KNOWING FROM THE INSIDE

An Unfinished Compendium of Materials

Edited by Rachel Harkness

Rachel Harkness

ISBN: 978-1-85752-060-6
Published by the University of Aberdeen

knowingfromtheinside.org

This book has been produced as part of the project: *Knowing from the Inside: Anthropology, Art, Architecture and Design* funded by the European Research Council (ERC) and hosted at the University of Aberdeen.
First Published: Aberdeen, 2017

Design: Neil McGuire / After the News

AIR

Becomes Breath Becomes Song Becomes Air

Caroline Gatt

"But if you ask where does the substance [of trees] come from … where do they come from? Do trees come out of the air? They surely come out of the ground. No they come of the *air*" (Richard Feynman 1983[1])

Like Feynman's fascination with how the tree comes to be constituted by carbon drawn from the air, anthropologists have always been interested in understanding how we humans come to be what we are. In other words how we are constituted. In recent discussions the processes of being a living body have been described as "becoming sensitive, embodying atmospheres, somatically judging environments, or becoming corporeally aware of nonhumans" (Shapiro 2015: 369).

Where these recent works differ to Feynman's interest in the constitution of the tree, is that these scholars, like anthropologists, include human *experience* in their accounts. In an anthropological account of human constitution then what we have is a body in life, not just a body. So if we understand air, as breath, as one of the flows between a body in life and the world, how could we follow or study the process of constitution that this entails?

In trees for instance, constitutional processes can be followed in the grain of the wood. Likewise the developmental traces of the human body, such as growth cycles and disease, can be followed in bone, diet in teeth; atmospheric chemicals in hair and skin, and so on, and much more.

However, to find ways of studying these constitutional traces in *living experience* is not as straightforward as reading the grain of our bones. We can only see the grain of wood once the wood has been cut open. Daily forms of memory and recall provide some insight to our constitutional experiences. However becoming aware of the multitude of relationships that are presently generating who we are is quite a different thing. And there is an incongruence in attempting to account for a multiplicity of constitutional relations when searching for an awareness of ongoing life as it emerges.

In this brief reflection I focus on the work of song-action in my collaboration with Gey Pin Ang in our work in experimental theatre and anthropology. Ang and I have been working together in a collaborative process as part of a project called "Knowing from the Inside", based at the University of Aberdeen.

Vent frais

In pre-socratic theories, perception was understood as the passage of, or the meeting of films, of effluences. The historian of philosophy Hamlyn tells us that for Democritus (460BCE – 370BCE) all bodies, including human bodies and all things, give off atoms in the form of effluences (εἴδωλα – literally images) (1961: 8). The effluences of a thing and effluences of the eye meet each other and form an impression in the air, it is this impression, or image, which enters the eye and generates vision. Although very different in character to these effluences, meeting and forming and re-entering all things, for the Stoics pneuma πνεῦμα is an all-pervasive force that keeps the world from disintegrating. The entire cosmos breathes in and out (Horky 2016). As dualism begins to take ascendance, however, 'image' later becomes associated with Platonic forms, ideas existing in a realm separate from the material, no longer emerging from things as 'atomic' effluences (Hamlyn 1961). Equally the cosmos no longer breathes.

Air becomes implicitly understood as the most insubstantial of all materials (Irigary 1999). At least for the 'moderns' (Latour 1993) striving to order the world in terms of substance and spirit, or the material and the ideational, air is invisible save for the effects of wind.

1 https://www.youtube.com/watch?v=ifk6iuLQk28 accessed on 6th April 2017.

Vent du matin

More recently, the philosopher Luce Irigary (1999) has taken phenomenology to task for the forgetting of air; what she calls the 'forgotten material mediation' between body and world. Levinas turns to breathing in his radical ethics, his *pneumatism*, to allude to "a reciprocal contamination that opens everyone to the other in the vital act of respiration itself" (cited in Cavarero 2005: 31). Yet, still today scholars of experience need to be reminded that without air life itself would not be possible (Ingold 2015). At least not life making its way along and through the ground or in the skies, and some in the oceans of course. We have known since the 1600s that some extremophiles thrive without air or any of its components, but except for these surprising creatures air is essential not least as breath. And breath has the uncanny ability to be taken into our bodies, travel around and then be expressed or transpired, creating a circulatory system, an inner ventilation that is both personal and shared.

When air becomes breath its subtlety inspires, etymologically literally to breathe in. Air inspires life, the first breath signalling new life; the last breath the end of life.

Vent qui souffle au somme des grand pins

Air as breath as air can be silent, but it can also be voiced. Ethnographies from around the world attest to the power people sense in voice because of its link to breath and an animating principle. Song especially is also closely related to healing and the restoration of life. In Marina Roseman's (1991) ethnography of the Senoi Temiar, a rainforest dwelling people in Malaysia, the healing songs of the mediums are paths. Paths followed by the spirits in their search of the landscape for the patient's headsoul. But also the places in the jungle where the upper-body portions of plants met with the medium and gave them the actual songs. Songs are paths and made along paths.

Air can be made to resonate in different parts of the human body, to follow paths inside the singer, not only out in the world. What is called the Oxbridge form of choral singing uses resonators high in the body, mainly the head, but not the nasal cavity. The head resonator is appropriately intellectual, as far up in the body and away from the ground as possible. Some musicologists and directors (such as Marcel Pérès, Ensemble Organum and Björn Schmelzer of Graindelavoiz) have reacted against this and search for other singing traditions that they consider to be more grounded (Horvitz 2010). Beyond resonating forms within the body, song moves the whole person.

In a short video about her work with Haitian songs Maud Robart says

> ç'a bouge, ç'a bouge les choses, ç'a bouge les formes des pensées, ç'a bouge les emotions, ç'a bouge quell que chose dans le corps même la nuit après le travail il continue. Le corps continue a danser dans le lit, parceque sont des dances qui reveillent quell que choses comme, s'address quell que chose qu'on en pourrai dire encore instinctuelle, alors ç'a continue, jà, la personne humaine dans sont totalité, est touché, est bougie[2]

Grotowski worked in great depth with Robart on vibrational song. In Grotowski's work, vibrational song is an epistemic tool with which the singer can pay attention to breath during singing in a way that elicits a person's constitutive histories. According to Grotowski we can recognise vibrational songs because they have persisted over the

2 http://www.marcpetitjean.fr/films/maud-robart-la-source-du-chant/ accessed 15th June 2016 "It moves, it moves things, it moves forms of thought, it moves emotions, it moves something in the body, so that when one is asleep at night the work continues in one's sleep. The body continues to dance in one's bed, because they are songs that wake something up, they call up something that we could call still instinctive. So this continues, the human person in their totality is touched, moved." (Author's own transliteration and translation, any errors or misinterpretations are my own).

centuries (Grotowski 1997). These songs embody particular resonances that move the people who sing them and that is the reason for their persistence. These songs awaken those who sing them, or who allow them to be sung through them. Through these songs the singer can perceive the atmospheres in which they were made (*ibid*).

In a keynote at the Association of Social Anthropologists (ASA) meeting in Bristol in 2009, Ingold depicted an imaginary future ASA meeting in 2053, where future archaeologists and anthropologists no longer held that the 'past' was long gone, something no longer accessible in the present. Rather these future archaeologists and anthropologists engaged in

> a science of life whose overriding concern is to *follow what is going on*, within dynamic fields of relationships wherein the forms of beings and things are generated and held in place. (Ingold 2013: 77)

Ingold was arguing here against a particular understanding of time. Specifically Rankean history, in which the past is a foreign country. In this temporality, 'occurrences' are 'deposited' at successive moments while times carries on. Alternatively he suggests, we could understand time as duration, where change is *immanent* in things. In this temporality the past is not any older or more ancient than the present, 'the past' is itself 'constitutive of that very movement'. This is a temporality of emergence, in the sense that past relations are all present in the current constitution of things. This temporality of emergence might shed light on Grotowski's claims about the ancient resonances in songs. But further, in agreement with emergence approaches such as Ingold's, experimental theatre has a very simple hope. It is about what is alive, and knowing that what is alive is in constant transformation. The training carried out by these theatre makers is aimed at developing awareness of these ongoing processes of transformation, and therefore of constitution. So I ask again, how could we perceive these constitutive paths that song and breath awaken?

