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A Time for Designing

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LANDSCAPE REVIEW
A Southern Hemisphere Journal of Landscape Architecture

EDITOR — Jacky Bowring
School of Landscape Architecture,
Faculty of Environment, Society and Design,
PO Box 85084, Lincoln University, Christchurch 7647,
Canterbury, Aotearoa New Zealand
Telephone: +64–3–423–0466
Email: jacky.bowring@lincoln.ac.nz

CONTRIBUTIONS — The editor welcomes contributions and will forward a style guide on request.

Landscape Review aims to provide a forum for scholarly writing and critique on topics, projects and research relevant to landscape studies and landscape architecture. Articles are considered and published in three categories. 'Research' articles report on recent examples of substantial and systematic research, using a conventional format that normally includes a review of relevant literature, description of research method, and presentation and interpretation of findings. 'Reflection' articles undertake a more discursive examination of contemporary issues or projects and may be more flexible in format to suit the subject matter.

All published contributions in the 'Research' and 'Reflection' categories are subject to double blind review. Criteria for acceptance are critical insight, originality, theoretical and methodological rigour, and relevance to the aims of the journal.

A third category is entitled 'Reports'. This category is intended for shorter commentaries, reviews and reports on progress. Although not normally fully refereed, contributions in this category are nonetheless subject to editorial review.

The editor is particularly interested in contributions that examine issues and explore the concepts and practices of special relevance to the southern hemisphere, but welcomes contributions from around the globe. Contributions are encouraged from both academics and practitioners.

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CONTENTS

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A Time for Designing

MICK ABBOTT AND PAUL RONCKEN

Internationally, the tendency towards using designing and design in landscape architecture research is growing. Yet many still perceive designing as unscientific and as a form of practice rather than a method of inquiry. As a result, it is strongly critiqued and challenged by researchers who seek to determine the validity of research methods across the discipline of landscape architecture.

We perceive this dilemma comes from an urge to identify and position design within a sciences paradigm that orients design-directed inquiry into a specific place among a wider pantheon of approaches; at times even relating it to the most deterministic of scientific communities. Our concern is that such a focus constrains rather than liberates the actual activities of designing, along with its potential, as a means to do research.

Consequently, many so-called methodological improvements in design research seek to harness its practice through analysis and subsequent insertion into design principles. Or worse, the often late phase of designing in a typical design research proposal co-opts design as a gathering-up device of loose ends from a conglomerate of other types of research (euphemistically referred to as mixed methods) into some form of exemplary appendix.

Why then edit a themed issue on the role of designing in landscape architecture research? Because design as a method of inquiry is, in our view, being underused, misused and misled, and becoming part of a miscellaneous department of lost and found. And because we sense it is long overdue for design and designing to be generously welcomed into landscape architecture's programmes of research.

Landscape architecture, with its current low status in terms of H-indices, its slight impact in wider programmes of research and its relatively small number of scholars, is arguably seeking to do too much. Instead of trying to achieve the impossible – to simultaneously and rapidly build an accredited peer review system (and with it methodological rigour and scientific acceptance in an increasingly demanding regulatory realm) *and* at the same time offer a capable and feasible set of alternatives for the great challenges the sciences tell us lie ahead – researchers in landscape architecture should make a call as to where they might serve best. We consider this place to be *designing* and all the connotations and innovations that surround its activity.

In this issue of *Landscape Review*, the discipline's first issue dedicated to the theme of designing and landscape architecture research, we seek to support the building momentum evident in the different research cultures that exist within landscape architecture's international community and many of those already

Mick Abbott is Associate Professor and Director Landscope DesignLab, School of Landscape Architecture, PO Box 85084, Lincoln University, Christchurch 7647, Canterbury, Aotearoa New Zealand.
Telephone: +64–204–0016–921
Email: mick.abbott@lincoln.ac.nz

Paul Roncken is Assistant Professor, Landscape Architecture Group, Wageningen University, PO Box 47 6700 AA Wageningen, The Netherlands.
Telephone: +31–317–482–090
Email: paul.roncken@wur.nl

EDITORIAL

focused on designing. The authors who responded to our call for this themed issue have been selected to represent a diversity of approaches.

The four main papers reveal emerging methods and subjects in designing landscapes and landscape architecture research. Because of their emergent character, they contain an immanent research orientation. The designers involved express naturalness in researching their intentions, and their own means and mutual relationships between society and landscape phenomena. The subjects addressed range from enhancing embodied interactions on site, understanding animal interactions with landscapes, real-time and 1:1 design intervention and, lastly, the complex realm of biosemiotics, including navigation by means of smell. These subjects all break traditional boundaries of research interests. They explore, much like surveyors once charted new terrains, what designerly aspects are included while engaging landscapes from a bodily, animal, real-time and multisensory type of interaction.

Carola Wingren from the Swedish University of Agricultural Sciences explores how the human body can become a sensory tool for designing rapidly accelerating landscape change as sea levels keep rising and coastal areas lag behind in their adaptation to such changes. To her and her students, the body is not only an instrument to gather alternative data; it is a unique platform giving time and space for mourning and acceptance.

Roxi Thoren from the University of Oregon (USA) describes how she inverted the structure of studying the unfamiliar world of animals. Instead of exploring how we should engage with animals, she has set up yearly field experiments that allow students to perform alongside animals. Valuable lessons and artistic means gathered from this multi-year approach are shared in her paper.

Brett Milligan from UC Davis, College of Agricultural and Environmental Sciences (USA) describes design interactions in vacant spaces. These began with small gestures, awaited responses, regarded alterations by other users, plant life and animal interaction in the same space as he more consciously upscaled his real-time involvement. This series of interventions points to a process of learning by doing. Each time, the design intervention talks back beyond what had been conceived, revealing existing landscape assemblages and creating new assemblages within the same milieu.

Judith van der Elst (independent researcher, the Netherlands), Heather Richards-Rissetto (University of Nebraska-Lincoln, USA) and Lily Díaz (Aalto University, Finland) all share a background in anthropology with an interest in nomadic landscape relations. They also share a fascination with sensing technologies, advanced geographic information systems and ubiquitous computing. They introduce a design challenge that focuses on multisensory aspects of the environment to help increase a situational awareness that indicates ways to investigate the relationship between health and ecology and the interconnectedness between rural and urban areas.

The report section of this issue features seven studies that extend the scope and generative potential of design research. This comes from the way the authors are able to elicit critical insight from creative and imaginative practices. Design methods, such as drawing, graphic creation and mapping, are used in unique ways to expand the capacity of landscape architecture to consider

and respond in designerly ways to problems, including landscape degradation caused by industry, and landscape practices such as walking. This often involves the intentional synthesising of seemingly opposing or unrelated concepts, forms and practices. These projects, therefore, are able to bring together environmental analysis and aesthetic analysis of national parks and mining sites, for instance.

The first five reports present work from Master of Landscape Architecture design research theses. From Wageningen University, The Netherlands is research by Frederik Gotemans and Carlo Leonardi and from Lincoln University, New Zealand, is research by Jess Rae, Tenille Pickett and Kate Blackburne. This work takes the form of a series of exhibits that indicate the direction of their work and provides a gateway into each scholar's in-depth design research, which is accessible online.

The sixth report is an abridged chapter from Mick Abbott's doctoral thesis that outlines a case for design-directed research and considers the metaphor of trajectory ways as a means of structuring design research.

The final report presents a design research studio undertaken in collaboration with researchers from Lincoln University and Wageningen University. It examines the potential of landscape cities as a conceptual trope for dealing with rapid population growth, and discusses the main methods used, as well as design 'challenges' versus the research 'objective'. These reports – whose genesis is firmly located with landscape design research – demonstrate a sustained effort to expand the various approaches within landscape architecture, creating and using imaginative methods to produce innovative research outcomes. They investigate potential departure points and expectations for research, as a commitment is made to explore novel processes that can generate original findings.

This issue of *Landscape Review* focuses on the active components of the design imperative that underpins the discipline. In it, active and specific investigations are reported that are embedded within interwoven practices of design*ing* and research*ing*. This issue rejects a desire to use matrices of Boolean word searches in academic databases to claim a panoptic view of design-directed research's scope in the discipline. Rather, and because we consider the design-directed research area to be rapidly expanding, it is located firmly *within* and *of* the territory.

Hence, this issue does not establish a singular frame for 'design-directed research', 'research through design', 'research through designing', 'landscape design research' or any other related phrase. While each term may have validity as a way-finding device, we reject that any of them marks out any known, defined and specific place. Rather, the papers in this issue operate as an open invitation to participate in the many (and as yet only partly discernible) ways that welcome a diversity of investigations, design methods, terms and forms of finding.

The Human Body as a Sensory Design Tool to Advance Understanding of Coastal Landscapes Changes

CAROLA WINGREN

As the world's climate changes and becomes warmer, the sea level is rising and affects the coasts globally (Church et al, 2013). One area where its impact is especially evident is southern Sweden, where land uplift is almost absent and where commitment and preparedness among authorities to adapt to these rising sea levels are limited. In a search for complementary strategies to enhance the work for climate adaptation, alternative methods have been tested in collaborative work with a choreographer and groups of Master's students in landscape design, where the students used their bodies to express landscape dynamics, principles for protection or interaction with the sea and their own understanding of a future changed meaning and identity within the coastal landscape. In one of the choreographed, design-driven movement workshops, the students walked the high-water line as it appears on maps and, with other movements, they integrated the dynamics of the sea and its confrontation with coastal life.

The challenging and tentative work, conceptualised as 'reflective motion', ended in a public performance where the students identified and dramatised threats, reconciliation and possibilities for change in relation to future sea-level rise on the site. The performance took place along a 2-kilometre stretch and concluded with a public discussion in the library. The method seemed to be useful and complementary to other methods; by 'blurring' the static high-water line in favour of a more complex understanding; by being an interactive tool between the researcher, the designer, the choreographer and a coastal society (Germundsson and Wingren, 2017); by developing a 'value action' or a common language of environmental awareness (Hirsch, 2016); and by giving space for emotional expressions and mourning related to loss of landscapes, landscape identity and meaning (Cunsolo Willox, 2012). The results indicate that 'reflective motion' is a method that can be investigated further as a platform for better-informed design and as a forum where local people and authorities can meet to share their landscape knowledge.

Carola Wingren is Professor, Department of Landscape Architecture, Planning and Management, Swedish University of Agricultural Sciences (SLU), Box 58, 230 53 Alnarp, Sweden.
Telephone: +46–707–104111
Email: carola.wingren@slu.se

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As the world's climate changes and becomes warmer, the global sea level is rising (Church et al, 2013). In Sweden, this will mainly affect the southern coast (Scania region), where land uplift is minimal or non-existent (Malmberg Persson et al, 2014). However, local, regional and national authorities seem to have a limited understanding of these accelerating changes, along with a limited commitment and preparedness to adapt to them within planning and design (Länsstyrelsen i Skåne, 2014). Several possible reasons exist for this failure to fully consider coastal dynamics. One is the lack of clarity about how to handle a changing coastline, who is responsible for actions and what the best design measures or strategies are for adapting to this change. Another influential factor is the rather common unwillingness among citizens, and society as a whole, to acknowledge a change where land is eaten up by the sea and where a landscape

REFLECTION

that local residents know, love and identify with is disappearing centimetre by centimetre. A third possible reason is that coastal dynamics are difficult to understand: waves, floods and other coastal dynamics, which affected coastal landscapes even before sea-level rise was an issue, are often hidden in planning documents or maps, which generally represent the coast in a static way as a line, rather than as a zone.

To improve awareness of coastal landscape change and the need to consider it within landscape design, when teaching landscape design Master's studio classes I have covered landscape dynamics, including coastal changes in relation to climate change, as a main theme. During these classes, I observed that students had difficulty in fully integrating the processual thinking required to understand the design challenges and in design proposals. Therefore I sought to devise alternative or complementary design methods to improve processual thinking on landscape change over time. These methods included: comic drawing inspired by Sara Granér; section drawing inspired by Anuradha Mathur and Dilip da Cunha; and dance, movement and choreography in collaboration with Ríonach Ní Neíll. All these methods proved successful in improving students' understanding and my own. Storytelling through comics became important for understanding and showing change over time; sectional drawing clarified how a differentiated coastal area could be transformed not simply with protection walls, but with solutions that involved a more subtle interaction between land and sea (figure 3a and b); and the movement and choreography workshops influenced the students both emotionally and strategically. Overall, through their better understanding of a future changed landscape identity, students came up with the collective idea of 'embracing' the dynamic between land and sea in their design proposals.

In the movement workshops, students were able to map the landscape dynamics, the principles for protection or interaction and their understanding of changes in meaning and identity within the landscape, all at the same time, using their bodies. When provided as one of several initial parts of the design process within the course, this activity seemed to support these students to grasp the complexity of coastal dynamics much more quickly than in former design studio courses. The 'otherness' of the approach compared with more institutionalised methods within the profession and its strength in introducing complex questions and systems for landscape and design knowledge were the main reasons for exploring it further as a strategic tool in more explorative and open-minded landscape design methodology. This work is especially aimed at designing within the frame of changing landscapes processes, such as those associated with climate change.

My movement exploration workshops are design driven or design directed. Their purpose is to improve understanding of the processual, involving both the movement and dynamics that exist within the landscape and their importance in changing landscape identity and meaning. The goal of achieving dynamic understanding as the initiator for the workshops was clear from the outset. The more emotional part, relating to the importance of landscape identity and meaning, became obvious during the workshops and can be seen as a research finding (Germundsson and Wingren, 2017). The role of the designers (students in this case) in these initial workshops was that of storyteller, but during the

activities in one of the workshops involving a physical performance in public, the designers also became place-makers, introducing meaning by their own movements and actions (de Certeau, 2002).

The explorative choreographic work described in this paper can be considered part of the design process and knowledge production process. It can be described or conceptualised as processual design, explorative design or research by design. Using specific methods inherited from choreography makes it possible to reveal alternative knowledge about the site and its processes and about the designers themselves. My approach to making it part of the field of landscape design research is principally through transparency, close description and documentation, as described in my PhD work on artistic practice in landscape architecture (Wingren, 2009). This can be seen as connected to the field of autoethnography (Adams et al, 2015).

This paper is structured as follows. After discussing problems and consequences related to actual representational methods such as drawing maps, I consider how creativity and choice of alternatives can expand understanding. The discussion is then widened by introducing actual and alternative narrative methods using embodied knowledge and considering their importance for influencing action. Next, I present workshops or research-by-design processes that took place in southern Sweden in 2014 and 2015, in collaboration with Master's students in landscape design, where choreography was one of several experimental tools used to improve understanding of the challenges connected to landscape design in a landscape influenced by climate change and sea-level rise. The results of the choreography-based workshops are then analysed, using the concept of 'reflective motion'. Finally, I explore the benefits and limits of using this methodology in the larger context of how it could enrich landscape design for changing landscapes, especially related to climate change and adaptation.

Static representational methods conceal the dynamics of coastal landscapes

Like other coastal cities in the western world, municipalities in southern Sweden (Scania) – the region analysed in this study – tend to represent their actual and future coastline as a static line on a map, thereby hiding temporalities of high and low water levels. Likewise, the expected geographical limit for high tide in 100 years is drawn as a line (only redder and thicker) on top of the landscape inland, where the contour line representing 3 metres above current sea level is situated (figure 1). This line, representing not only sea-level rise but also the high-water line reached during future expected storm surges and high waves driven by strong winds, is a simplified description of probable flooding in the landscape. Thus it provides little space for interpreting and understanding the coast as a changing zone in relation to water and wetness, or in relation to other connected processes, including the lives of humans and animals and the fate of different habitats.

This way of describing contemporary and future coastal areas by static phases and lines, instead of as different parallel processes such as progressing water fronts or a tide changing in relation to other factors such as annual variations or heavy storms, influences understanding and decision making in coastal design and planning. Consequently, authorities may not recognise coastal dynamics like

Figure 1: The red line on the map represents the idea about the future coastline in around 100 years, when the sea is at its highest. The line is static (in the same way as the actual coastline on the map) and does not communicate the dynamics of the coastal landscape. (Map: DHI for Höganäs municipality.)

storms, currents or even human behaviour; instead, topography and height above sea level tend to govern decisions about building sites or protection measures. The static map is less useful as a single tool for communication and could even be seen as negative, as it reinforces the static view and use of the coast in a world that, in reality, is changing. Threatened infrastructure or buildings might never be questioned or thought of as moveable, while preserves for nature and heritage might be regarded as protected geographically in their specific location, instead of as areas that can be maintained only by letting them move geographically in relation to the water line.

The static approach to geographical boundaries and spatial positions still dominates views on the landscape and associated investigation, planning and design, which thus fail to embrace the dynamics of the landscape or the strong change expected in relation to climate change (some land will disappear). In recent years, however, some have criticised the static planning and design approach and the lack of interest in the dynamics of the coastal landscape; at the same time, a more dynamic view of the coastal zone is gaining in importance. A similar change is evident in the growing discourse emphasising the value of 'soft', flexible protection walls compared with strong, static sea walls, for better adaptation of the coast as the sea level rises (Cooper and Pilkey, 2012; de Vriend and van Koningsveld, 2012; Hanson et al, 2006). This could be seen as a loss of terrain for engineering and a gain of terrain for landscape architecture and design. For example, in the aftermath of Hurricane Sandy in the eastern United States of America, a number of university-based architect teams were invited to devise new design strategies to protect the US coast against future storms and erosion (www.structuresofcoastalresilience.org). The design brief was to provide an alternative to the hard-cover protection walls (quays and piers) engineered by the US Army Corps of Engineers, which in many cases had failed to protect the coastline from the effects of the hurricane and instead exacerbated erosion through 'Newjerseyization' (Pilkey and Dixon, 1996).

One of the teams led by landscape architects Mathur and da Cunha, based on their former design work for Indian coastlines, developed a new strategy in which they described the coast not by a line but by multiple overlayered topographical sections. This way of representing and visualising the coast's topography directly on the map developed into a landscape design strategy where the usual protection wall that goes along the coast was turned 90 degrees and by repetition formed a system of 'fingers of high ground' across the coastline (figure 2). This strategy is more accommodating and less confrontational towards the sea, storms and future sea-level rise (Mathur and da Cunha, 2014a, 2014b). The 'fingers of high ground' are intended to function as high-lying areas to which the population can retreat in times of storm and rain, while the water can find its place between the ridges ('fingers'). The simple strategy, of course, needs to be customised to each specific situation and is similar to design strategies developed at the same time by my landscape design students in Sweden. They were highly inspired by Mathur and da Cunha's way of representing the coastline by topographical over-layered sections (figure 3a and b), which indicates the importance of methodologies used for exploring the landscape and landscape change in influencing final design proposals and strategies.

Figure 2: The conventional protective line of demarcation to the sea is turned 90 degrees in Mathur and da Cunha's proposal for Norfolk at Chesapeake Bay, USA, to form 'fingers of high ground' that can be used for safe retreat during floods. (Sketch: Anuradha Mathur and Dilip da Cunha.)

The methodology determines which landscape knowledge and story to tell

To date, researchers and organisations have used a range of methods for communicating the abstract events of climate change and sea-level rise. For example, in documents of the United Nations International Panel on Climate Change and the Swedish Meteorological Institute, maps, graphs and diagrams play a particularly large role as descriptive tools. As a base for these graphical representations, researchers collect particular types of information.

Powerful input comes from describing historically important moments or events or collecting long time-series of data (Hamblyn, 2009; Sörlin, 2009). This information can be interpreted, extrapolated and expressed through describing a probable future scenario that needs to be addressed by planning and design. This much-used and influential scenario technique can be viewed as a form of storytelling to guide politicians, planners, designers or other citizens to make the best possible decisions for adaptation.

However, some narratives of actual events spark a discussion about how to avoid similar situations arising in future. Examples include how the 'Advent Storm' on 27 November 2011 flooded Helsingborg in southern Sweden, and how the city tunnel in Malmö was almost flooded (with only 15 centimetres of margin) on 5 December 2013. Such 'lived' events function in a more direct way as powerful tools for developing new strategies and improving preparedness. Moreover, in communities without a significant written language but with a strong connection to nature, local stories can even be created to communicate important social issues related to landscape change. Such methodology has been highlighted as important for future understanding of climate change and impact (Bravo, 2009).

Storytelling of different kinds appears to be a powerful tool for communicating information about landscape and social change that is difficult to understand for different reasons – for example, it may be unknown, abstract or unwanted.

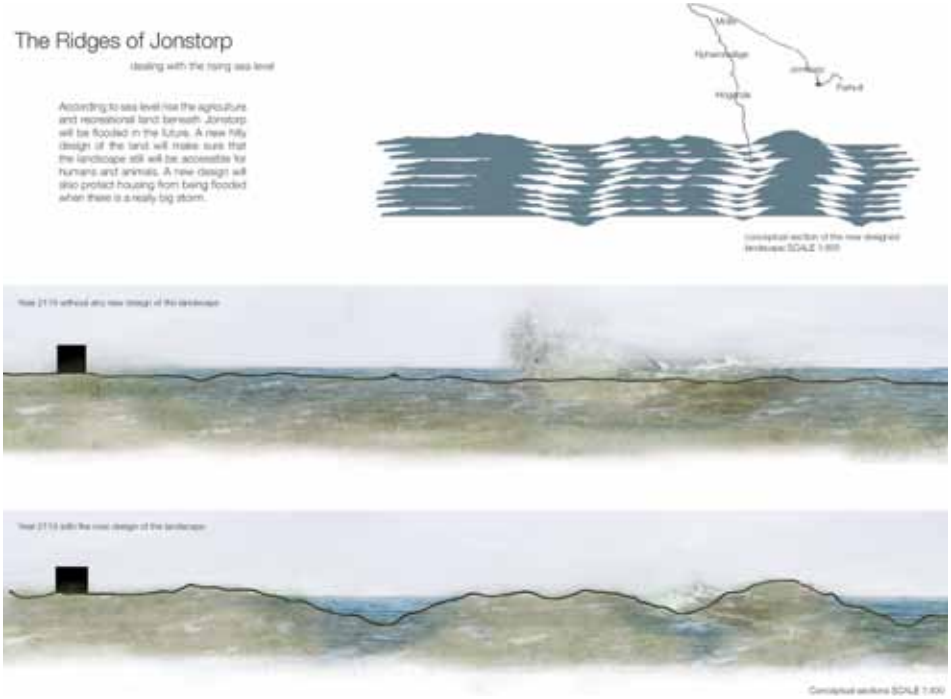

Figure 3a: Using an exaggerated height scale, in 2014 Elise Eriksson, Master's student in landscape architecture at SLU, designed sections along a coastline in Jonstorp and then developed the sectional drawings by moving masses in the landscape to create lower areas for the water to get into the landscape and higher areas for people to move to. (Image: Elise Eriksson.)

Different techniques can be used, of course. One is to develop choreographed stories in relation to landscape and society as 'site-specific performances' (Birch and Tompkins, 2012; Pearson, 2010). These performances can sometimes have a more political or artistic undertone, where the dramatisation not only enriches the understanding of space but also opens the way for necessary interdisciplinary discussion on difficult design and planning issues, in the same way as artistic inquiry of other kinds can inform interdisciplinary research (Rust, 2007).

Within landscape architecture, exploratory design work (namely, research by design) could thus employ complementary artistic methods and focus more strongly on understanding the landscape in all its parts and implications – materiality, topography, plants, life and so on – while also providing a platform for design discussions or collaboration with other researchers, professionals, decision makers and citizens.

Figure 3b: The proposal by Elise Eriksson is based on her previous studies and visualisation of a coastal landscape with sections (see above). Houses are placed on higher ridges in the new landscape, while sea water can find its way in between. The landscape can still be used and the confrontation with the sea is minimised. (Image: Elise Eriksson.)

One example of such broadened landscape design methodology is when the employees at the studio walk through the landscape and investigate it both from a distant view and by engaging with details, experiencing it and taking notes of different kinds to fully understand it through these different perspectives or aspects (Foxley and Vogt, 2010; Schultz, 2014). Another is the symposium 'Let's Walk Urban Landscapes' organised by Studio Urban Landschaften in Hannover in 2015, with the aim of finding new pathways to transform urban landscapes (de Wit, 2016; http://letswalkurbanlandscapes.urbanelandschaften.de). Most important is, of course, the collaborative work of Anna and Lawrence Halprin, which has been highly influential in considering performance and choreography within landscape architecture. Their collaboration had its peak in the 1960s, when they involved local residents and architects in various exploratory works examining landscape within civic and design processes, and where Anna's choreography and Lawrence's notations in relation to space and movement provided input to Lawrence's landscape design works (Halprin, 1986; Merriman, 2010).

Design-driven needs form the method of 'reflective motion' as part of the design process

On the basis of design-driven needs and influenced by some of the above-mentioned works, Master's students in landscape design at the Swedish University of Agricultural Sciences (SLU) in Alnarp explored the interaction between the shallow and sandy coasts of two different coastal towns in collaboration with a choreographer. In the first group project in Höganäs in 2014, the work initially focused on future coastal dynamics embedded within climate change, but eventually became much more complex and challenging in terms of both time and effort (see below). In the next year, with another group of students, the project hosted a smaller two-day workshop in Vellinge that focused only on erosion, in collaboration with a PhD student in engineering. Her knowledge of and interest in the interaction between streams, waves, sandy beaches and dunes were mediated into movement with the help of the choreographer, and the main outcome was embodied knowledge about erosion that influenced each design proposal on a technical level.

The Vellinge work was successful, but did not initiate the same reflective development about overall landscape dynamics, identity and meaning as the more holistic approach of the previous week-long workshop in Höganäs. The Höganäs workshop ended in a public performance that dealt both with coastal processes and with design possibilities for coastal adaptation in a changing climate, in a collaboration involving the choreographer and students along with politicians, municipal employees and local residents. The performance was structured as a storytelling process consisting of different phases, where the first formulated a common story about the threat of rising waters, the second expressed this story and the third performed and discussed the story in front of, and together with, a public audience.

In a limited period of 10 weeks, the students had to gain an understanding of coastal dynamics, including storms, tides, currents and erosion, and of the abstract issue of future sea-level rise. They also had to integrate those processes into design proposals for coastal development and adaptation. One difficulty in

this work was the abstract and static way in which coastline was communicated (see the discussion at the start of this paper). Another was the priority given to visible features when communicating about the landscape, at the expense of other factors that are hidden. One such hidden factor is the porosity within the ground and its materials where water can hide; another is the relational experience that people have with 'their' landscape, which influences the value citizens give to individual landscapes and the extent to which they identify with each one. As already mentioned, several alternative investigatory design methods were tested in week-long workshops in an initial phase of the design course, with the aim of uncovering such hidden aspects or dynamics within coastal design challenges: analogue model making, comic drawing, laboratory exercises investigating the porosity of materials and its relation to water, sectional drawing and, finally, movement or choreography.

The movement workshop provided time for thinking and for a common discussion about coastal dynamics and its implications for local residents and for coastal design strategies, and was conceptualised as 'reflective motion'. It came to act as a platform for better understanding and communication about the future landscape and its changes, and to bring an important knowledge input to students' final design solutions. By introducing these creative and artistic working methods early in the exploratory processes of designing, it also appeared as though a more integrated process of investigation and design could take place, which also meant that creativity and designing of another kind became an important complement to the ordinary drawing design process. This enriched the discussion about design possibilities, where a more dynamic view of alternative solutions emerged. It could be said that the artistic methods opened the way for an earlier, accelerated and more complex emotional approach to the task of designing, already in the investigatory phase, which influenced both the kind of knowledge production that took place in the project and the character of the final design proposals.

'Reflective motion' – dynamics and interaction

> Could you please make the students walk the line and dance the waves, so that they understand what it's all about?

This is what I asked the choreographer commissioned to carry out a week-long 'movement workshop' with the students. The aim was to give them the chance to develop an understanding of what rising sea levels can do to coastal landscapes in future, as a way of preparing them to create better design solutions that could minimise negative effects for people living by the coast. The artistic approach was created to enable the students to gain embodied knowledge about the different coastal dynamics by letting them walk the red line on the map (figure 1) that describes the level the water is expected to reach in 100 years (including sea-level rise, waves and wind pressure on water), and with other movements to integrate the dynamics of the sea and its confrontation with coastal life. In the initial phase, the content of this 'movement work' was vague but, during the workshop and through the collaboration with the choreographer, it developed into a real public performance, where students identified threats and possibilities for this specific site in relation to future sea-level rise and communicated them to its residents.

Because the collaboration between myself as teacher/researcher and the choreographer was new and because the students – as non-dancers – were unprepared for the task, the work began in a tentative and relatively open-minded way. Tasks included: understanding the landscape and its future dynamics and changes; finding out what this means for the landscape; finding the red high-water line in the landscape; changing the line into a walk in the landscape; adding knowledge about waves, storms and other coastal dynamics; and adding the associated movements and making them into a dramatised story about threats, reconciliation or possibilities for change.

In a short session that began the course, students met the choreographer. Together with her, they tested some exercises to understand the future work, as well as to create trust and strong group dynamics. At this stage, the 'movement workshop' that would take place a month later was also presented, and students were informed that they could choose not to participate (and do something else instead). Only three students out of more than 30 made that choice. At the same time, on a conventional site visit students walked the landscape and collected impressions, materials, sounds, objects, sketches and photographs that they displayed and analysed back at the university.

The main work started on a cold Monday in mid-February with a full-day site visit to the coastal town of Höganäs (figure 4b) and continued with four days of full-time work in a large hall at the Department of Landscape Architecture, Planning and Management, SLU, which was chosen to function as a 'dance studio'. The workshop on 'reflective motion' ended on the following Saturday with a performance consisting of a 'movement walk' from Höganäs harbour to the main shopping street and the square in front of the library. A film manager followed, video-recording the work (figure 4a), and then cut and produced the film as one of the outcomes of the project (Varhegyi, 2016). A photographer also followed the work and documented it in 1,600 images. To accompany the performance, a PhD student in landscape architecture and soundscape prepared a sound arrangement involving sounds of water and wind. As teacher/researcher and project leader, my role was very much to facilitate the process but also to choose the props that were then accepted or rejected by the choreographer and the students: these included blue hats and gloves representing water, red warning snow sticks representing forces or movements (like waves or rowing oars) and

Figure 4a and b: The choreographic landscape enquiry in Höganäs with Swedish Master's students in landscape design was led by the Irish choreographer Ríonach Ní Neíll and filmed by Lajos Varhegyi. The work involved long discussions and hard physical work aimed at knowledge production and understanding landscape dynamics. (Photos: John S Webb.)

other paraphernalia representing the historical bathing culture and the wildlife in the area. Several assistant lecturers and researchers also participated in parts of the work and a PhD student in landscape architecture focusing on dance and movement was invited to follow the process.

The 'reflective motion' method finds its form

The tentative work described here as 'reflective motion' started with extensive discussions about what sea-level rise is, how it changes the landscape and what in this knowledge could be interesting to express. In parallel, through discussions and small exercises, ideas developed about how important knowledge, thoughts or values could be expressed and communicated through movement. From the first day on site in Höganäs and continuing in the dance studio back at the university, the project comprised collaborative work of the choreographer and the students, while I as researcher/teacher stepped back and supervised the work from behind (observing researcher position). To find and express the high-water line and the dynamics of the waves in the physical landscape, and to develop a story about threats, challenges, sentiments and possible ways to act, the work also involved building group dynamics and mutual trust among the students, which proved to be positive for the design work that followed.

The students threw themselves into the unknown, experimental and explorative interplay with the choreographer, where the initial aim was to create and understand the physical forces to which landscape in transformation is exposed. During the work, the students and the choreographer transformed this aim, and constructed a story about what can happen in a city that is flooded. The choreographer, coming from the more political background that site-specific performance represents, wanted to dramatise the process of rising waters in a way that could engage citizens by criticising political decisions about building houses in coastal areas and also introducing insurance questions. While the individual students, of course, all had their own ideas, as a group they developed the idea of mitigating the feeling of threat and instead encouraging optimism and revealing new opportunities for developing the coastal landscape together with sea-level rise in a positive way (figure 6a and b). Their motto was 'embrace', which involved embracing the dynamics of the coastal zone, including sea-level rise, and developing the landscape with adapted means.

The work proved to be demanding, both mentally and physically, as the students had to leave their comfort zone by performing in public and by undertaking physical exercise for six to eight hours a day for a whole week. In particular, establishing the necessary trust, knowledge and self-confidence in such a short time was a challenge that I had not anticipated as project leader (teacher), but that could probably have been predicted. Feelings of uncertainty and anxiety affected the group (students and choreographer) in the middle of the week, and I was brought in to manage the situation. A set of talks with the students as a group and individually mostly related to questions and comments such as: 'Why are we doing this? What is it good for? I thought I was attending a design degree, not a dance degree. This seems to be a manifestation (political) and I do not feel comfortable with it. I don't want to perform in front of people as I am not a dancer.' The choreographer and I tried to address the issues in relation to the value of embodied knowledge, and once again offered the students

the option of not participating and of doing something else instead. Finally, all students decided to continue and the work resumed with new vigour.

