start getting paid to get their hair cut? Would it be remunerated by weight, as with scrap metal? Or by colour, similar to the way the wig industry currently pays more for blonde hair?

#### CITIZENS' VOICE, RIGHTS AND RESPONSIBILITY

The customers I have engaged with during the research process – those getting haircuts, trims or highlights – respond very positively to the project, particularly after understanding where their hair might end up as I showed them yarn and ropes from human hair among other potential newer applications. One of the customers responded saying: 'That is amazing! I never thought it would be used for something. I guess it is going to waste anyway, so you're more than welcome to have it. I am glad to hear that there is a purpose for it.' Another customer said: 'Is even my hair really that useful? It is quite short and grey? Well, I am glad I can be of any help.'

So what rights should an individual have to determine how their hair is used once cut? Do they have a say in this process? We know that utilising and trading human hair waste is legally accepted without the person's consent, but what is not formalised or clear is if people have the right to say where their hair might end up and how it's being processed, after it has been cut off by their local barber. [5] In theory, this could be compared with your local household waste: once put on the street, we do not have a say *where* and *how* this is being processed and used. Only through legislation or local incentives would it be more regulated, as currently you do not 'own' your hair, nor the decisions of its end-of-life once cut.

Now imagine, if hair waste were a more valued resource, and new legislation was in place to give citizens more rights, what other responsibilities might we (the citizens) have to take care of our hair for its future uses? If our hair has greater value after it is cut and will benefit multiple ecosystems, the hair needs to be taken care of: healthy diets and lifestyles, no use of chemical dyes, protection from UV radiation. Such external factors could potentially harm the hair and therefore affect the raw materials for its new life. It would be the same way as we should currently wash food containers before putting them out to be recycled.

#### PARALLEL INDUSTRIES

The rhetoric around rights and responsibilities might sound familiar if we look to other, similar

[4] Presentation by Prof. Rebecca Earley during the Future Observatory Symposium, 'Questions of Scale: Economy and Ecology', The Design Museum, 10 February 2022.

[5] 'List of materials considered to be "relevant material" under the Human Tissue Act 2004', HTA (2019).



industries. For example, farmed vegetables or sheep and the accompanying exploited workers, underpaid farmers and even the farmed sheep themselves.

A clear comparison is the clothing industry, where materials such as cotton are produced under conditions where worker exploitation is rife – leading to humanitarian disasters such as the collapse of the textile factory Rana Plaza in Bangladesh in 2013 – and planetary damage is significant – catastrophic air and water pollution due to the use of chemical dyes is but one example among myriads.<sup>[6]</sup>

The wool industry is another comparable sector, in terms of its materials, tools and systems. Sheep's wool is a similar fibre to human hair in its chemical composition and quantities. With an ongoing decline in wool production and increasing global population, it is estimated that, by 2050, one million tonnes of human hair will be generated globally every year – nearly the same amount of fibre as current global wool production.<sup>[7]</sup> This parallel industry provides an opportunity to learn about the infrastructure which might be required to process and recycle human hair on large scales, as well as its potential pitfalls. The well-established wool infrastructure of sheep, sheep farmers, collectors, graders, sorters, sellers and recyclers hasn't changed in design for many years. Yet, as observed during my field research, there are significant flaws in this system. Farmers are only getting a fraction of the value for their wool: as little as eighty-eight pence per kilo (depending on breed).

More obviously, we can also look to pre-existing industries around hair. The existing industry around hair extensions and wig manufacturing, for example, is currently valued at \$6.6 billion and is projected to grow to \$10 billion by 2030.<sup>[8]</sup> The industry is notorious for its human exploitation, hair theft and ecological damage in its use of toxic chemicals, yet it's also one with extensive expertise on hair as a material among the workers who process it. There is certainly more work to be done to exchange and share this knowledge in the service of more ethical and ecological hair industries.<sup>[9]</sup>

## PREFERABLE STATES AND NEW PRINCIPLES

What can we learn and unlearn from these pre-existing systems? How do we envision a fair system for the recycling of human hair with hairdressers as farmers?