Joie de vent qui souffle

Gey Pin Ang is a Singaporean theatre-maker who has worked in Europe, North and South America, and Asia. For almost ten years she was a lead actress at the Jerzy Grotowski and Thomas Richards Workcentre in Pontedera in Italy. After that she embarked on her own enquiry about the artist's intuition and creativity through the discipline of Taijiquan and what she calls 'the songs of her tradition'.

In 2006 she founded a platform for performers called 'Sourcing Within'. She called her platform 'Sourcing Within' in reference to the search for encounters with one's own heritage, one's ancestors, one's memories. During one of the workshops she gave before we began our collaboration, a participant asked her about the body-voice connection.

Ang's paraphrased response:

> Having suggested that the voice lives everywhere in the body, she conveyed its ever-changing flow through the image of personal associations rooted in one's lived experience and memory, including what one thinks one has forgotten. Ang inferred that vocal work entails a confrontation with oneself because the voice is composed of our imagination, desires and personal experiences. Including what we don't want to remember, which can create tensions in the body in the form of muscular contractions that can block the flow of the voice. What is developed is an embodied awareness of this very delicate and ever-changing process.

Ang compared this process to a journey leading to a memory, an association, and insisted that although these may be linked to the past, they affect us in the present moment. She noted that it takes a lot of work for space to open within the body so that the voice can flow, and

it takes a lot of time to discover in the voice what she described as another little universe.

Gesturing to her body as she spoke about this space, Ang evoked the image of flowing water passing underneath a rock, then becoming a little stream, going with the current, and then against the current, perhaps due to some tension in the body which might be related to something never before expressed, generating a struggle with oneself, and then, in time, leading to a great sense of release. Ang cautioned, however, that blocks in the body change from day to day, so that it is never possible to repeat the same thing, hence the necessity to search anew every time.

She added that while in her teaching she guides participants in this search, each person has to engage in it on their own by sharpening their senses to be able to see, to hear, the changes happening beneath the skin.
(Magnat 2015: 143)

The relation between voiced breath and these changes can be heard in the quality of the sound. Even listening to that song is a matter of constitutional histories, or as Feld puts it in his acoustemology, attending to this constitutive path is a "reflexive feedback between sounding and listening" to breath (2015). Here is a practice where listening to breath in song is always an explicit listening to relational histories of listening *(ibid)*.

Every place has a particular make-up of air, not separated off, but fluidly distinct, as with currents of saltier water in the sea. The different characteristics of a place become partners in the way breath vibrates in each different instance of song. Even when working alone, the singer comes to work with the walls, the floors, the different densities and shapes of their own body, the air and energies that they direct through breath and action specifically as creative partners (Tatinge Nascimento 2010: 88).

The self in these experimental practices cannot be understood as hermetic. Magnat's (2015) ethnography of Ang's work suggest that these explorations resonate with Fiscus's "ecosystemic life hypothesis". Fiscus's theory posits that rather than starting off from an understanding of individual organisms, we should focus on ecosystems in order to understand processes of life (Fiscus cited in Magnat 2015: 116). Here it is "the ecosystem ... [that] is the general, self-perpetuating form of life, and cells and organisms are special case subunits of life which cannot persist in isolation" (*ibid*). Grotowski and his collaborators, including Ang, Magnat argues, develop the ecosystemic life hypothesis *as if* the body-in-life were an aspect of living ecosystems. Following Magnat, then, the awareness that these actors strive for is a means to attend to life as it unfolds.

Alons dans le grand vent!

Musicologists can trace rhythms, tonal quality, things like melisma or polyvocality to locate specific songs in time and place. The paths air takes through the singer can be placed and traced. Roland Barthes talks about this as the grain of the voice, that emerges depending on the way a singer engages the sonic history of their language. This grain of the voice is exactly like the grain of the wood: a perceivable trace of the constitutive path air that a person, like everything else, continuously emerges from, is made by. Song, voiced breathy air, is way, a path, along which we can encounter our emergent constitutive histories.

References

Barthes, Roland. 1977. *Image, Music, Text* London: Fontana Press.

Grotowski, Jerzy. 1997. "Tue es le fils de quelqu'un", in Wolford, L. and Schechner, R. (eds), *The Grotowski Sourcebook*. London; New York: Routledge.

Cavarero, Adriana. 2005. *For More Than One Voice: Towards a Philosophy of Vocal Expression* California: Stanford University Press

Feld, Steven. 2015 'Acoustemology', in D. Novak and M. Sakakeeny (Eds.) *Keywords in Sound*. Duke University Press.

Hamlyn, D.W. 1961. *Sensastion and Perception: A History of the Philosophy of Perception*. New York; London: Routledge and Kegan Paul.

Horvitz, Asa. 2010. *Singing The Body, Singing the Other, and Ensemble Organum's Messe de Notre Dome*. Unpublished B.A. Dissertation. Wesleyan University, U.S.A.

Horky, Philip. 2016. 'Breath in philo, the stoics, and the New Testament' Paper presented at 'Breathing in context' conference 8th and 9th March 2016, University of Durham.

Ingold, Tim. 2015. *The Life of Lines*. London; New York: Routledge.

Ingold, Tim. 2012. 'No more ancient; no more human: The future past of archaeology and anthropology', in David Shankland (Ed.) *Archaeology and Anthropology: Past, Present and Future*. London; New York: Berg.

Irigary, Luce. 1999. *The Forgetting of Air in Martin Heideggar*. London: The Athlone Press.

Latour, Bruno. 1993. *We Have Never Been Modern*. Massachusetts: Harvard University Press.

Magnat, Virginie. 2014. *Grotowski, Women and Contemporary Performance: Meetings with Remarkable Women*. New York; London: Routledge.

Roseman, Marina. 1991. *Healing Sounds from the Malaysian Rainforest*. Berkely; Los Angeles; London: University of California Press.

Shapiro, Nicholas. 2015. 'Attuning to the Chemosphere: Domestic Formaldehyde, Bodily Reasoning, and the Chemical Sublime', in *Cultural Anthropology*. Vol. 30, Issue 3, pp. 368–393

Tatinge Nascimento, Claudia. 2010. *Crossing Cultural Borders Through the Actor's Work: Foreign Bodies of Knowledge,* London: Routledge.

ASPHALT
Of Still Lifes and Circulation
Germain Meulemans

Asphalt is the residual fraction obtained by the distillation of crude oil. This means that it is oil's heaviest fraction, and the one with the highest boiling point. Asphalt is in itself a fold of the organic and mineral worlds, as its origin rests in organisms that were living in the Cambrian and Tertiary periods. However, its origin in thriving life is easily forgotten as it serves to counter life too. Be it in the form of tarmac when combined with gravel, or in the coating of Egyptian mummies, it has been used across millennia to set things outside of the ongoing forces of weathering, decay, decomposition and disaggregation.