On Saturday 22 February 2014, the students put on a public performance along a 2-kilometre stretch for half an hour, followed by a public discussion in the library where the challenges of sea-level rise and the need to act became obvious to those who attended. An important component was the 'haka' that began the public performance. This traditional Māori challenge was proposed by a student from New Zealand and was directed towards the sea (figure 5). Some expressions represented the dynamics of the water: the gentle splashing of waves, drops falling or heavy waves rolling in towards houses and buildings, threatening to destroy people's constructions and lives. Other expressions focused on actions using the rising water for positive effects: a flooded square became a place for swimming and recreation (figure 6b); and an imagined protection wall was destroyed by waves (figure 7a–c) but then without it the shopping street was transformed into a canal where people could use boats (figure 7d). In the final dramatic scene in the square in front of the library, the students (accompanied by an increasing level of water sounds) showed how people differ in the pace at which they come to recognise the threat of rising water and what happens to those who do not listen to warnings (figure 8a–c). In the beginning of the scene, only a few were able to save themselves on higher ground (a fountain or a raised flowerbed). However, as the imagined water rose higher and higher, the coastal dwellers, here represented by the students, collaborated and helped each other to safety. Finally, the last person to heed the warnings fell on the ground and 'drowned'.

The performance ended with an invitation to everybody to meet inside the library for a discussion about sea-level rise and the future of Höganäs (figure 8d). A large group followed the performance from the harbour to the library, among them some employees from the municipal authority and politicians. Many of these also followed the students into the library and participated in the discussion, where the students, the choreographer, a research colleague, a representative

Figure 5: The 'haka' started the performance, challenging the sea. (Photo: John S Webb.)

Figure 6a and b: Disaster and happiness in relation to the sea in future, communicated with certain props. (Photos: John S Webb.)

from the municipal authority and I responded to questions. In this session, the students met hesitant and sometimes anxious questions and statements with realistic, but also positive and creative, answers.

The future landscape in relation to sea-level rise was debated for the first time in public in Höganäs, and the feeling of something important happening was obvious not only from the level of engagement of the students and the group of local residents attending, but also from the wider interest that the activity generated. Media interest was demonstrated in news interviews for radio and television and for the local newspaper. The work in the project was presented as part of an exhibition on photography in research in Landskrona Museum, and also as part of an exhibition at the Form Design Center in Malmö (both in southern Sweden), which about 20,000 people visited during a three-month period. A slightly modified exhibition has also been produced in a scientific research environment at the SLU campus in Uppsala during its climate research days, to explore and discuss how artistic or exploring design methods can cope with scientific research and data.

Analysing the findings – what constitutes 'reflective motion'?

This paper describes an attempt to integrate an expanded understanding of landscape processes within a developed design methodology in relation to landscape changes influenced by climate change, with particular focus on coastal adaptation to sea-level rise. The method adopts an artistic and exploring approach deriving from the fields of landscape design and choreography (dance) and could be described as research by design (Seggern and Werner, 2008). The method can complement other methods (such as historical data and modelling) used to capture the features of the coastal landscape and its changes, with the outcomes of the different methodologies together providing a complex description of the coastal situation.

'Reflective motion' – an eclectic method

The method, here referred to as 'reflective motion', can be used as an interactive tool for investigation and communication between the designer (and choreographer) and a coastal society, its politicians, municipal employees and local residents, where the interactive element can expand the understanding of coastal changes, challenges and possibilities for actions, but also open the way for negotiating the landscape and its values (Germundsson and Wingren, 2017; Wingren, 2016a, 2016b). The reflective motion method was developed in an interdisciplinary collaboration between landscape architecture and choreography, with the

Figure: 7a, b, c, d: Arriving in the main street, where the sea level is expected to reach in about 100 years, the students show how it is not worth building a wall, because it will break, and that it is better to think about new ways of transporting people. (Photos: John S Webb.)

aim of better understanding, communicating and working with important and unknown landscape changes. The methodology is eclectic, using methods and discourses from different disciplines. It is principally artistic in its experimental approach, but is also connected to phenomenology, by using the subjective senses of the performer, and to hermeneutics, by transforming maps and diagrams into movement and letting both performers and a possible audience interpret these movements and allow new things to happen from there. The method is therefore multi-layered, and can be discussed and studied as a whole or in relation to each of the research fields identified above.

'Reflective motion' – a method for collective environmental awareness

'Reflective motion' is, as already noted, situated within a landscape architecture tradition of investigating landscapes through walking and explorative design, where methodologies and conceptualisations are continually under development. However, it might to some extent differ from several of these methods in terms of engagement with an actual landscape because 'reflective motion' also involves interpretation of an abstract and overflowing threat of change.

It is possible to draw a parallel to Halprin's 'value action', which indicates a shared experience from which a group can develop a 'common language of environment awareness' and move forward in a collective way (Hirsch, 2016). For example, the week-long movement workshop that ended up in the students' Saturday performance was one such 'value action', which helped them to grasp and conceptualise a strategy for coastal adaptation (in their case, described by 'embrace'). The value of this collaborative initial part of the design process, where shared environmental awareness was developed in a thoughtful and reflective way through discussions and explorative movements involving both understanding the existing and interpreting the unknown, can probably not be overestimated. This process or 'value action' was the moment when the agenda was set out step by step through bodily expressions towards the final expression of the performance, and for which strategic collective decisions were made about how and what to communicate – for example, whether the aim was to calm anxiety or to enhance it, to avoid specific actions or to push other kinds of actions that could give better results in relation to climate adaptation.

These strategic decisions need to be decided as a collective agenda from the beginning of the design process, when 'reflective motion' work starts. Thereafter they should be under the influence of the actual motion investigations in the workshop and modified in relation to emotional findings, which is an important part of the methodology. When coming to the end of the process, it is also important to clarify the final agenda permeating the work, as it may be used for political purposes.

Figure 8a, b, c, d: The final scene in the square in front of the library, where the students show how the water rises slowly, bit by bit, and they save themselves on higher ground. Finally, they go into the library to start discussions with the citizens of Höganäs. (Photos: John S Webb.)

'Reflective motion' – a method for initial design phases

'Reflective motion' proved to be a useful method for initial investigation within the design process, where knowledge can be gained about such diverse subjects as the landscape itself and embedded and approaching landscape processes, and about design possibilities or strategies, but also about the designers themselves and their preferences and strategies. It is therefore a useful but complex methodology for initiating strategies of design, involving different steps of artistic experimentation and dramatisation, phenomenological sensation and hermeneutic interpretation. It is a complex explorative and time-consuming method to use within a design process, with interesting and important outcomes on several levels. Use of 'reflective motion' therefore requires time and space to be allocated between the start of the project (understanding phase) and the final part (decision about design solutions or strategies), in order to process ideas, sensations and emotions relevant for the work.

'Reflective motion' – a method for emotional design

A specific value of 'reflective motion' in relation to landscapes threatened by transformation under climate change is that it gives space for emotional expressions related to such issues as loss of landscapes, landscape identity and meaning. Cunsolo Willox (2012) points out that a time of climate change and associated changes, such as those in the landscape, might bring with it a need to mourn lost values, similar to the mourning following bereavement. In the work described in this paper, the value of 'reflective motion' in this regard was not thoroughly examined, but the emotion that emerged among landscape design students, planners at the municipality and project leaders is an important field to investigate further.

Aims related to design – 'reflective motion' as an interactive tool for intellect, emotion and movement

The investigation through 'reflective motion' that took place in Höganäs had aims related both to design and to design research. As design-related explorative action, the 'reflective motion' undertaken in Höganäs could be described as involving an interaction between intellectual knowledge, emotional expression and expressed movement. It was thus helpful in 'blurring' the high-water line described in the maps and in avoiding a static view of the coast in favour of more complex description, understanding and development of design strategies for coastal zones, considering their full dynamics. During the design-driven movement workshop, this aim was continually modified through ongoing reflection using an open-ended, explorative approach. Consequently, while the initial aim within the teaching process was to create a common understanding of the actual coast,

including its spatiality and dynamics, and to provide a better basis for design decisions, it developed into a more complex approach involving the creation of a platform for communication with others.

Aims related to design research – 'reflective motion' as a platform for research within different fields

Regarding the design research aim on a meta level, the project initially dealt with how methods related to art-making, creativity and designing can complement and expand ways of understanding the coast and its change over time, and how they can be part of constructing a developed platform for discussions about additional alternative design strategies that need to be developed among designers in relation to a changing world. During the movement workshop and associated documentation and analysis, other issues emerged as interesting topics to study, such as the use of 'reflective motion' as a platform for collaborative planning and for developing discussions on changes in landscape identity and meaning as a result of climate change. The latter discussion could give time for acceptance of this (for many people, unacceptable) change, by accommodating anxieties and even mourning between the initial understanding of a landscape challenge and the final phases of a design process.

Conclusions

Awareness about rising sea levels is increasing among citizens, planners and decision makers, partly because of new reports from the International Panel on Climate Change, but also because of lost beaches or more frequent downpours and storm events in recent years. Media reporting of specific storms or catastrophes makes people react instantly, but these events seem to be forgotten rapidly unless people's own bodies or properties have been directly affected. This study has examined how people's and especially designers' awareness of landscape and climate change and preparedness for climate adaptation can be increased.

Time and space are needed for alternative methods and reflective communication

While it is important to act quickly in relation to climate change, the relatively slow pace of sea-level rise allows time for creating a platform for reflection, discussion and communication. The sea level will rise whatever the global community does and whether it manages to stop carbon dioxide emissions immediately or not, but it takes time to understand and accept this inevitability. Simplified representations of the landscape and its change, such as maps, can affect, delay or even obstruct an understanding of the implications of sea-level rise for the landscape, and thus also the ability to develop creative ideas and strategies for future coastal planning.

The results from the project described in this paper using reflective, artistic and design-based explorative methods for investigation and communication (storytelling and choreography) as a complement to established methods (such as maps and diagrams) indicate that 'reflective motion' can enhance coastal planning and design processes by expanding the way future coastal changes are understood and offering complementary possibilities for collaboration and 'value actions' between different groups and disciplines.

Bodily experience and reflective motion give input to strategic actions

Bodily experience is important, as it gives specific knowledge, understanding and presence to different situations (Thrift, 2007). This was valuable in the movement workshop described in this paper. In relation to sea-level rise, the workshop created a bodily experience anticipating real catastrophes, which could be seen as a way to prepare for strategic actions in advance and thereby avoid disasters.

The complementary design method 'reflective motion' created an initial engagement among the design students that better prepared them for the following design phases. Some reasons for this were that the method proved to be forceful in relation to several aims, understandings and agendas; its movement methodology correlated well with the movements and dynamics in the landscape investigated; it allowed the unexpected and the emotional to influence the research and design process; it connected well with how human emotional decisions influence climate change, sea-level rise and decisions made (or not made) for adaptation; and it seemed to be effective for knowledge production and for collaboration between designers and others related to the actual landscape (citizens, politicians and employees).

Further investigation needed

Further research through interviews and analysis of drawings and proposals is needed to prove the creative and strategic value of collaboration between the choreographer and landscape designers described in this paper. In the present case, introduction of alternative methods into the design process gave a better understanding of landscape dynamics and relevant design strategies to handle the threat of rising sea levels than former design courses. The case also achieved better dialogue among the landscape architects themselves and with others (politicians, officials, local residents), especially through sharing time, space and uncertainty. Moreover, it gave reason to believe that this approach is relevant for better-integrated design and planning in relation to future landscape changes of all kinds, where design and planning issues must not be separated as in today's more static approach. By involving multi-layered descriptions and flexible and dynamic methods related to change and including time and space for negotiating landscape values between the authorities and a wider public, the reflective motion offers a useful methodology for future planning and design. It creates a platform for better-informed design and a forum where local residents with their specific landscape knowledge related to memories and emotions can meet with authorities.

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Co-creating with Animals: Crossing the 'Narrow Abyss of Non-comprehension'

ROXI THOREN

This paper describes student work in a seminar and field school that use research through designing as a means to engage the more-than-human world in landscape architectural design practices. Students used an epistemology of engagement to observe, describe and co-create with animals, towards an applied end of transferrable design theories and practices that aim to make places for people and animals. Claire Waterton has described the large literature in anthropology, cultural geography and related social sciences exploring the idea that *how* we study the world is also a way of reinforcing, of *performing*, that world (Waterton, 2003). This field experiment sought to invert that structure: by consciously *performing* an inquiry, can we change how we perceive and conceive of the world and, specifically, the role of animals as co-creators of our landscape architectural designs? The field experiments were grounded in art practices, intentionally uncoupling and problematising notions of perception, landscapes and their human and non-human inhabitants (Jeremijenko, 2010).

Roxi Thoren is Associate Professor and Department Head, Department of Landscape Architecture, University of Oregon, 5234 University of Oregon, Eugene, OR 97403, USA.
Telephone: 1–541–346–3641
Email: Rthoren@uoregon.edu

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Non-human studies

The field of non-human studies and inter-species interactions is robust in many fields, including philosophy, geography, sociology, anthropology, linguistics and literature, and the notion of animals as ecosystems engineers is similarly well studied in the biological and ecological sciences. Very little of this research crosses over to the field of landscape architecture, where landscape architects seek primarily to design *for* animals, not *with* animals. Designers create empathetic or educational zoo design, or landscape designs that facilitate ecological function or reduce negative impacts of animal–human interactions. This is not through a lack of interest – landscape architects spend a great deal of time studying animals within ecosystems, and understanding how animals move in the world and what their spatial needs are.

John Berger (1980) has described landscapes as 'extensions of people who happen to be invisible' (p 50); in his phrasing, physical landscapes are temporal arrangements of materials, people and processes, ephemeral artefacts of human occupation and use. This study seeks to connect across the gaps between various disciplines, extending the reach of landscape architecture to include *animals* who happen to be invisible, bringing to light the landscape-forming qualities of animals that can be ignored and undervalued in landscape design. We are, of course, also animals ourselves, and perhaps by revealing other animals and their agency in landscape formation, we may also reveal some invisible or disguised aspects of humanity in landscape formation.

REFLECTION

Research through designing

While landscape architects and scholars continue to refine the overlapping categories of research and design practices within the discipline, there are four broad modes of synthesising the practices.[1] In research-based design practices, qualitative or quantitative research methods operate as catalysts for design innovations, creating a relationship of *designing from research*. In *researching from design*, drawn or constructed work is analysed to monitor and evaluate the design process or the effectiveness of a built work. In both cases, design and research practices do not overlap; one precedes the other. In two additional modes, design and research activities occur simultaneously: in *design through researching*, data collection methods are designed in a way to make them visible and interactive, to highlight the research activity as an art practice; and *research through designing* uses the design process as a research method.

Research through designing uses the design process – iterations through schematic design, design development, prototype and built work – to generate transferrable design principles and practices (Wang and Hannafin, 2005). It is a synthetic process where speculative design informs a research question, the investigation of which informs a design exploration; rigorously and iteratively establishing new facts, forming new knowledge and creating new forms, objects and places.

Performative fieldwork as a design method

The work done at the Overlook Field School[2] was performative, as defined by Waterton, with experiments and data collection operating in tension between '*accurate replication*; and … never-ending *improvisation and adaptation* to local contingencies, unexpected events or terrain' (Waterton, 2003, p 112). This is a variant on Lorimer's 'make-do' methodology, an epistemology of knowledge-in-practice, that is both 'practical and participative' (Lorimer, 2006, p 500). Lorimer describes fieldwork that begins by taking stock of resources at hand, including the researcher herself – the physical experience of a landscape, the subjective experience of animal encounters, and documentary evidence – and using mapping as a synthetic tool. In the Overlook Field School, students drew on field biology methods rather than documentary evidence, but similarly used the phenomenological experience of the landscape and animal encounters to build knowledge of the site.

Finally, the fieldwork was based on Tim Ingold's writings on knowledge construction through skilled practices: 'a coupling of the movement of one's own awareness to the movement of aspects of the world' (Ingold, 2000, p 99). In *On Making*, Ingold advocates for a research practice of engagement rather than detachment, of phenomenological being in the world. The application of research methods drawn from the physical sciences is well defined in landscape architecture, notably in the work of Ian McHarg and Richard TT Forman. Performative fieldwork, well defined in anthropology and cultural geography, provides an alternative method for research through designing that is active, engaged and iterative, like the design process itself.

Inquiry and method: Co-creating with animals

> The animal scrutinizes [a man] [sic] across a narrow abyss of non-comprehension ... The man too is looking across a similar, but not identical, abyss of non-comprehension. And this is so wherever he looks. He is always looking across ignorance and fear. And so when he is being seen by the animal, he is being seen as his surroundings are seen by him. His recognition of this is what makes the look of the animal familiar. (Berger, 1980, pp 2–3)

Through prototypes designed and installed as a mode of artful landscape architectural practice, the University of Oregon's Overlook Field School reveals some of the challenges and successes of design-based research. The 2016 field school, *Co-creating with Animals*, examined the role that animals play in shaping the current and future landscape at multiple scales, from puddles to forests. The field school and a preparatory seminar asked students to consider both animals and landscape architects as form makers, place makers and ecosystem engineers; and to question their role and capacity as design collaborators with other organisms. Through iterative critical mapping, schematic design, prototype construction and design installation, students tested the potential of designing as a research method.

The programme had three goals: to engage landscape architects in the large discourse around non-human worlds; to build knowledge through material engagement, or performance; and to merge research and design practices in a hybrid praxis.

Design engagement in a more-than-human world

The first goal, engaging landscape architecture in the discourse on non-human worlds, framed the overall inquiry for the student work, as we sought to forge a way of designing *with* animals rather than *for* animals, which is the current norm in the discipline. Tactically, we used a deep engagement with real animals (Hinchliffe et al, 2005; Johnston, 2008), not one where a pre-existing notion of an animal presages a design project. Rather than prescribing solutions at a distance, the design project and the animal knowledge built each other over time, something that can only happen through fieldwork. Students accustomed to studio work, to mapping and remote site analysis, would need to learn new engagements and new ways of sensing (Hinchliffe et al, 2005).

Philosophically, we sought to shift our way of thinking about animals from one where animals are perceived as 'other', strange to the human experience and vice versa (Berger, 1980; Derrida and Wills, 2002; Ingold, 1994), and perceived as without agency in the creation of the landscape (Low, 2011). Drawing on extensive work in animal geographies (Hinchliffe et al, 2005; Ingold, 1994; Johnston, 2008; Wolch, 2002), students framed their design research as a way to 'journey across the species divide' (Wolch and Emel, 1995, p 632), understanding the co-constructed quality of environments, viewing landscape as an emerging expression of mutualistic relationships, and knowing animals as active and perhaps more-than-equal partners in the ongoing emergence of places.

Normative landscape architecture practice still views animals as clients for whom we design. That design may take such forms as ecologically accurate and stimulating zoo enclosures, habitat restoration and connectivity projects, safe highway crossings or national parks to serve as refuge.

Several designers have explored the idea that their artful projects could provide critical habitat for vulnerable species (Fritz Haeg, Animal Estates, 2008; Jamie Hutchinson, Bee Station, 2011). Many of these projects have serious questions behind them: can design raise awareness of threatened species, increase understanding of the animals' needs and provide habitat for them in hostile environments? Yet many others are speculative works without the backing of an explicit research question or method. Designer Geoff Manaugh (2011) has explored possibilities for 'architectural ecology' research projects: do ornamental details from particular eras attract certain species of birds, and does their guano create unique ecotypes within those buildings? Projecting forward, could buildings be designed to foster the emergence of an ecosystem? Moreover, he has speculated on the use of animals as 'biological 3D printheads', with unbuilt projects guiding bees or silkworms to create objects or enclosures.

These speculations raise questions for material science and product design research about the possibility of material engineering using animals, genetically altered or otherwise (Manaugh and Becker, 2014). Perhaps the most robust current work in this realm is that of Natalie Jeremijenko, who has studied artful monitoring and the notion of cross-species communication in projects such as Bat Billboard (2011) and Amphibious Architecture (2009). Many of her projects provide ways that animals can 'speak' to humans, trying to break beyond Alice's observation in *Through the Looking Glass*:

> It is a very inconvenient habit of kittens ... that, whatever you say to them, they *always* purr. 'If they would only purr for "yes", and mew for "no", or any rule of that sort,' she had said, 'so that one could keep up a conversation! But how *can* you talk with a person if they *always* say the same thing?' (Carroll, 1871, p 269)

These works show the power of design speculation to reframe the discourse and the sense of possibility in an emerging inquiry.

Seminar

A multidisciplinary spring seminar prepared students for the summer field school by refining the inquiry and problem of designing for the non-human world. A three-part methodology over the term would be compressed into a much shorter timeframe once we landed in Pennsylvania. Students selected an animal for study, prepared two critical maps about the animal and devised speculative design-based research experiments. The seminar collaborated with scientists, and water resource engineers, terrestrial ecologists, conservation biologists and foresters introduced design students to biological and ecological field research methods and critiqued early iterations of the students' speculations.

Students prepared two critical maps, drawing on the rich literature of the agency of cartography (Corner, 1999; Crampton, 2009; Harley, 1988; Wood and Fels, 2008). Mapping, James Corner reminds us, is a project of 'creating and building the world as much as measuring and describing it' (Corner, 1999, p 213). Maps are simultaneously what is – specifically the physical world – and what is not, namely an ideological ordering of that world. They have power and agency; the author of a map exerts power by constructing our understanding of the world. Critical mapping explicitly engages this power structure, asking students to

critically construe and construct the world. The maps, rather than re-presenting an existing condition, act as a mode of experimentation, of calling a reality into being. If maps are constructions of an ideology (Wood and Fels, 2008), the goal of the seminar was to construct an ideology of equal agency with an animal.

The first critical map detailed the animal's umwelt, what we think we know about its own perception and conception of its world. These maps documented the animal's modes of perception, whether through sight, scent or magnetic orientation; its primary concerns and needs for food, migration, reproduction and shelter; how those concerns play out over the landscape and through time; and how the animal shapes its environment to better suit its needs. The second critical map documented human cultural demands on the animal and how those demands create unintended consequences and conflicts. Damming rivers for hydroelectricity, for example, impacts on the nutrient cycle of Pacific Northwest forests, as salmon returning upstream to spawn and die bring nutrients from the ocean to the headwaters of streams, and predators distribute carcasses, along with nutrients, to the surrounding forests (figure 1). Students used the two maps to identify both their research problems and their design concepts to investigate those problems.

The final project in the seminar was to propose a speculative design based on the critical mapping work. Students were asked to design either a monitoring station or an artwork co-created with the animal. The former option is an exploration of design through researching, where data collection on the environmental actions of an animal is conducted artfully, in a way that is legible to site visitors and could provoke aesthetic, ethical and intellectual engagement. The latter option is research through designing, where the design process is the research method. Because the seminar set no constraints on the animal studied or the topics explored in the final design, the speculations were often unattainable within the constraints of a one-month field school: they were too large, too long-term, too expensive to construct. With reviews from designers, restoration ecologists and conservation biologists, we narrowed the scope of the projects from large spatial scales, or multi-year research projects tracking ecological change, to projects that could yield results in a single month. Based on the viability of the projects, we entered the field school with a narrowed set of concerns and a clarified set of possibilities.

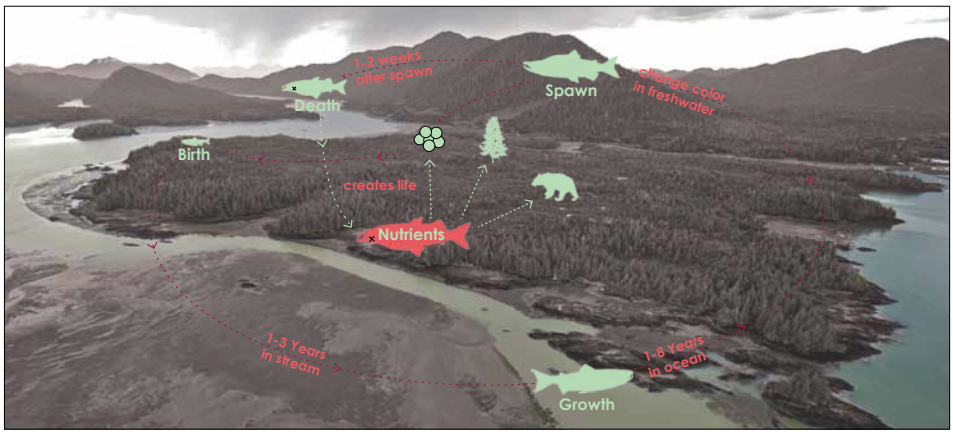


Figure 1: Critical mapping from the seminar showing the migratory movement of salmon. (Image: Margo Barajas.)

Field school

The field school reiterated the mapping and design methods, and added prototyping and installation of built works that investigated questions of either the animal or our relationship with it. Students used critical mapping to understand the animal and our cultural demands on it; design visualisation to posit the research question and method; and prototypes and experimentation to refine and revise the question and method as new information emerged through interactions with the site and animals.

The fieldwork, with its prototypes and installations, was grounded in design and art practice and drew on mixed research methods from dwelling-inspired animal geography (Finnegan, 2002; Ingold, 2000; Johnston, 2008; Lorimer, 2006; Shapiro, 1997; Wylie, 2003). This design-based research was iterative: students prototyped data collection tactics, deployed them, refined their study question and revised the prototype design multiple times over the summer. This process drew on practice theory, especially de Certeau's (2011) recognition that when we seek to understand the world, we cannot passively use an autonomous method, but instead we are active agents, 'unrecognised producers' of the very world we seek to understand. The work was 'improvisatory, situated, and, importantly, embodied' (Waterton, 2003, p 114). Recognising that we build our mental world as improvisations, as situations specific to the moment and participant, the field school intentionally sought to collect embedded and experiential evidence (Bourdieu, 1977; de Certeau, 2011; Hinchliffe et al, 2005).

This inquiry ended with the creation of eight student-designed, site-specific art installations that were co-created over time with the animal as collaborator, and that set a framework for monitoring the animal. The design work was only possible thanks to collaboration with a large group of experts, most notably ecologists and biologists from State University of New York College of Environmental Science and Forestry (SUNY-ESF), under the guidance of Dr James Gibbs. Dr Gibbs has led teams of biology students on bio-blitzes of the field school property, documenting the variety of mammals, birds, fish, insects, amphibians and reptiles on site. The work of his students helped the University of Oregon design students narrow their focus, selecting animals for study that would be plentiful during the summer and would be likely to cooperate with intrusive designers. Dr Gibbs critiqued initial propositions and design prototypes, grounding the speculative work of the students in the tested practices of field biology.

Field school experiments

In the field school, students' research questions, which co-evolved with the prototypes, fell into three categories – study, collaborate and reveal – which correspond to three installation types.

Many students found some aspect of the animal or its behaviour that they wanted to *study* further. These projects drew on the seminar's design installation proposition of artful monitoring of animal activity in the landscape. Here students would ask a research question about the animal, set up a monitoring process and design the experiment – the monitoring process or station, or the results after the fieldwork – as a work of site-specific art that would persist as an aesthetic and revealing element in the landscape.

A second inquiry was to *collaborate* with an animal's environmental alterations to improve ecological structure or function. These projects used the seminar's second proposition of co-creating artworks, in which students either used the actions of the animal as a starting point for their own artistic interpretation or created a framework for the animal's activity, resulting in the animal creating an art object or land art installation over time.

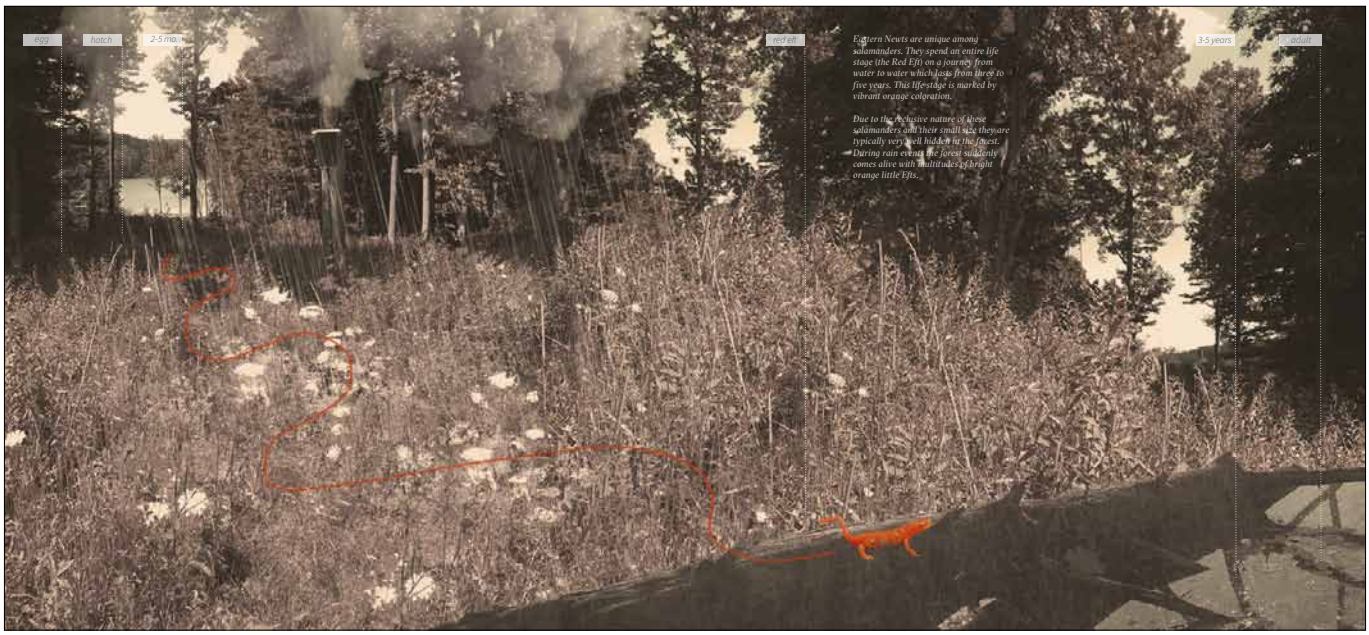
In the third inquiry, students sought to *reveal* significant aspects of the animal or its behaviour through an act of design. Typically they used a hybrid design method, combining co-creation and monitoring.

Study: Artful monitoring of animals

The first design tactic was to understand the actions of animals in creating their environments and design monitoring stations. One function of these stations was to track the animal's interventions and alterations of the environment. In addition, they were to form an aesthetic moment in the landscape, engaging visitors with the artwork and creating an opportunity for education, exploration and discourse. Students worked with several local animals, including monitoring deer as they browsed and the impact of an exclosure fence, and creating gardens to draw groundhogs away from the farm fields and monitor their preferred foods throughout the year (figure 2).

In *3 Newts: 180 Minutes*, Justin Kau monitored the movement of red efts, the terrestrial life stage of the eastern newt. During the red eft phase, the middle stage of its transformation from aquatic larva to terrestrial eft to aquatic adult, the salamander undertakes a three- to five-year overland journey from water body to water body. In the terrestrial phase, the salamander is a brilliant red-orange, spotted with ringed, dark-red spots, a warning colour to predators indicating that the salamander is toxic. Using magnetic orientation, the newt moves from one water body to another, in this way dispersing genetic material between communities (figure 3). The salamanders are small, reclusive and rarely seen. Yet when a rainstorm occurs, suddenly the forest comes alive with dozens of bright-orange efts, their colour a striking contrast to the browns and greens of the forest floor. In monitoring their activity, Kau recorded their movement and

Figure 2: Monitoring forest growth inside and outside a deer exclosure fence. (Project: John Maxson. Image: Justin Kau.)



range in the forest, and then marked those locations with orange stone lines to preserve them for future visitors. He sought to develop a way of monitoring the number and range of efts in a given population over a given period, while also creating a landscape installation that would permanently mark the ephemeral presence of the eft.

Tracking the efts was a time-consuming process. Early prototypes for tracking devices included non-toxic, phosphorescent paint powder that the efts would walk through, leaving a trace in the forest visible under black light, and several iterations of spools or vests that would unwind thread as the eft wandered (figure 4). Both proved more difficult than simply watching the animals, who move rather slowly, and marking their paths in the forest with survey flags. Kau was able to observe a dozen efts for the three-hour period, and mark their movement across the forest floor (figure 5). For a typical ecological monitoring project, this would have been the data collection phase, and could be repeated as needed to track several efts over a desired period, or the movement of a generation of efts from one water body to another. As a designer, Kau was interested in revealing the secret life of the forest to later visitors, exposing the presence of animals usually hidden beneath leaves and logs. The small stone walls record the progress of three efts over a three-hour period, and hint at the presence of animals moving over roots and under outcrops, invisible on most days (figure 6).

Figure 3: 3 Newts: 180 Minutes *prototyped a method of monitoring the movement of red efts on their movement from one water body to another. (Image: Jill Stone, based on image by Justin Kau.)*

Collaborate: Co-created artworks

A second design tactic was to understand the environmental actions of an animal and design a way of co-creating artworks with it. In one mode, the artist acts first, creating a framework to guide the animal, and the animal creates along that initial structure in an unpredictable way. In the reverse mode, the animal acts first in its quotidian life and the artist responds to the animal's activity, using it as a framework for artistic creation. Students explored using movable electric fences to guide pigs to clear thoughtfully designed paths, leaving materials such

Figure 4: Early prototypes of vests for newts and spools of threads, to unwind as the animal moves through the forest. (Project: Justin Kau. Image: Author's own.)