If we want to design a preferable system – an equitable, regenerative one that benefits all ecosystems – which principles do we hang on to? As highlighted by designer and researcher Matthew Wizinsky 'design is struggling to materialize "preferable states" and humane ways of being in the world while confronting new ethical and ecological challenges'<sup>[10]</sup>. Wizinsky goes on to propose a framework for designing post-capitalism, adhering to the following principles: to create social power, to build and sustain community economies, to enact degrowth and to construct post-capitalist subjectivities.

I don't have the answers as to what this preferable state would look like (yet). However, from the start of this residency the aim for my project was to engage with the hairdressing and barber community on a hyper-local level in order to understand some of the systemic barriers and structural limitations within the system (e.g. from increased rent to the impacts of Covid-19). Together with the community, through participatory and co-creational methods, I was hoping to understand better how this system could work following similar principles. The following two paragraphs highlight a few elements I have encountered during this project.

## THE SALON

As a way to think through the site of the salon as a hair farm, together with the hairdressers we began to consider the spatial and object arrangements that might need to change.

[6] 'The true cost of colour: The impact of textile dyes on water systems', *Fashion Revolution* (2020).

[7] 'Preferred Fiber and Materials Market Report', Textile Exchange (2021); 'World Population to Reach 9.9 Billion by 2050', *IISD* (2020).

[8] 'Forecast market value of hair wigs and extensions worldwide from 2020 to 2026', *Statista* (2021).

[9] E. Tarlo, *Entanglement. The Secret Lives of Hair*. (London: OneWorld publications, 2016) p.178-258.

[10] Matthew Wizinsky, *Design after Capitalism: Transforming Design Today for an Equitable Tomorrow*. (Cambridge, MA, USA: MIT Press, 2022). p.6.

[11] Envisioning new concepts and designs of hair salons and barbershops and their practices, I have been inspired by London based initiatives including Open Barbers and DKUK, which incorporate community driven prices and approaches and artistic, physical rearrangements in design of the shop.

[12] This is an estimated figure based on the collected data during my field research at the time of the residency early 2022. All hair collected during the residency was weighed over a period of 4 months.

[13] The Design Museum (2021) *Waste Age. What can design do?* (London, UK: The Design Museum, 2021). p. 172, p.174- of 4 months.

We considered the role of the mirror and explored different ways of pricing hair waste. For example, by length or hair type rather than gender. [11] We proposed adaptations to the furniture of the salon to fit their subtly altered uses: the humble bin might be partitioned to organise hair or chairs might become bins themselves.

These altered objects and new interiors need to be designed carefully. There is no one size fits all option; no two hairdressers or barbershops are the same. Indeed one barbershop can produce five times more than a hairdresser. A small hair salon might not have space for extra bins. Or some hairdressers will produce different types of hair waste, including hair extensions and wigs.

## LOCAL INFRASTRUCTURE

How might the farming of hair add social value to a cluster of proximate hairdressers? Within a one-mile radius of the Design Museum there are ninety-seven hairdressers and each one produces an estimated 2.4 kilograms of hair each month [12]. A common, industrial approach would be to take away the hair waste and transport it to a centralised depot to be processed and then sold. Instead, I tried to understand what an alternative model might look like, one that could serve a local community through localised processing and manufacturing. As designer Natsai Audrey Chieza mentioned: 'Scaling up is something that we also need to think of in a smaller way, in a more distributed way, as opposed to something centralised.' [13] The 'Questions of Scale' symposium highlighted this even more, where curator and chair Justin McGuirk asked: 'Is scale always desirable?' My proposed model would be to have community driven, localised and distributed hair waste processing centres, that not only process the physical hair, but have the ability to enhance (or in some places restore) community and circular economies. This is an ongoing process of design and research and one I will continue exploring with more hairdressers and other stakeholders beyond this residency.

I had many conversations with different hairdressers and barbers about how they imagine the future of hair and their role with it. By donating the hair to me it saves them money; normally they pay the council to 'get rid' of their waste. I questioned how this model would work if the hairdressers should get paid instead. One of the hairdressers counter-argued 'Yes. We have already saved quite a few bags, each bag would normally cost us money. That said, it shouldn't have to be always about money, why are we so greedy? Can it not be a win-win for both – saves the hairdresser a big cost and the recycler is getting value out of it.'

## WHAT FUTURE DO WE CHOOSE?

So as we are on the journey of processing this exciting, versatile, abundant, at-times controversial material, with the potential of it becoming the new textile or bioplastic, how do we understand and design the system and infrastructure first from the outset and not question this when it's too late?