Egyptian mummy band stained with asphalt, Creative Commons licence, Medelhavsmuseet http://collections.smvk.se/carlotta-mhm/web/object/3011435

Originally coming from the Accadian 'asphaltu' or 'sphallo', meaning 'to split', the Homeric Greeks then adopted the word as an adjective meaning 'firm, stable, sure.' In its early usage, the term already reflected that the properties of asphalt had to do with an enduring, stable separation: a split between the solid and the liquid, between elements in flux and elements in stasis. Sumerians and Babylonians used it for centuries to waterproof baskets, floors, masonry, tunnels, and even the great gardens of Babylon, while the Greeks collected it on the shores of Lake Asphaltite (the Black Sea) to coat the inside of their wine casks. For centuries, asphalt served as a waterproofing agent and mighty immortalising substance for important buildings, the flavour of refined wines, or the bodies of kings.

Today, asphalt is mostly used in combination to gravel and crushed stone to produce tarmac, the material most commonly used for building roads and many other urban hard surfaces in western countries. The properties of this mix were discovered by serendipity in 1849 by Merian, a Swiss engineer at the asphalt mine of Val de Travers. Merian noticed that small quantities of asphalt often fell from transport carts on the road between the mine and the village and was then compressed under the wheels of the carts. He observed the strength and elasticity of the surfacing thus formed, and in 1854, the first compressed asphalt road was constructed in Paris following Merian's marketing of the process (Abraham, 1918).

Close-up on gravel in asphalt coating, G.Meulemans

In the 19th century, the making of smooth, waterproof surfaces had become crucial to the ways western humans think about movement. In the same way that the upright position of humans was thought to have liberated the hands of our species and so allowed for a major evolutionary step towards 'civilisation', the defenders of hard surfacing believed that it would bring the human condition a step further by allowing

Still life with gravel, dust and asphalt, G.Meulemans

us to liberate eyes and mind from concentrating on slippery mud and treacherous cobblestones (Ingold, 2011). Urbanites could now concentrate solely on their business and trade, unencumbered by concerns for where they were putting their feet. Enlightenment and smooth surfaces surely came in a pair.

From around 1820, in Western Europe, the preferred material for roads and sidewalks had been macadam, a system of layered, egg-sized rocks that compacted under traffic load. But the advent of the motor car changed the rules of the game, as macadam's unbounded materials meant sideslips and clouds of dust on the roads, dirty facades, and even tuberculosis. Various 'Leagues Against Street Dust' lobbied for the adoption of a road surfacing that would produce less mud, dust and noise. This is how, towards the end of the 19th century, tarmac – shortened from 'tar-bound macadam' – came to participate in what might be recognised as the final and most durable step in the Modern chronicle of soil impermeabilisation in cities. Asphalt-bound gravel now covers streets and roads all over the world. It has become banal, almost invisible to our eyes. It manifests a kind of cosmic insouciance in which the complexity and unevenness of the ground is cancelled, as urban soils become a technical closet where to hide our infrastructure of water pipes and sewage networks.

Through its alliance with gravel, asphalt has also become crucial to the development of modern roads. But again, one has to think of this story with the watery world in mind. When emergent modern states started to trace new roads in the 17th century, they aimed at transforming a convoluted space into one of straight connections. Engineers turned to principles of maritime navigation to decide on the straight route of these new roads. The straight line therefore made its appearance as a means to navigate surfaced lands with the building of royal roads (Guillerme, 1996). Roads of stone, macadam and asphalt are the actualisation of the lines traced by geometers of this time.

Even in our era of mass travel, asphalt retains a sense of this early emulation of the maritime: to many, it speaks of a sense of freedom once strongly associated with the sea. One can think of the hitchhikers of the Beat Generation, or of motorway builders who sometimes claim that eastern bloc regimes have always favoured the development of rail over that of roads: tarmac comes to be a symbol of freedom of movement and trade, whereas steel rails represents the control operated by socialist states (Dagognet, 1996). The maritime also reappears is some new 'asphaltic' sports, such as when boards designed to surf the waves are fitted with wheels and transformed into skate-boards that can surf the tarmac.

Surfacing with a smooth dark finish, G.Meulemans

Few people think of how the roads they ride on are made. Today, tarmac is manufactured in asphalt mix plants. It is then transported in heat-proof trucks and set in place at the temperature of 150° C using machines called 'finishers' that can spread in the desired thickness of layers. The tarmac layer is laid on a compacted base course made of several other layers. It rests on a subbase of coarse sand bound with cement, which spreads the load evenly over a subgrade made of compacted native material. It then has to be compacted again before cooling by a repeated passage of rollers. To road workers, working with asphalt is hard and dangerous. Depending on its chemical composition and the temperature conditions, asphalt demonstrates a complex range of behaviours that oscillate between viscosity and elasticity. To be workable, the material must be at a mid-point between grain and liquid. Working with hot tarmac is to be amid a scene replete with the smouldering mouth of a truck's tipping trailer, and of helmeted workers sweating around the furnace, in a sea of machine noise and warning horns. An intense heat emanates from the sticky ground just laid, irradiating through shoe soles. The compaction of the roller allows workers to get rid of all the air and water. There lies another ambiguous aspect of asphalt: it is used to waterproof city soils, but fears water and rain when hot. Once cold, tarmac is only rock and solid glue, it becomes a closed up material without any voids. Pitched against the utmost vitality of water, which takes particles away and invites life everywhere it flows, engineers have chosen asphalt and its millenary history of waterproofing and stabilising to coat road gravel. A layer of asphalt coated gravel is one into which no mole or worms will dig a burrow, in which no rainwater will soothe, no fungi or bacterial colony will develop. As in the coating of ancient mummies, asphalt suspends the work of life.

Anthropogenic parent rock, G.Meulemans

Of course, the skin of roads and streets also ages. From being a glossy black when it is just laid, it soon turns to a dust grey colour as particles stick to its surface. Broken down by frost, traffic loads, or gas drips, its interlaced wrinkles resemble the hide of a crocodile, and soon make space for water to soak the layers beneath it, and for plants to grow in its cracks. Under the combined forces of traffic and weather fluxes, if neglected, our sandcastle against the rain soon returns to the cycle of the elements and becomes parent rock for new soil to grow. Yet, a damaged piece of tarmac can be melted again, a new section can be pasted on top of it to effectively patch it, as the many fixes and black stitches on roads and sidewalks can attest to. In fact, asphalt can be recycled and refined again to the point that one could easily get it back to crude oil state (Dagognet et al. 1996). From fluid to solid, and vice versa, asphalt is transformable. Despite dreams of permanence and stability, it persists only in its reworking, and it is precisely the material's versatility that allows this reworking. From the geological depth where it is mined to road surfaces, asphalt is always tangled between stone and fluid, between the glue that holds together and the coating that separates, between stillness and extreme circulation.

References

Herbert Abraham, 1918, *Asphalts and Allied Substances*, New York: Van Nostrand.

François Dagognet et al., 1996, 'La chimie de la route, dialogue du philosophe et de l'entrepreneur', *Cahiers de Médiologie*, 2(2), 105-115.

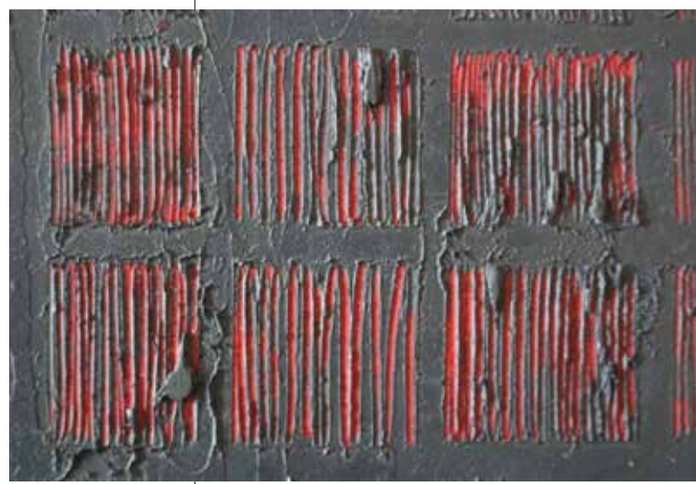
André Guillerme, 1996, 'Chemins, routes, autoroutes', *Cahiers de Médiologie*, 2(2), 117-129.