Figure 5: Marking the movement of the newts by hand proved easier and more time effective than paint or thread methods. (Project: Justin Kau. Image: Author's own.)

as stone or metal around caddis fly larvae to encourage them to incorporate those elements into their shell construction, and building structures to guide spiders as they spun their webs.

These pieces tended to be less about incorporating field research within landscape design and more about using the work of biologists and ecologists to inform the work of landscape architects, and to design installations that use the activity of animals to complete the work. With the short timeframe of the field school, these tended to be small-scale and speculative, prototyping and testing the concept of co-creating with animals. In a longer timeframe, these could themselves be speculative research stations, asking design-based questions. Can we subcontract invasive plant clearing to pigs? Can we subcontract replanting forests to squirrels? How effective are pigs in restoring microtopography for wetland restoration?

In Transition, by Rachel Spencer and Jillian Stone, monitors the shifting maple-ash forest of northeastern Pennsylvania. It co-creates striking forest paintings with the emerald ash borer, while harnessing the power of the eastern grey squirrel into forest reclamation and monitoring their progress over time. Contemporary maple-ash associations in the region are largely successional forests that have grown in since farming operations ceased. The forest at the field school, for example, moved in rapidly to reclaim the land after grazing or haying ended in the mid-twentieth century. More recently, the emerald ash borer has also arrived in the region; the insect bores into the tree to lay its eggs, and the larvae move through the tree, feeding on the inner bark. Eventually, the infestation will girdle the tree, preventing the inner bark from distributing nutrients, and the tree dies. Given that approximately 70 per cent of northeastern Pennsylvania's forests are ash, the region faces a devastating loss, along with an opportunity for a new ecological chapter for the forest (figure 7). *In Transition* looks both backwards and forwards, simultaneously revealing the forest's history and proposing its future. The work co-creates with the ash borer, revealing the trails of the borer beneath

Figure 6: Small orange walls mark the traces of three newts; their colour is a reminder of the bright colouration of the newts in the eft phase. (Project and image: Justin Kau.)

Figure 7: In Transition *inserts itself into the continual emergence of the forest, from ruderal plants colonising abandoned farm fields to ash stand die-off, and speculates on a future forest condition. (Project: Rachel Spencer and Jill Stone. Infographic: Jill Stone.)*

the masking bark and marking the act that killed the tree. Opposite, a squirrel feeder holds seeds of cherries, hickory, basswood and other native trees, with the intent that squirrels will cache the seeds for the winter, planting seeds that can grow, thrive and change the shape of our forests once again (figures 8 and 9).

In a project from a previous year, when the field school was studying forestry as a design practice, Patty Hines' *Preview* studied the potential impact of the ash borer on the forest and marked the future devastation the insect was likely to cause (figure 10). At that time, the borer had not been observed in the ash-dominated forests at Overlook. The arrival of the borer and the consequent death of the ash trees would dramatically alter the landscape, eradicating the ash and opening large swaths of forest to new species of animals and plants. Hines designed a simple black band across the ash trees, arranging it to converge from two vantage points into a linear void across the forest. The black armbands, signs of mourning, marked the high volume of ash in the forest, highlighting the vulnerability of the forest to the borer's assault, and the potential void the insect would create. Three years later, with the arrival of the borer confirmed and the ash trees beginning to die, *In Transition* reveals the process of destruction and projects the next stage of the forest, working with the local fauna to replant a diverse, robust community. Students in the next year's field school will survey the forest around the installation, marking seedlings that have emerged in the area around the dead ash stand. By expanding the temporal frame from a single month to multiple years, we can return to determine the utility of subcontracting squirrels for forest restoration planting.

Figure 8: In Transition *uses the ash tree to simultaneously look backwards and project forward. One side reveals the traces of the ash borer that killed the tree; the other side holds seeds of the future forest, for distribution by the local squirrel population. (Project: Rachel Spencer and Jill Stone. Image: Justin Kau.)*

Reveal: Hybrid experiments

Several projects blurred the line between artful monitoring and co-creating. Students created human-scaled, illuminated kaleidoscopes, drawing nocturnal insects into both an observation station and a performance. A geometric garden drew a friendly groundhog away from the crop fields of the farm, providing an opportunity to observe the animal's eating habits and preferences. An additional opportunity to emerge, as artist Robert Smithson sought, was to work with the entropy of a groundhog's browsing, slowly shifting a highly regular vegetal display into a homogenous pattern over time.

Jamie Willeke was inspired by the impact earthworms have on soil structure and composition. Ingesting, processing and expelling organic materials, they change the nutrient composition of the soil and create space for oxygen and water to travel through the soil. But these processes occur underground and remain largely

Figure 9 (left): Prototypes for revealing the ash borer trails in ash snags. (Project: Rachel Spencer and Jill Stone. Image: Author's own.)

Figure 10 (right): Preview *highlighted the dominance of ash in the forest and framed the destruction that ash borers would bring. (Project: Patty Hines. Image: Author's own.)*

invisible to most. In *Earthworks Exposed*, Willeke worked with earthworms to reveal their tunnelling patterns as they travel through the soil. After testing several techniques focused on their actual tunnelling – casting tunnels in plaster and wax, among other media – Willeke turned to the centuries-old technique of cyanotypes and directed the earthworms' movement across glass plates, replicating rather than exposing their underground movement (figures 11 and 12). Like Kau's walls, Willeke's cyanotypes reveal the hidden actions of the animals around us, opening discursive space for designers and viewers of the artworks.

Developing a hybrid praxis of research and design practices

> To think more realistically about the world, we should acknowledge the power of nonhuman agency … But most people, including experts, are so reluctant to recognise nonhuman influence that animal agency is regularly attributed to people. (Low, 2011, pp 122–23)

The student work from the field school tested two ideas: the possibility of collaborating with animals in creating the landscapes we share; and the process of collaborating with biologists and ecologists, integrating scientific field research within an artful, critical practice of landscape architecture and vice versa. The work was intended as a series of prototypes to test both collaborations and to form a foundation for future work. The prototypes and installations reveal two broad realms of lessons for future work: emphasising the impact of hybrid methodologies; and revealing ongoing gaps in landscape architecture discourse related to animal agency and the more-than-human landscape.

Hybrid methods

While the short, one-month duration of the field school limits the possibility of deep research, the methods used provide models for hybrid praxis. The work at the field school highlighted how art and science are never far removed. While collaborating with ecologists and biologists, the landscape architecture students were frequently inspired by the beauty and emotional impact latent in many scientific field methods. As Dr Gibbs showed tactics for monitoring different species of animals, the students rapidly transformed the images into floating islands, hanging gardens or site-specific sculptures, drawn and watercoloured in

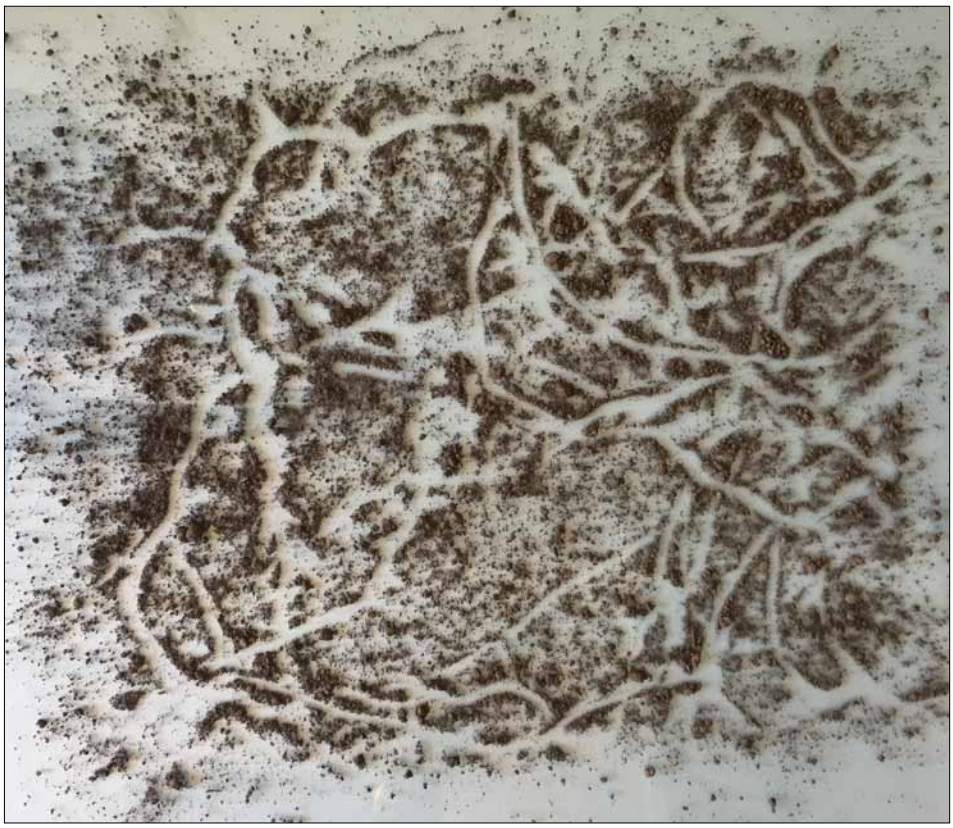


Figure 11: Glass plates prepared for exposure. (Project: Jamie Willeke. Image: Author's own.)

their sketchbooks. Images of Dr Gibbs' students completing a three-day bio-blitz at the field school site inspired the landscape architecture students to reimagine the observation and documentation process as performance.

The combination of art practice and field research practice allowed two developments. First, the use of ecological and biological field tactics in design made the practice of design 'strange' to the students, as often occurs when using another discipline's methodology. When our own method is strange to us, we can interrogate our own practice as we interrogate the new practice (Waterton, 2003, p 115). This 'naïve experimentation' can reveal aspects an expert takes for granted and can also provide a fresh perspective on one's own assumptions (Waterton, 2003, p 124).

Second, as the students gradually developed the requisite skills for scientific fieldwork, they also became sensitive to the animals themselves – to their lived experience, their phenomenological world (Hinchliffe et al, 2005; Ingold, 2000). Understanding the lived experience of the animal, even for a brief encounter, enabled the possibility of far richer art practices to be imagined than would have been possible without the hybrid praxis of research through designing.

Conclusion: More than human

As a discipline, landscape architecture is still far from fully integrating animals as collaborators within a landscape design process. Expanding animal agency in landscape architectural research and design has clear value. It is a direction that has been called for at least since Aldo Leopold (1949) described the land ethic as enlarging 'the boundaries of the community to include soils, water, plants and animals, or collectively: the land' and redefined our role in that community 'from

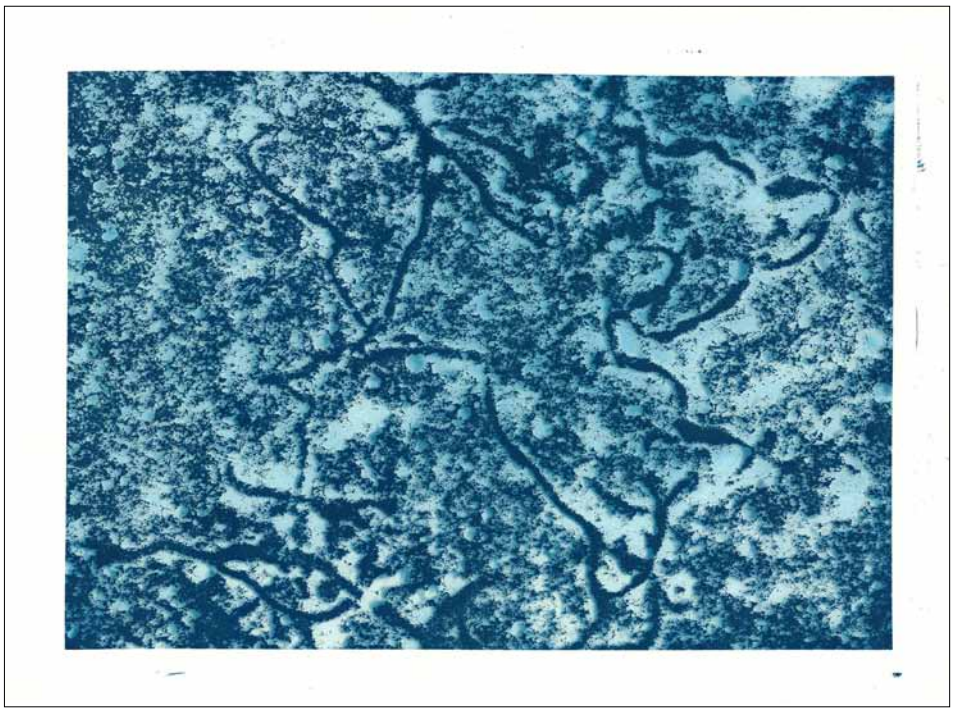


Figure 12: Earthworks Exposed *reveals the tunnelling patterns of worms as they travel through the soil. (Project and image: Jamie Willeke.)*

conqueror of the land-community to plain member and citizen of it' (p 204). By taking non-humans seriously as members of and agents in a co-created landscape, we enable a nuanced understanding of our environment as 'interconnected phenomena, processes, and presence' (Lorimer, 2006, p 506) and as a web of mutualistic relationships on which we depend. This nuanced understanding can enable a more ethical expression of our position in that community, through the works of landscape architecture we design and build, so that the concept of co-design, from its current focus solely on human communities in current theory and practice in the discipline, expands to include co-designing with non-human communities as well (Jones, 2000; Lorimer, 2006; Matless et al, 2005; Wolch et al, 2003).

The student work engaged a way of designing – co-creating with animals – that has a long history in vernacular and agricultural practices, but fewer precedents in landscape architectural design practices. Humans have long worked with other animals, whether accidentally or intentionally; the often-told story that Boston's disorienting street system was not designed but rather overlaid onto cow paths is a humorous example. The projects of the Overlook Field School propose a conscious collaboration with animals and begin to develop another intentional design process and a mode of monitoring its success.

Acknowledgements

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NOTES

1 These four categories are a synthesis of ideas from several presentations at the American Society of Landscape Architects national conference in October, 2017, in which practising landscape architects, scholars and educators in landscape architecture explored the relationship between researching and designing within the discipline. These sessions included 'Endless questions: The heart of research' (C Dehlavi, J Cain, J Long, H Whitlow); 'Making research relevant and applicable: Three models for defining research in practice' (S Jacobs, L Elachi, E Schlickman); and 'The academy's disciplinary contribution: Research, cases, and connections' (B Cantrell, K Hill, E Meyer, T Way).

2 For more information on the Overlook Field School, see its website: http://fuller.uoregon.edu.

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Design Fieldwork: Reclaiming Affect and Experience as a Primary Locus of Design Knowledge and Expertise

BRETT MILLIGAN

This paper presents a series of design experiments that are used to introduce and prototype a form of research I call *design fieldwork*. Design fieldwork is a hybrid practice of fieldwork and design intervention in which each informs and is embedded in the other. This method builds knowledge and understanding of landscapes through immersive encounters, actively intervening in the landscape and observing the events and novelty that unfold. In each of the experiments, the designer's own sensing and affective physical body is foregrounded as a primary medium for exploratory research, either as prelude to design or as the design itself. Two claims are made based on this research. First, the aesthetic and performative experiences of the designer/researcher should be a primary concern in any design research method, as they are pivotal to how sites and landscapes are perceived and constructed, which in turn lead to qualitatively different research outcomes. Second, design fieldwork is positioned as an iterative technique of engaging landscapes that provides unique access to indeterminate formative processes, novelty and serendipity. This embodied exposure to landscapes' elastic range of becoming can serve as a productive counterpoint to highly conceptual, abstracted and overly determinate design methods in research, teaching and practice.

Brett Milligan is Professor of Landscape Architecture and Environmental Design, College of Agricultural and Environmental Sciences, UC Davis, 157 Hunt Hall, 1 Shields Avenue, UC Davis, Davis CA, 95616, USA.
Phone: +1–505-980-1761
Email: bmilligan@ucdavis.edu

KEY WORDS
Fieldwork
Design research
Affect
Aesthetics
Embodiment
Landscape emergence

A remarkable contemporary convention in landscape architectural design is that it is mostly performed within the interior of buildings, away from the medium it seeks to remake and manipulate. Design, research and teaching predominantly happen at desks, computer stations and studios. These activities are, as other critics have remarked, increasingly characterised by a paradoxical 'indoor aesthetic' (Dee, 2010). Other than a requisite 'site visit' or two, most site interpretation and design work occurs outside of the actual landscapes considered. In this manner, design research is literally action at a distance; action based on what is remotely, abstractly and conceptually perceived and acted on.

Another remarkable convention of landscape architecture is the manner in which we, as designers, conceptualise and project physical realities for *other* people and citizenry as routine design practice, yet largely fail to use and engage our own bodies as an affective and effective medium for design research.

This paper explores a counterpoint to highly conceptual and abstracted modes of design research. It provides a contrast to methods that rely on remote or sparse direct contact with actual landscapes. The work here focuses on the potential of a new term I am introducing and calling design fieldwork. Like it sounds, design fieldwork is a merger of fieldwork and design investigation, wherein each informs and is enmeshed with the other. It is fundamentally distinct from fieldwork or site analysis that seeks to passively or objectively construct geographic description of 'existing conditions'. Such avowedly unbiased or complete readings of landscapes

REFLECTION

are untenable, as description itself selectively constructs sites (Burns and Kahn, 2005). As a distinct method of research, design fieldwork embraces this active construction of sites and takes it further. It attempts to build experiential knowledge of landscapes through targeted interventions and engaging in the transformations that emerge.

I have come to define design fieldwork through a set of experimental trials that I detail here. However, these experiments were based on a set of theoretical concepts, as well as my own dissatisfaction with other modes of design research. Thus it would be incorrect and too linear to claim that the experiments have defined design fieldwork. Rather, the development of the approach has been recursive, with the experimental trials iteratively informing and evolving the methodology, and vice versa. In the following paragraphs, I lay out my definition of design fieldwork, supported by a body of existing scholarship. This definition is then illustrated and tested through a series of landscape experiments.

Design fieldwork, as I am defining it here, is a method of experiential learning in which affect – the relational capacity to act and to be acted on – provides informative encounters with a landscape's dynamic assembly. Encompassing the *forces and intensity of encounters* (Seigworth and Gregg, 2010), affect eludes clear distinctions between subjects and objects, because all participants in an encounter are influenced by one another's qualities and actions. Affect implicates an interrelationship among things; a mutuality of feedback within multiple-authored spatial milieus. In design fieldwork, this affectivity occurs between a designer and a landscape, with each influencing the other. How and what we are able to sense and perceive in these exchanges is the concern of aesthetics.

Through bodily immersion in a landscape, design fieldwork is an experiment in *affect-driven* aesthetics, or *affect trials* (Highmore, 2010). Affect and aesthetics are entwined terms, particularly if we reclaim the origins of aesthetics as the 'entire field of sensate perception', rather than its more limited contemporary association with fine art, stylistic concerns and moral betterment (ibid, p 121). Aesthetics encompasses the entire distribution of what is or is not made sensible – spatially, socially and politically (Rancière, 2004). It is 'concerned with material experiences, with the way the sensual world meets the sensate body, and with the affective forces generated in such meetings' (Highmore, 2010, p 121). As the entire range of what is sensible, aesthetics delimits, mediates and generates affect.

Recent scholarship in landscape architecture has attempted to reclaim a broader definition of aesthetics for what it can offer design and the study of landscapes specifically (Dee, 2010; Meyer, 2015; Moore, 2010; Reimer, 2010; Roncken et al, 2011). As theorist Beth Meyer states:

> Aesthetic experience occurs within an affective world that implicates bodies, objects, spaces, values, experiences and networks. A theory and practice of landscape affects and effects would recognize that encounters between people and places are exchanges of emotion, agency and energies. (Meyer, 2015, p 35)

For a theory of landscape affects, attributing agency is tricky. As a dynamic and mobile assembly of diverse materials and actors (Milligan, 2015a), agency within the landscape medium is confederate and distributed (Bennett, 2009). Within such assemblages, nothing truly acts alone. Co-creative and co-evolutionary

processes are the emergent basis for all landscapes (Milligan, 2015a). Even human bodies are not singular, controllable things. They too are multi-authored; dependent on colonies of bacteria to survive and on steady sustenance to think and moderate our moods (Bennett, 2009). What a human body is capable of changes in relationship to changing contexts. In Baruch Spinoza's often-quoted words, 'No one has yet determined what the body can do' (cited in Seigworth and Gregg, 2010, p 3). Given the magnitude of technological and environmental change since Spinoza's time, his statement is perhaps all the more poignant today.

With design fieldwork, I aim to reclaim aesthetics and experience as a primary locus of design knowledge and expertise. I take the absent, overlooked body of the designer and foreground it as a requisite intermediary in design research. As I position it, this research technique provides unique access to landscapes' elastic and affective range of becoming (Barnett, 2013) via embodied exposure to chance, co-creation, serendipity and emergence. In the text and images that follow, I present a collection of design experiments that prototyped and gave form to design fieldwork. In each of these trial grounds, I test how a designer's own sensing and affective physical body might be foregrounded as a tool for exploratory research and site-specific knowledge building, either as a more grounded prelude to design or as the design itself. Each experiment was driven by a research question that I sought to test and answer through direct and immersive encounters with actual landscapes.

My intent in presenting these experiments is to demonstrate the particular aesthetic knowledge and articulations of landscape that this mode of design investigation generates, so that they can be compared with design results produced by other research means. Broadly, my overarching research questions concern the following: How can design research operate outside the pervasive conventions and landscape abstractions of studio culture and its indoor aesthetics? What unique capacities can design fieldwork offer in terms of spatio-temporal experimentation and the 'relational construction of sites' (Burns and Kahn, 2005)? As an immersive and proactive approach to landscape, what unique experiences can design fieldwork provide in understanding, making and imagining processes of emergence, feedbacks, contingency and trajectories of development?

Inhabiting vacant lots

The sites for each design experiment are 'vacant lots' within the United States city of Portland, Oregon. These landscapes are just one example of numerous other landscape types that could be examined through design fieldwork, with each type affording different possibilities and experiences. The term 'vacant lot' is a misnomer in that vacant means empty; without content or occupants, or not in use. Such vacancy is an unachievable state within the open porosity of urban landscapes. In common parlance, 'vacant' refers more to a break in a site's officially designated use by its legal owner and operator. But it implies little about the unique spatial conditions such vacancy gives rise to. During the interim period while these landscapes are re-purposed or change ownership, their terrains absorb, diffuse and reflect the forces emanating from the more regimented and *productive* spaces surrounding them. Vacant lots are vague terrain (Doron, 2000, 2007; Solà-Morales, 1994). The moment they emerge as deprogrammed environments, they

are appropriated by vegetative, human and other actors seeking to colonise them. Exhibiting dynamic urban and sociopolitical ecologies, their functional ambiguity sets them apart from the otherwise orderly urban fabric.

The field experiments described below were designed to engage with these lots in order to better understand how they work as ambiguously programmed space. Their intent was to test and affect processes of landscape emergence by introducing new conditions. I embedded myself as one actor among many participating in their co-creation. The four experiments presented here proceed from the simple and small to those that were more ambitious and required sustained engagement, reflecting what was experientially and iteratively learnt (rather than a priori known) through successive trials.

Massaging normative protocols

Graffiti tags and their in-tandem paint cover-ups often blanket the walls of industrial districts; a territorial language expressed in paint. Painting over graffiti with a hand roller often leaves behind its own peculiar inscription (figure 1). It echoes the tag, but supplants it with something reminiscent of an abstract expressionist or Russian suprematist artwork.[1] At the same time, it is a clear indication of territorial suppression of the tagging; a no-tolerance protocol. My impression, from observing the pace and extent of this activity over several months, was that neither side was giving ground. The tagging and painting of walls were escalating. What were the boundaries and the rule set in which these activities were operating? My first intervention pursued this research question.

Echoing the painted patterns of the graffiti cover-up, I seeded symbols of 'turf' on the vacant lot adjacent to the walls where this was occurring, extending the territorial exchange to the ground plane in a palette of different materials (figure 2). I made cardboard stencils to quickly spread a coating of seeds in the abstract shapes of the cover-ups. This action was legally ambiguous. The lot had neither *no trespassing* signs or any fences around it and, as far as I could tell, dispersing grass seed was not and is not illegal. I timed the seeding to expected rainfall, sun exposure and favourable temperatures to try to optimise seed germination. Temporally, the tag itself wouldn't emerge while I was there or under my control. It had a time delay and depended on the work of the seeds to manifest.

The vegetated graffiti was intended as a spatial joke; a bending and transposing of protocols to call attention to the absurdity of the tagging skirmishes. And, as with any joke first performed, the audience's potential reaction to it was fully unknown; the audience being both the landscape and the people involved in the tagging. Would the grassy tag actually manifest, based on its biophysical interaction with that environment? If it did, how would other taggers, cover-up personnel and the land owner react?

Figure 1: Shapes and colour fields created by graffiti paint cover-ups, Portland, Oregon. (Photos: Author's own.)

Figure 2: Seeding, sprouting and development of graffiti grass, shaped to mimic cover-ups. (Photos: Author's own.)

Over several weeks the grass seed took hold and turned into patches of *reclaimed* or *borrowed turf*. Other than occasionally being run over by vehicles, the installation was left intact throughout the autumn and winter, seemingly ignored or respected, while the wall behind it was tagged and repainted over and over again. The grass tags were clearly outside of the turf war protocols, as it would have been easy to eradicate them.

The fact that the tag was not deliberately destroyed or responded to fostered a new set of questions that I chose not to actively pursue, as I became more interested in the behaviour of the ground tag itself. Of particular interest was how the patch of ryegrass became a register of other activity on the site, as revealed in the wear patterns of tyre tracks, footprints and things left behind (figure 3). This marking was being tagged and interacted with, just not deliberately or in code. This experience led me to a new research question: could vegetation be used as an in-situ mapping instrument; a survey of site activity more broadly? This question became the focus of the next experiment.

Figure 3: Fully developed grass tag with tyre tread marks. (Photo: Author's own.)

The map is the territory

To test the question for the second experiment, an evenly spaced grid of annual ryegrass was seeded on the gravelly surface of another vacant lot in a highly trafficked downtown area. The lines of this survey grid were laid out using bodily measurements, such as distances measured in paces and literal 'feet'. Like the previous test, this was also a drawing in and on the landscape itself. As a cartographic method, the living grid was grafted on to the site to reveal activity and forces via its presence, its effects and its erasure. It was there to record and participate in the creative and political 'practices of everyday life' (de Certeau, 1984). In this manner, the embedded map operated inversely from survey grids deployed in archaeological and scientific cartography (Crampton and Krygier, 2005), which spatially record what inhabited the past. In contrast, this vegetative grid sought to record and intervene in the emerging present and future of the landscape by operating performatively (Crampton, 2009). Rather than privileging a documentation of what things definitively are (ontology), the map engaged with how things become (ontogenesis) (Kitchin and Dodge, 2007) and how those becomings are mapped and messily known (Turnbull, 2003).

From the moment it was seeded, the grid emerged in direct relationship with the landscape (figure 4). For example, some of the grass seed became a source of food for local pigeons, which were observed in flocks pecking along the lines of the grid. Like the previous experiment, the grid was also dependent on rainfall to germinate and the material composition of the ground to grow and persist. As the grass sprouted, gaps in the grid lines revealed where the seedlings could not establish due to variations in the demolition rubble or other factors, such as compaction, trampling by pedestrian and vehicular traffic, excavation and other on-site activity.

The grid took three weeks to fully establish, after which it could be used to record the distribution of activities happening on the lot. This included placement of various personal artefacts that were left behind, such as sunglasses, clothing, magazines and handmade signs (most of which likely belonged to people living on the streets in the surrounding area). Spray paint markings were also imposed, designating forthcoming construction and excavation, and the destruction of the grid due to vehicular traffic. Like the tattered, 1:1 scale map of the territory described in Borges's (1998) 'On Exactitude in Science', the grid wore away in areas of heavier use (figure 5). Segments disappeared altogether as a result

Figure 4: Seeding and emergence of the 1:1 survey grid composed of ryegrass. (Photos: Author's own.)

Figure 5: Interactions and recordings within the survey grid, including pigeons, signs, paint markings, vehicles and excavation, which together incrementally erased the grid. (Photos: Author's own.)

of interaction with a multitude of things pressing on them. The democratic, even distribution of the grid gave way to a remnant hierarchy based on what was happening on the surface of the terrain. Where the drawn lines were not, something was going on.

This installation operated like a variant on William Whyte's (1980) *The Social Life of Small Urban Spaces* in its detailed and sustained observation of dynamic urban phenomena as a way to understand and interpret specific sites. It differed from Whyte's work in that: (1) it focused on a marginal, derelict space rather than one specifically programmed for public gathering; (2) it expanded *social* phenomena to encompass a larger affective assemblage than the human (Latour, 2005), which included pigeons, rain, concrete rubble and ryegrass; and (3) the work went beyond detached observation, directly affecting the terrain as a way to access and engage it.

The 1:1 vegetated grid probed the composition of the ground medium by observing if the grass would grow on it and testing how long it would persist under varied surface conditions. If well timed, it became clear that it is feasible to get grass seeds to germinate on the challenging ground of vacant lots. But keeping the seedlings alive in an often sterile and compacted medium is another matter. In the experiment described above, nearly all of the grass died within one to three months. But were there ways to extend and diversify the kinds of vegetation that could exist in these conditions? Could a successional scheme be developed for vacant lots that improved soil conditions? Could a planting scheme be designed in a manner that might add ecological and aesthetic diversity to the landscape? These were the questions driving the third intervention.

Crop circles

These planting and soil-conditioning concepts were tested at another lot. Two different growing mediums were available for experimentation: one area where buildings had been demolished several years earlier and a feral meadow had begun to develop in their place; and an adjacent area where asphalt had just been removed, exposing a fresh surface for colonisation (figure 6). This entire site was intended to become a public park but, due to a regional economic downturn, construction was indefinitely postponed.

As another unsolicited work (Bouman, 2008), multiple circular shapes seeded with different perennial grasses and forbs were implanted into these surfaces

Figure 6: Vacant lot for the crop circle test. In the foreground is the area where asphalt had just been removed. In the background is a weedier meadow that had established over several years. (Photo: Author's own.)

(figure 7). The 'crop circles' were intended as an interim use of the site; emerging as whimsical garden tropes while also functioning as ecological test plots (islands) that would interact with the open field of weeds and people spontaneously colonising the newly available ground.

In the more established meadow plot (where the removal of buildings had occurred several years earlier), the demolition medium was disturbed and tilled in circular shapes before being seeded with different plant species. Half of the circles were seeded with a horticultural cultivar of perennial ryegrass, which turned richly green. The other circles were seeded with 'native' meadow mixes of forbs and grasses that appeared tan to magenta as they emerged. The native meadow test plots withered soon after germination in the *foreign* medium. Circles of sunflowers were also tested, but were subject to predation by squirrels and birds and never established. The horticultural ryegrass proved far more adaptable to the urban rubble, and the weeds that introduced themselves via wind and other vectors proved to be the most resilient of all.

In the area of the lot where the asphalt had just been removed, a phased, successional seeding strategy was tested. Here all crop circles were heavily seeded with the same perennial ryegrass cultivar used in the other crop circles, but without tilling. Strategically timed to rainfall, temperature and adequate sun exposure, these formed a mosaic of thick, geometric turf carpets. These crop circles got a head start on the endemic 'weeds' that were just beginning to colonise the exposed ground. Inexpensive and readily available, the ryegrass was selected and deployed as a 'cover' crop to accelerate the production of soil, while also introducing

Figure 7: Crop circles implanted into the existing meadow. Left: Tilled circles that appeared just after seeding. Middle: Sprouted ryegrass circles. Right: Sprouted 'native' meadow mixes (foreground) and contrasting ryegrass circles (back left). (Photos: Author's own.)

culturally framed yet ambiguous garden figures to the scene. This introduced vegetation had to contend with the challenging growing medium as well as routine maintenance regimes that included mowing and herbicide spraying.

The ryegrass was able to quickly grow, persist for a season on the challenging terrain and then decompose, thus adding photosynthetically derived organic content both above and below ground. As the crops expired, they were easily reseeded again and again, depending on weather conditions, thus accelerating the soil development of the field through minimal means. This successional trial was occurring while the native ruderal plants were colonising the interstitial spaces as well as the crop circles, forming an interactive and competitive space between the 'introduced' species and the 'indigenous' weeds.

The circles alternated from green to brown to green again as seasons changed, as they were sprayed with herbicide or as they were reseeded again (figure 8). After this alternating pattern occurred multiple times, a new seeding regime in the form of rectangular shapes was implemented. These intersected with the crop circles, forming seeding palimpsests, or explicit successional Venn diagrams across the terrain. The crop rectangles were seeded with a custom blend of naturalised and horticultural meadow-like plants that were drought tolerant and known to have habitat value for birds and insect pollinators. Where the rectangular plots overlapped with the circles, organic content was greater and thus the seeds would encounter potentially better growing conditions (such as higher moisture retention and more compost and nutrient matter). These ground conditions could be compared with the non pre-treated areas through the geometrically overlapping shapes, allowing one to aesthetically engage and *read* the ecological processes occurring on the ground plane (Simus, 2008).