If we can understand how we treat a material like human hair within the wider ecosystem, then might that inform how we could (and should have) treated any other non-human material that humans use and interact with?

Are we smart enough to design carefully with this material? Or are we blinded by solutions? In the words of Christiana Figueres, what future do we choose?



# GREEN IS THE NEW STEAM

## DESIGNING A SOLARPUNK FUTURE

LILA BOSCHET

[1] 'Climate Change 2022: Impacts, Adaptation, and Vulnerability', IPCC, 2022.

Faced with the realities of the climate crisis, imagining the future is an increasingly difficult exercise. The Intergovernmental Panel on Climate Change report published in February 2022 reiterated that, even under 1.5 °C global heating, we are already witnessing irreversible effects of global warming such as mass extinction of species, food and water shortages, and in turn the displacement of communities. [1] If *imagining* the future is a challenge, being optimistic can feel unfounded, irresponsible even.

In literature and film, we are familiar with the dystopian genre's dominance over speculative future narratives: the apocalyptic climate fiction novel like HG Wells' *The War of the Worlds* or cyberpunk's nihilistic criticism of technology like Ridley Scott's *Bladerunner*. Yet, around 2012, faced with more of the same dismal reports on the viability of our planet and socio-political landscape, another punk came on to the scene as a direct contradiction to dystopia.

[2] Ben Valentine, 'Solarpunk wants to save the world', *Hopes&Fears*, 2015.

Born from a literary tradition of Brazilian speculative fiction, solarpunk was first imagined in the *Solarpunk: Ecological and Fantastical Stories in a Sustainable World* anthology. While steampunk and cyberpunk respond to the age of the anthropocene with reactionary and nihilistic solutions respectively, solarpunk dares to be utopian 'propos[ing] that humans can learn to live in harmony with the planet once again'. [2] Narratively, this is marked by a portrayal of societies that acknowledge the failure of extractive behaviour and strive for a world that champions a restorative relationship between technology and the natural world. In his blog posts on solarpunk, Adam Flynn, an artist and pioneer in the community, notes that '[p]rogress/development is not the same as growth, and an integral thesis of solarpunk should be about decoupling the first from the second'.

[3] Adam Flynn, 'On the Need for New Futures', *Medium*, 2017.

With this ideological framework in mind, how might solarpunks imagine what their world looks like? How do we design a solarpunk future?[3]

Like its 'punk' brethren, solarpunk gained traction in the public imaginary through its online presence. Reddit forums, Tumblr and Facebook pages saw people collaboratively posting and creating the utopian future they dared to imagine. Solarpunk blogger missolivialouise dedicated a post on her Tumblr page to delineating the aesthetic of the movement: '[a]esthetically my vision of solarpunk is very similar to steampunk, but with electronic technology, and an Art Nouveau veneer.' [4] Similarly, in his *Solarpunk Manifesto*, Flynn outlines some of the key visual qualities of the movement:

- 1800s age-of-sail/frontier living (but with more bicycles)
- Creative reuse of existing infrastructure (sometimes post-apocalyptic, sometimes present-weird)
- Juguad-style innovation from the developing world, High-tech backends with simple, elegant outputs [5]

[4] Miss Olivia Louise, 'Here's a thing I've had around in my head for a while!', *Land of Masks and Jewels*, 2015.

[5] Adam Flynn, 'Solarpunk: Notes towards a manifesto', *Hieroglyph*, 2014.

These renderings of a solarpunk utopia share a versatile and hybrid outlook on the future. They look to existing cultural movements and existing materials for the maintenance of life in the future. This harks back to Flynn's thinking around decoupling progress and growth by asking people to reconsider available resources and cultural histories with a fresh eye. In doing so, development is reframed to be about the flourishing of what we have already available

to us, talking back to the Silicon Valley-esque modus operandi of innovation for the sake of innovation.

By virtue of building a utopian future, the solarpunk visual language is highly infrastructural and can become a useful framework for designers. The aesthetic importance of solarpunk is about more than what the future looks like: it implies a radical reimagining of how we interact with the world. Picture a city thick and green with trees, solar panels abound, wind turbines in the distance and not a car in sight. Beyond painting a pretty picture, what an image like that implies about our world is that a deep political, cultural, social change is needed in order to veer off the path of climate collapse we are currently headed down.