Tim Ingold, 2011, *Being Alive*, London : Routledge

Beeswax Pellets

All Images Sally Duguid

Swatch



All Images Sally Duguid

BODY

A Choreographic Journey into Salvador Dalí's Metamorphosis of Narcissus

Paola Esposito

Is the body a material? If so, what stories can it tell? While an assumption of materiality underlies discourses on the body, such materiality is seldom accounted for or problematized (Alaimo and Hekman 2008: 3–4). Focusing on the dancing body, this contribution draws on Ingold's (2007) distinction between materiality and materials to reformulate the question of body materiality as not one of essence but of processes.

Materials and substances entail a potential for changing state and composition, for becoming something else, for instance, 'through processes of admixture and distillation, of coagulation and dispersal, and of evaporation and precipitation' (Ingold 2007: 7). The human body is also capable of change and transformation. Yet, this potential is also its fragility. In normal conditions, we must take special care in maintaining the integrity of our organic boundaries, least we undergo radical transformations, even dissolution (Ingold 2013: 94).

Despite variations of size and shape, the human form is distinctive. Spinoza ascribed this distinctiveness to the 'relation of motions' which, within and between bodies, supports our recognition that a human being is not a chair (Lord 2010: 61–62) nor any other thing, living or non-living, except for a human being. Thus, relations of motions allow us to tell the human from the non-human and, in an unfamiliar environment, friend from foe. In the Japan based dance form *butoh*, meanwhile, this very perceptual principle is exploited for aesthetic purposes: *butoh* dancers alter their bodies' relations of motions to craft the illusion of their transfiguring into non-human – animal, vegetal, elemental and otherworldly – beings.

This contribution aims to offer a glimpse into these metamorphic – hence material – potentialities of bodies. Based on my own *butoh*-informed creative practice, it highlights, in drawing and writing, the corresponding of imaginative and corporeal force fields in dance.

In 2015 I composed a short dance piece titled *Dalí Narcissus*. The piece was inspired by Salvador Dalí's painting *Metamorphosis of Narcissus* (1937). I was struck by Dalí's adoption of optical illusion as a pictorial narrative technique. Hinging on visual analogy, an image within the painting (Narcissus absorbed in his own reflection) morphs into another (a hand holding an egg) and then into another (a narcissus blossoming from the egg) in an oneiric, image based storytelling. While the images coexist in the picture, a sense of cyclic temporality emerges that corresponds with a viewer's perceptual engagement as guided by optical illusion.

Dalí Narcissus emerged from my attempts at re-crafting the optical illusion in Dalí's painting through dance. Three main strategies were used: establishing, through composition, an (optical) correspondence between images in the painting and body shapes as 'fixed' in particular positions (through the use of a mirror); using *butoh* techniques of slowing down movements and 'isolating' body parts; using appropriate light design on stage.

In making *Dalí Narcissus*, I worked with and through my body, from the outside and from the inside, alternatively and simultaneously.

The choreographic score that follows conveys the perspective from the outside in the form of drawings. The drawings are based on the images in the original painting and my reflections in the mirror. As such, the score draws attention to both what the dancer imagines and to what the audience sees. While these two dimensions overlap in the score, in performance the dancer primarily engages with the images in the painting while the audience only sees the dancer's moving body. The piece is not a literal translation, then, but an interpretation of Dalí's painting: an audience is not supposed to see a representation of the painting in the dance, but to attend to the dancer's moving body as it transitions between human and non-human forms.

The commentary on the score conveys the perspective from the inside, or the somatic perspective. It does so by coinciding with the dancer's point of view (in this case my own) and by being anchored in tactility-kinaesthesia (Sheets-Johnston 1999): words illustrate positions and movements by reference to the spatial arrangement of anatomically-defined parts and to experiential qualities such as weight and tension.

The graphic score and somatic commentary report key moments in the journey from one image to the next. Because there are physiological limits to what a human body can do – and all bodies are different – they record a 'wayfaring' (Ingold 2013: 25) through the particular material of my body. That is, the score traces the path of least physiological resistance, with specific positions as signposts. The positions themselves and movements between them are for a dancer to improvise.

While experience of *butoh* is not necessary for performing this score, flexibility, strength and concentration are recommended as conditions for any dance practice.

References

Alaimo, Stacy, and Susan Hekman (2008). 'Introduction: Emerging Models of Materiality in Feminist Theory'. In Alaimo and Hekman (eds.) *Material Feminisms*. Indiana University Press, pp. 1–19.

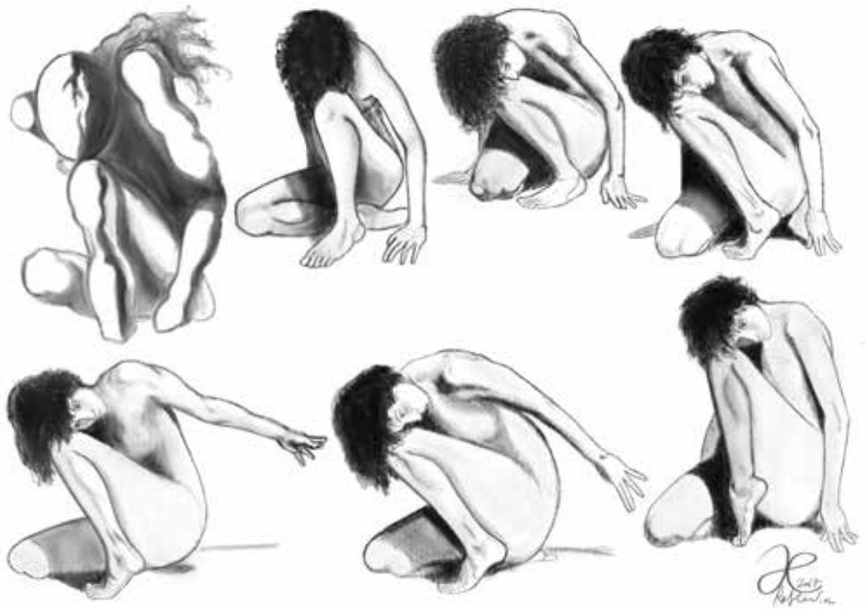
Ingold, T. (2007) 'Materials against materiality', *Archaeological Dialogues*, 14(1), pp. 1–16.

Ingold, Tim (2013). *Making: Anthropology, Archaeology, Art and Architecture*. New York and Abingdon: Routledge.

Lord, Beth (2010). *Spinoza's Ethics*. Edinburgh: Edinburgh University Press.

Sheets-Johnston, Maxine (1999). *The Primacy of Movement*. Amsterdam; Philadelphia: John Benjamins.

Choreographic Score



Somatic Commentary

I

Reflection (Narcissus absorbed in his own reflection)**:** Three-quarters in relation to audience. Sat down with weight *between* right sitting bone and the ground, hip open, knee down, leg folded. The right foot is tucked underneath with right heel pushing against left sitting bone. Left knee up, left foot planted on the ground, back of thigh and calf forming a triangle acute with the ground. Right arm is behind, invisible, propping the body up. Left arm extended to the front, relaxed.

Forehead rests on left knee. Head and hair visible, not face.