The crop circles operated as an urban socioecological design experiment (Felson et al, 2013). The horticultural strategy paralleled the approach of botanist Peter Del Tredici. In discussing the ecology and selection of urban vegetation, he states that:

Figure 8: Development, change and interactions of the crop circles on the newly exposed ground where asphalt had been removed. (Photos: Author's own.)

> ... the basic idea behind the cosmopolitan urban meadow is to select an assemblage of plants that will grow well on typical urban soil, create an aesthetically pleasing urban meadow on vacant land, and remain in place until a more permanent use for the land is developed. (Del Tredici, 2010, p 25)

The difference here is that I was attempting to rapidly alter the urban soil condition through the urban plants themselves. But the overall intent was the same: to engage aesthetics, function and novel ecologies on liminal surfaces found throughout cities.

I made one preliminary design drawing of this project (figure 9), which turned out to be the only drawing I made for any of these experiments. It was a phased, diagrammatic plan for future action, as well as a guess of what I thought might happen. It was purely conceptual and formalised a set of ideas and general forms that would be used. However, after drawing it, I made little use of it and did not precisely execute its specifications. From the time I physically marked and planted the actual circles, I was more interested in immersing myself in an unfolding of actions, indeterminate process and *taking-forms* (Massumi, 1998) in the landscape, which I approached through an iterative, exploratory process of doing, observing and recording. It was a pursuit of how 'gaining knowledge of how the stuff of landscape behaves physically' might lead to a 'more fluent aesthetic practice' (Dee, 2010, p 29). Similarly, in speaking about his work in experimental forestry, Roland Gustavsson (2009) remarked, 'One of the most effective ways to move from the pure collection of facts to an understanding of environment is to embody knowledge by studying living processes in the field' (p 32).

In all of the design fieldwork experiments described here, I found digital photography to be the most effective medium for documenting and recording the changing landscape. It was the only medium that could keep pace with the work and proved highly useful in indexing conditions and events across time. It is often implied, if not a standard mandate in contemporary landscape architecture, that 'designing means making drawings'.[2] This is largely taken for granted in the discipline, yet the experiment here suggests that perhaps it should not always be. Or, alternatively, a more expansive notion of *drawing the landscape* is needed.

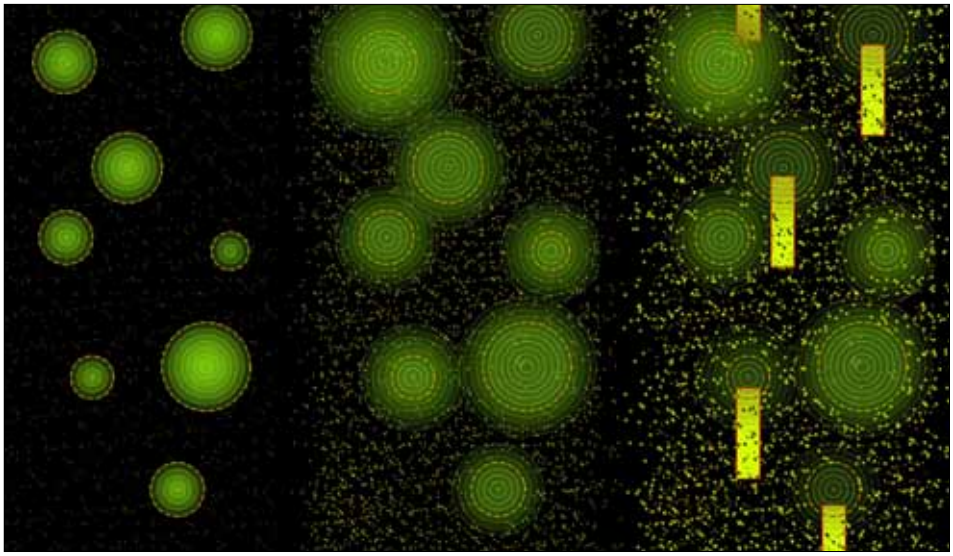

Figure 9: Seeding trials over time (left to right). Left: Initial seeding of crop circles on the vacant surface. Middle: Experimental plots expand or die back in response to the site. Disposable cover crops and failed seed mixes are reseeded while spontaneous ruderal species continue to expand across the field. Right: Crop rectangles were seeded with a custom blend of naturalised and horticultural meadow-like plants that were drought tolerant and known to have habitat value for birds and insect pollinators. These plots were placed to intersect with the circles and unmanipulated ground to test for differences in plant growth. (Image: Author's own.)

Clearly, digital and hand drawing, as commonly practised and taught, is integral to most design research and can effectively operate in a variety of ways. But it can also obscure, mislead or get in the way of other forms of design experience that it suppresses through its privileged status. The crop circles in this installation offer up a very different type of drawing; drawing not as primarily representation or conceptual projection, but as a transformative etching into the actual landscape medium; a marking that physically and materially changes things in direct response to the act.

The crop circles were akin to a *living machine* that was 'made of landscape features and driven by landscape processes'; co-evolving through 'interaction with physical, chemical and ecological processes' (Roncken et al, 2011, p 72) as well as social intervention. Unlike the previous two experiments, this one required ongoing inputs and stewardship to develop over a longer period, which might then self-sustain. It needed to be *gardened* (stealthily) in a manner that responded to emergent and unexpected phenomena. When I planted the seeds, I did not know how difficult it would be to hand-till the gravelly matrix. I did not know how different species would fare or how long the ryegrass would last before needing to be reseeded. I did not know or anticipate that maintenance crews would spray the circles with herbicides, ironically accelerating the succession process. I did not know how the local community would respond to the garden tropes, or that they would think local dog owners created the circles for the benefit of their pets. These behaviours and unfolding of events could not be effectively diagrammed, conceived or designed a priori. They had to be learnt in the process of doing and engaging.

Staring at goats

The three experiments described above all had a 'guerrilla' and legally ambiguous quality to them. They were unsolicited works; done without formally asking, similar to the actions of other colonisers of those sites. This last experiment instead sought to test a sanctioned and official approach to intervention – an approach that, however, it did not maintain.

This test was concerned primarily with how vacant lots are managed, particularly with regard to vegetation that spontaneously grows on them and the relationship these landscapes foster with the public. In this instance, the site was a 2-acre (0.8-hectare) vacant lot (covering two contiguous blocks) where years earlier its buildings had burnt down and the site had not been redeveloped (figure 10). It was enclosed by a chain-link fence that deterred trespassing.

From the fenced perimeter I could observe how plants and other species made effective use of lands like these. I photographed this dynamic meadow over several years and noticed that the only sign of sanctioned human activity occurred when it was periodically mowed to prevent it from looking unkempt or feral. However, to me the site always looked more unsightly – uglier – after it was clear cut, and the process of having the industrial-scaled mowers out there to trim it was loud, dusty, energy intensive and undesirable. Could this landscape be maintained differently? Could management activity of sites like this take on entirely different aesthetic qualities? Could it operate regeneratively, rather than deplete? Could it be pleasurable, an amenity rather than just a chore? If so, could the practice be memed, creating effects beyond the site?

Figure 10: The two-acre lot at Belmont Avenue. Former buildings on the site were destroyed by a fire. During the multi-year period before the site was redeveloped, a field of vegetation colonised the terrain. (Photos: Author's own.)

As a start, I determined who owned the parcel – a development corporation – and cold-called them. I asked if the owners had considered using goats to maintain their lot. One can imagine their first reaction, but I explained that goats and sheep had been successfully used in other urban areas (though under different conditions) and mentioned that the city's code allowed for the temporary use or presence of these animals without the need for special permits.[3] I also mentioned a suite of potential 'green' benefits the owners might reap from the practice, including reduced carbon emissions, decreased weed regeneration, soil amending, and their potential amenity value for the neighbourhood (Milligan, 2015b). Sceptical at first, the property owners generously agreed to a test trial on condition that I would shepherd the rented goats on site during the event. As researcher, this was precisely where I wanted to be in order to perform and oversee the experiment.

In the first trial, the herd of goats performed wonderfully in their self-directed work of eating the landscape (figure 11).[4] However, the maintenance function of the herd was eclipsed by its social aesthetics. The presence of the goats on the 2-acre urban savanna created a vibrant hub of activity far beyond expectations. It became a type of roadside attraction in which hundreds of people were observed getting out of their vehicles or stopping to watch, ask questions and just hang out; either on their own or socialising with other people (Milligan, 2015b).

Based on the success of the initial trial, the experiment was repeated several times, and with each trial the community it engaged seemed to deepen and expand. People around the city were coming to the lot as a social and recreational destination. The neighbourhood community took on increasing ownership of and investment in the herd, eventually introducing their own goats, play structures, basalt stone benches and supervised public entry to the lot through a gate they installed on their own volition (figure 12). Over successive stays by the goats, the basis of the experiment – the 'work' of cutting down weeds – affectively morphed into the vagaries of urban pleasure, recreation and sociability (ibid).

Figure 11: The cosmopolitan meadow: the Belmont field with a migratory herd of goats. (Photo: Author's own.)

During the many hours I spent in that field, I had conversations with probably more than 1,000 different people. From those discussions, I learnt far more about that particular landscape and its surrounding context than perhaps any *site analysis* I had performed in a commercial practice or academic capacity. It was only through accessing that landscape and initiating changes to it that those aggregated interactions could have happened. Similarly, one of the most memorable comments I heard several times from visitors and passersby was that before the goats had been brought on site, they literally didn't *see* or notice this 2-acre field, which was remarkable given that the lot was bounded by arterial streets and fully surrounded by occupied buildings. 'I drove by this site all the time and never noticed it.' For many, it was a conceptual and aesthetic void; an inaccessible space that didn't experientially register for them.

Introducing changes in activity and materiality to the terrain changed the 'distribution of the sensible' (Rancière, 2004); it changed what could be experienced and by whom. As read through Rancière, these *aesthetic practices* can be 'ways of doing and making' that change what can be experienced by a human urbanite or a *Capra aegagrus hircus,* the domestic goat with which we have co-evolved. This distribution defines the political dimension of aesthetics and affect as 'the sensible delimitation of what is common to the community, the forms of its visibility and of its organization' (ibid, p 18).

If we speak of access to aesthetic experience, then we are also implicating the presence or absence of relationships and exchanges engendering those experiences – what theorist Nicolas Bourriaud (2002) calls *relational aesthetics*. According to Bourriaud, relational aesthetics (and the participatory artworks he uses to define them) operate at *social interstices*, opening up new avenues of exchange that exceed or break the confines of normative habits and cultural restrictions. 'They actively produce a bundle of relations with the world, giving rise to other relations, and so on and so forth, ad infinitum' (ibid, p 22). In applying Bourriaud's theory to landscape architecture, Maria Hellström Reimer states that relational aesthetics are inherently *performative*. A *performative aesthetics*:

Figure 12: The Belmont goats project. (Photos: Author's own.)

> focuses on the establishment and exploration, through action, of a distributed field of reference … which activates the specific power dynamics and configurations of subjectivities that a certain situation presents … it works over time, through reiterations or contestations, repeatedly actualizing the relations, the tensions, or the field conditions of a historical or local setting. (Reimer, 2010, p 32)

For Reimer, the performative shifts aesthetic attention from objects to interactions, and from transcendent existence to immanent life (Reimer, 2010). Performativity foregrounds action, affect and agency.

Relational and performative aesthetics are easily applied to the unfolding of this particular project, which continues seven years after it began. In the first years of the project, the lot came to colloquially be called the 'Belmont goat field' by the networked communities that laid claim to it (with Belmont referring to an arterial street bordering it). The project has been written about, documented and televised over 40 times, including through numerous newspaper feature stories, appearances on news broadcasts, radio interviews, film documentaries and an appearance on the city's national television mockumentary series *Portlandia*. These narratives and meta-performances have carried the project beyond its immediate context, creating memes that have *aesthetically distributed* it into other regions and cities. Locally, as the project reached a critical mass of community engagement, I stepped aside and a group calling themselves 'the Belmont Goats' took over management and ownership of the goats and the project. They currently have over 2,600 Twitter followers.

Recall that the goats were only legally permitted to be on the landscape temporarily, which technically was a month or less. Over several years, our 'use' of the site became closer to permanent, with a herd of goats remaining on site year round. The city never made any mention of the legal issues. In fact, four years after the event started, when the land owners gave notice that they were going to redevelop the lot and thus the goats needed to move on, the Portland Development Commission, the city's urban renewal and economic development

agency, invited the Belmont goats to migrate to a lot on the outskirts of the city (Milligan, 2015b). Given the lot was in one of its zones that was struggling to manifest urban redevelopment, the commission hoped to use the aesthetic effects of this assemblage as a long-term catalyst in its urbanising strategy. A motley herd of goats was affecting official city planning.

Discussion

The four design fieldwork trials presented above were all sited on 'vacant' lands within a city. Each of them experimented with inserting new materials, forms, activities and protocols into an actual landscape, and then engaging with the empirical changes and novelty that emerged. All sites were affected in these trials, but in different ways, at different levels of engagement and for different durations.

Each experiment was driven by one or more research questions based on direct observations of site phenomena. Through the interventions, detailed information and processual data were acquired that answered all of these research questions and could lead to further testing and refinement of the inquiry. But more significantly, in all four experiments the emergent feedback generated by the interventions consistently and productively exceeded the bounds of the question on which it was based. This feedback revealed the narrow scope of the question when moving from conceptual space into the flexible multiplicity of real landscapes; consequently each intervention actually tested and engaged a multitude of things and relations beyond what had been conceived originally. Complex and malleable assemblies were brought into play that could not have been fully known, revealed or mobilised *until* the affective action was taken, which selectively brought that ensemble into being. For example, in the 1:1 vegetated survey grid, the changes in the intervention revealed existing material potentials and patterns as they unfolded through time. In other trials – the crop circles and the Belmont goats – a priori knowledge of what was there and what was going to be there was impossible, as the virtual assembly was not yet manifest and its potential to be was indeterminate.

In each of the four experiments, the imagining of the landscape's behavioural potential broadened as a result of direct physical intervention and sensing, rather than through distanced and highly mediated modes of conceptualisation, which characterise a great deal of contemporary landscape design research. These co-creative feedback loops are a distinguishing feature of design fieldwork that points to a two-fold generative capacity of the approach: the ability to reveal existing dynamic landscape assemblages (more than what a detached 'snapshot' observation typically reveals), as well as the ability to create new assemblages from within those same milieus. In this way, the method can be seen as exploratory and expansive rather than delimiting. The experiments facilitated a broader imagining of the landscape. Each coupling of intervention and fieldwork produced a plethora of new phenomena and posed more questions than it answered, which I contend is a result of accessing the generative plasticity of landscapes.

Given the exploratory nature of design fieldwork, it is most effective as an iterative approach, in which successive trials lead to a broader understanding of landscape's elastic range of potential and becoming. The four trials presented here are best reflected on as a single, comprehensive research project on vacant

urban lots. Through the succession of all four trials, I gained a much stronger sense of the qualities of these lands, how they vary from one context to another and the wide possibilities latent in their loose and feral programming. These sites were encountered as contingent and malleable, while also exhibiting clear propensities. As I progressed through these interventions, I became better at reading these places and more aesthetically attuned to possibilities to affect them. Over time, this iterative exploration and learning led to more sophisticated, affective and sustained interventions.

From a sociopolitical perspective, all of these field interventions tested non-normative thresholds. They explored the edge of legality and the blurry zone between sanctioned and unsanctioned behaviour. This is also atypical of much landscape architectural practice and research, which, as mentioned earlier, tends to project physical realities for *other* people through highly prescribed behavioural and programmatic conventions. The first three interventions described above were unsolicited works that were just within legal bounds. Only the Belmont goats project was conducted through official and solicited means. Yet that was also the only project to infringe on legal boundaries and planning codes – an unsanctioned model that was, paradoxically, then adopted by the city's official planning and development commission. Similarly, based on the crop circles project, I had conversations with the city's lead park ranger and other city personnel about developing a design framework to use excess construction fill from around the city to amend soil on select vacant lots; seeding that amended soil with customised annual and perennial seed mixes to create an ecological network of interim urban meadows. Happenings and coalitions such as these point to the transformative and activist potential of design fieldwork.

The experimental work presented in this paper has clear edges and limitations. Notably, (1) the method was only trialled in urban vacant lots and (2) the trials deployed a modest range of in-situ technology, which included horticultural techniques, animal husbandry, digital photography (as the main form of documentation), landscape ethnography and social media. Both of these factors suggest a variety of opportunities for further experimentation and refinement of design fieldwork methods. Any number of other landscape types and conditions could be trialled – like rising shorelines, disused public space and freeway rest stops – each revealing different potentials and limits. In addition, challenges and questions are posed in terms of scale jumping in these works – such as tactical adaptation to much larger sites or networks of sites. The Belmont goats project demonstrated the potential of operating in this way; as a networked meme performing far beyond the site. Even though design fieldwork operates at an intimate, humanised scale, it can simultaneously act more broadly, through tactical thinking about where to observe and intervene and how. Lastly, much opportunity remains to incorporate a wider range of sensing technology for on-site observations and intervention. Technologies such as environmental sensors could explore a more hybrid-like, cyborg version of design fieldwork that expands on what can be aesthetically sensed, monitored and affected within the landscape medium.

Conclusions

In presenting these design fieldwork experiments, my intent has been to demonstrate the unique capacities the approach can offer, so that it might be further pursued and contrasted with other modes of landscape design research. Different modes of research engage landscapes in qualitatively different ways, which produce markedly different perceptions and imaginings of the landscape medium itself. Given the ongoing expansion of methods used for design research due to new technologies and the expanding scope of the discipline, more methods are available to choose from now than in the past. Unfortunately, in the discipline of landscape architecture, this expansion of options seems to have brought about as much confusion as it has methodological advancement (Walliss and Rahmann, 2016). Thus a turn towards method can help to dispel such confusion and bring clarity to a diversifying discipline.

In closing, I wish to address the design capacities that design fieldwork potentially offers, as a way to address method more generally.

The findings of this research suggest that the qualitative relationship between designer and landscape should be foregrounded as a defining parameter of any design research approach. Often unconsidered, the nature of this relationship is foundational to how sites are perceived, engaged and constructed. In all variants of research, this is an experiential and affective relationship that can be qualitatively assessed, based on the clear differences of those experiences and what is derived from them.

Design fieldwork, as developed through the four documented experiments, emphasises direct, bodily immersion in the physical landscape medium, coupled with active manipulation of that medium to experience and understand its malleable qualities. This combination of being in the field while manipulating it provides distinctive access to emergent processes and phenomena within actual material, social, ecological and political milieus. Unlike laboratory settings, design fieldwork has no scaling, similitude and fidelity issues to contend with. The method reduces distancing – both geographical and technological – in favour of a less mediated and more interactive relationship with the terrain. This more direct relationship provides exposure to aggregate landscape feedback, forcing the designer to encounter novelty and the complex unfolding of events, based on actions taken. Working in the 1:1 open terrain in this manner, critical research questions centre on: (1) what is perceived and apprehended from complex embodied interactions with environments; (2) what phenomena are selectively acted on from those perceptions; (3) what the reasons and motivations are behind a researcher's choice to act in a particular way, and (4) to what effect; and, lastly, (5) if the method is iteratively practised (recommended), what kind of learning feedbacks are created – that is, how does one shift observational focus and tactical interventions based on what was observed? All of these research questions can be qualitatively explored, recorded and evaluated.

In this way, the techniques of design fieldwork distinctly cleave away from tendencies to overconceptualise landscapes through broad generalisations and abstractions. Instead, it presents affective situations to explore serendipity, happenstance, productive failures and processes of contingent co-creation.

Actual landscapes cannot be entirely scripted or predicted across time. In each of the experiments presented, what I could script were my own actions: seeding lines of grass, churning up circles of rubble and herding goats. What I could not script were the effects of these actions within an open medium. The more I worked in these urban lots, the more skill I acquired in stewarding trajectories of development and change within them. But I was not and never could be in full control of the experiments. Rather I was co-authoring them with a multitude, which broadened my sense and imagination of what the landscapes were capable of as dynamic assemblages. What the design fieldwork method lacks in terms of controlled experimentation, it gains in aggregate traction with temporal and messy reality.

Based on the trials presented, design fieldwork is claimed as an iterative method for understanding and affecting landscapes, in which the goal of the iteration is not necessarily to arrive at a singular or best solution. Rather the goal is to explore, affect and aesthetically sense landscape in its astonishing elasticity; to develop a sense of place, specificity and groundedness within a dynamic and contingent medium. This approach is radically different from how many students are taught to understand landscapes in remote relationship to design, and thus is a useful addition or counterpoint to highly conceptual 'indoor aesthetics' that are currently dominant. Akin to gardening, the more one physically engages in the experimentation and stewarding of in-situ design and management schemes – both failures and successes – the more one becomes confident of what is possible within a wide range of potential. The learning that occurs in design fieldwork jettisons the notion of landscape as passive object to move towards landscape as affective and co-creative milieu.

Acknowledgement

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NOTES

1 This unintentional patterning of the city is documented in Matt McCormick's short film *The Subconscious Art of Graffiti Removal* (2002). The film compares the unintended artistic results to postmodern minimalist art and Russian suprematism.

2 I am indebted to a colleague for saying these exact words while I was writing this manuscript.

3 Categorised as livestock under Portland's codes, goats are exempt from special provisions or permits, as long as their use or occupation of an urban site is temporary.

4 I recorded my findings as they were happening in a series of blog posts (Free Association Design: https://freeassociationdesign.wordpress.com/?s=staring+at+goats&submit=Search).

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Rural Sense: Value, Heritage, and Sensory Landscapes: Developing a Design-oriented Approach to Mapping for Healthier Landscapes

JUDITH VAN DER ELST, HEATHER RICHARDS-RISSETTO AND LILY DÍAZ-KOMMONEN

Landscape design needs a novel value system centred on human experience of the landscape rather than simply on economic value. Design-oriented research allows us to shift the focus from mechanistic paradigms towards new sense-making approaches that value both the sensual and the cognitive in human experience. To move in this direction, we investigate cultural and natural aspects of sensory experience in rural landscapes, arguing that: (1) rural (non-urban) regions offer diverse sensory experiences for optimising human health; and (2) spatial interconnectedness between rural and urban areas means that healthy rural regions are critical for urban development. Our key argument is that many rural landscapes contain intrinsically valuable traditional practices that create multisensory experiences with untapped benefits for human wellbeing, particularly in the auditory and olfactory realms, and thus a mapping system that accounts for sensory experience is required.

Judith van der Elst is an independent researcher, Molenstraat 25, Montfoort, The Netherlands.
Telephone: +31–06–2446–4076
Email: jvandere@icloud.com

Heather Richards-Rissetto is an Educator, Department of Anthropology and Center for Digital Research in the Humanities, University of Nebraska-Lincoln, 840 Oldfather Hall, Lincoln, Nebraska, USA.
Telephone: +1–402–318–2245
Email: richards-rissetto@unl.edu

Lily Díaz-Kommonen is an Educator, Department of Media, Miestentie 3, Aalto University, Espoo, Finland.
Telephone: +35–840–725–6925
Email: lily.diaz@aalto.fi

KEY WORDS
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In this paper we set out the need for a novel value system centred on human experience of the landscape rather than economic value. Using a design-oriented approach can allow for cultural and natural variables to be translated into strategies for more sustainable and healthy landscape design. Such an approach is radically different from the current strategy that incorporates 'nature as co-producer' within a neoliberal system in which ecosystem services are defined as novel sustainable values (Chan et al, 2016). We instead build on a current trend in geodesign as design for the future that is firmly rooted in an understanding of the history, or heritage, of current landscapes. We expand on this trend through a focus on multisensory aspects of the environment and embodied experience – that is, an approach that develops skills and methods for (renewed) attention to our surroundings and situational awareness (McCullough, 2013). A design-oriented approach therefore plays an important role by enabling new sensibilities to our surroundings through sensing technologies, interface and landscape design. In doing so, it considers senses as one of the most important sources of information and knowledge for human action and experience (Pickering, 2005).

Studies of the visual aspects of landscape and the visual–spatial structure of perception have identified shortcomings in commonly used spatial representation systems (for example, pictorial and schematic). In particular, they fail to incorporate cultural and cognitive diversity in present and past landscape experience, differing significantly from such experience in several spatial domains (Levinson, 2003; Mark et al, 2011; Palmer, 2015).

To counter these shortcomings, we focus on cultural and natural aspects of experience in rural landscapes, starting from the premise that: (1) select rural

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regions (where traditional practices are the norm) often best represent the diversity of sensory experience for optimising human health; and (2) healthy rural regions are critical for urban development because they are spatially interconnected with urban areas. In so doing, we draw on relatively recent ecological research in the auditory and olfactory domains (for example, ecoacoustics and chemical ecology) to support this direction of research. The challenge before us is both philosophical and technological, and the role of design is crucial to developing multisensory mapping systems in order to effectively bridge these domains to acquire new knowledge and applications.

Philosophical challenge

Although a detailed philosophical discussion on value theory is beyond the scope of this paper, a few remarks about 'landscape as human value' are necessary. Discourse on 'landscape as human value' centres on questions of what is good and whether something is of intrinsic or instrumental value. For instance, one can argue that money is instrumentally good, because it can lead to good things such as pleasure, knowledge and happiness (Schroeder, 2012), but that money itself has no intrinsic value. This example demonstrates that measuring value is problematic because the concept of value straddles the abstract and concrete. In environmental ethics – a field where discourse on 'human value of landscape' is at the forefront – the abstract and concrete are often conflated. Chan et al (2016) suggest that, rather than focusing on either intrinsic or instrumental values, the discussion of environmental protection can be reframed by introducing 'relational' values as a third class of values based on personal and collective views of wellbeing. In this paper, we take note of this idea, but are particularly concerned with how we can use design-oriented approaches and experiments to measure views of wellbeing and then, from that basis, design (or mediate) spaces and surroundings to incur feelings of wellbeing.

Environmental ethics propounds that wilderness, nature and healthy ecosystems have intrinsic value apart from their instrumental value as resources for humans (Leopold, 1949). Building on this idea, cognitive research has begun to focus on the intrinsic value of natural environments for humans, asking how nature contributes to happiness and wellbeing (Farina et al, 2007; Karjalainen et al, 2010; McCullough, 2013). Generally, these studies focus on visual perception – in other words, whether 'seeing green' makes us calmer, happier and the like (Arriaza et al, 2004; Grinde and Patil, 2009; Wilson, 1984). A smaller group of studies is concerned with sensory integration; among other activities, they assess the dominance of mode in perception when diverging stimuli are presented (Bolognini et al, 2007; Stein and Meredith, 1993; Yu et al, 2010). Building on the latter work, we contend that the visual sense constitutes only part of wellbeing and possibly functions as a proxy measurement (or index). By 'proxy' we mean that 'green environments' are likely to be associated with qualitatively good atmospheric conditions, including sounds and scents that benefit health; thus all sensory experience, rather than simply 'seeing green', directly affects human health. Therefore an important question when designing healthy environments is whether the sensory hierarchy in perception is trained or innate. In other words, is visual preference in assessing environment actually the result of cultural

conditioning? For instance, the erroneous assumption that humans have a poor sense of smell, based on a faulty nineteenth century idea (McGann, 2017), has led researchers to neglect smell as a valuable source of information for landscape design, particularly in relation to the potential health benefits of 'good' smells.

Our discussion of the environment is based on the premise that humans are part of and have always interacted with the environment (Favareau, 2010; Gibson, 1979; Pickering, 2005) and this condition warrants a contextual or embodied approach. We therefore follow the notion that the distinction between wilderness and human landscapes as separate categories is not informative, and it is better to investigate human impact and ecological dynamics on a continuous scale (Farina, 2018; Farina et al, 2002). In this way, rural regions (and urban areas) can be differentiated based on sensory attributes along a continuum rather than by categorising them in terms of presence versus absence. For instance, some rural regions may be characterised by small-scale agricultural activity interspersed with forested areas, whereas others are predominantly monocrop fields with related industrial activities, resulting in widely diverging environmental conditions. Yet for administrative purposes, rural areas are often identified as being the same based on population density or broadly defined land-use categories. Instead, it may be more appropriate (particularly in our case) to apply non-standard criteria such as soil condition, farm size, atmospheric conditions, soundscape and viewshed to more accurately define regions for landscape design purposes. In this paper, we suggest initially focusing on rural landscapes comprising small-scale activities and healthy ecosystems that can be measured by multiple senses (for example, Aaltonen et al, 2012; Farina, 2018).

Technological challenge

We propose that the presence of entities in the environment, such as chemical compounds, or acoustic communities comprising a diversity of life forms, such as plants with flowers that emit scents and birds that produce songs, can be regarded as signal data that are processed by the full range of the human sensorium. In addition, we argue that these phenomena can be quantitatively measured in landscapes through stationary and mobile (bio) sensors. These sensor units can be designed and programmed to mimic or (even) expand the human sensing range. Associated human health metrics (for example, blood pressure and heartbeat rate) and qualitative data (ordinal) on wellbeing (for example, ratings of 'happiness') can then be linked (synchronised) to environmental measuring systems.

A key issue, however, is the technological challenge involved in designing and implementing sensors to use in outdoor settings from which data can be gathered, integrated and gauged alongside these other metrics. We propose that, by carrying out experiments, we can begin to collect data to understand the notion of value of the landscape in novel ways and then move towards integrating other ways of valuing into landscape design. In this paper, we consider a healthy ecosystem: one that constitutes sensory signals and scenes that do not harm organisms inhabiting that ecosystem. This approach is based on recent innovative research primarily in the field of ecology focused on intra- and inter-species communication (Kull, 2010). For instance, sound pollution affects bird communication detrimentally, while increases in polluting gases

make semiochemical communication between plants and pollinating insects more difficult (Krause and Farina, 2016; Potera, 2008).

In addition, it is now recognised that these forms of sensory communication and patterns are much more important in maintaining human health and behaviour than previously thought. Examples include investigations in biochronology and biosemiotics (Aschoff, 1981; Glass, 2001; Pickering, 2005). It is thus of paramount importance to distinguish beneficial and neutral signals from harmful signals. To this end, theoretical and practical explorations of multisensory signals within a humanistic framework are initial steps toward the goal of developing a design methodology and associated sensing and representational system in support of maintaining and creating beneficial sensory scenes for (human) living.

Following an ecological approach that shifts away from the anthropocentric view of humans as the centre of the universe, we seek to design a system that can observe and document the 'Being-in-the world' of a diversity of entities and species in a diversity of landscapes. The system would not only record patterns of behaviour but also yield data that afford us what Krippendorff (2006) has labelled as second-order understanding (pp 66–70). That is, the data collected must document not only the scientists' point of view of the phenomena being observed but also a point of view inclusive of the different living entities under observation. Importantly, the approach must also factor in how every new device brought into an environment inserts its own conditions into the phenomenon under observation (for example, sensors have limited observation parameters restricted to set time intervals).

Integrating multisensory data in a system is challenging because representation is an embodied experience sentient beings apprehend in relational ways that current data-gathering techniques fail to document. In other words, none of the current data-gathering strategies is intrinsic to the phenomenon it seeks to represent; however, given that these strategies are objects of design, we can alter them to more 'accurately' collect and integrate diverse sensory data inputs. Table 1 describes some of the data-gathering strategies available to gather multisensory data.

However, ultimately the final disentanglement and interpretations of such data are left to individual scientists as observers situated outside the system under observation. Though it is a challenging task, we contend that by starting with individual steps, appropriately contextualised, we will move closer to the development of a value system to use in a mapping/representation system based on multisensory information and knowledge. Initially, we propose a multistage, iterative approach comprising six broad steps.

1. Conduct a literature review of technological and theoretical developments in sensory data collection, knowledge and integration.
2. Identify spatial structural differences in sensing sources.
3. Understand perceptual spatial structures.
4. Develop data collection methodologies.
5. Design sensors to accommodate new sensory data types.
6. Design, pilot and test the system's representational sensory integration and mapping capabilities.

Table 1: Spatial structures of sense and perception

	Human sensing organ	Spatial field of experience/ receptive field	Human perception/ spatial representation	Spatial components / spatial configuration
Visual	Eyes	About 180 h, 135 v degrees view angle; focal length	Higuchi (1983), viewshed; colour, texture	Source: Sun (fixed pattern), electromagnetic waves interact with matter/reflection, refraction/absorption
Auditory	Ears	360 degrees	Schafer (1994); Krause (1993) soundscape; pitch, loudness, frequency	Source: Variable. Mechanical waves (horizontal) interact with matter/topography; refraction etc
Olfactory	Nose	Immediate surrounding of sensor	Turin (1996), Kaiser (2006), chemosensation	Source: Variable, transported through mechanical waves; interact with other chemical compounds (diffusion)

While we summarise steps 1–3, the objective of this paper is to discuss some of the design-related strategies that would enable us to move toward our goal of constructing representational systems with explicit sensory integration allowing mapping variables and participatory design strategies that both are beneficial to landscape heritage and expand existing geodesign principles. We advocate that design is a fundamental part of an iterative process to acquire and analyse data on landscape knowledge and experience. As Binder et al (2011) argue, through participatory design, for example, it is possible to envision and understand use of the new tools as already being a part of the ongoing activities of experts as well as local community members. To explore an innovative perspective, we begin with a focus on methods that have not been widely employed due to: (1) the dominance of visual aspects in conventional mapping systems (Geographic Information System – GIS); (2) the assumed importance of the visual in human perception and experience; and (3) the difficulty of integrating multisensory information in current analytical and representation systems (Başdoğan and Bowen Loftin, 2009; Schafer, 1994).