Solarpunk finds an inherently productive partner in design to move along its utopian vision through making. Design bridges the gap between art and industry, proposing tangible and actionable reimaginings of the world. In return, solarpunk lends designers the vocabulary to imagine alternative possibilities in their design process. By adopting a solarpunk language in their practice, designers are opened up to a new realm of possibilities, in part, because solarpunk offers a lifeline to believe that there will be a future to design for in the first place. Being a solarpunk is part of a toolkit ‘for rapidly prototyping narratives and exploring the future that we are collectively on the verge of actually actualising if we wish to fight climate change’. [6]

With this toolkit in hand, how might looking at the world through a solarpunk lens influence how the future is designed? Certainly, the exteriority of ‘nature’ to the ‘human’ becomes rather untenable. As Timothy Morton notes, ‘nature, a transcendental term in a material mask, stands at the end of a potentially infinite series of other terms that collapse into it’. [7] For designers of landscapes, objects, or cities, this can be achieved through a more nuanced relationship to their environment and developed into a restorative practice.

Biomimicry emerges as an approach to design ‘based not in what we can extract from the natural world, but on what we can learn from it.’ [8] The Biomimicry Institute, a non-profit organisation based in Montana, USA, describes biomimicry as a new science that learns from and emulates nature which, if applied to design, has the potential to solve human problems. This approach can be found in projects across the globe, such as the Eastgate Building in Harare, Zimbabwe, with its climate control system inspired by the structure of termite mounds, or P&G’s study of snake and leech enzymes to improve their detergent products, or Sabin Design Lab’s study of fibrous strand systems to produce photoluminescent webs for building skins that can adapt to environmental cues.

Initially, it seems that this synthesis of natural and human knowledge captures the essence of solarpunk’s techno-optimistic vision. However, an imbalanced relationship to the natural world persists here, whereby humans ‘mimic’ nature to proliferate capitalist models of growth. According to philosopher Freya Mathews, biomimicry ‘could replace original nature with a human-made ‘second nature’, an engineered planetary simulacrum of nature created to service our own needs’. [9] In this sense, biomimicry does not facilitate solarpunk’s search for alternative systems of power, but rather runs the risk of emulating a ‘green’ capitalism.

Biomimicry takes us halfway to designing a solarpunk future. But how do we achieve the other half? Flynn encapsulates this nuance in his manifesto, asking readers to ‘[i]magine “smart cities” being junked in favo[u]r of smart citizenry’. [10] The shift here is structural, it’s about the logic that underpins the city. Going back to the early iterations of solarpunk, the hybridity between embracing new technologies and existing materials and cultures (from ideology to aesthetic) calls to mind regenerative models of design and agriculture as particularly viable.

Regenerative thinking is not new. It is a relationship that Indigenous communities

[6] Jay Springett, ‘Solarpunk: Life in the Future Beyond the Rusted Chrome of Yestermorrow’, *THEJAYMO*, 2019.

[7] Timothy Morton, *Ecology without Nature: Rethinking Environmental Aesthetics*, (Cambridge: Harvard University Press, 2009)

[8] Janine Benyus, *Biomimicry: Design Inspired by Nature*, (Boston: Mariner Books, 2009)

[9] Freya Mathews, ‘Biomimicry and the problem of praxis’, *Environmental Values*, 2019.

[10] Adam Flynn, ‘Solarpunk: Notes towards a manifesto’, *Hieroglyph*, 2014.2022). p.6.

around the world have been practising in their respective environments based on an understanding of potential co-evolution between nature and humans known as custodialism, stewardship or guardianship. A regenerative approach to design proposes an alternative to growth-based models by asking what nature might need from us in order to flourish. Such an approach is already being taken up by projects such as the Floating University in Berlin, a timber and scaffolding structure that sits amid the algae and reeds of a rainwater drainage pool close to the centre of the city. Community led co-creation of the future is at the heart of this self-described ‘natureculture’ learning site: by ‘maintaining and developing the site to gardening, cultivating collaborations and taking care of neighbo[u]rhood connections’ [11] their ethos can undoubtedly be recognised as solarpunk. For a solarpunk future to materialise, drawing on and taking care of the resources – be they material or cultural – is imperative. Not every solution will come from a technological *deus ex machina*.