Right heel pushes against left sitting bone. Hingeing on right knee, while right hand pushes against ground, body weight shifts diagonally from right sitting bone onto left knee, with right calf and foot sliding under right thigh and sitting bone.

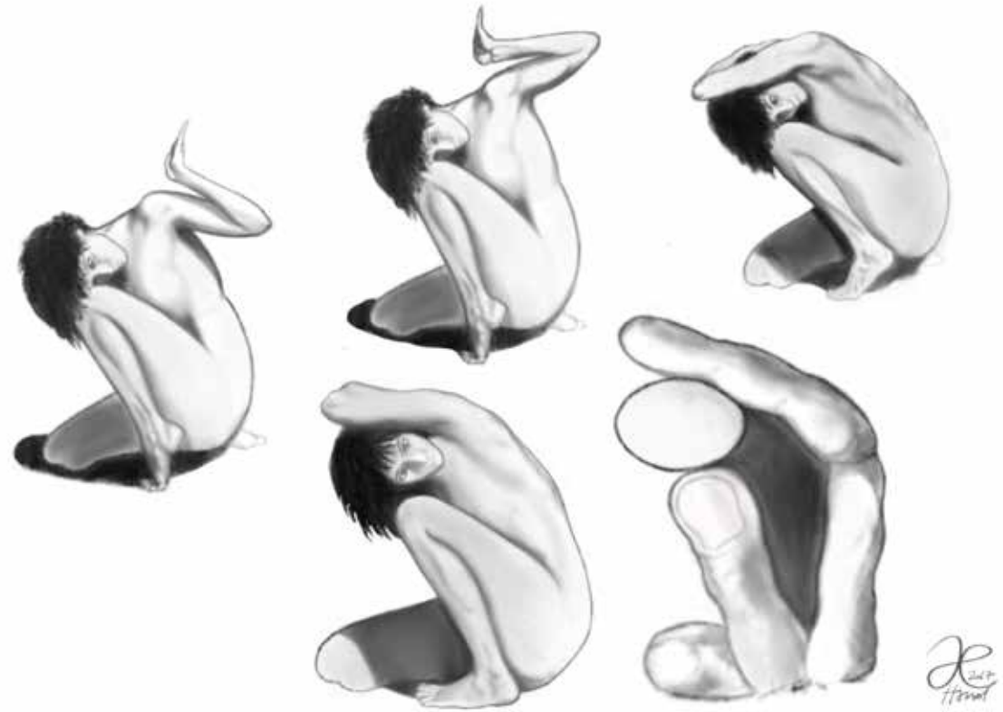
Weight shift triggers small rocking of forehead against left knee. Vibrations rippling up throughout the skull, under the skin, into hair locks. A shivering.

Left leg. Pressing toes down against the floor, heel and knee lifting up. Knee pushing upward against forehead. Combining up and down leg movement with gradual rotation onto one's own axis to find profile relation to audience.

Maintaining contact with knee, forehead turns outwards to the left. Left eye looking out.

Balancing on ball of foot.

Torso turning, opening to the left. Right temple on left knee, entire face looking out. Keep pose as left arm comes to life, fingers reaching out and back, leading arm to full extension.



II

Palm up, elbow bends. Elbow up, palm turning toward head.

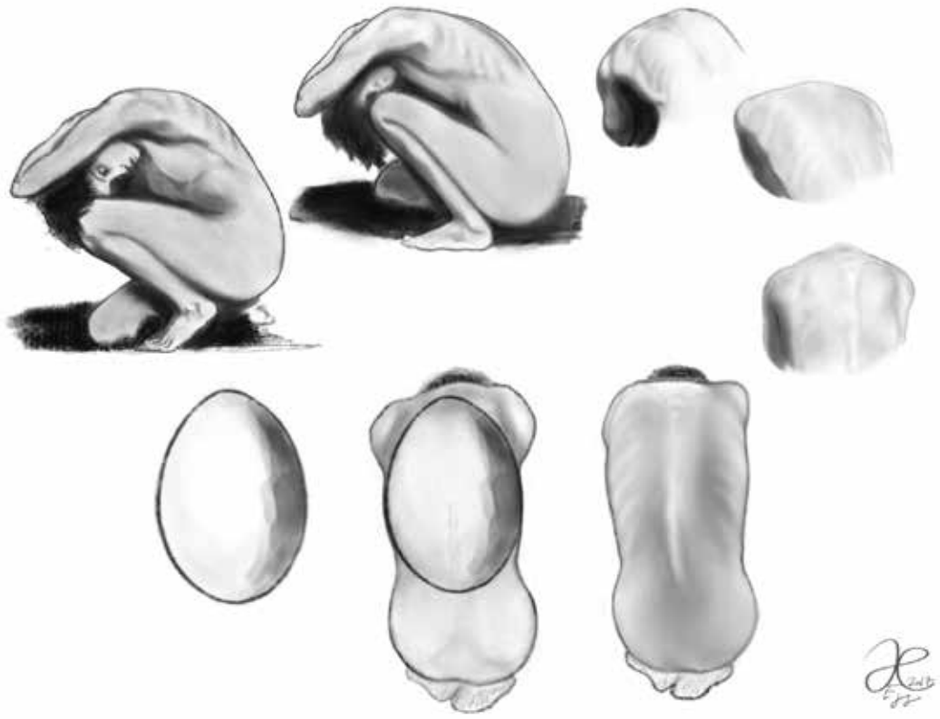
Stretching underarm, pushing arm up to enclose head between left arm and knee.

Forearm disappearing behind head.

Face completely turned towards audience. **Egg** head.

Bent left leg and arm turn into thumb and first finger respectively:

A hand holding an egg



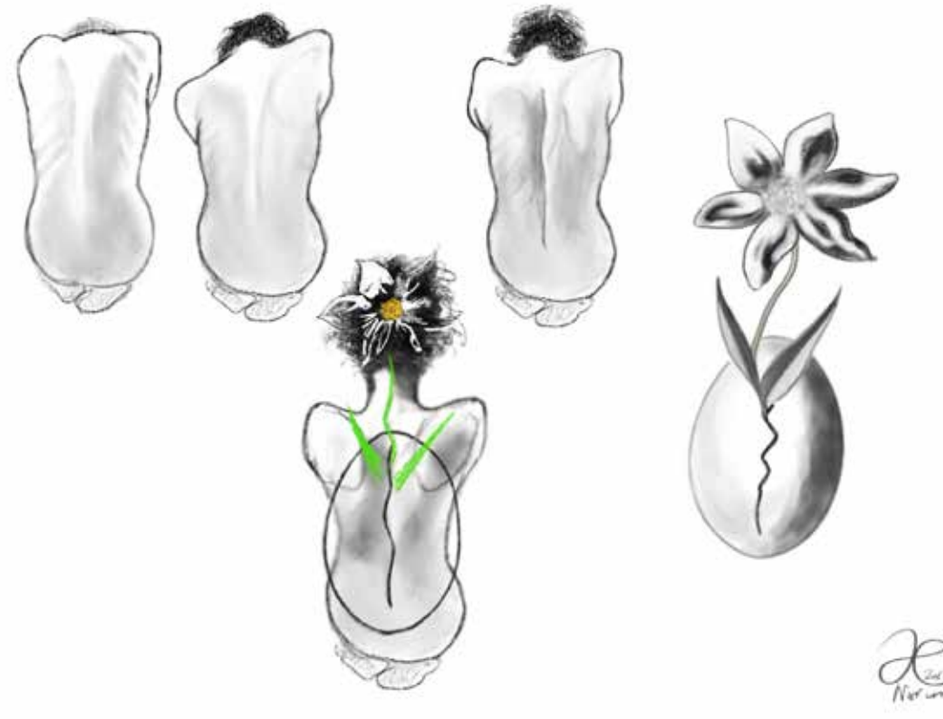
III

Back to enclosed pose (left arm overhead).