Defining the problem with design thinking or design theory

In the domain of computer-mediated communications, digital cultural heritage (DCH) is a new field that has emerged as a result of the ubiquitous use of computer technologies in all areas of cultural production. Digital cultural heritage is concerned with the role(s) of technology in analysing, creating and communicating cultural heritage – including landscapes, which are fundamentally anthropogenic and culturally influenced. Ethnologist Dagny Stuedahl (2009), for example, has suggested that the use of new tools, such as virtual spaces and mobile media, promotes the emergence of new social groups and new forms of interaction and participation. The use of 3D digital reconstructions is an instance in which DCH

can help to bridge the gap between the past and present as well as provide a rich ground for research into notions such as human identity and interpretation. After all, heritage sites are often foci of multiple (and many times conflict-ridden) interactions through time with social and political implications. Because representations of DCH systems can be configured to process and display data from multiple and alternative perspectives, DCH systems can make an important contribution to society. Instead, however, cultural heritage in all its complexity and wealth is often bypassed in favour of banal and stereotyped representations.

In this context, most of the current heritage mapping and representation systems use a western approach that developed primarily out of a need to inventory land surface, not to understand and design experience. Over the last decades, technological advancements have enabled analysis at multiple scales; however, our ability to gain spatial knowledge through multiple senses is largely ignored, as developments have taken a single-mode (visual) perspective, instead of more inclusive multimodal approaches (Başdoğan and Bowen Loftin, 2009; Tak and Toet, 2013; among others). Landscapes encompass a wide range of sensory signals and stimuli that humans and other organisms can differentially sense, each through their unique sensorium. McCullough (2013) states that a sphere of information is embedded in our surroundings as augmented and mediated space yet, underneath, a layer of unmediated experience persists. But how much of this unmediated layer remains present today, or are human actions decreasing the sensory richness in our physical surroundings?

The concept of *Umwelt* provides a useful starting point to conceptualise the ambient sphere; since the early twentieth century, when von Uexküll defined it to identify subjective universes (Favareau, 2010), it has become a central idea in the foundation of the research field of biosemiotics. The related concept of semiosphere, introduced by Lotman (2000), then indicates the total sphere of meaning-making of two or more interacting *Umwelten*. Communication within and among organisms in the semiosphere is studied within biosemiotics, whereby signals that are introduced through technologies become part of but also transform the semiosphere, with effects that are currently not well known (Díaz, 2015).

Mapping the semiosphere – designing with the senses: A role for design in research

The sensorium is important because it is the seat of perception that integrates sensable stimuli, which means that the sensorium constitutes a primary source of (spatial) knowledge (BonJour, 2013). Even though the human sensorium draws its information through a standard set of human sensors such as eyes, ears and nose, focus and skill vary across individuals and cultures (Kress, 2010; Tanaka et al, 2010); humans experience differentially, and thus know the world differently. Many of these stimuli are not consciously apprehended yet still affect our health and wellbeing (Stansfeld and Matheson, 2003). As Mandler (2004) proposes, many times we do not consciously register 'what is impinging in our sensorium' (p 69), suggesting that the faculty of seeing is in itself somewhat subjective and subject to pliability through physical and cultural interactions with the environment.

In previous publications, we have theoretically addressed and practically explored humanistic approaches to anthropological, participatory and

community projects (underwater archaeology simulation, Sen et al, 2012; classroom of the future, Díaz and Partanen, 2010; collaboration between art, design and archaeology, Díaz and Kaipanen, 2002; Richards-Rissetto et al, 2012, 2013; van der Elst et al, 2006; van der Elst et al, 2010; van der Elst and Richards-Rissetto 2013). Through fieldwork and education, we have realised that, to enrich landscapes and cultural heritage, community perspectives must be integrated into larger decision-making processes that have traditionally involved only government, business, nongovernmental organisations and/or academia. To assist indigenous groups, communities and small stakeholders, we propose designing and developing spatial technologies in a way that can incorporate landscape value and knowledge systems that often deviate from an economic focus (instrumental value) and yet can significantly contribute to meeting the objectives of cultural and natural heritage management (intrinsic value).

According to research conducted at the Max Planck Institute, spatial thinking differs significantly across language groups (Levinson, 2003). Building on this research that challenges the idea that experience of the landscape is the same for all people (universal value), we take the perspective that spatial thinking, a fundamental cognitive domain, is a key factor in how humans differentially experience, conceptualise and design the world around them. Studies from sociology and ecology support this finding, arguing that unique constellations of sensory information underpin different knowledge systems (Krause, 1993; Kress, 2010). Prominent sociologist Gunther Kress (2010), for instance, argues that information gained from different senses and represented through different modes can overlap but does not coincide. The consequence is that humans acquire different knowledge by focusing on different sensory stimuli in their environment (see also Brier, 2008).

Yet a focus on the visual, as is customary (in western scientific systems), provides only a partial 'picture' for understanding human experience and the value of the landscape for human wellbeing. As Mandler (2010) has proposed, though spatial image schemas might provide ontogenetic foundations for the adult conceptual system, attentional mechanisms (such as sound and smell) also help to recode incoming information into so-called Experiential Gestalts (EGs). Individuals develop EGs – image-schemas or general-purpose interaction patterns and abstractions that influence reasoning throughout life because of perception and action (Fuchs, 2012). Given that these EGs emerge as a result of our embodied interaction with the environment, there is room to consider how they are susceptible to cultural and social influences such as language (Mandler, 2010).

Toward (designing) a multisensory value system for design

Step 1: Review technological and theoretical developments and human challenges

In 1962, cinematographer Morton Heilig patented the Sensorama Simulator,[1] a multimodal virtual representation system, and interestingly many of the technological and theoretical challenges he faced remain today. The area of virtual reality (VR) has continued to be of interest for heritage and landscape experience, but most VR emphasises the visual at the expense of other senses. However, museum institutions continue to pursue their foray into multimodal

designing and presenting multimedia experiences. As early as the year 2000, the exhibition *Easter in Carúpano Venezuela* held at the Helinä Rautavaara Museum in Espoo included smell experiences in an esoteric shop (Botánica) (figure 1). (Kotilainen, 2000) Also consider the recent award-winning Tate's London *Sensorium Exhibition* that brought aural, haptic and olfactory stimuli into the gallery for patrons to experience (Davis, 2015).[2]

While Başdoğan and Bowen Loftin (2009) note that technological developments in haptic, olfactory, gustatory and vestibular display systems can now supplement systems based on visual and auditory channels, they conclude that efforts to develop multimodal sensing systems, within or beyond the human sensing range, have been limited (Angelaki et al, 2009; Gallace et al, 2012; Stein and Meredith, 1993; Tak and Toet, 2013). Although not exhaustive, these sources indicate the gap in research and technological development in this direction. In addition, we confront the challenge of how to link these 'experiential data' with other sources of data that work in concert to create narratives. This means not only integrating the use of both quantitative and qualitative data but also including other voices, such as native informants who speak from a first-person autoethnographic perspective. Further, it means using participatory methods that afford possible reconstruction of both the phenomenon being observed and the observation viewpoints of entities that populate the landscapes in the study.

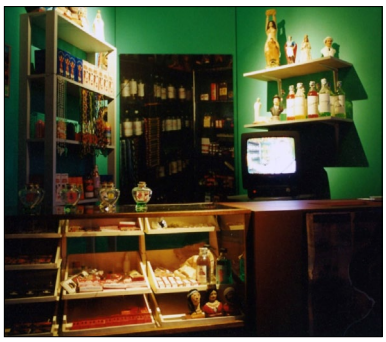

Figure 1: To the left are smell samples, allowing visitors to experience odours in this replica of an esoteric shop (Botánica) shown in the Easter in Carúpano Venezuela exhibition (Semana Santa en Carúpano, Venezuela – pääsiäinen Carupanossa Venezuelassa) *held from April–June 2000 at the Helinä Rautavaara Museum in Espoo, Finland. (Photo: Lily Díaz, 2000.)*

Step 2: Identify spatial structural differences in sensing sources

Differences in the physical structure of perception arise because the sense source (for example, sound or sun rays) and the relationships between source, path and sensor are different for each sensing mode (table 1). For instance, sound is transient, originating from variable sources (Pijanowski et al, 2011); even though sound patterns, such as bird songs in the morning, can be regular at a specific – sensing – place, they are never the same. While research is aiming to link sound spectrogram data to geographic location using GIS (ibid), as well as sound recordings to place (Kytö et al, 2012), current visually oriented analytic and representation systems do not adequately (if at all) incorporate acoustic data at a landscape scale because they do not account, or cannot adjust, for spatial structural differences in sensing sources.

Step 3: Understanding perceptual spatial structures (table 1)

The visual orientation of many representational systems stems from the idea that visual sense and perception evolved into the dominant sense for knowledge acquisition (Gillings and Goodrick, 1996; McGann, 2017). However, this notion is now being challenged. Recent research indicates that vision provides only partial knowledge of environmental conditions. In reality, cultural differences – particularly in relation to other (non-visual) senses and perceptual information – provide additional knowledge of and, in some cases, better indicators of environmental conditions (Krause, 1993). Yet we still need indices to evaluate these types of data.

In his landmark publication, *The Visual and Spatial Structure of Landscapes*, Tadaheko Higuchi (1983) outlines eight indices of visual perception of the landscape that can be assessed using GIS. Considering the differences in spatial structure of other sense experiences, we contend that his work can provide a

model for the design of geo-mapping systems that account for perceptual spatial thinking and integrate visual, spatial, auditory and olfactory elements (table 2). The goal of multisensory indices, for example, is to develop a different –namely non-Cartesian – spatial framework, based on shifting ontologies that view nature in a more complex way and acknowledging that bodily existence is essential in the process of cognition (Brier, 2008).

In short, steps 1–3 highlight that a major problem in the development of systems of representation, analysis and synthesis used in cultural heritage is that these systems do not include the diversity of human spatial experience and knowledge of landscapes, largely because they fail to consider how multiple senses contribute (Mark et al, 2011). Embodiment is a factor in the human process of acquiring data. Thus better insight into the sensory/perceptual foundation of different knowledge systems is needed to understand how sensory scenes are linked to heritage, human health and wellbeing and, more importantly, how the loss of sensory stimuli in the landscape will negatively impact the human condition in multiple ways (Kaiser, 2006; Tanaka et al, 2010). For example, biodiversity loss results in loss of sensory signals and, according to Gorenflo et al (2012), 'as the world grows less biologically diverse, it is becoming less linguistically and culturally diverse as well' (p 8032), even though the reasons for this co-occurrence are complex.

Designing a multisensory value system for landscape design

Steps 4–5: Develop data collection methodologies and sensor design

While the intrinsic value of urban environments is a current research topic in architecture (Deakin et al, 2007), urban living is always dependent on the rural region for its natural resources, meaning rural areas have instrumental value (Ward and Brown, 2009). From a contrasting perspective, we propose to investigate, reveal and highlight the intrinsic value of rural landscapes using

Table 2: Humanistic focus of sense data collection

	Technology environment signals	**Theory environment**	**Technology human sense**	**Theory human sense**
Visual	Remote sensing instruments, global coverage	Change detection, land surface/ processes (Farina, 2018)	Virtual environments – modelling in GIS	Biophilia
Auditory	Stationary sensors – microphones, varying frequency range	Changing soundscapes as early indicator of environmental change (Krause, 1993; Pijanowski et al, 2011) acoustic ecology	Virtual environments, acoustic space – recordings, world soundscape project (WSP)	Soundscape
Olfactory	Headspace technology	Localised, monitoring specific compounds and biodiversity loss (Kaiser, 2006)	Modelling in GIS of environmental data	Chemosensation

multisensory data collection. For example, an olfactory scene with flowers emitting semiochemicals that carry 'communicative' messages often intended to attract insects may in the future be shown to benefit humans in significant ways (Jacobs, 2012; Jacobs et al, 2015). Even though the impact of these chemosensory fields on human health still eludes scientists, research indicates that forest visits improve the human immune system, whereas a visit to the city does not (Karjalainen et al, 2010; Li, 2010). Another example is the auditory scene where 'pink' noise such as the sound of flowing water emitted by waterfalls relaxes us and assists sleep (Zhou et al, 2012). These examples just begin to illustrate the multisensory value of rural landscapes.

Even though soundscape analysis has taken off since the innovative research Murray Schafer sparked in the late 1970s (for example, Bregman, 1990; Farina et al, 2002, 2007; Krause, 1993), sensor design and methodologies in other modalities are still in the early stages. Sensor design for and analysis of the olfactory scene and semiochemical sphere are hindered by the ephemeral and localised nature of the data. Like acoustic ecology, chemical ecology is a relatively recent research field and has been defined as 'the promotion of an ecological understanding of the origin, function and significance of natural chemicals that mediate interactions within and between organisms' (Harborne, 2001, p 361). Yet sensors and systems development in the olfactory domain are limited to specialised research in biometeorology and chemical ecology (Aaltonen et al, 2012). The development we envision encompasses semiochemical sensors for close-range and olfactory scenes, ideally suited to a range of skills, from specialist to citizen science application. We have begun this effort recently in association with the Third International Conference on Code Biology in Urbino, Italy (www.codebiology.org/conferences/Urbino2016), which marked a jumping-off point for collaboration among art and science/design to develop such sensors and (embodied) methodologies to link communities of sound, odour and vision in the spatiotemporal domain.

Future direction: Rural sense – value, heritage and sensory landscapes

Step 6: Prototyping a design-oriented approach for mapping healthier landscapes

Designing with the senses is not a new idea, yet its development is probably hindered by the 'machine model' that has underpinned modern science from its inception. In the field of architecture, Juhani Pallasmaa and Peter Zumthor are both advocates of a sensory approach that can move us toward combined tangible and intangible experiences of landscape.

Since the time of industrialisation, the impact of new elements and compounds transforming our environments has intensified, adding a variety of stress factors that work against health and wellbeing, especially in urban settings (Stansfeld and Mathesen, 2003). Our sense organs may be ill equipped to sense and process these non-natural compounds. However, we propose a potential solution to this problem. *If we could gain insight into the diversity and richness of signals in the environment that fall within the human sensing range, we could develop a value system to integrate and account for the range of cultural and environmental sensory experiences that can promote health and wellbeing*.

To achieve this goal, we contend that initial data collection as 'mapping' should take place in rural regions with traditional subsistence and other practices rather than urban environments because impacts on traditional cultures are typically less obvious in rural areas (table 3). We must be aware that current threats to intangible heritage in rural regions will result in the loss of the sensory qualities underpinning those traditions just as rainforest loss leads to biodiversity loss.

We propose that signals in the environment that can be processed by the human sensorium (for example, sounds and scents) can be quantitatively measured – that is, mapped – through high-resolution sensing instruments and can be linked to human perceptual and biometric data. The challenge for designing data collection, analysis/synthesis and representation is to devise interfaces that can translate the different kinds of data, including environmental, physical and human experience, into a unified and holistic mapping system. At the same time, we need to remain aware of how 'interfacing activities' ultimately also contribute to an artificial transformation – an erasure of 'wilderness' so to speak – and rendering of the landscape into an artificial construct. We have identified three key challenges for this task, along with some initial steps to address them.

Challenge 1: Assessing environmental health, using appropriate indices.

Step to address it: Improve understanding of the correspondence and relationship between different sensory signals by developing integrated methods and targeted case studies in rural regions.

Challenge 2: Understanding the relationship between environmental conditions and the human experience of that environment.

Step to address it: Ecologists, anthropologists and system developers take a collaborative approach to sensory mapping, focused on interoperability and data exchange.

Table 3: Environmental and perceptual data

Data collection	**Environment**	**Bio/body sensor – mobile**	**Perceptual**
Visual	Remote sensing, image processing; electromagnetic data within and beyond human visual range	Field of view, mounted camera (electromagnetic energy)	*Seeing* – visual object; Ware (2008) visual query; Kress and van Leeuwen (2001) visual grammar
Sonic – vestibular	Acoustic analysis, soundscapes, noise pollution; stationary recorders at specific points, within and beyond human frequency range	Microphones (mechanical waves)	*Listening* – sound object; Schafer (1994), soundscape, listening methods; involves training of observers
Olfactory – gustatory	Headspace technology; atmospheric sensors (interpolation mapping)	Chemical sensors	*Smelling* – 'smell' object least developed
Other			*Feeling* – general notions of happiness and wellbeing at an ordinal scale

Challenge 3: Designing human–computer interaction systems that open up and transform our experience of the environment from passive spectators to active and interrelated actors and entities. Such systems should support not only direct individual interaction via computers but also social and vicarious (Sutton, 2000) interaction incorporating indirect communication activities such as observing and learning from watching others, which typically occur as part of human social contexts.

Step to address it: Use participatory, collaborative design methodologies that support critical thinking and, from the start, involve the communities that will be using these technologies.

Currently, we are furthering our efforts to develop a design-oriented approach to mapping landscapes so that we can address present concerns about environments that are rapidly becoming more unhealthy on a global scale. Through the kind of collaboration in interdisciplinary research teams that we have proposed, we have been defining and addressing the challenges of data collection and subsequent data integration. Much of this has been achieved through Euclidean-based geospatial mapping approaches and the traditional spatial tools and methods presently available that limit multisensory analyses. One of the greatest challenges is translating and synthesising environmental sense data and human perceptual data. Design theory provides a framework to unite phenomenological mapping with ubiquitous computing to foster embodied learning and research environments that can help in designing for healthier landscapes (figure 2).

In summary, awareness of the importance of biodiversity is mounting. Beyond the interest the topic generates among environmental scientists, we emphasise that associated sensory scenes – or sensory richness – are fundamental in sustaining human health and heritage, as is work in rural environments to measure sensory stimuli and their human impact. We contend that sensory studies in the context of cultural traditions in rural landscapes, rather than

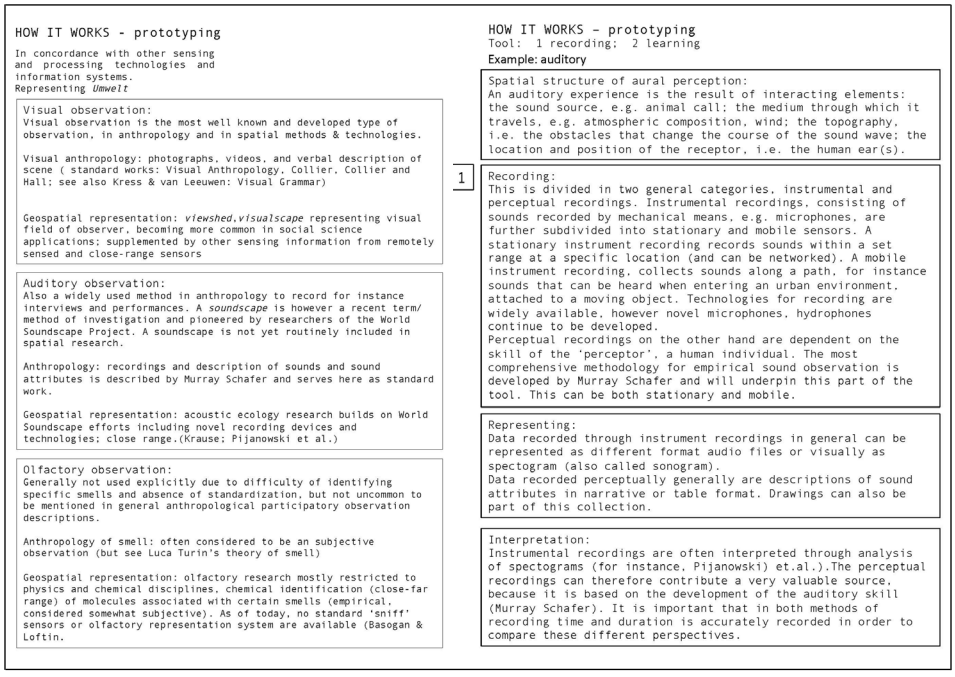

Figure 2: Prototype for developing methodologies for perceptual data collection.

laboratories (where the majority of research occurs), will lead to the discovery of many previously unknown health benefits and provide the foundation for novel systems of landscape design.

NOTES

1 United States Patent US3050870.

2 For more information on the Tate Sensorium, see www.tate.org.uk/whats-on/tate-britain/display/ik-prize-2015-tate-sensorium.

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Bingham Canyon National Park: Reclaiming the Bingham Canyon Mine by Transforming it into a New Generation of National Park[1]

FREDERIK GOTEMANS

In the wake of the industrial revolution, landscapes gradually deteriorated, creating the formidable challenge of reclaiming devastations humans have caused. Large-scale mine sites provide a clear example. However, the potential contribution that reclaiming devastated landscapes can make to restoring the environment is often ignored or unacknowledged.

To address this pressing issue, it is necessary to examine different pathways to reclamation. Current reclamation scenarios – to simply fence mine areas off and shield them – are insufficient because they fail to provide a carefully considered and planned post-mining land use.

Figure 1 depicts the design of a poster in response to the cultural basis of the well-known national park system of the USA. It captures the powerful image of open-pit mines like the Bingham Canyon Mine into a new generation of national park. Envisioning the transformation of former mining sites into national parks requires new design processes and techniques. Figure 2a and 2b depicts the opportunity to include not only placemaking in landscapes but also the design of the experience by means of transportation towards national parks. Figure 3 shows the means to use physical models combined with digital projection, enabling the aesthetic dimension, narrative underpinning and experiential quality of the design. One more example is the use of written stories by following certain personas (archetypical users) as they experience the many instances and scale dimensions within the future national park (figure 4).

Frederik Gotemans is a thesis student of Landscape Architecture, Wageningen University, Droevendaalsesteeg 3, 6708 PB Wageningen, The Netherlands.

REPORT

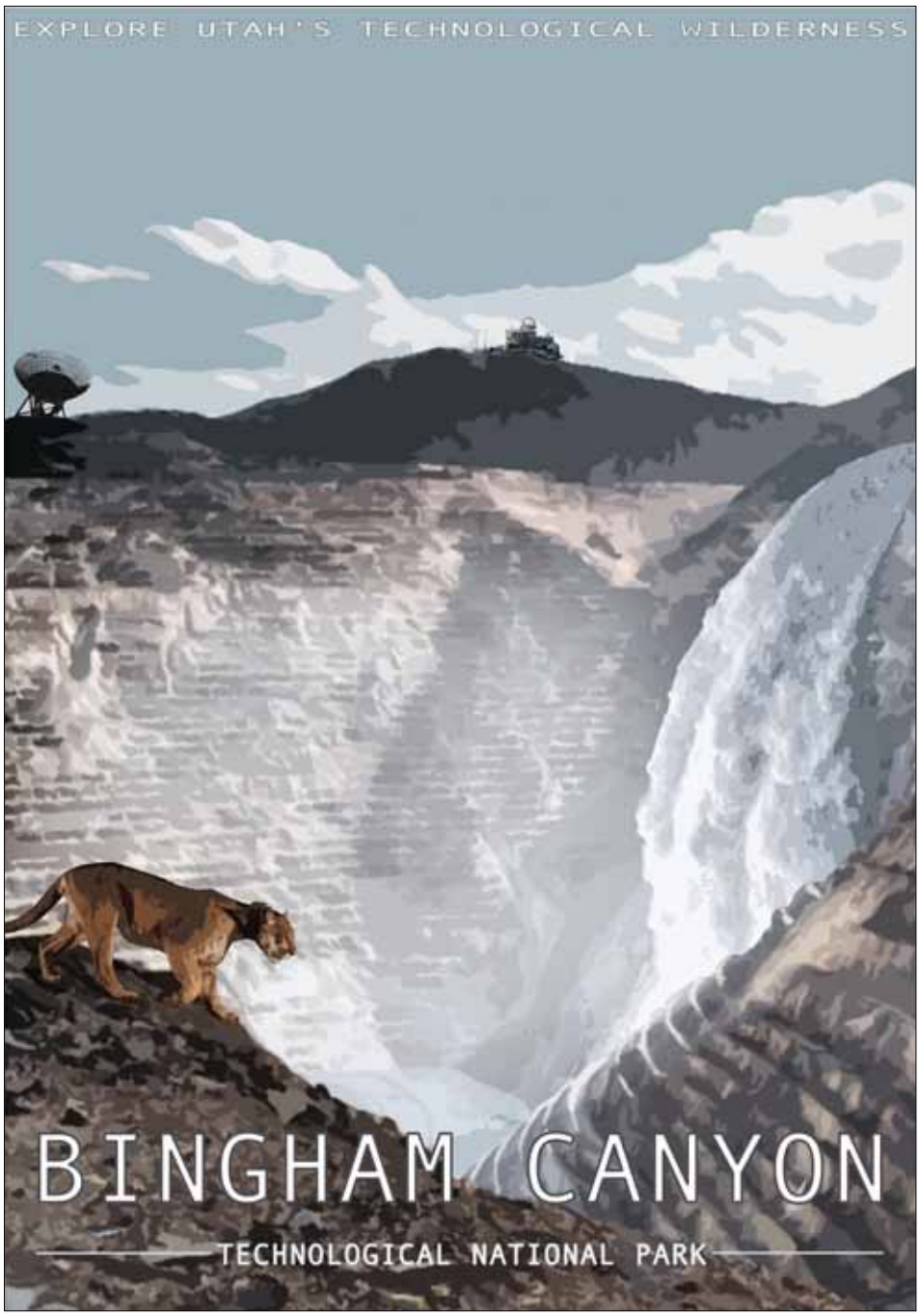

Figure 1: Poster of national park service technological wilderness. (Image: Author's own.)

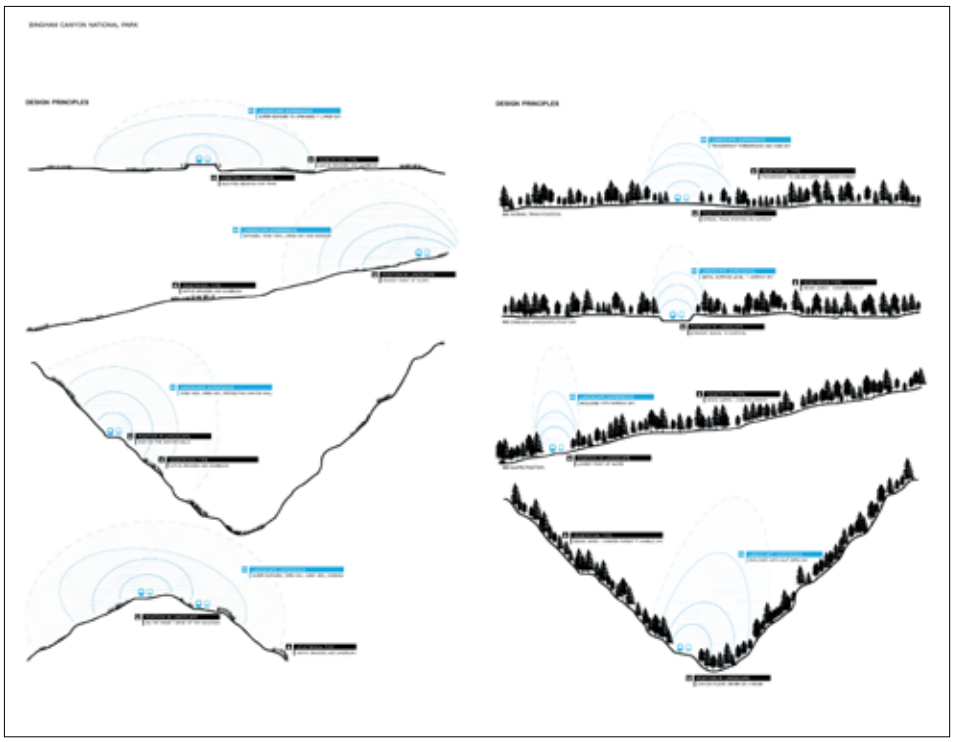

Figure 2a: Cross sections of the design of the railway routing as part of the post-mining experience. (Image: Author's own.)

Figure 2b: Interior design of the train with panoramic and interactive windows. (Image: Author's own.)

Figure 3: 3D terrain model with beamer projected design and zoning suggestions. (Image: Author's own.)

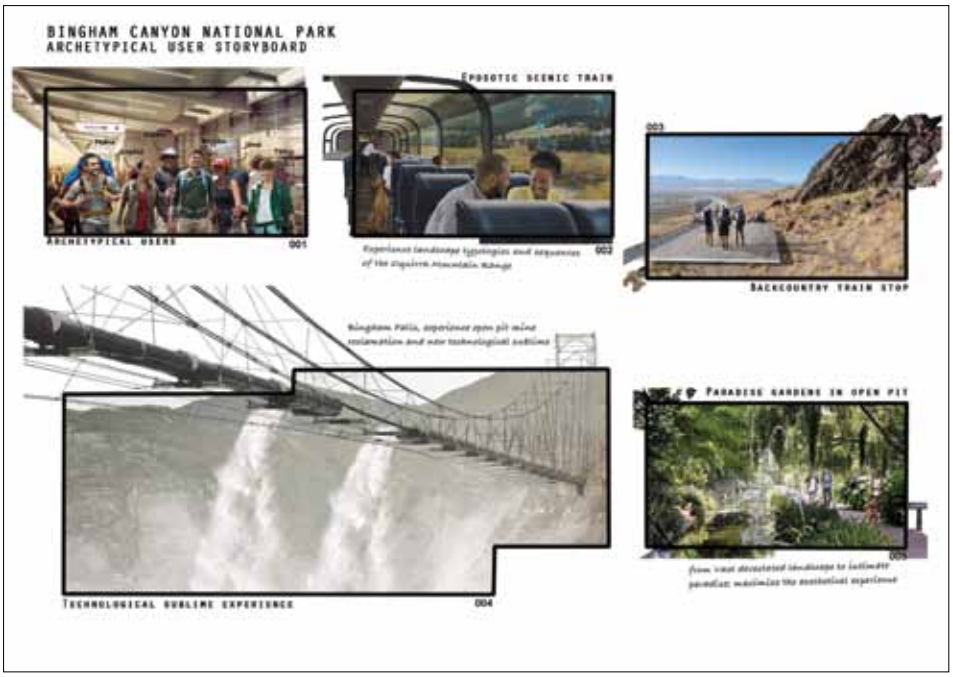

Figure 4: User story board explaining the subsequent landscape experiences. (Image: Author's own.)

NOTE

1 For the MLA thesis on which this report is based, go to http://edepot.wur.nl/425043.

Experiencing the Post-mining Wonder: Reclaiming a New Purpose for Post-mining Landscapes in Quadrilatero Ferrifero[1]

CARLO LEONARDI

Carlo Leonardi was, at the time of this project, a thesis student in Landscape Architecture, Wageningen University, Droevendaalsesteeg 3, 6708 PB Wageningen, The Netherlands.

Rich imaginative perceptions are often unrelated to hard scientific data. In this project, this dilemma is explicitly addressed by integrating different research methods to examine post-mining landscapes like those in Quadrilatero Ferrifero, Brazil. The imaginative method is phenomenological and includes a gradual development from personal observations to more objective spatial dimensions of the landscape, such as form, texture, structure and volume (figure 1). The final result of this method is a synthesising into archetypical place characters (figure 2).

The more regular scientific data are retrieved from field reports on ecological restoration and a narrative description of events during the mining activity (figure 3). The final combination of the archetypical place characters, the ecological potentials and the mining narrative is then studied by using physical modelling that allow a deep engagement with placemaking (figure 4). This final phase aims at maximising the value of the 'creative jump'. This jump emphasises creativity as the researcher is able to strive for the best possible spatial synthesis, which comes to both symbolically and ecologically represent different sites (figure 5).

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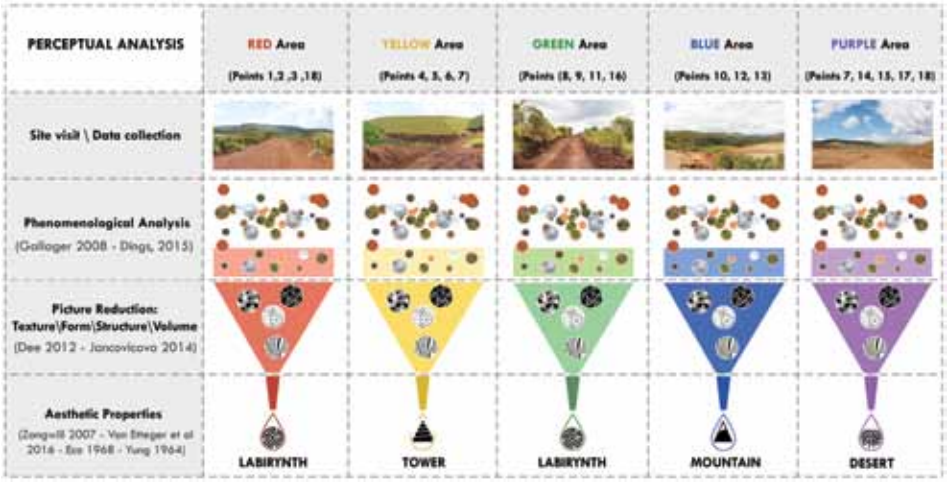

Figure 1: Schematic of different forms of perceptual analysis for different areas. (Image: Author's own.)