[11] Floating University Berlin, ‘About: Floating E.V.’, 2018.

A solarpunk future contains multitudes. By capturing the literary, artistic and political imaginations of internet dwellers, solarpunk jumpstarted the imaginary lexicon of possibility for what our future might look like if we choose to recognise our current shortcomings. For solarpunk and theorist Jay Springett, the movement is in a unique position ‘to leverage the narrative logic of decentralised infrastructure and technologies to change the kinds of politics and futures we can imagine’. [12] The word ‘solarpunk’ might evoke an oxymoronic image of a punk with a sunny disposition, but daring to be optimistic while staring directly into the eye of the super storm that is climate change – it doesn’t get much more punk than that.

[12] Jay Springett, ‘Solarpunk: Life in the Future Beyond the Rusted Chrome of Yestermorrow’, *THEJAYMO*, 2019.





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SAVVAS ALEXANDER is a designer and maker originating from Yorkshire who is committed to drive change in an industry that desperately needs redefining. His practice advocates for rethinking systems within fashion by designing solutions that challenge harmful over-consumption. He is currently completing an MA in Fashion at the Royal College of Art.

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SHANTI BELL is a multidisciplinary artist with a specialism in menswear, sculpture, and furniture making. She constantly seeks to push the boundaries of creative fields and allows the concept to shape the creative output. This has led her to expand her practice to include film, sound, and performance. She is currently completing an MA in Fashion at the Royal College of Art.

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JAMES BRIDLE is a writer, artist and technologist. Their artworks have been commissioned by galleries and institutions and exhibited worldwide and on the internet. Their writing on literature, culture and networks has appeared in magazines and newspapers including *Wired*, the *Atlantic*, the *New Statesman*, the *Guardian*, and the *Financial Times*. They are the author of *New Dark Age* (2018) and *Ways of Being* (2022), and they wrote and presented *New Ways of Seeing* for BBC Radio 4 in 2019.

THIERMANN CRUZ is a Santiago and Berlin based architectural practice lead by Alfredo Thiermann and Sebastián Cruz. Their work has been exhibited at the Museum of Modern Art in New York, Museo Nacional de Bellas Artes in Santiago, the Istanbul Design Biennial, gta exhibitions in Zurich, and the Venice Art Biennale, among other institutions.

ALICE DOUŠOVÁ is an independent filmmaker running a video production company Zuketa. She specialises in art, design and architecture, working with some of the UK's most prominent institutions such as the V&A, the Design Museum and Somerset House to produce original film and content for exhibitions. Alice often challenges the format and presentation of her films in space to create more engaging installations.

Under the alias of Dresser Design, CHARMAINE DRESSER is a former prop maker turned upholsterer. After a varied career working in Fashion, Advertising and Events for clients such as Apple, Adidas, Google and Vogue, she now focuses her seasoned design eye on restoring furniture for contract and residential clients. With a focus on sustainable solutions within the interiors industry, she uses the knowledge gained from studying Textile Design at the University of the Arts, London and her diploma awarded by the Association of Master Upholsterers to modernise furniture to last another lifetime.

EKOW ESHUN is a curator and writer. He is Chairman of the Fourth Plinth Commissioning Group and the former Director of the ICA, London. Ekow is the author of *Africa State of Mind: Contemporary Photography Reimagines a Continent* and *Black Gold of the Sun*, which was nominated for the Orwell prize. His writing has appeared in publications including the *New York Times*, the *Financial Times*, *The Guardian*, *The Observer*, *Granta*, *Vogue*, *New Statesman* and *Wired*.

GEORGE KAFKA is the curator of Future Observatory. Previously he was a writer and editor, contributing to *BBC Culture*, *The Architectural Review*, *Disegno*, *Frieze* and *e-flux Architecture*. As a curator he has worked on festivals, exhibitions and more for the Canadian Centre for Architecture, Open House Worldwide, Onassis Stegi and the Oslo Architecture Triennale.

ROSE NORDIN is a graphic designer and artist in residence at Somerset House Studios, focused on publishing as social practice and the book as a site of collaboration. She is a research associate at INIVA, focused on developing STUART, a publishing imprint based on the cultural theories of Stuart Hall. Rose is an associate lecturer at UAL and was previously the Arts & Social Practice Fellow at the University of Chicago.