Gradually turning onto one's axis to give back to audience.

Knelt down. Sitting on heels.

Breathing in and out the thoracic spine, expanding and contracting. **Egg** back



IV

Shoulder blades slide up, back, and down. Pushing against one another. Crease between the two (spine) is **crack in egg shell**.

Slowly unravelling of neck vertebraes, bringing head up.

The spine is a **stem**. Shoulder blades are **leaves**. Head is a **flower**:

A narcissus blossoming from an egg.

Narcissus bends towards the water. Return to (I) **Reflection**. The cycle begins again.

BRISTOL BOARD
A Self-Effacing Drawing Technology
Ray Lucas

Bristol Board is a heavyweight machine-made paper used for illustration, originally produced in the early 19th Century.

It is one of a family of illustration boards produced by laminating untreated papers together for stiffness and resistance to buckling. It is characterised by a smooth, white, relatively non-porous surface allowing media such as marker pens to be used without bleeding. The board has a weight of 250gsm (grams per square metre) or higher, compared with typical cartridge paper which is 125gsm. Like other forms of industrially manufactured paper, it can be produced in a range of weights and surface finishes. Bristol board is usable with a wide range of media, from pencil and ink through to watercolour and gouache (although traditional techniques for producing washes might misbehave due to the resistance and lack of porosity of the board: liquid media will pool on the surface rather than being absorbed), its stiffness also makes it useful for collage and some model making. It is a forgiving material, but lacks much of the character of paper and board with more of a tooth to it: its smoothness makes it appropriate for some uses, but less so for others.

As I am working with architectural drawing conventions, it is useful to have reference points on the sheets of paper.

When working with Bristol board, I prepare a grid of points in very pale grey on my computer, using an online tool which gives a range of options (http://incompetech.com/graphpaper/squaredots/). The points are 5mm apart, and give useful guidelines for working to. Unless the viewer is looking for them, they recede into the background: particularly if a colourful marker sketch is completed on the page. I draw freehand, but with reference to these guidelines.

Using a mechanical pencil with 0.7mm lead, I begin to draw. At this point I am referring to a series of photographs from my field study. I normally use a soft lead of 2B or darker, as a harder graphite has a tendency to inscribe the marks into the surface more deeply, making errors more difficult to erase. The pencil drawing is the time for mistakes and discoveries to be made, broad massing is the first task: having established the rough scale of the drawing, the proportions are sketched out by selecting the most significant forms. This process is one of establishing an underlying geometry.

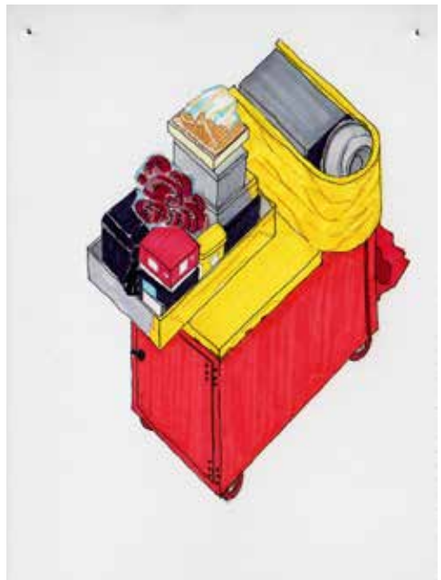
This often reduces the scene to a series of boxes, which are then fleshed out with further detail. A rectilinear shape might have rounded corners added, or define the limits of a drum – but the broad composition is drawn first as boxes. Once this is in place, the process is one of gradually adding details and erasing 'hidden lines'. This is where the robust nature of the Bristol board is essential, as it allows multiple erasures. The forms are initially depicted as a kind of transparent x-ray, but as the drawing is established, lines which would not be visible from the presumed viewpoint are erased – or decreased in prominence in the next step of *inking*.

Inking is the stage of committing some lines to permanence and is rather more carefully executed because of this. For this stage, a variety of fine line pens with a range of thicknesses from 0.1mm to 1mm are used: the thickness of the line can be used to denote materials being depicted, for example steel poles are given a harder outline edge than a piece of cloth hanging down. I also use different colours of fine line work at this stage, giving more options to communicate the qualities of the piece. The smooth drawing surface means that the lines are drawn precisely as intended. In a sense, Bristol board, fine-liners, and markers are self-effacing materials, materials which do not seek to announce their presence in the way that charcoal or impasto oil paints do.

The final step is colouring. Using pigment ink markers, the resistance and non-porous nature of the board is again essential. This prevents the ink from bleeding, meaning that the coloured areas are accurate and intentional – with colours true to those of the ink. Using markers with more absorbent paper leads to a number of unintended consequences which might be interesting in a watercolour, but much more problematic in this case.

The robust nature of the board has a further set of affordances: the drawings can be exhibited as they are, without backing; can be copied and reproduced accurately, and handled without too many worries about damaging the work. This was another factor in the choice of Bristol Board for these series of drawings.

Figure 1: Vacuum wrapped goods for porter pick-up, Namdaemun Market, Seoul, 2014. Ray Lucas.

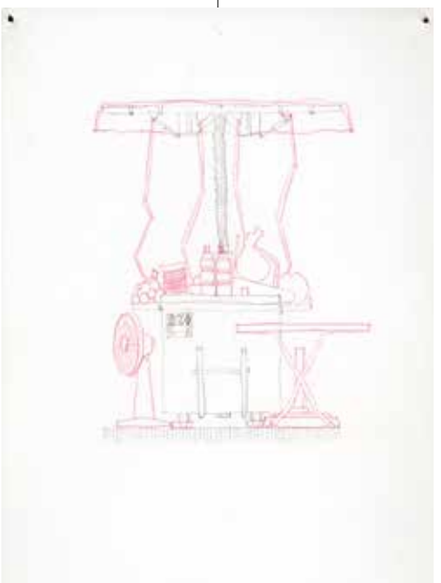


Currency exchange stall, Namdaemun Market, Seoul, Ray Lucas, 2014

Used trays from restaurant delivery for vendors, Namdaemun Market, Seoul, Ray Lucas, 2014

Food stall with serving octopus, Namdaemun Market, Seoul, Ray Lucas, 2014

Elevations of modular market carts, Namdaemun Market, Seoul, Ray Lucas, 2014



Mobile conveyor belt, Jagalchi Market, Busan,
Ray Lucas, 2012

CASTORS
Facilitators of Impermanent and Mobile Architecture
Ray Lucas

Castors are small wheels mounted on other heavy objects to allow ease of movement. There are two broad types: *swivel castors*, mounted on ballbearings to allow them to rotate through 360°; heavier loads are carried on fixed castors. Castors are usually made from steel, with rubber and synthetic equivalents providing grip. They come in a range of sizes, tending to be small in proportion to their load.

The examples shown are from a range of markets in South Korea from Jagalchi in Busan through Seomun in Daegu, and Dongdaemun & Namdaemun in Seoul.

Castors require a relatively smooth and well maintained surface in order to work, being unsuited to cope with extreme level changes such as slopes or kerbstones, uneven or rough materials.

Examples show castors being used for a range of market stalls, frames for drying fish, mobile partitions and barriers. Castors form part of the ecology of markets where the intrinsic architecture is impermanent and mobile; an architecture that can reconfigure according to the needs and whims of vendors and authorities.