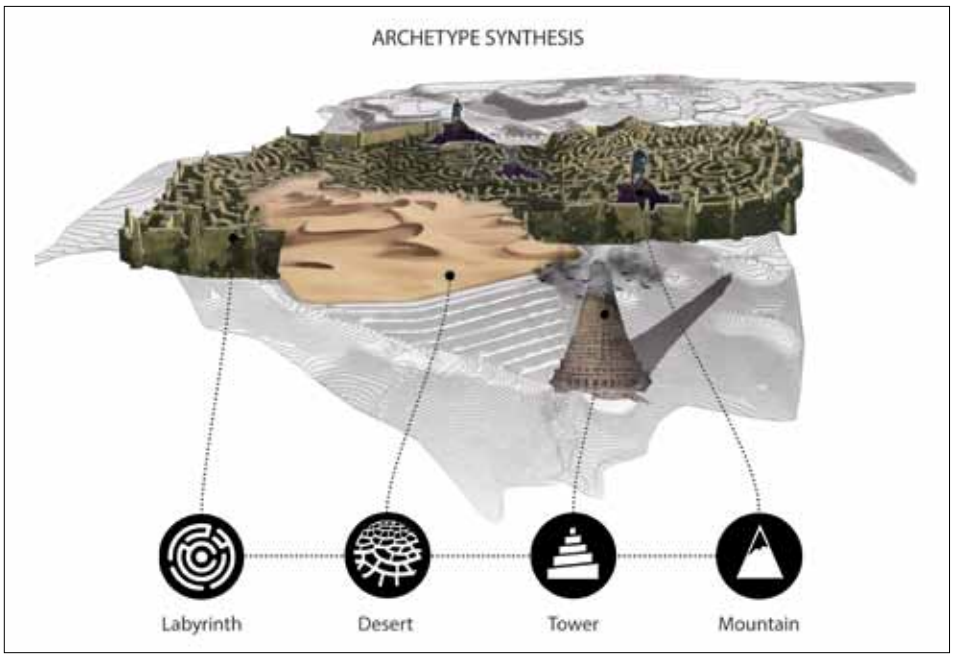

Figure 2: Archetypical synthesis: four archetypical place locations resulting from the perceptional analysis. (Image: Author's own.)

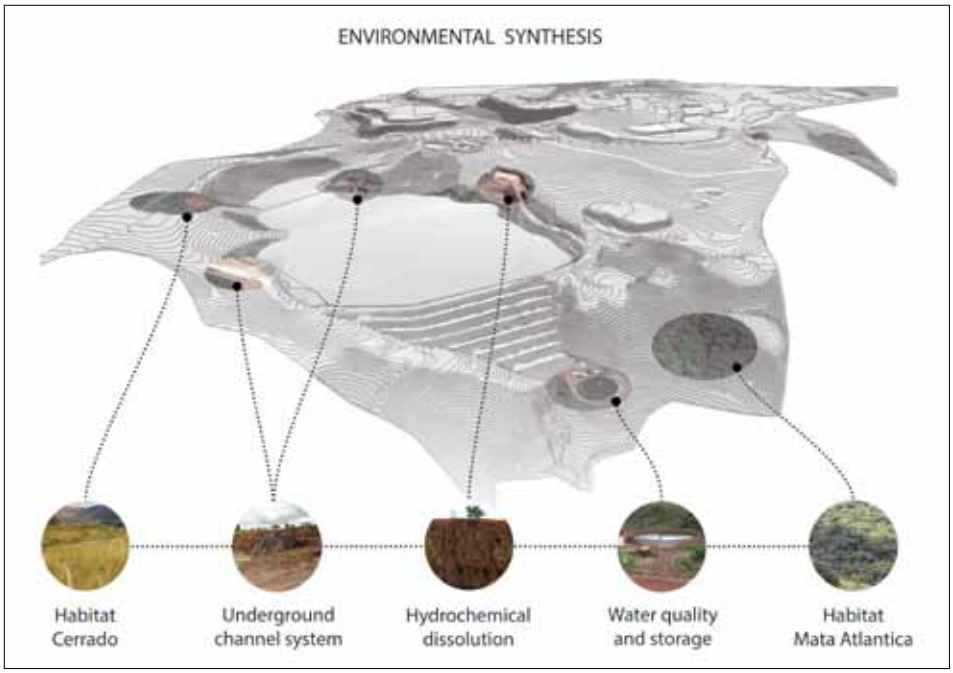

Figure 3: Environmental synthesis: blending of the landscape ecological characteristics and narrative events during the period of mining. (Image: Author's own.)

Figure 4: Interaction with the physical-scale model, in collaboration with Jolanda de Jong, including a water circulation, a wooden base, sand topography, cardboard paths and cress vegetation. (Image: Author's own.)

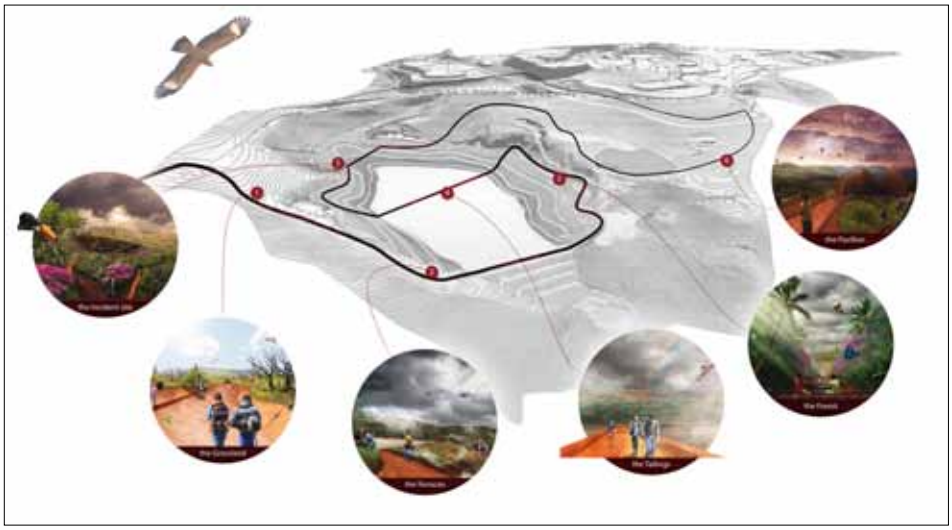

Figure 5: Digital renderings of the transformed post-mining site. (Image: Author's own.)

NOTE

1 For the MLA thesis on which this report is based, go to http://edepot.wur.nl/426587.

Walking as Designing: The Use of Walking as a Tool for Discovering Landscape[1]

JESS RAE

The path affords alternative ways of knowing (and coming to know) landscape. Walking is the primary mode of data acquisition in this research, with design operations the key tools for the interpretation and exploration. Iterative walking and diagramming are combined with temporal and experiential mapping to provide new translations of known spaces (figure 1). While objective methods of looking at landscape make what is made known to us, design exercises enable new and enriched ways of understanding spaces and of finding the diverse materials, processes and meanings that compose them. In this light, they also allow us to imagine new forms of paths and new ways to score landscapes based on their walkability (figure 2).

Walking permeates the field of landscape architecture: as a performance prompted in the landscape (Ingold, 2000, 2004); and as a form afforded by the paths we construct and/or generate (Abbott, 2013; Carter, 1996). Tapping into their rich experiential, sensual and physical qualities is an enduring area of study for the discipline (Jacks, 2004, 2007; Jackson, 1994). However, while construction drawings might describe the structure of a path, such representations fall short in expressing the potency of path and the practices of walking, ambling, strolling, sauntering, hiking, tramping, strolling, trekking, wandering, roaming, trudging, and so on (Halprin, 1965; Thiel, 1997).

Landscape can become known in unique ways by carrying out a series of solo and collaborative walks in a particular site like Banks Peninsula, New Zealand. Creative and critical analysis of such acts of walking can mirror in written form Ingold's (2000, p 230) directive for finding one's way where 'we know as we go not before we go' (figure 3).

Jess Rae is Lecturer, School of Landscape Architecture, PO Box 85084, Lincoln University, Christchurch 7647, Canterbury, Aotearoa New Zealand
Email: jess.rae@lincoln.ac.nz

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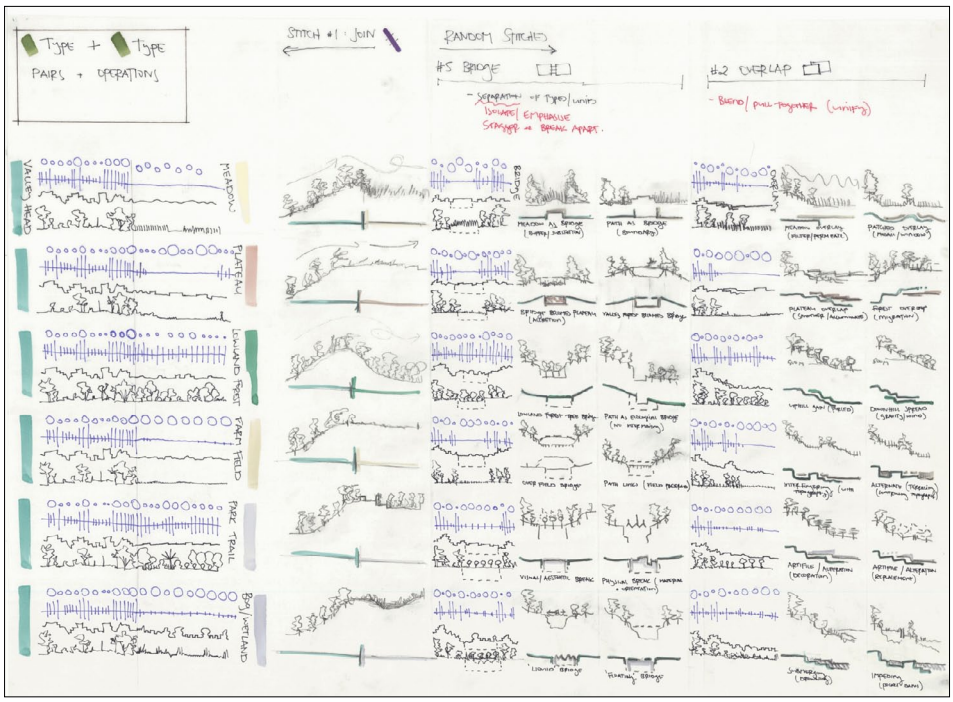

Figure 1: Walking typology revealing the relationship between walking and topography. (Image: Author's own.)

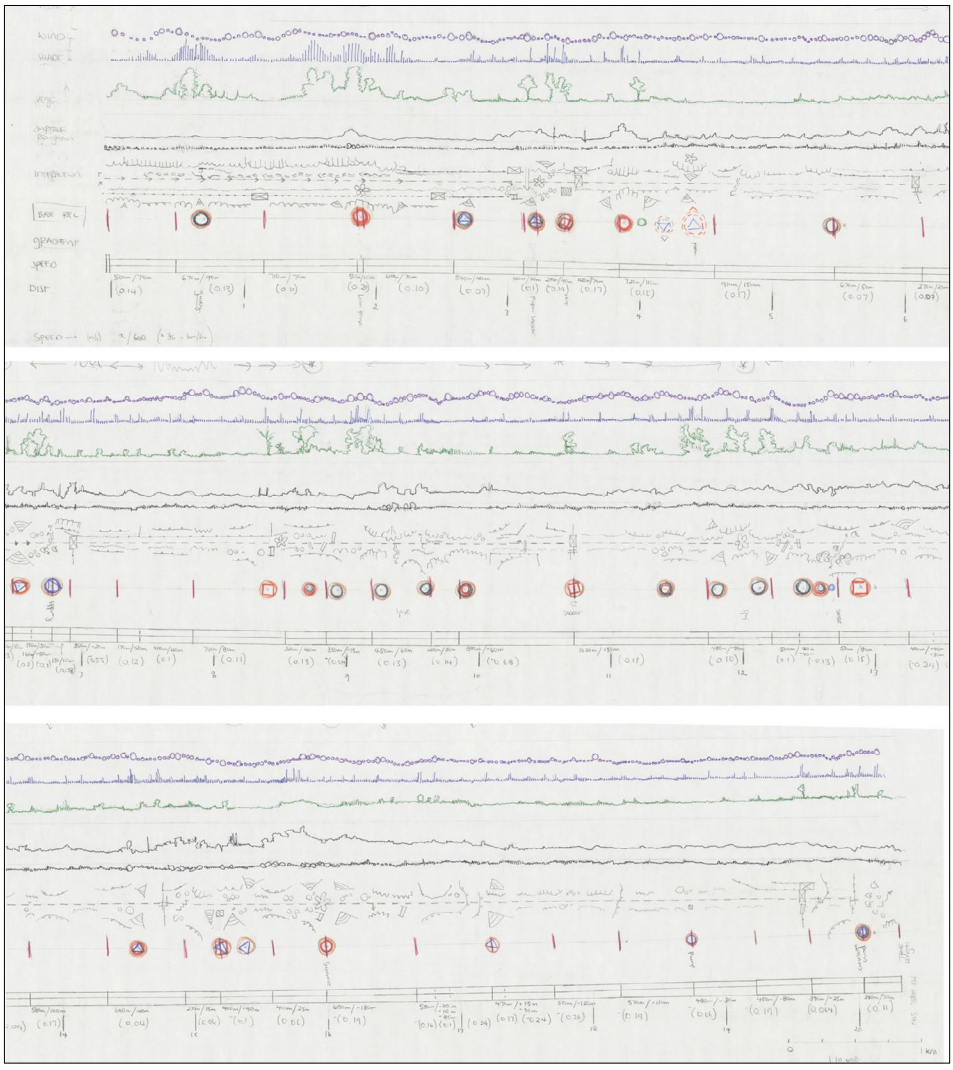

Figure 2: Walking score directing a potential walking experience. (Image: Author's own.)

Figure 3: Design as walking table. (Image: Author's own)

A process for walking explorations					
	Survey activities		**Inventory**		
Stage 1: Building a typology of materials **Catalogue and form typologies of materials encountered along the path**					
	Step	**Aim**	**Inventory goals**	**Task**	**Resource**
How are materials, form and interactive elements observed?	Step 1	Determine what is already known and structure study areas	Create a base map and gather existing information	Reading, review Mapping	Existing maps, literature review, historic accounts
	Step 2	Survey and describe material form and features	Compile comprehensive track notes and experiential account	Survey mapping Sighting Drawing Writing (walk journal)	Base map, guide/notes
	Step 3	Examine how features relate and compare/ contrast inventory	Structure a catalogue of materials and form types	Sketches Maps Notation	Collected inventory and walk records
Stage 2: Typing operations **Investigate how material typologies can create itinerary**					
	Step	**Aim**	**Inventory goals**	**Task**	**Resource**
How can materials be used to alter the path?	Step 4	Ideation: Consider how typologies might be explored further	Form a frame of operations and a set of tools/prompts	Design readings/theory Design examples	Type cards, cue cards
	Step 5	Explore a range of relationships between types and explore connections	Build a collection of reworked types and relational sketches	Use design prompts and operations	New typologies and sketches showing structural relationships
	Step 6	Reimagine track materials and experiences based on reordered sequences	Develop track notes and sections from new typologies	Explore notations and sequences, expand to account for path itineraries	Concept sketches and path routes
Stage 3: Recording the temporal as experienced in a walk **Explore how the walker responds to materials when walking**					
	Step	**Aim**	**Inventory goals**	**Task**	**Resource**
How does the walker move through landscape?	Step 7	Record how the walker moves through space and builds itinerary	Establish itinerary of route taken	Record travel time (time taken), sighting and sensing survey. Observe walker interactions/attention (walk journal)	Base map (topographic)
	Step 8	Examine recorded itinerary	Build timeline of events (establish walk line)	Map out walk (timings) Locate events Correlate with walk notes	Walk journal/walker record of response Photos, sketches Notation Marked-up base map
	Step 9	Analyse walk line. What can the walk line tell us about walker motivations?	Annotated map/sketches and marked-up maps – itinerary of route	Review map and notes, compare changes in line with journal notes	Walk line, maps, walk journal notes

NOTE

1 For the MLA thesis on which this report is based, go to http://researcharchive.lincoln.ac.nz/handle/10182/6821.

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Walking, Hutting, Mapping: A Landscape Architecture Investigation into the Generative Potential of Experiences' 'Other'[1]

TENILLE PICKETT

'Walking' and 'hutting' are two familiar components of the immersive experience of Aotearoa New Zealand's forest parks. The terms 'walking' and 'hutting' disrupt and repurpose the familiar notions of 'walk' and 'hut', and can be used to understand the rich experiences of landscape (figure 1). This change in perspective is prompted through a mapping of such experiences in a design studio setting (figure 2). Through mapping the relationship of the experiences, those experiencing them, and the designer, are transformed into a reciprocating dialogue, revealing the often invisible aspects of landscape experience. Here the seemingly contained categories of walking and resting become fluid and enfolded. The noun 'hut' becomes '*to* hut', and then 'hutting', embracing a greater breadth of being in the landscape.

For landscape architecture, this insightful model offers a way of challenging concepts as it reveals the hidden depths of the taken-for-granted elements of the built landscape. Opportunity is presented in leveraging the tension between form-dominated definitions and activity-borne behaviours. The examples of 'wayfind-ing', 'car park-ing', 'swimming-pool-ing', 'neighbourhood-street-ing', 'residential garden-ing' and 'green or grey infrastructure-ing' all invoke – as with walk, hut and signs – form-based images. But the unpacked reality of walk and hut reveals a processual depth not addressed in form-favouring definitions (figure 3). Unsettling the fixed containers of landscape can mobilise the seemingly static categories of things into processual, interactive, dynamic elements. Through immersive and interactive engagement, an understanding of the creative practice that is *to* landscape can be developed.

Tenille Pickett is Tutor and Landscape Architect, Landscope DesignLab, School of Landscape Architecture, PO Box 85084, Lincoln University, Christchurch 7647, Canterbury, Aotearoa New Zealand.
Telephone: +64–3–423–0475
Email: tenille.pickett@lincoln.ac.nz

REPORT

Figure 1: Discerning the integrative experiences of 'walking' and 'hutting' through diagrams, photographs and drawings. Temporal map brainstorms the relation between person and site during the walking experience. (Image: Author's own.)

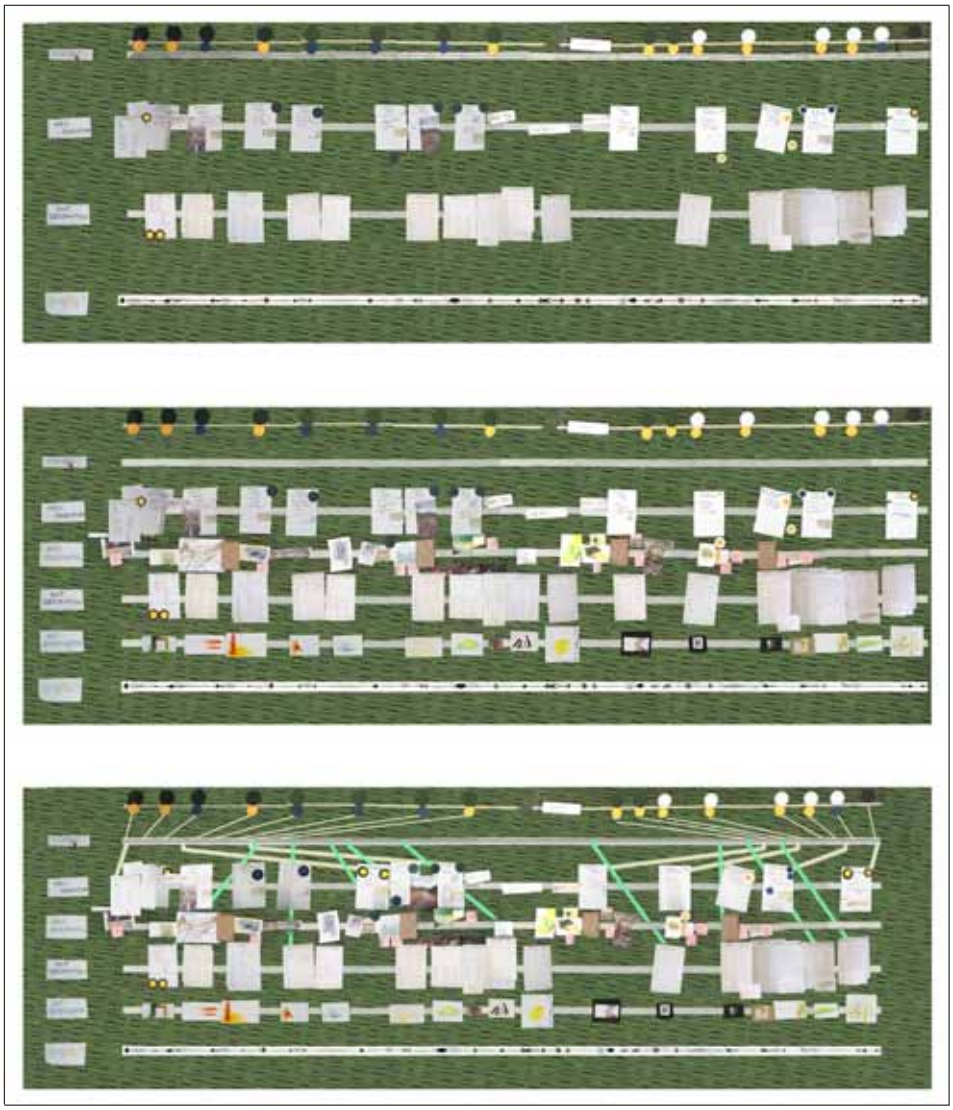

Figure 2: Creative cartographies of 'walking' and 'hutting' mapping time, distance, experience and emotion, as interwoven elements. (Images: Author's own.)

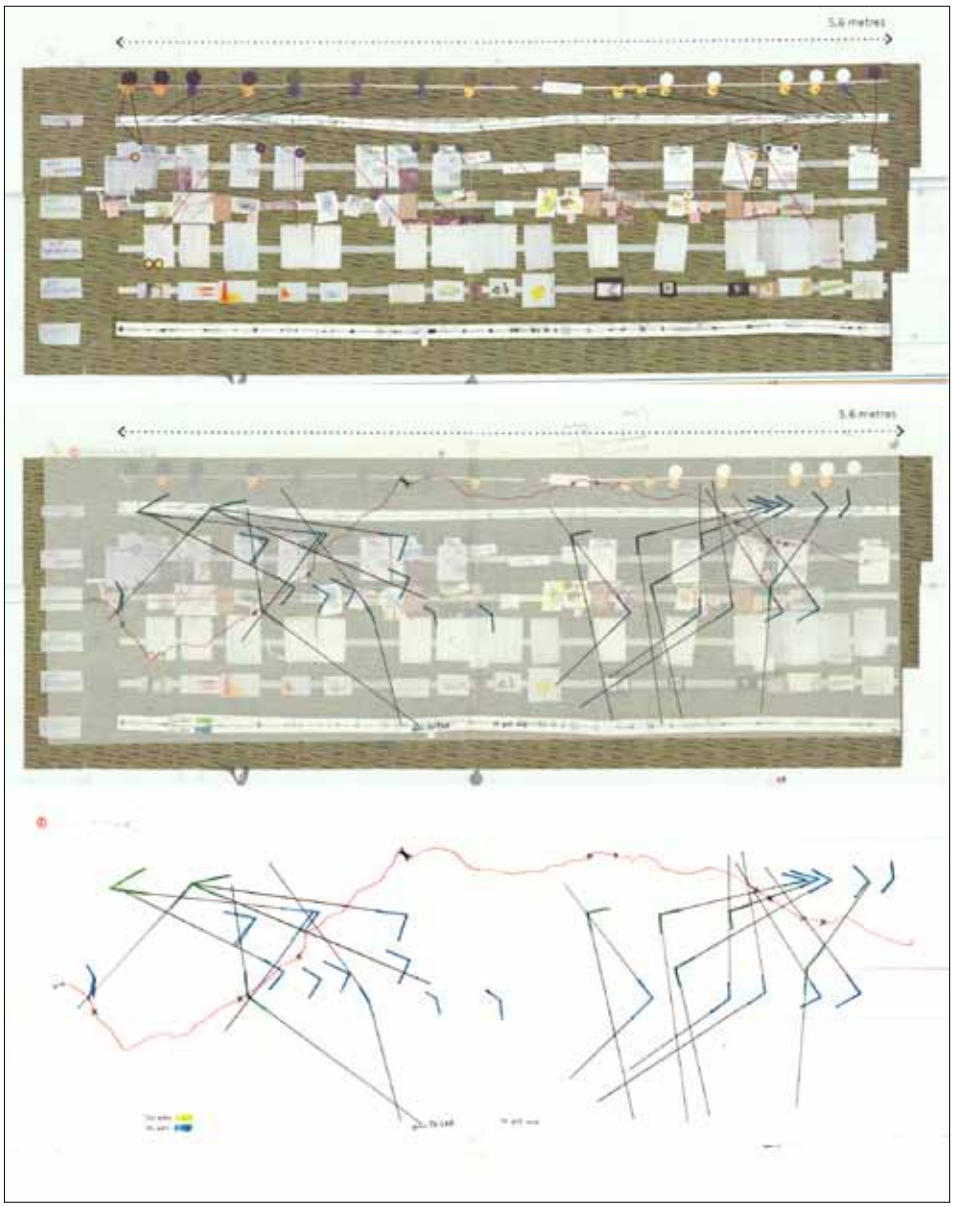

Figure 3: Process diagram showing points along a walk where thoughts of movement forwards or backwards along the track are noted, forming an emergent pattern of the temporal experience of the walk. (Image: Author's own.)

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1 For the MLA thesis on which this report is based, go to https://researcharchive.lincoln.ac.nz/handle/10182/7662.

Landscape as Tension: Exploring the Analytical and Generative Potential of a Focus on Tension in the Landscape[1]

KATE BLACKBURNE

The rural landscape is the site of complex relationships that are often manifest as tensions. A natural inclination when confronted with tension is to seek to repair or resolve the situation. However, this process of removing tension can at the same time create anodyne landscapes – quiet and well-behaved, but inherently banal. Human relationships with landscape are fiercely complex. They can be personal or collective, subjective or objective, and fundamentally resistant to being distilled for analysis. While landscape architecture seeks to understand sociocultural relationships, the tendency to find order and systems can limit our understanding and blind us from recognising complex relationships (Meyer, 1997; Selman, 2006). Complexity is found not only in the spatial aspects of landscape, but also in its non-spatial dimensions, such as inhabitant perception and sociocultural value (Stephenson, 2008). The idea of 'landscape is tension' underpins John Wylie's (2007) *Landscape*, where landscape is 'precisely and inherently a set of tensions' (p 2). By focusing on tension, landscape research does not produce a more accurate definition of place, clarity or categorisation, but rather develops a deeper, comparative understanding of relations born out of difference.

Focusing on landscape tension has generative value as difference creates synthetic potential (figure 1). This synthetic potential can be harvested to develop design briefs that create spaces in which to explore the possibilities for this landscape (figure 2). A matrix can be used to develop the tensions into design possibilities. Conventional models of landscape value seek a unified understanding; in contrast, a landscape tension-oriented approach to analysis and design focuses attention on relationships, layers and points of interaction and opens out potential rather than narrowing it to a single solution (figure 3).

Kate Blackburne is a Landscape Architect, Exterior Architecture, London, UK.
Email: kate.blackburne@gmail.com

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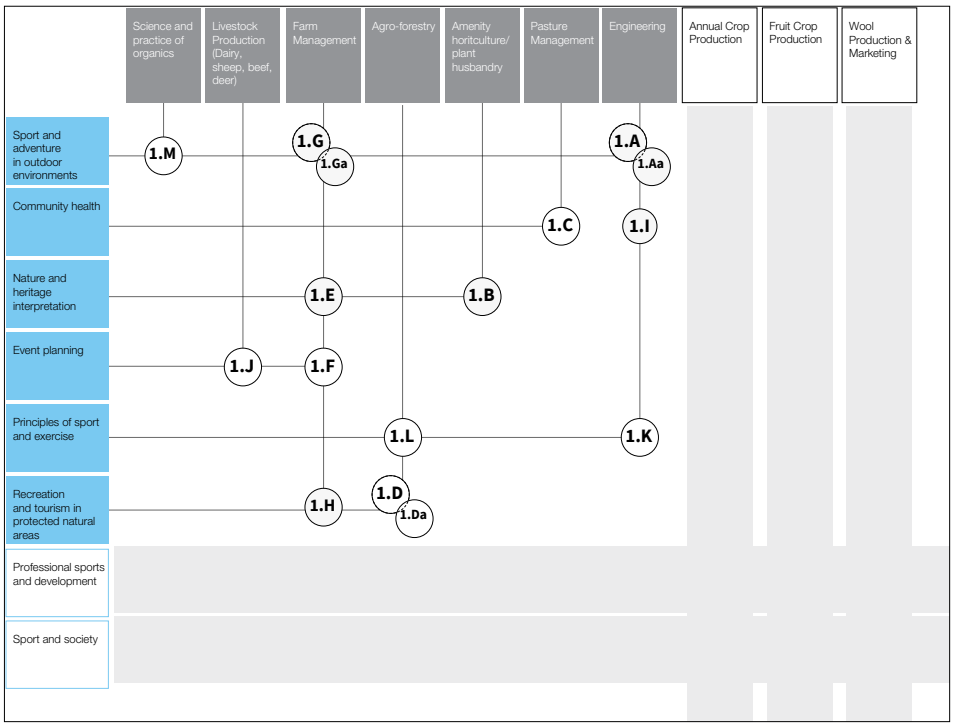

Figure 1: Design projection table. Taking a (potentially opposing) value from each sociocultural group and using these to generate a multifunctional, multi-valued landscape response. 'Farmer' values are shown across the top, with 'walker' values down the left. Only those relevant to the design context (Banks Peninsula) are considered. (Image: Author's own).

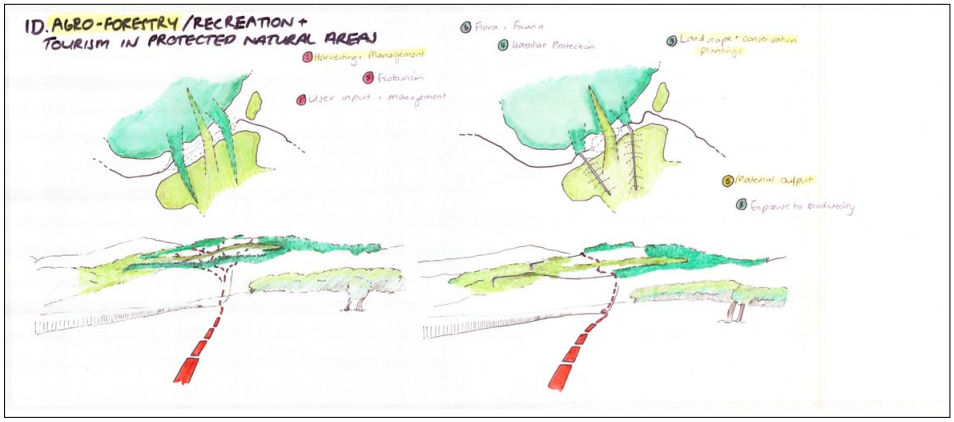

Figure 2: Design projection 1D interrogates the intersection between the agricultural landscape value of 'agro-forestry' and the recreationalist value of 'recreation and tourism in protected natural areas'. (Images: Author's own.)

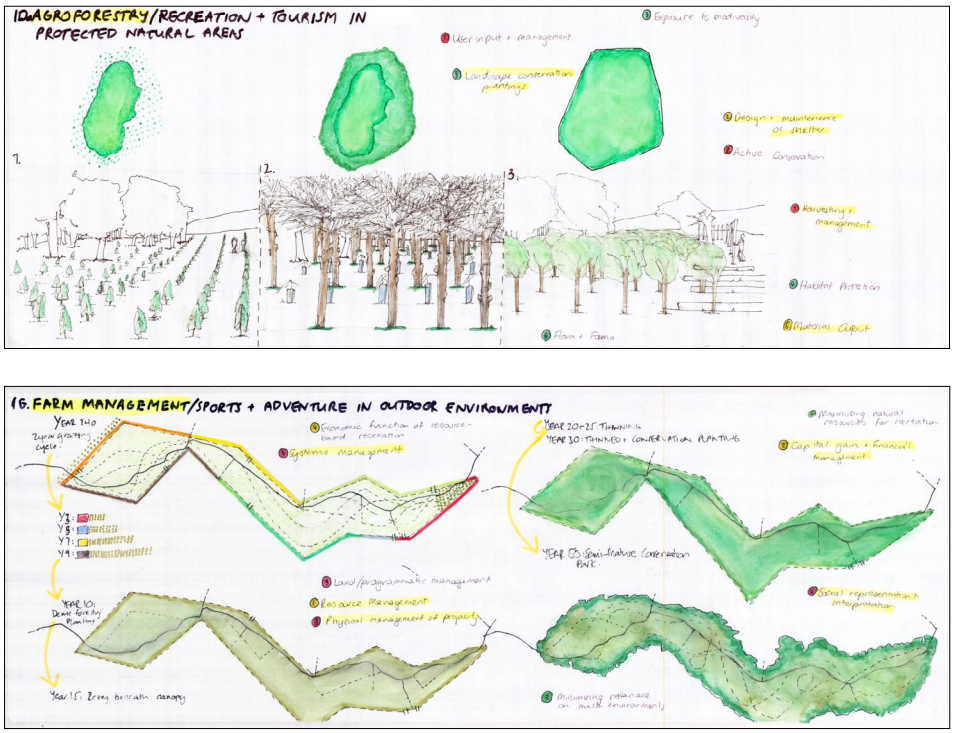

Figure 3: Forced design synthesis of farm management versus sports and adventure in outdoor environments, questioning technology's role within the rural Banks Peninsula landscapes. Recreationalists passing over farmland in this area are employed as monitors of hazards and safety and can alert landholders to any of their concerns (for example, about distressed stock, a broken fence or a fallen tree). (Images: Author's own.)