CHER POTTER is the curatorial director of Future Observatory. Previously, she was senior researcher at the V&A (2013-2021), where she founded the creative research hub AfriDesignX (afridesignx.com) to study Southern design responses to large-scale social and environmental change. Trained as a design historian, with a professional background in trend forecasting, her interests span the history and future of design and reform.

JULIA ROSEN is an independent journalist covering science and the environment from Portland, Oregon. She writes about how the world works and how humans are changing it. Her work has appeared in *The New York Times*, *The Atlantic* and *Science*. She was the 2014 AAAS Mass Media Science and Engineering Fellow at the *LA Times*, a 2015 Open Notebook/Burroughs Wellcome Fund fellow at The Open Notebook, and a 2016 writer-in-residence at the Wrangell Mountains Center in McCarthy, Alaska.

SALTYCO is a materials science company that makes planet-positive textiles such as BioPuff, a plant-based fibre fill material designed to keep you warm without harming the environment.

ALEXA SIRBU is a London-based 3D artist, director and co-founder of XK Studio. The focus of her practice is to explore the relationship between the natural and the artificial by reimagining the subjects of nature, beauty and fashion through digital technologies. By combining a handcrafted approach with a diverse array of procedural and simulation techniques, she creates work that is tactile and intricate, imbued with emotion and mesmerizing energy. Her clients and collaborators include Apple, Microsoft, Velcro, House of Culture Stockholm and London Symphony Orchestra.

PAUL WITHERS is a Professor of Catchment Biogeochemistry in the Lancaster Environment Centre at Lancaster University and Honorary Senior Research Fellow at Bangor University with particular interests in sustainable phosphorus use, and how we can recycle and recover phosphorus in agricultural settings.

# ALUMNI

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*Researchers in Residence builds on the principles framework and legacy of Designers in Residence, the museum's distinguished education programme for emerging designers*

## 2007

Tomas Alonso  
Sarah van Gameren  
Finn Magee  
Chris O'Shea  
Richard Sweeney

## 2008

Tom Drysdale  
Matthew Falla  
Lea Jagendorf  
Jethro Macey  
Ben Storan  
Adrian Westaway  
Freddie Yauner

## 2009/10

Dave Bowker  
Guy Brown  
Alexena Cayless  
Giles Miller  
Sebastian Hejna  
Asif Khan  
Marc Owens  
Bethan Wood

## 2011

Jade Folawiyo  
Simon Hasan  
Hye-Yeon Park  
Will Shannon

## 2012

Lawrence Lek  
Freyja Sewell  
Yuri Suzuki  
Harry Trimble &  
Oscar Medley Whitfield

## 2013

Adam Nathaniel Furman  
Eunhee Jo  
Chloe Meineck  
Thomas Thwaites

## 2014

James Christian  
Ilona Gaynor  
Torsten Sherwood  
Patrick Stevenson-Keating

## 2015

Chris Green  
Stephanie Hornig  
Hefin Jones  
Alexa Pollmann

## 2016

Alix Bizet  
Clementine Blakemore  
Andrea de Chirico  
Rain Wu

## 2017

Soomi Park  
Chris Hildrey  
Studio Ayaskan  
Yinka Danmole

## 2018

Hester Buck  
Ella Bulley  
Eva Jäger and  
Guillemette Legrand  
Dr Helga Schmid

## 2019

Máile Uribe Forés  
Marta Giralt  
Robert Johnson  
Stiliyana Minkovska

## 2020

Abiola Onabule  
Cynthia Voza Lusilu  
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### Design Researchers in Residence: RESTORE

This publication features the work of the 2021/22 Design Researchers in Residence. It accompanies an exhibition held at the Design Museum from June to September 2022.

Design Researchers in Residence is Future Observatory's programme for design researchers hosted at the Design Museum. The residency supports thinkers at the start of their careers to spend a year developing a new research project in response to a theme.

Future Observatory is a programme for design research supporting the UK's response to the climate crisis. It is coordinated by the Design Museum in partnership with the Arts and Humanities Research Council.

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## **RESTORE**

Design Researchers in Residence 2021/22

Thomas Aquilina, Delfina Fantini van Ditmar, Samuel Iliffe and Sanne Visser

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