Fish drying rack, Jagalchi Market, Busan,
Ray Lucas, 2012

Fruit seller, Jagalchi Market, Busan,
Ray Lucas, 2012

Mobile market stall constructed from palette on castors, Namdaemun Market, Seoul,
Ray Lucas, 2012

Mobile barrier, Namdaemun Market, Seoul,
Ray Lucas, 2014

Castor supplier, Seomun Market,
Daegu, Ray Lucas, 2012

Mobile barrier, Namdaemun Market, Seoul,
Ray Lucas, 2014

CHI
Gey Pin Ang[1]

So first what is Chi? Of course, from my point of view it is breath.

Chi in Chinese literally means breath. It is what is coming in and out every second, every moment in us without us noticing and without us consciously noticing where chi is. The moment I begin looking for it, that is when it starts to get blocked. We start to think how do I breathe? This is the moment my body starts to get a little uncomfortable. Yet, we are *in* Chi since the beginning, since the day when we come out of our mother. We are already in it.

And is it material?

I of course think no.

For me it is an intangible thing. Is it not something we can touch. We *can* sense it, we *can* feel it. When there is no breath there is no chi. Let's say we are stuck in a little lift, there is no air, I can't get out! That is the moment we feel we are missing it. That is why the place we work in for our Sourcing Within[2] sessions are important, why we go to the countryside, to the sea. This moment we feel chi a lot, but we don't know, or have to know it.

Somehow chi influences without us noticing it.

We feel joyous. We feel some kind of freedom. We have all had this experience from when we were very young. And we have the opportunity to feel this in any kind of life circumstance.

So if you ask me how I experience it, firstly we experience it through daily life.

Then of course in my experience I have had the chance, and this is a very precious chance, to practise something that has been passed down since over two thousand years! Through a specific practice, where our ancestors explored in a very rigorous way, how to create a relation between ourselves and the rest of the universe, and nature. The practice I am referring to is Taijiquan[3]. And in this we practise. What is it that we practise? We practise each posture, from our body, from head to arms to legs, our torso, our knees. Everywhere! In this we can move towards the experience of freedom and joy, chi, through the sequence of movements in a particular structure.

Yet in the beginning the sequence is difficult to learn, because first you have to memorise all the different postures and moving from one to the next to the next, this requires a lot of memorisation. But once this is overcome, this difficulty of memorisation, we can have a chance to start to experience something from *the beginning to the end*, let's say through this one structure.

So let's say once we really memorise the structure we have a chance, doing each movement, from beginning to the end of that whole structure. This takes around ten to twelve minutes. And there what we are experiencing through the movement is, it is as if we are discovering the interior of our structure. Where we can start to sense different parts of our bodies not just externally, like the fingers, but you start to sense something that is passing inside us. Our awareness goes *into*; into something that is not just from our eyes. I can sense something is flowing. As the sequence moves on I feel: "Oh I can sense a little more". Sometimes my arms, sometimes my armpits, sometimes just from my feet coming up. But that is not *the point*.

The point is just to practise. And then day by day we may have a chance to get in touch with that internal life. The Taijiquan structure is really to get ourselves in touch with this internal architecture. We become more sensitive for example to sensing bone, internally, and for instance to changes of temperature. This is because the practice opens up little possibilities, little wakings of each little part of us. Here I'm speaking not just about the nerves, but also our internal organs. Each part of our organs that usually we don't think about it. We do think about it when we get sick! We get very sensitive to that! But in reality...

So until here, how we experience Chi through Taijiquan is complicated to do and to think about. But you asked whether this can be taught? I think this is clear in our Sourcing Within Worksession. There we don't approach the Taijiquan sequence in a very systematic way. We don't learn posture by posture.

We learn through play [laughs]

And this many times, I don't know if you discover from your own experience, from that play somehow sometimes we get into certain position that helps in the Taiji structure. For example the knees, we need to half bend, we need to slightly bend. Let's take the example that we play with often in the Sourcing Within Worksession, that is playing as if planting in the earth, in the land. In this the body is slightly slanting tilted forward, but the knees, one part of our knee is already bent, half bent and our body goes towards, the attention is forward, but slightly down, towards the earth. So in playing we come find we bend the knee and tilt the body in a way that is what is needed in the Taiji sequence also, without giving instructions as such.

Surprisingly to me, discovering the value of playfulness maybe has come from working with very intercultural groups.

In preparing for Sourcing Within Worksessions I have thought about what could be the best way forward that does not require any pre-knowledge about this Taijiquan? How could participants benefit from working with this structure when some may not have ever even seen anyone practising Taijiquan?

And I thought that is a very interesting entrance point for me, to see how everybody can get into this one sequence. And not to learn this as a memorised practice. It takes a really long time, year after year, day after day to learn Taijiquan. But in the kind of workshop that is possible in our context we usually have five days, six hours more or less per day. So in the five days there is not enough time to share the type of understanding that is necessary in order to move towards mobilising chi.

Usually my approach in the Sourcing Within Worksessions is *not* to say too much, or anything in fact about chi and the philosophy of the Taijiquan structure but rather impart seeds of this through a lot of unspoken tasks. We play in the Worksessions, we are not conscious, for instance using our palms to hit each other starts to get our self moving without being too hard to the body. Since we are on Skype without a video I don't think you can see, but imagine just hitting the palm gently against my arm that already starts something using very little effort.

Effort! This is another important thing as well.

So I began to play in the worksessions, and with playing what happened? In playing there is no place to stop and think. We respond to each other, and there is no place to be too hard, to use too much effort, except of course if in that playing you are being chased by somebody! But that is also helpful, because you have a certain way to react and respond; you get faster in running! And even if it is serious (you don't want to be caught!), there is something lighter about the way we exert ourselves when we run in a playful chase.

1 This text is a transcription of a Skype conversation between myself and Caroline Gatt. Transcribed and edited by Caroline Gatt.
2 See www.sourcingwithin.org
3 This can also be written as Tai Chi Chuan.

But at the same time, talking about effort, I was thinking that there is something else about playing, through play another possibility opens. Without telling anybody to *do* something, then something happens, which is non-effort.

Like kids! You have a child, you see how she plays; you see how children playing don't *over use*, they have a certain way.

Adults on the other hand accumulate things which seems to clog up that way of playing, that *playfulness*. We all do this, you know after years of doing things. I find how people hold their shoulders gives a very clear sign of this accumulation in our body from the beginning of life. Think of people carrying things. Let's say in their youth a person might have carried a bag on one side, on one shoulder. I realise in my own experience, from schooldays, I used to carry my bag on the left side. So my shoulder is sort of held on one side, upside down. I hold one side more, higher or tighter, to counterbalance the weight of the bag I *used* to carry on the other shoulder. So because we need to go against that thing, in this case the weight of the bag, so the body accumulates this kind of habit, and even when we no longer carry that school bag the shoulders keep that habit, those tensions. These unnecessary tensions and postures come from a long time of *effort* and the *effort* we used to try to counteract that.

But then through playing, sometimes, and the more we play the more it happens, we find we use our knees and the muscles of our leg differently, we only use what is necessary we don't use much more. Playing awakens the possibility to loosen these tensions which we don't even know are there.

The very first movement we have in Taiji involves raising the arms and then slightly sinking down and the knees bending. It is so simple, but many times the very first time someone tries this movement, you can start to see, sometimes, people find difficulty in doing this. The difficulty is to recognise that from the wrist to the elbow to our shoulder there is a kind of flow, there are different moments to the movement, it can be separated. People sometimes don't realise that it is not one whole straight solid arm. The difficulty is to do with something about the flow of movement, a kind of softness is lacking, may be something about can be more supple. To go back to play, playing reminds us about being children, a child in each of us, not just someone we see, someone you take care of everyday, but the child coming from us as well. This child we are remembers that playfulness, which has a certain suppleness.