NOTE

1 For the MLA thesis on which this report is based, go to https://researcharchive.lincoln.ac.nz/handle/10182/6504.

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Placing Design, and Designing's Place, in Landscape Architecture Research

MICK ABBOTT

In European-based discussions concerning landscape architecture research methods, there is strong advocacy for the term 'research through designing' and its acronym RTD (Lenzholzer et al, 2013). Given an agreed lack of clarity regarding the role of design in landscape architecture research, the suggestion of certainty contained in the term RTD is inviting.

However, could this directness of phrasing prevent design from expanding its scope in landscape architecture research at a time when only a small number of published studies on the topic exist? Advocacy for RTD is part of a continued skirmishing with design's potential in creative research that is manifest in sporadic articles in journals like *Design Issues*, *Design Research*, *Design Philosophy Papers*, *Architectural Design Research*, *Journal of Architectural Education* and *Landscape Review*, and studies within wider texts by Deming and Swaffield (2011) and van den Brink et al (2016). These works attempt to shape theoretical models and provide exemplars for design's role in academic research that is supported with an expanding number of international interdisciplinary conferences, as well as panel and workshop discussions at recent Council of Educators in Landscape Architecture (2017) and European Council of Landscape Architecture Schools (2017) conferences.

Mick Abbott is Associate Professor and Director Landscope DesignLab, School of Landscape Architecture, PO Box 85084, Lincoln University, Christchurch 7647, Canterbury, Aotearoa New Zealand.
Telephone: +64–2040–016–921
Email: mick.abbott@lincoln.ac.nz

KEY WORDS
Design-directed research
Case study methods
Research through design
Research itineraries

The complex place of design and designing in landscape architecture research suggests a more invitational orientation continues to be needed so greater richness and diversity of thinking can continue to be fostered. This paper is an abridged version of a key chapter in my doctoral research into a phenomenological design of wilderness (Abbott, 2008). Developed between 2006 and 2008, its lineage can be traced back to prior work that used design and designing to express positions the poststructuralist philosopher Jacques Derrida, the mathematician Benoit Mandelbroit and the architect Aldo Rossi had been articulating during postmodernism's zenith in the 1980s. As this paper makes clear, the processual qualities of design are prioritised, but not exclusively, especially given design's capacity to provocatively and instrumentally intervene in a range of settings, including those at the interface of people's behaviours and place. Over the last 10 years, this chapter on design-directed research has been regularly referred to in postgraduate research at Lincoln University, New Zealand (Blackburne, 2014; Copley, 2014; Pickett, 2016; Rae, 2015), in terms of providing a theoretical framing from which to undertake design-directed research, and it is included in this issue to extend the number of available studies that frame the role of designing and design in landscape architecture research. For ease of understanding, it has been abridged to remove specific references to the wilderness context that the thesis focused on.

REPORT

A fundamental question for the discipline of landscape architecture, particularly as it seeks to define itself as an independent discipline, is whether landscape architecture provides only the context for academic research or whether it also offers distinctive research methods that have a broader application.

According to Corner (1997), it is an awareness of landscape's process-driven qualities, such as temporality and agency, that has led the discipline of landscape architecture to be increasingly located at the interface of an 'ecology and creativity [that] speaks not of fixed and rigid realities but of movement, passage, genesis, and autonomy, of *propulsive life unfolding in time*' (p 181). While landscape has broad academic appeal – being discussed in disciplines as diverse as aesthetics, art history, environmental psychology, anthropology, ecology, theology, history and sociology (Stephenson, 2005) – it is in landscape architecture that landscape and creativity explicitly meet.

Corner (1997) argues the discipline must be oriented to the concerns of method and process rather than outcome: 'a landscape architecture that has yet to fully appear, one that is less preoccupied with ameliorative, stylistic, or pictorial concerns and more actively engaged with imaginative, enabling, and diversifying practices – *practices of the wild*' (p 105). Using examples from other fields, Corner (1999) illustrates how a creative engagement of landscape might be enabled. While he includes work from artists and cartographers, it is clear the greatest affinity for his own work is not with the field of landscape architecture, but instead with architecture and the work of Koolhaas, Tschumi and MVRDV (Corner, 1999).

However, to suggest that a programme that engages landscape's agency will develop out of the field of architecture is problematic. To argue that landscape architecture can simply be split between its context (landscape) and method of engagement (architecture) revisits the antagonism between two unequal relations. As John Dixon Hunt (2000) states:

> ... professional landscapers' inclusion of the word *architecture* seems largely the result of a feeling of acute inferiority, an inferiority that many architects have done little to rethink, including their rather patronising assumption that landscape architects are the ones who put the flowers and shrubs around *their* finished buildings. (p 1)

Nor, on a deeper level, is it helpful to suggest architecture embodies landscape architecture's creative mode, as it merely conflates both context and creative method into a single term: a making of architecture through architecture (Wigley, 1998).

Such issues suggest design is a more useful term for discussing the discipline's creative processes. While design might be considered both a context and a method, the ease with which it can be expressed as a verb – designing – aids investigation of landscape architecture's methodological significance. The term also unlocks inherent tautologies: rather than the indistinct 'landscape architecture produces landscape architecture by a method of landscape architecture', more straightforward is 'landscape architecture produces designed landscapes through designing'. Here landscape can be both the context and outcome while designing is the method by which such contexts are transformed into outcomes.

Landscape architecture research

The practice and teaching of landscape architecture are generally agreed to be directed and driven by design. Teaching programmes and monographs emphasise its role as the foundational method by which productive and meaningful outcomes are developed. Yet the same approach is not the norm for landscape architecture's programmes of academic research, with far less readiness to enlist these same creative strategies and processes when undertaking academic inquiry. Instead the tendency is to enlist any number of methods other than designing. Given the discipline's distinctiveness is dependent on its designerly attributes, this reticence is perplexing, especially when creativity and design are elsewhere often considered integral to research. For example, Michael Crang (2003), whose research is based in the humanities, states, 'producing order out of our materials, of making sense … is a creative process' (p 117). Similarly, geographer Sarah Whatmore (2003) considers the research process relies on 'the creative and sometimes contrary possibilities generated in and by exchanges between researcher and researched' (p 103).

Paul Carter (2004a), an academic whose career has developed from literature and history and more recently from design theory and practice, states:

> … 'creative research' [is] a phrase that ought to be an acknowledged tautology. If research implies finding something that was not there before, it ought to be obvious that it involves imagination … [Hence] as a method of materialising ideas, research is unavoidably creative. This is why, Michel Serres claims, 'Invention is the only true intellectual act'. (p 7)

Yet, as Carter continues:

> … while 'creative research' *ought* to be a tautology, in its present cultural climate it is in fact an oxymoron. A research paradigm prevails in which knowledge and creativity are conceived as mutually exclusive … A narrowly reductive empiricist notion of research, which, by insisting on describing the outcomes in advance, defines the new in terms of a 'present more extreme', now influences the framing of research questions across all disciplines. Interpretative sciences (traditionally the humanities), and even applied disciplines, architecture and design, find they can describe what they do only on condition that they leave out invention. (ibid, pp 7–8, original emphasis)

Arguably it is the lack of enthusiasm by design-led disciplines to use design as a cornerstone method of research inquiry that has limited their academic scope. Instead, as Catherin Bull observes, 'scholarship and research in these fields, where it does occur, is "about" them, rather than "of" them' (cited in Carter, 2004a, p 8). Almost always absent in the methodological mix is the very characteristic that gives creative disciplines their distinctiveness – namely design.[1] Consequently, the field of landscape architecture exhibits a paucity of scholarly research that attempts to use design as its primary research method: a dearth that tends to be self-perpetuating.

Moreover, an observation from Klaus Krippendorf is that 'probably the most notable pathology of design discourses is its openness to colonisation by other discourses' (cited in Findeli, 2000, p 2). As a result, historians, plant ecologists, social scientists, educators, geologists, planners, mathematicians and geographers,

while competently exploring topics of landscape architecture, do so from a methodologically external position – where the corpus of landscape architecture is understood, and defined, from the outside looking in (Foster and Lorimer, 2007). While such an ecumenical approach could be considered a positive expression of multidisciplinarity, less certain is how other disciplines would respond if the roles were reversed; for example, if creative methods distinctive to a design-led discipline like landscape architecture were applied to academic investigations outside landscape architecture. Or, as Nigel Cross (2001) writes:

> … we must concentrate on the 'designerly' ways of knowing, thinking and acting … Design practice does indeed have its own strong and appropriate intellectual culture, and … we must avoid swamping our own design research with different cultures imported either from the sciences or the arts. (p 56)

Researching after designing

If one form of academic research in landscape architecture can be characterised as outside methods looking in, then a second form is the critiquing of processes and outcomes pertinent to the discipline *after* designing has occurred. Mark Francis (2001) argues for the prominence of the case study as a method that 'inform[s] their colleagues and public about [the landscape architect's] work' (p 15). A template with common categories is proposed with which to examine specific 'best-case' outcomes of the discipline, so producing more robust results from individual and comparative analyses. Later case studies' suitability as a framework for design-directed research is considered, but the key point here is research begins *after* designing is complete. In an emerging academic discipline like landscape architecture, this can result in positivist articulations of the already resolved (and often already built).

This quality of closure is also evident in research examining the process of learning and practising design. In such studies, themes extensively developed in other academic paradigms, like post-structural philosophy, and concepts of narrativity and semiotics are examined for their capacity to produce either better formal and usually site-specific design solutions or better processes to deliver such outcomes (Alon-Mozes, 2006). However, their intent is to bring into landscape architecture's fold ideas developed outside the field rather than extending their application into other disciplines.

Such introspection means it is neither surprising nor unusual that Francis's argument for a case study approach ignores the possibility of linking his templates with similar frameworks found in other design disciplines, or applying his concepts outside of landscape architecture productions. Is it possible such activity, by asserting the distinctive identity and value of each discipline, reinforces territorial disputes between architecture and landscape architecture? And is it the reason why, for example, landscape architecture–oriented conferences are more likely to be attended by planners, ecologists and policy makers than architects, industrial designers and communication designers – just as architecture and design conferences are similarly insular?

Research and designing

These inward-looking attempts at disciplinary self-definition – whether derived from landscape architecture marking out its territory or from the study of landscape architecture using methods founded in other disciplines – can be characterised as research *into* the field of design. Counter to such approaches, what is the potential of designing to provide a distinctive research method for landscape architecture with which to engage and inform the research of other disciplines? How could creativity be a method of research or, put another way, what is research that is directed by designing, rather than research focused on design's productions?

Examining the peer-reviewed landscape design studio, Alan Berger and his collaborators (2003) identify that '"research by design" is an emerging field with many questions to ask and traditions to establish' (p 2). However, landscape architecture's nascent condition in university scholarship, as it shifts from its professional pedagogical purpose to one also with academic substance, means peer-reviewed academic and postgraduate research, regardless of method, is relatively recent. Variety rather than clarity of methodological approach appears to prevail, such that most substantial research in landscape architecture is likely to involve an implicit inquiry of method rather than just the application of an already accepted approach. The result is considerable ongoing academic debate over the relationship between practice and research as definitions of each iteratively reverberate through various academic channels. Academic inclination to debate and investigate this situation is evident. For instance, *Landscape Review* sought 'to uncover and develop new areas of knowledge to inform the education and practice of design' through a series of articles on the refereed design studio (ibid, p 1). The *Journal of Landscape Architecture* and *Landscape Review* include special categories of peer-reviewed, design-directed research.[2] Also, current emphasis on linking institutional funding to measures of research performance has strengthened research's value for academics securing resources through careful framing of research to what may previously have been considered practice.

Nonetheless, such approaches are not the prevailing position. Paul Carter (2004a) states 'creative research … has been intellectually a rather under-resourced debate' (p 7). In his view, the intent of most studies is to 'extend' and 'intensify' the already known. The 'criteria of success are simplification, resolution, closure. In the process of conducting research, new problems "emerge"; but they are treated the same way' (ibid, p 13). It is this situation that leads him to provocatively declare that, for many in our academic institutions, 'it is self-evident that a research question without a simple answer is not a proper subject for research' (ibid).

Yet arguably it is questions for which any answer is complex and provisional that define scholarship (Buchanan, 1992). Sarah Whatmore (2003) calls this 'the joy of *not* knowing' (p 98); the outcomes, as John Law (2004) lists, can be 'slippery, indistinct, elusive, complex, diffuse, messy, textured, vague, unspecific, confused, disordered, emotional, painful, pleasurable, hopeful, horrific, lost, redeemed, visionary, angelic, demonic, mundane, intuitive, sliding and unpredictable' (p 19). Given the level of discussion and the shifting of positions,

it is overly ambitious to suggest that any attempt to apply a methodology based on research through designing could be definitive. Indeed, a more likely result might be to suggest possible and potentially viable approaches for further inquiry alongside what appear as dead ends.

Confusing as it may seem, this is nonetheless what design-directed research currently is. It is the subject of much debate that shows no signs of resolution. In an inquiry on 'Design as Research', in which the *Journal of Architectural Education* launched a new category of contribution, Lily Chi posed five interrelated questions for designerly research that continue to resonate:

> [First,] in what ways can design work's very specificity and finitude offer a medium of investigation for questions of broad concern? [Second,] how do the creative and discursive interact? [Third,] how does individual imagination figure in the deliberation of sociocultural matters? [Fourth,] what role does the created artefact play in the conjectural process? [Fifth,] how, in short, can design *as design* be practised – and read – as a pursuit of knowledge, understanding? (Chi, 2001, p 250)

She concludes such 'questions invite not definitive answers, but reflection' (ibid). Yet while research through designing is uncertain and potentially risky, the question as to what design-directed research specifically could be remains. It is useful to further break down the issues: first, what dimensions of design are to be used in design-directed research; and second, what form of framework could be used to structure such research?

Designing

The first question, at its most bare, is, 'What is design?' In itself this topic is the subject of much scholarly comment about its form and processes, as well as design's expanding number of disciplinary fields.[3] This question alone sustains the field of design studies.

John Heskett (2002) presents design's syntactical breadth with the statement 'design is to design a design to produce a design' (p 5). In this single sentence, the meaning of design shifts from a disciplinary field, to an active process, to a potential prototype and finally to a fully realised form. Design in this sense is ubiquitous in its use and invocation.

Nonetheless, in terms of design-directed research, its scope can be narrowed. Design is inextricably tied to the notion of making: making products, communications, places and environments; and making marks and futures. For Heskett (2002), design is 'the human capacity to shape and make our environment in ways without precedent in nature, to serve our needs and give meaning to our lives' (p 7). For Simon (1996), it is the means by which we 'change existing situations into preferred ones' (p 112). Design, in each framing, is a process of transformation.

However, perhaps it is not overly useful to labour over different definitions. While each has merit, caution is required in undertaking any prolonged recursive analysis, both because such a task is itself not that designerly and because it suggests an agreed singular understanding of design is required before design's myriad dimensions can be used in research. For this reason, perhaps definitions of design should be considered not as a thesis to be defended but instead as a

point of departure from which to open up diverse design-directed investigations both within and beyond the current realms of landscape architecture research. In such an understanding, the following definition is proposed:

> *Design* is an iterative, associative and synthetic process that attempts to build possibility out of diverse elements.

In this statement, design's processual character – Heskett's (2002) 'to design' – is emphasised. While outcomes, products and archetypes can all be forms of possibility, this definition has as its focus methods of transformation, creativity, making *and* designing. The notion of synthesis is critical. Carter (2004a) states to 're-member' disparity one 'has to be a specialist in alloying' (p 179) and of combining elements together. Like cannot be usefully mixed with like: 'the dialogue has no purchase unless its materials are heterogeneous' (ibid). He cites Heraclitus to evoke this spirit of the synthetic: 'Things which are cut in opposite directions fit together. The fairest harmony is born of things different, and discord is what produces all things … Let us unite wholes and not-wholes, convergence and divergence, harmony and discord of voices' (ibid, p 11). Or, as he also states, 'invention, after all, depends on equivocation – the possibility that something might mean *something else*' (ibid, p 10).

Carter (2004a) terms this sense of emergence from the combination of two elements a 'third apprehension'. Others also articulate this method of hybridisation. Communication designer Bruce Mau calls it the 'third event': something that 'occurs between images' (Mau et al, 2000, p 326). Burroughs and Gysin (1978) call it 'the third mind'. For Whatmore (2003), the interface of the researcher and researched produces a 'third party' (p 99).

It is through such 'alloying' and transformation that new possibilities develop. For architect Peter Eisenman (1999), these possibilities have 'nothing to do with the actual physical character of the form but with something implied in the relationship between forms' and, among other things, may involve 'blurring', 'twisting', 'interweaving' and 'displacing' (p 52). It is in this *process* of building emergence, based on ways to bring together diverse elements, that *designing* is at its most instrumental. Moreover, such emergence is not necessarily sequential – moving from one form to the next and then the next. Multiple and divergent possibilities may develop from a common inquiry. The diverse responses found across design competition entries readily evidence the diversity of design methods, understandings and interpretations that can be enlisted and generated from a single prompt. It is in producing such a spread of possibilities, rather than the resolution of a single outcome, that suggests much depth and productivity for design-directed research.

While design in its professional guises realises its value according to *the designs it produces*, as a method of research inquiry *the process of designing* takes precedence. The former expects a completed, singular production. But in design-directed research, it is the identification of a range of *possibilities,* where it might not be essential for one to be identified as preferable, that is critical. This is where the discipline's research can be more expansive in influence: many multidisciplinary research efforts could benefit from having an expanded range of options developed through design-directed research before being reintroduced as

rich and tangible scenarios ready for further examination using research methods founded in the social sciences, sciences and humanities.

It is the capacity to be continuously melding diverse elements that enables the process of designing to find purchase in many situations. It can readily consider what might happen if a multitude of inks are combined with different paper stocks – or, for that matter, if other newspapers, music, Shakespeare sonnets, maps, buildings or landscapes are similarly 'alloyed'.[4] In this generation of multiple hybrids, and the enhanced options that emerge out of an interconnected and expanded web of possibility, the value of designing as a research method is located.

This paper has suggested that concentrating on formulating an ever more 'precise' definition of design could lessen the opportunity for its qualities to shift during the research process. However, this caution concerning mechanistic processes should not imply design-directed research is a laissez-faire or ad-hoc process. While this paper argues for an experimental orientation towards design methods, it is relevant to consider what frameworks might best structure the fluid qualities of design-directed research so it can be effectively incorporated into programmes of research that not only stimulate the generation of possibility, but also provide points of departure for further iteration.

A case study approach to design-directed research

As previously noted, landscape architecture's diverse spread of concerns across multiple contexts, environments, cultures, forms, methods and meanings indicates a case study approach to design-directed research could be suitable. Francis (2001) states the approach is 'a well-documented and systematic examination of the process, decision-making and outcomes of a project, which is undertaken for the purpose of informing future practice, policy, theory, and/or education' (p 16). To Swaffield (2006, p 26), case studies are a means by which common 'categories', 'typologies' and 'archetypes' might be identified. Generally conducting a case study entails taking a comparable set of contexts, environments or meanings and then, in a matching examination, differentiating attributes in terms of those that are shared, distinctive and/or difficult to evaluate.

A case study approach offers a number of potential advantages. First, it provides sufficient structure to sustain an extensive research programme. Second, provided enough difference can be identified, it is reasonably certain comparisons can be made and conclusions formed. As Law (2004) comments, such methods are 'a system for offering more or less bankable guarantees' (p 9). This is a key reason why case studies are a recommended structure for postgraduate research.

In his approach, Francis (2001) directs a systematic examination of the process and outcomes of a project 'around the type of project, the problem, the geographical region, or the designer' (p 20). Additional categories include 'environmental sensitivity and impact', 'scale', 'infrastructure', 'baseline information' and 'financial' information (ibid). The very nature of a case study is to resist tailoring categorisations to the individual cases, as this makes comparative analysis across case studies difficult. Yet, while case studies can discern difference, there is no assurance that multiple case studies can be brought back together into some form of coherence. Swaffield (2006) identifies this methodological gap: 'what appears to be needed is better synthesis of the conceptually driven approach to critique

that is predominant in the "subjectivist" parts of the [landscape architecture] discipline, with the more empirical stance promoted by Francis' (p 27).

It is in the establishment of specific categories from which to undertake comparative research that findings are effectively locked in. It is not difficult to identify ways design-directed research and particularly its explorative dimensions might be stifled. The tighter the adherence to a predetermined set of categorisations, the more predictable the result – with findings only verifying the diligence with which the method, determined from the outset, has been pursued. For example, Francis (2001) asks each study to enter the names of the 'landscape architect(s)', 'client' and 'consultants'. Even this simple task structures a separation of roles between client and designer. What about the work developed within a participatory design framework (Hester, 2006, 2008)? How can that relationship fit such predetermined categorisations? As Law (2004) compellingly argues, 'simple clear descriptions don't work if what they are describing is not itself very coherent. The very attempt to be clear simply increases the mess' (p 2).

It is apt to reflect on Carter's (2004a) comment that, instead of revealing new understandings, these approaches are adept at extending and intensifying the already known. In Francis' (2001) categories, what is found and validated relates more to the qualities of predetermined typologies and structures than to the context under examination. Inherent is an assumption that the subject of the research is passive, and is to be disciplined by an external and unmodified structure (Cross, 2001).

This deadening of the research subject's instrumentality – of enabling the designing and its productions to interject its own shaping into that being explored – suggests a number of difficulties for a design-directed research framework based on the case study. As Law (2004) notes:

> ... the world is not to be understood in general by adopting a methodological version of auditing. Regularities and standardisations are incredibly powerful tools but they set limits. Indeed, that is part of their double-edged power. And they set even firmer limits when they try to orchestrate themselves hegemonically into purported coherence. (p 6)

This is an observation illustrated by the previous example that distinguishes between landscape architect and client.

A structure for undertaking design-directed research must allow both the method being used and the subject being studied (and the relationship between them) to be contingent on, and modified by, each other. Both are active and both are co-produced. Massey (2003) states:

> ... many imaginations of the field have pictured it as static, as synchronic. A revision of that imaginary would make the field itself dynamic; and it would make field*work* into a relation between two active agents. It would recognise it as a two-way *encounter*. (p 86)

In this sense, a shifting subject interrogates the method with the same vigour as a shifting set of methods tests the subject.

This leads to a critical point for design-directed research, and one that adds necessary complexity. For, if method and context are in an ongoing and mutually transformative dialogue, then where is the researcher to be located? If the negotiation of subjects by different methods is driven by the researcher(s), it follows that in acts of researching (and necessarily designing), a 'co-fabrication'

occurs in which its practice is a 'two-way encounter' and the subjects of research are not without substantive influence. Massey (2003) rejects the default position in which 'the researcher does all the acting while the researched are merely acted on' (p 90) and which structures 'the establishment of a gap in kind between the known and knower' (p 75).

Most research methods depend on a proficiency in the identification of difference: the capacity to demonstrate that this situation, phenomenon or result is different to this other situation, phenomenon or result. However, design-directed research, in terms of methodological approach, depends on its capacity to synthesise, hybridise and bring together such differences in innovative ways. Instead of teasing apart, it seeks to creatively manipulate heterogeneity into further possibility. Moreover, it is not only the context and the methodological framework that suggest these possibilities. In creative disciplines each researcher is an active participant intimately and explicitly involved in the research.[5] Like the landscape in Corner's (1999) model, the instrumentality and particularity of the designer cannot be forgotten or replicated, and arguably should be celebrated as providing a key point of methodological difference for the discipline of landscape architecture.

Just as Corner (1999, p 156) has warned of a scenic lookout separating the viewer from the view – and of the stance and site by which the view is formed remaining unexamined – it is important to be wary of a framework for design-directed research that allows the researcher to be situated outside of the context being examined. Such an approach subdues the instrumentality of landscape, landscape architecture and design that, for instance, Corner's work demands be activated. To structure design-directed research in ways that diminish this agency would inevitably influence the outcomes of design-directed research.

It is contradictory for landscape architecture researchers to argue for a recognition of landscapes' agency (as is now routine) without also enlisting these very same instrumental qualities that the research subject brings on the researcher. Like the designer who is alloyed when designing, the researcher is an active participant that is also able to be alloyed while conducting the research. As Carter (2004b) states, on discussing the field of landscape design, 'to go over the ground, as if for the first time, is not only to possess it, but also to be possessed by it' (p 141). Similarly, Whatmore (2003) notes 'both the scientist and his/her object of study are (re)constituted through the activity of research' (p 97).

The purpose of this section is to argue that a research framework embedded in designing cannot be simply separated from either its subject or the researchers. Neither precedes the other. Like the choreographic pattern formed by a group of dancers, each component is produced within and as part of an iterative and open-ended process that meshes dance, dancer, audience, choreography, environment, sound and light into one (Schön, 1992). It is the emerging form, rather than the cases or typologies with which the researching began, that is the substance of design-directed research:

> [M]ethod is not ... a more or less successful set of procedures for reporting on a given reality. Rather it is performative. It helps produce realities ... It is also creative. It re-works and re-bundles these and as it does so re-crafts realities and creates new versions of the world. It makes new signals and new resonances, new manifestations and new concealments, and it does so continuously. (Law, 2004, p 143)

These methodological considerations are vigorously debated in the humanities and social science disciplines that researchers such as Law, Whatmore, Stengers and Massey work in. However, within design disciplines such issues could be expected to be much less contentious. The ease with which the instrumentality of research subject, research method, research outcomes and researcher is accommodated when designing suggests design-directed research might both receive greatly from and offer much to the disciplines of the above researchers. That is because the embodied role these researchers seek to assign to the researcher clearly describes the immersive dimensions a designer has when designing with communities of interests, contexts and people – where all aspects of the project are actors and agents that are working off, through and with each other.

Perhaps it is still possible to accommodate this interplay between researcher, method and context within a case study approach. For example, rather than analysing a number of cases, an argument for reasons of scope could be made that a single case, whose shape will emerge during the research, will be studied (Swaffield, 1991). Even this paper's discussion of the case study could be considered a specific individual case study. Yet this paper and the case study are at odds in their intent. Rather than seeking synthesis and invention, the underlying purpose of the case study is elsewhere: to organise and compare.

And while a case study method and design-directed research both value heterogeneity and difference, they do so for very different reasons. In design-directed research, the importance of these qualities lies not in how elements can be differentiated but in how they can be *used*. Further, as noted earlier, a key attribute of design is to continually seek opportunities to alloy heterogeneity and equivocation into third elements. Hence design-directed research would take a different approach to the categorical distinction Francis (2001) makes between the landscape architect and client. For example (and creatively alloying Francis' work), what if the client was considered the landscape architect, and the landscape architect the client? What outcomes might result? Or what if both were considered landscape architects, or clients, or consultants or project managers; or the landscape the client, and the client the thing to be designed?

Research trajectories

Possibility in research is (to adopt a phrase by Massey, 2003) 'open and porous and connected by a chain of practices' (p 84). For these reasons, in the context of design-directed research – redolent with agentic conceptions of landscape, designing, method and designer – a different research framework is required. Considered here is the potential of a framework based on the metaphors of trajectory, by examining the trajectory of exploration documented in cartography.

From the maps that record the first European discoveries of Aotearoa New Zealand can be gleaned qualities that come from an unfolding, participatory and creative investigation. They document the journey and discoveries of Abel Janszoon Tasman and his crew of 110 men who travelled from Holland to New Holland and New Zealand in 1642 in the *Heemskerck* and *Zeehaen* (Beaglehole, 1939).

Figure 1 is a map drawn following this journey. Across its base, entering from the west, is a dotted line, horizontal until it is diverted by the land mass

annotated on the map as 'Terre de Diemans' (present-day Tasmania), alongside its discovery date of 24 November 1642. Tasman's route continues, tacking along the southern coast of this land mass, with dates entered at intervals along the way. Once the original latitude of 41 degrees is reached, the dotted line sets off once more horizontally, east until the west coast of 'Nova Zeelandia' is reached. The trace of his journey continues north with various dates in December marked off at intervals until 'Cap. Maria van Diemens' is passed and the dotted line leaves land and heads off.

In this map, it is possible to identify fragments of the now known coastlines of Australia and New Zealand. But what this map also reveals is the movements and decisions of Tasman and his crew in response to their own understanding of a coastline taking shape. Considered as a metaphor for researching, Tasman and his crew (the researchers), along with the various navigational and sailing technologies by which their course is possible, and including their strategy to follow the 41st parallel (their methods), are interrupted by the presence of land (their research subject). In this map, which can be understood as a component of the research outcome, the journey and land are records of each other. While it is obvious that, without their journey, the lands they found would have continued unknown to Europe, it is also the case that, without the land, their investigation and approaches taken would have been similarly altered.

While a contemporary reading of these maps grants the coastline an ipso facto permanence, the findings of Tasman and his crew, as marked on the map, can be read as the almost arbitrary and incidental result of their own particular process of exploring (researching). Hence it is not contentious to suggest that a different captain and crew (researchers) or different vessels and navigational strategies (methods) would have made a different set of discoveries. The route taken could not have been made in the opposite direction. Only by travelling east were they confronted with the choice of going south or north when they reached the west coast of New Zealand. Likewise, because of external factors, such as weather, seas

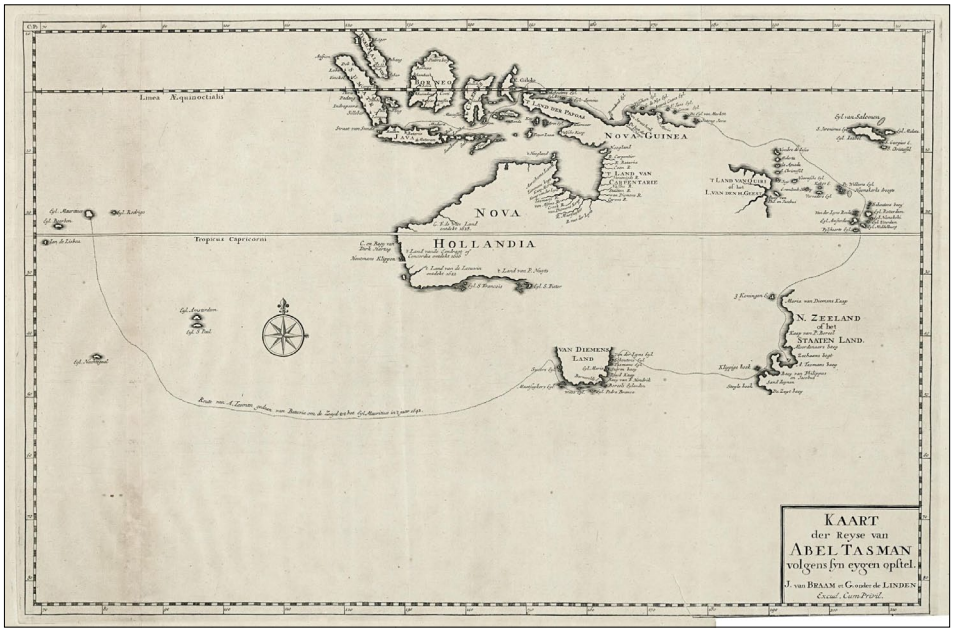

Figure 1: Chart of Tasman's journey, with present-day Tasmania at bottom centre and New Zealand at bottom right (Kaart met de route van Abel Tasman, Anonymous (engraver), J van Braam (publisher), Gerard onder de Linden (publisher) Wikipedia Commons: https://commons.wikimedia.org/wiki/File:AMH-7220-KB_Map_showing_the_route_taken_by_Abel_Tasman.jpg).

and visibility, and personal motivations including the need to rest the crew or to escape 'Moordenaers Baij' where six crew members were killed, the intensity of investigation and manner of 'discoveries' varied according to circumstance (Salmond, 1991).

Tasman's trajectory of travel is not the product of a disciplined adherence to a grid search of an area of the South Pacific. Though sailing along the 41st parallel was a strategy brought to the South Pacific, events, islands and the difficulty that his type of vessel had in making safe harbour caused him to readily change tack. The resulting map gives little sense of organising the lands found. Instead, what is evident is an emergent trajectory produced by the meeting of their intentions and the context they were sailing in and becoming part of. Different choices, different events, different technologies and different directions would have produced a different set of discoveries and a different map for discussion.

In Tasman's particular itinerary can be found a valuable metaphor for design-directed research. Within its cartographic image is woven the co-dependent, non-replicable, particular and iteratively informed meshing of the researcher, their methods and discoveries. All are co-formed and, most importantly, each has been active and instrumental.

Another quality to this trajectory of exploration can be considered. Tasman's findings provided impetus for subsequent routes by other sailors, including Cook in his circumnavigations of New Zealand, which in turn prompted journeys by de Surville, du Fresne, Vancouver and Malaspina (figure 2). As each itinerary is joined to those it follows, a picture of the southern Pacific's islands and coastlines slowly develops that also identifies absences, making each map a provisional prompt for subsequent journeys.

This metaphor of research as a series of interlinked trajectories – as an 'assemblage' of vectors – can be readily applied to design-directed research. It

Figure 2: 1776 Nuove Scoperte ([cartographic material] : fatte nel 1765, 67 e 69 nel : mare del sud / G Zuliani scl ; GV Pasquali, scri, Alexander Turnbull Library Cartographic Collection: https://natlib.govt.nz/records/22004721?search%5Bpath%5D=items&search%5Btext%5D=Nuove+Scoperte+Fatte+nel+1765%2C+67+e+69+nel+Mare+Del+Sud).

celebrates experimentation and inventiveness in ways that do not demand that the form a finding takes is known before setting out into the research. It accepts that such studies are in themselves not routinely sequential.

Carter (2004a), describing his own creative research collaborations, conveys this motile restlessness of designerly inquiry: 'their discourse, giving back to the term its physical sense of running hither and thither, had no origin; its direction, like that of the shuttle, being a product of the forming situation that impelled its motion' (p 5). In this analogy, the shape of the research becomes apparent in its traces of disturbance. Carter also applies a nautical navigational theme and Thomas de Quincey's description of 'the tracks that trading vessels leave in the sea – "so many thousands of captains, commodores, admirals … eternally running up and down it, and scoring lines upon its face." If these ephemeral traces could be preserved the weave of them would yield a pattern' (ibid).

This understanding of research, coming not from prior territorial scoping but from the meeting and ensuing dialogue of multiple trajectories, is a powerful metaphor for design disciplines. In it, the researcher is welcomed (and required) as an explicit part of the research material who, along with their technologies and strategies, becomes enmeshed in the ocean-like and similarly vast and intricate contexts they are navigating. Each trajectory is part of a forming image that is always open to further makings. By definition, the picture is never complete. New arcs are always possible, and inevitable.

Yet no resulting understanding must be simply considered as chaotic. The mid-nineteenth century maps of Matthew Fontaine Maury present Carter's (2004a) analogy in diagrammatic form (figure 3). Based on the ships' logs of vessels plying the Pacific, they map the various courses, speeds and climatic conditions recorded during hundreds of journeys across the same expanse of ocean. Wind speed, wind direction, ocean currents and temperature are all described. In this map, the 'forming situation' is the appearance of a 'concentration of tracks in the trade winds' that builds a rich multidimensional image (Hayes, 1999, p 153).

Within debates regarding design-directed research is an urge for definitions. However, de Maury's maps suggest caution. In his maps, while Hawai'i and the trade routes can be discerned, much is still unclear. Design-directed research as yet appears to have fewer researchers and ship logs to plot possible territories. This is not a discouragement but rather a call for greater time and effort to determine what design-directed research might, and also might not, produce.

This notion of research has an interesting parallel with Massey's (2006) conception of landscape. It can be argued that, just as landscape is always ongoing and emergent, characterised by the intertwining of trajectories, so is research. And just as Massey (2006) considers landscape, therefore, to be an 'event', so too research – especially when undertaken at the meeting point of creativity and landscape – can be a coming together in which a multiplicity of trajectories mesh and evolve from the instrumental and temporal interplay of contexts, methods and researchers: in which, as Isabel Stengers states, 'all parties assembled in the research process, researcher and researched, bodies and texts, instruments and fields, condition each other and collectively constitute the knowledge event' (cited in Whatmore, 2003, p 95).

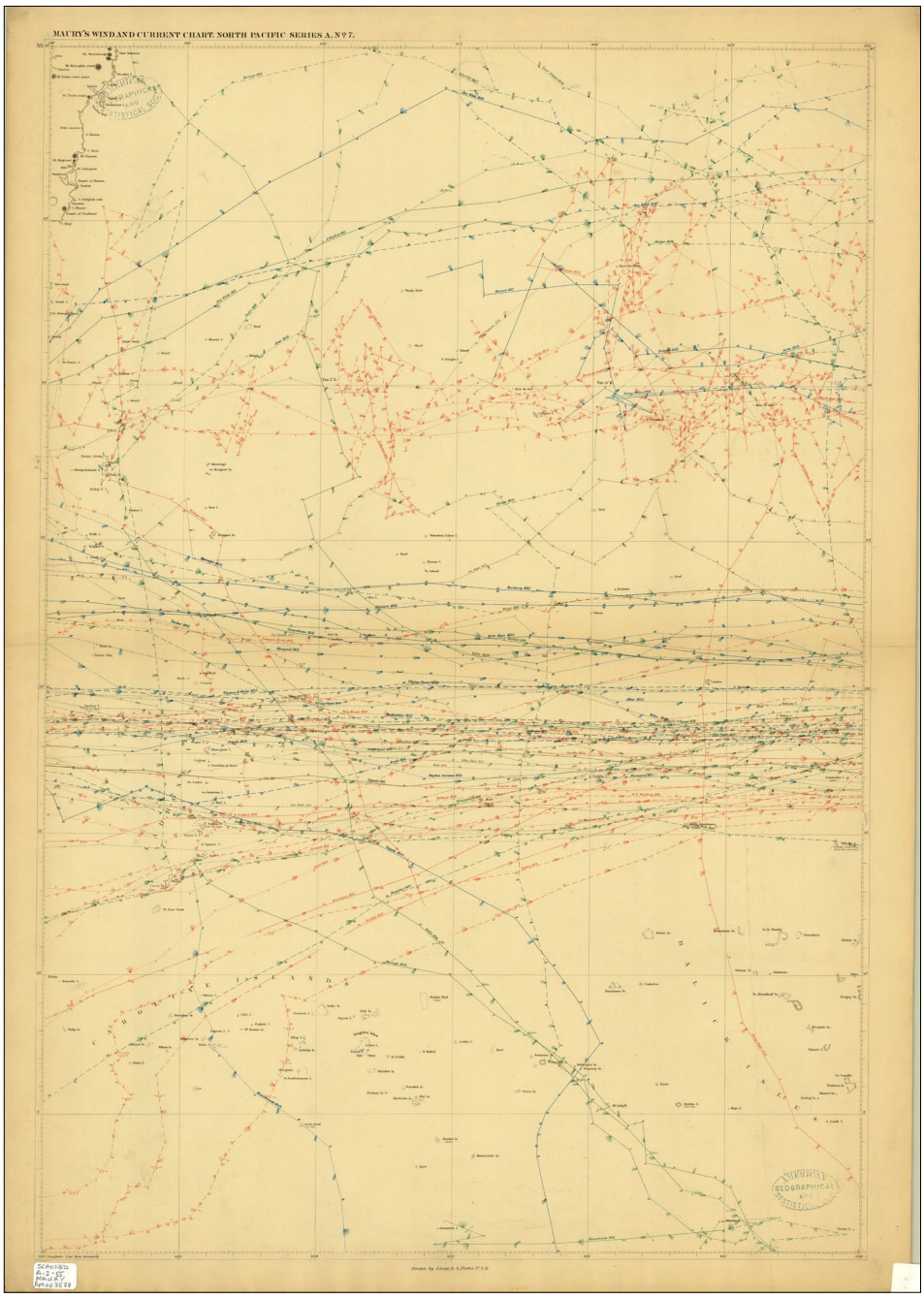

Figure 3: Matthew Fontaine Maury's 1852 Wind and Current Chart for North Pacific series A, no. 7 (American Geographical Society Library Digital Map Collection: https://collections.lib.uwm.edu/digital/collection/agdm/id/1729/rec/6).

The purpose of design-directed research

This examination of the trajectory leads to a final question about the value of design-directed research's findings. Swaffield (2006) highlights this issue in stating, 'an argument can also be made that researchers and scholars who wish to claim "design" as research have an obligation … to explain in plain language what new knowledge their work has created' (p 26). Arguably Swaffield's (2006) framing of 'design' is somewhat different syntactically. His statement and subsequent discussion understand design as a noun, bound up in a finished outcome, the point of contention related to claims of such work embodying research. But what of design as a method of research, as a process that is focused on those acts of designing for which this paper articulates a case?

Carter's (2004a) detailed discussion is again helpful. Creative research does not produce straightforward answers. Instead, as Carter notes:

> [C]reative research, respecting the materiality of thought – its localisation in the act of invention – has a different object. It studies complexity and it defends complex systems of communication against over-simplification. It explores the irreducible heterogeneity of cultural identity, the always unfinished process of making and remaking ourselves through our symbolic forms. Its success cannot be measured in terms of simplification and closure. Exploring the reinvention of social relations at that place does not produce a 'discovery' that can be generalised and patented. It is an *imaginative breakthrough*, which announces locally different forms of sociability, environmental interactivity and collective storytelling. (Carter, 2004a, p 13)

While creativity and design are often understood by their production of form-based outcomes, the 'imaginative breakthroughs' Carter (2004a) calls for are embedded less in the methods used and artefacts generated and more in the conceptual possibility those methods and artefacts enable. In this sense, what designing 'produces' should not be seen as solving a problem (such as Owen would advocate) but rather as generating the *pivot points* by which 'breakthroughs' are triggered.[6] Consequently its function is not to bring closure, but to instead open up its material so a myriad of prospects becomes possible. Law (2004) notes, in this orientation, 'the ability to pose the questions is at least as important as any particular answers we might come up with' (p 151). Rather than aspiring to identify firm intellectual ground to settle, the goal of such work is to identify where to continue or, as Carter (2004a) puts it, 'make possible a new conversation' (p 5).

In many senses, an inquiry directed by the use of design methods is often going over already tilled ground. But just as novel technologies are capable of extracting gold from already processed tailings, the anticipation is that newly emergent methods could offer possibility where other academic disciplines have moved on.

It is important not to infer that designing alone might best engage with creative research. Law, Whatmore, Massey, Ingold and others who work in the humanities and social sciences similarly seek to incorporate creativity into their research. The point, however, is that research methodologies that enlist designing and creativity have a natural home in the design disciplines such as landscape architecture. Arguably, only from such an intimate stance of designing's multiple dimensions can a case for the playful synthesis of other researchers' findings be readily justified and encouraged, and skilfully undertaken.

Opportunities for designing within wider university research settings continue to be significant, given the seemingly singular focus to date on analytical modes in preference to synthetic modes of research. Research from within the humanities, sciences and social sciences that examines pressing concerns related to identity, environment, urbanity and the anthropocene is a rich site for the design imperative that underpins landscape architecture. Similarly, design can underpin landscape architecture's body of research, in which imaginative possibilities emerge from creative processes that explicitly 'alloy', 'hybridise', 'meld' and 'synthesise' elements drawn from other positions, locations and practices.

NOTES

1 Obvious exceptions exist, of course, including Halprin (1965) and more recently Berger et al (2003), Corner (1997), Dee and Fine (2005), and Getch-Clark (2005).

2 See the 'Refereed Studio' themed issues of *Landscape Review* – volumes 5(2) and 8(1) – and also *Journal of Architectural Education* volumes 54(4) and 61(1).

3 Even using the crudest measure of references in the Google search engine, a search for the term 'design' returns 'about' 1,470,000,000 website uses.

4 For example, Burroughs and Gysin join texts by Rimbaud and Shakespeare and splice taped sounds to generate unpredictable outcomes. For further applications of this approach, see Burroughs and Gysin (1978) and Sobieszek and Burroughs (1996).

5 Action Research can be considered to grapple with similar concerns in that it also considers the instrumental role of the researcher in shaping the research context. See, for example, Heron and Reason (2008).

6 It has been proposed that scenarios that provide designerly inquiry have the greatest effect: see Jonas (2001), Evans (2005), Irmak (2005) and van der Heijden (2005). As a process, such an approach has the ability to generate a rich set of choices; however, Carter's call shifts the emphasis from the means by which design might operate, like through the use of scenarios, and the purpose of this and other approaches – namely to achieve imaginative breakthroughs.

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Conjectural 'Landscape Cities' and the Gap of Imagination

MICK ABBOTT, PAUL RONCKEN[1], WOODY LEE[2] AND TENILLE PICKETT[3]

This report discusses the results and layout of a design research studio focused on applying methods related to speculation and imagination. Three main findings are presented: a review of six methods that can direct designerly speculations; development of 11 'landscape city' scenarios; and a discussion of the role design 'challenges' can play in studio research settings. These outcomes reveal that creative discoveries are not bound to elaborative final outcomes only. Some of the intermediate results, particularly those with explicit habit-breaking effects on the imagination of the designers involved, and the process-driven materials produced, are equally valuable. This report seeks a reconsideration of the presentation and sharing of research results through designing, moving from the familiar focus on high-end, 'glossy' finalisations towards those more revealing of intermediate and abstract products of inquiry. In conclusion, an argument is made as to what can be framed as an 'imagination gap' that suggests possibility operates as a counterpoint to empiricism.

Corresponding author:
Mick Abbott is Associate Professor and Director Landscope DesignLab, School of Landscape Architecture, PO Box 85084, Lincoln University, Christchurch 7647, Canterbury, Aotearoa New Zealand.
Telephone: +64–2040–016–921
Email: mick.abbott@lincoln.ac.nz

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Landscape architecture has a speculative role in imagining diverse, innovative and environmentally responsive futures (Waldheim, 2012; Weller, 2009). In its research, the discipline is prone to critique by a scientific community that either disqualifies speculative approaches or does not know how to assess the associative imaginations on which most design processes depend. Such critique is constructive as it urges clarification of what is both unique and systematic about design-directed research.

As part of an examination of this capacity we, as a group of researchers spanning both contexts (from Lincoln University, New Zealand and Wageningen University, Netherlands), proposed an imaginative question: how could Canterbury, New Zealand – with its current population of 600,000 people and an area equal to that of the Netherlands – flourish if its population was similar in size to the Netherlands' 16 million people?

The parallels between Canterbury and the Netherlands presented a number of possibilities for the research studio. First, as noted above, the two places are similar in total area. Likewise both places rely on agriculture-driven economies, particularly dairy, which is vulnerable to rapidly changing requirements to mitigate environmental impacts (McKnight, 2013). However, unlike Canterbury, the Netherlands has an explicit urban focus and a much larger population, which in turn is connected to the infrastructure networks and dense populations of neighbouring countries. These twinned possibilities of similarity and difference drove the development of a more specific research question: what forms of dwelling and integrative landscapes might develop if the Canterbury region was inhabited by 16 million people?

REPORT

Responding to this question required challenging the prevailing, yet often limiting paradigm of New World landscapes: that intensively farmed landscapes and landscapes of outstanding natural significance cannot be located at the same site (Macfie, 2016); that places of beauty cannot be places of industry and economic success; and that places of high production cannot be ecologically rich (Abbott et al, 2018). Using design, we sought to identify landscape forms in which ecological integrity and prosperity could be mutually achieved.

Provisional findings focus on three aspects of the research: an expanding typology of design methods in academic research; landscape typologies that might afford potential for urban form; and an assessment of the role of design-directed research within academic inquiry.

The design studio

The role of the design studio has been the subject of examination in terms of its suitable scope and the manner of findings that result (Abbott and Bowring, 2018). This study operated on an understanding that different studio structures, which considered the range of tasks, types of activity in terms of individual and collaborative design work, and the order and tempo of sequencing, have the capacity to instrumentally shape the content and form of findings.

The study developed within a five-week immersive design research studio that involved 12 senior landscape architecture students and four academic staff, who together examined the overarching research question. Throughout the studio, the knowledge space was concentrated on generating and extending the spread of possibilities, rather than seeking a single solution. This located the studio within a 'material thinking' paradigm that seeks, as Paul Carter (2004) observes, to 'make possible a new conversation' (p 5).

Processes of designing provided the core tools and focus for the studio, with strategies and methods tuned to ensure prolific outputs that were rich in form, content and variance. In addition, the processes were content to remain in a provisional space that, in John Law's (1999) words, 'lies in a modest willingness to live, to know, and to practice in the complexities of tension' (p 12). This included use of a rotating structuring of both the design teams and their respective tasks as an explicit device to seek out innovative and unpredictable outcomes. Throughout, a process of reflective practice was employed (Schön, 1992) as a means to: examine the role of specific design methods used in the research; review the forms of 'landscape cities' generated through these methods; and consider the manner in which designing can direct and shape academic research and the ways it is framed.

Design methods

The following methods of designing were identified as instrumental in generating a spread of 'landscape city' forms.

Design and critique

Iterative cycles of *design and critique* allowed the rapid and prolific generation of a spread of key concepts (figure 1). The approach involved providing teams of three to four designers with different design challenges that had to be rapidly designed into the same landscape setting. After 60 to 90 minutes these findings were critiqued by other groups.

Figure 1: Design and critique cycles at work. (Image: Tenille Pickett.)

This critique was approached in two ways. At times the individual designer/researcher would examine the design process work and outputs from their own individual positions. At other times they would take an explicit position based on a specific, previously studied, framing of landscape. For instance, Massey's framing of 'landscape as an event' (2005), Ingold's articulation of 'landscape as a never ending conversation' (2000), Meyer's placing of aesthetics and 'sustaining beauty' (2008), Nassauer's 'cues to care' (1995), Roncken's 'fremdkorper' (Roncken et al, 2014) and Abbott's 'being landscape' (2011) were each used as specific positions from which to critique and subsequently design. In this process, formative design work, provisional outcomes and critique melded, with identification of both gaps in the outcomes and opportunities to develop a contrasting position, so a different mix of designers could take these as prompts for further design development.

Scenario generation

Scenario generation was used to generate further themes throughout the studio. Jonas (2001) argues futures can be engaged in three interconnected ways. The first approach 'forecasts' the future, as a continuation of past trajectories already under way. The second articulates a single future position that, through planning and management mechanisms, is then 'backcast' to identify the necessary steps to ensure its achievement. The third approach, which was the primary focus of this method, is based on building scenarios of the future – 'images of possible, probable, or preferable futures or futures to be avoided' (ibid, p 76). In this design's task is the creation of a number of potential futures 'in different directions and time scales' (ibid, p 66). This positioning resists a sense of closure and completeness in both processes and provisional outcomes so that its multiple forms can maintain their generativity and sense of possibility. Such scenarios could be expressed graphically, schematically and in text-based form (figure 2).

It was during this phase that the metaphor of 'landscape cities' was used and developed as a means to ensure a wide spread of options. Inspired by Italo Calvino's (1974) presentation of his *Invisible Cities*, the deliberately hybrid term of 'landscape cities' prompted the forced association of urban density requirements with dominant landscape forms and uses in the Canterbury region (figure 3).

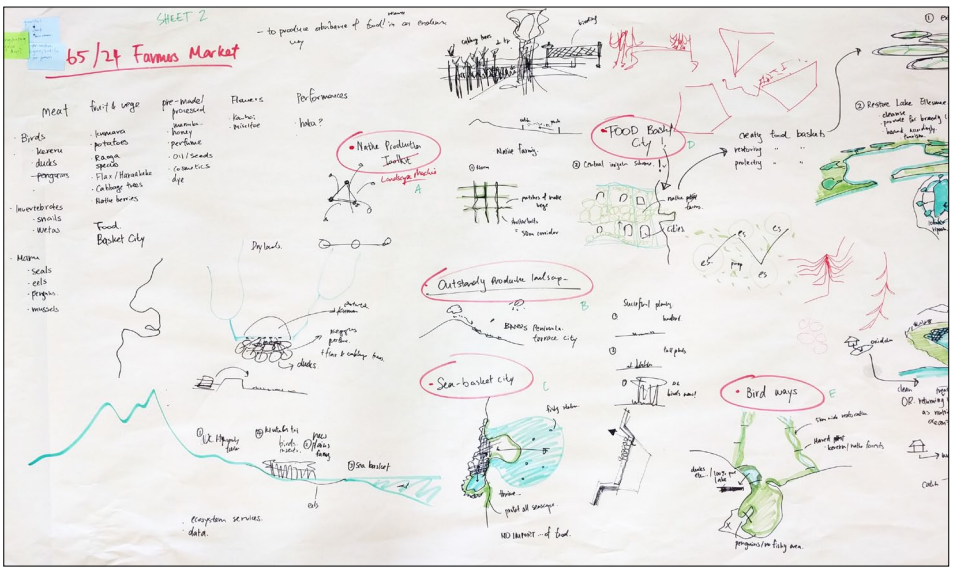

Figure 2: This scenario imagines a farmers' market extended across a wide landscape and running 24/7 and 365 days a year. (Image: Woody Lee and Tenille Pickett.)

Manifesto making

Within design disciplines is a tendency to make declarative statements concerning the products and processes of design (Meyer, 2008; Weller and Hands, 2014). A process of *manifesto making* was used to frame desirable, positivist outcomes that each scenario might achieve, even if no mechanism for delivering this attribute had yet been identified (figure 4). Its purpose was twofold: first as a tool for reflecting on an already developed scenario's potential and usefulness; and second as a design prompt to stimulate the further designing of landscapes, interactions, behaviours and changed understandings.

Thick inventory

A *thick inventory* method allows inclusion of a variety of cultural aspects (Geertz, 1994) that could more strongly support the melding of ecological, agrarian, recreational and urban aspects. This provided a more elaborative approach to building an inventory of the qualities of the existing landscape as first identified by McHarg and Mumford (1969). This includes four categories that synthesise into a thick inventory: to examine what it is that *confines* different landscape types; to examine what external influences cause these landscape types to be *open* at the same time (for example, economy or migration); to examine what previous characteristics of human behaviour have affected the landscape (the current and previous *ontic* state of the landscape); and to examine what *systemic* interactions determine the current 'steady state' of the included ecological systems (Roncken et al, 2014).

Projective densities

A process of designing *projective densities* prompted the development of diverse landscape forms that could generate productive landscape values within a mix of population densities. Here, a typology of built forms was incorporated into an ecological milieu. In this process, landscape was examined as both the generator and the expression of changing population densities meeting diverse 'landscape city' types.

Figure 3: Selected 'landscape city' scenarios. (Images: Top – Christine Skipworth, Ellie Helliwell, Jorden Derecourt; Middle – Ryan Satria, Tom Steck, Fraser Graham; Bottom – Mees Van Wagtendonk, Mingrong Zhang, Heath Melville.)

For instance, in this process a matrix of low, medium and high habitat densities was examined for the ways these different densities might beneficially intensify attributes such as aquifers, forests, braided rivers, drylands and shrublands. These forms were then experimentally mapped onto prospective sites at those sections of the Canterbury landscape that supported the different 'landscape city' types (figure 5).

Game board

Game board processes allowed this exploration of habitat forms to be extended into the generation of conglomerate 'landscape cities'. Here four 'landscape cities' were played out over an environment through a process of using dice to randomly generate the city density level (and accompanying form). This went in turn with each city champion locating their diced city mix onto sites that might best support the desired functions of their specific city mix. Through this process it quickly became apparent which 'landscape city' forms and respective densities worked synergistically with other 'landscape city' forms and densities, and also those that were more isolationist in their constitution (figure 6).

This design process expresses the fractal qualities that the mathematician Benoit Mandelbrot (1983) developed. He concluded – following efforts to mathematically describe the coastline of Britain – that its form is an infinite edge made up of 'turns, returns etc' at every scale. From this process, distinctive landscape patterns emerged that became the subject of further study.

This suite of six methods reveals ways designing can generate innovative, interconnected and complex outcomes within speculative inquiry. When worked in combination, including by establishing different tempos of activity among and across different collaborative groupings, it can usefully direct and structure design activity across scales, settings, programmes and skill sets.

Figure 4: Left: 'The whale opera' manifesto describes an event taking place within 'Lively Harbour City'. (Image: Fraser Graham.)
Right: The 'National Park City' presents six key drivers that articulate that city's essence. (Image: Hannah Wilson.)

'Landscape cities'

As noted, Italo Calvino's (1974) presentation of his *Invisible Cities* generated a range of 'landscape city' forms that in turn seeks to imagine ways landscape can be a direct generator of habitat and urban form, and fecund in terms of both productivity and biodiversity. Throughout the process, these 'landscape cities' have maintained an emergent and morphing quality with the 11 identified below provisional in mix and content.

The *Coastal City* imagines a beach-dweller people whose lives are shaped by the sand, the wind and the water. This inherent unpredictability provides residents with the daily, seasonal routine of perpetual adaptation and readaptation in this constantly changing landscape.

The residents of the *Tree City* live within a vertical natural world in which cycles of planting and harvesting materials match people and resources in a virtuous system that generates a deep awareness of the forest.

The *Drylands City* exists in a resource-sensitive environment in which water is made precious by its scarcity.

The *Lively Harbour City* is more pleasant than pressured. Its inhabitants draw and express their identity from the birds and wildlife.

The *Braided River City* draws its life from the river's changing banks and seasonal changes in water levels.

A highly developed permaculture system underpins *Aquifer City* with a keen focus on innovative food production.

The brackish water margin provides the opportunity for *River Mouth City*'s tidal aquaculture.

The *Wetland City* is rich in food and other resources, with water providing its foundations.

Alpine City seeks its locations in remote valleys and on steps above the more productive valley floor. Gondolas rather than roads provide connectivity and some core services move from place to place across the day.

Irrigation City is not just about living with water, but also about using innovative technologies and growing structures. These structures include hydroponic food webs that are suspended between buildings and are harvested by drones.

National Park City is a place made by volunteers for volunteers. It is a landscape that enables human survival and nature conservation such that the more people that inhabit it, the better the environmental outcomes are.

Figure 5: A map of Canterbury identifying a diverse set of 10 x 10 kilometre areas (Image: Tenille Pickett.)

The above 'landscape cities' establish opportunities for subsequently interrogating the manner and effectiveness of the activities, economies, food production, ecosystem services, scales and connectivity they afford. Each takes the form of a hypothesis that, rather than setting out a position to be defended, becomes a tool from which to find firmer ground. Designing becomes a tool for exploration rather than resolution as alternative expressions are teased out.

Design challenges

In this study, creative processes operated within the well-known pedagogical structure of the reflective practitioner and studio (Schön, 1985). In line with Dewey's (1938) understanding, learning is related to social response and communication that is established through dynamically creating experience (Lund, 2015). Design competitions set stimulating challenges as a means to provoke and shift notions in design thinking (for example, Parc de la Villette (1982–1983) and Parc Downsview Park (2000)). On a superficial level, a competition offers a contested mode, time pressure and a collaborative structure that allows fresh relationships to be built. Similar conditions are present in landscape architecture education, in which design briefs are formulated as challenges that can manifest the creative talents of the participants. The word 'challenge' is different to the conventional 'objective' (or 'aim') used in other scientific communities, with the latter arguably closely matched to expected forms of 'research methods' (Deming and Swaffield, 2011; Lenzholzer et al, 2013; van den Brink et al, 2016).

The formulation of an 'objective', whatever the qualities of the person involved, should follow predetermined and predefined research methods and procedures. By general scientific demands, the same results would be found independent of the person involved. In designing, however, the personality and personal capacity (for example, creativity) of the designer also direct the outcomes of

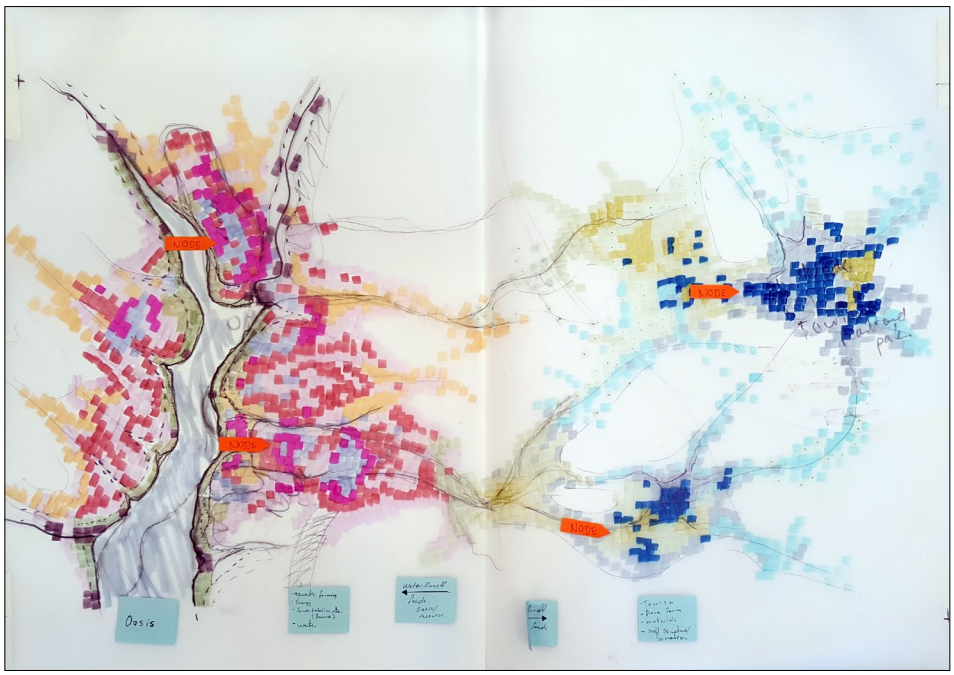

Figure 6: Landscape cities game board development. (Image: Tenille Pickett.)

the investigation (Deming and Swaffield, 2011, p 8). This reflexive approach includes the effect of the personality or presence of the researcher on what is being investigated and vice versa. Further, in design, any initial objective will change and be modified during the design process, as this provisionality is one of the consequences of creative explorations. In the 'landscape cities' research studio, a series of very different design processes allowed participants to both individually and at times collaboratively discover, test and consciously direct the ways their personality and creative capacities could shape and be shaped by the design 'challenge'. In the process, both design and designer were shaped. As a result, we have observed if a key research 'objective' is to provoke discoveries, then a key design 'challenge' is to stimulate and progress the creative capacities of the designer and design-team involved.

A similar approach of challenging landscape was also adopted. The second aspect is to recognise landscape architecture's capacities to integrate natural, technological and cultural components. Instead of focusing on one specific natural or technological or cultural objective, a landscape design challenge can address the synthesising potential of all three components. In the 'landscape cities' studio, imaginative 'what if' scenarios were used to consciously modulate different mixes of natural, technological and cultural component. Their intent was located as a means to, as Dunne and Raby formulate:

> … open up spaces of debate and discussion thereby they are by necessity provocative, intentionally simplified, and fictional. Their fictional nature requires viewers to suspend their disbelief and allow their imaginations to wander, to momentarily forget how things are now, and wonder how things could be. (Dunne and Raby, 2013, p 3)

This helps further differentiate between a research objective and a design challenge. A typical scientific objective is not served by 'forgetting how things are' but rather seeks to understand and clarify how things are. The permission to

imaginatively wander that Dunne and Raby advocate for is 'to open up spaces of debate and discussion' (ibid). In this, designing cannot lay claim to an objectivity that still prevails in some scientific domains. Design explicitly addresses the alignment of the subjective and the objective by provoking the speculative and the fictional within a full spectrum of possibility.

Design's position in this research does not signal a rejection of its many other forms, such as its capacity to efficiently solve perceived problems (Owen, 2001). Nevertheless, the type of landscape design articulated here suggests a discipline with design tools that can generate, meld and condense complex, integral and large-scale landscapes in ways that envision future-and-imaginative-and-provocative expressions of living systems that integrate a full spectrum of the urban, rural and wild. Linked to this is an advocacy for forms of research that both: increase the capacity of the designer and design teams beyond default settings as an explicit mechanism to provoke discovery; and critically (re-)align landscape's natural, technological and cultural dimensions through the use of designing as a tool for discovery.

NOTES

1 Paul Roncken is Assistant Professor, Landscape Architecture Group, Wageningen University, PO Box 47 6700 AA Wageningen, The Netherlands.
Telephone: +31–317–482–090; email: paul.roncken@wur.nl.

2 Woody Lee is Landscape Architect and Designer, Landscope DesignLab, School of Landscape Architecture, PO Box 85084, Lincoln University, Christchurch 7647, Canterbury, Aotearoa New Zealand.
Telephone: +64–3–423–0475; email: woody.lee@lincoln.ac.nz.

3 Tenille Pickett is Tutor and Landscape Architect, Landscope DesignLab, School of Landscape Architecture, PO Box 85084, Lincoln University, Christchurch 7647, Canterbury, Aotearoa New Zealand.
Telephone: +64–3–423–0475; email: tenille.pickett@lincoln.ac.nz.

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Addendum

Benjamin H George, the author identified for the article 'Barriers to the Adoption of Online Design Education within Collegiate Landscape Architecture Programmes in North America' published in issue 17(1), has requested that the following authors be added:

Brett Shelton, Department Head, Department of Educational Technology, Boise State University, Boise, Idaho, United States of America.

Andrew Walker, Department Head, Department of Instructional Technology and Learning Sciences, Utah State University, Logan, Utah, United States of America.