What I can say really is that Taijiquan, especially because taiji is written in different forms, is really about chi.

But of course here there are different characters, in the sense that there are many different meaning for the characters

[Gey Pin writes and searches on her keyboard in Skype chat, and types the following:

qi (as 'breath')

other Chinese characters that sound as 'qi' but with different meanings and pronounced in different tones include:

其，起，期，歧，凄，契，器，妻]

Tai is "the ultimate", in fact both words, Tai and Chi, are similar because Chi also means going to the extreme. But I should give you more definitions because both words in Chinese mean that you are going to the ultimate...the ultimate extreme! Because it is about going beyond, there is no ending but something above. So an extreme is not an ending.

What can help I think, coming back to Chi and play, is that we are still learning through the play, playing to be in contact with chi let's say in this kind of embodied participation. But what does it really teach us?

I must say that at the beginning I didn't even know what Taijiquan might teach us and it really takes years, before some day, some moment, some point, you start to have exactly this kind of discovery of the internal and what is passing. The kind of discovery when you feel: "What happened? What happened to my body?"

This kind of experience of somebody participating in their entire body through their own doing, it really gives the sense of time and space that is in the practice of Taijiquan. We discover this as a kind of knowledge *through* the doing; through *not* thinking that I have to know something right away; that I have to know what it is *before* I start, that I have to immediately come to some conclusion.

I think all that I have learnt through playing and Taijiquan goes against a lot of what we are taught, including in my own education. Usually we are told we need an objective, that I should know before, because as a student I pay for this education, so I should be able to judge if the 'education' is working, if it is what it should be.

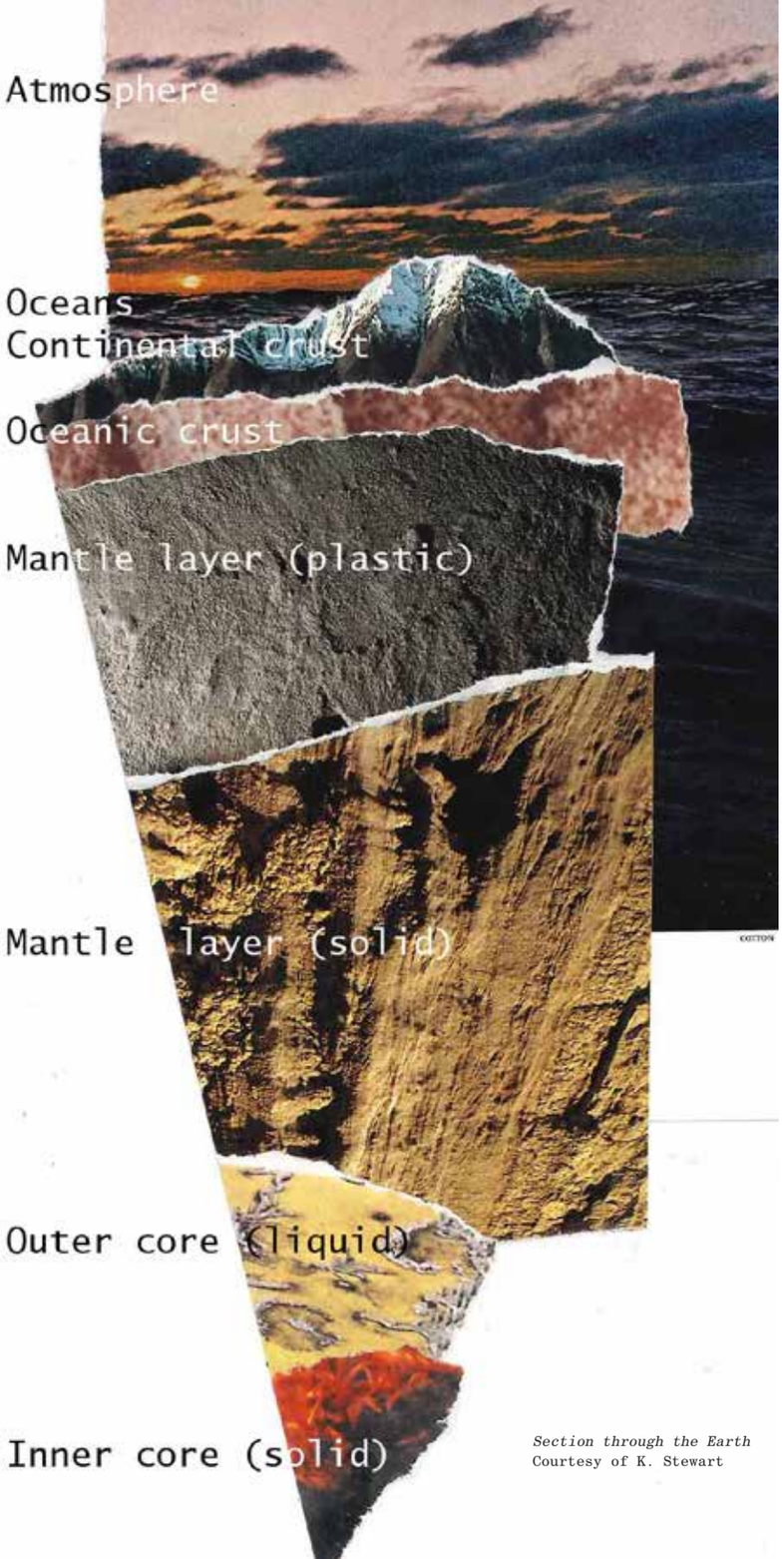
And yet, this knowing through Taijiquan can't be pushed, can't be forced. The more I think "now I'm going to do Taiji, and I should achieve something! I should achieve that I'm in harmony with the whole universe!" [They laugh]

I think that is a disaster waiting to happen! Because that terminates something. You start to sweat a lot. You get very nervous. You never get anywhere. You start to think "Oh shit! Am I not doing it well? After all these years!"

And then I start to think "Oh maybe now I should change this", and "Maybe it is the position", or "Today I'm not well", "Today it is not sunny", "I should not do it this hour", "Oh I'm hungry now".

We can have some many thoughts. I think we are so complex and because we like to have something that is certain, a product let's say, this prevents us from doing a kind of work which is in an intangible sort of way, where there is no 'predictable outcome', no 'product' as such.

Consider, if chi is breath, breath is with us for our *whole* life. 'Til the moment we are no longer in this life, we have our breath. And if we start to think "Oh where is it?" "Where should it be?" and "how should *I* be?" It really isn't the point.



Section through the Earth
Courtesy of K. Stewart

CLAY
Marc Higgin

Clay hides in plain sight. The very ubiquity of this material in everyday life conceals, under the fruits of its exemplary usefulness, the extraordinary qualities that make it such an interesting material to work and think with. Indeed, it might be valid to extend Donna Haraway's (2008) notion of companion species with which humanity has co-habited and co-evolved in order to treat clay as an essential *companion* material to the astonishing diversity of vernacular styles of *making* things that characterise material cultures nearly the world over, as well the social practices, institutions, myths and rituals that have grown around them.

The geological story of clay takes place within the narrow confluence of the Earth's three outermost layers; within the endless traffic between crust, ocean and atmosphere. All three are characterised by ceaseless, high-energy cycles of movement and transformation stoked by the energy from the Sun and the Earth's core. Taken together they comprise an endless number of inter-connected systems, some in equilibrium, some far from equilibrium; from the very small, to the planet-sized.

As igneous rock is thrust to the surface it is weathered and eroded; mountains are ground down, washed away, to be deposited in rivers and lakes. This sediment builds up in layers, compacted to form new (sedimentary) rock or partially melted to form metamorphic rock, which, in turn, are thrust up to form new mountains, to be again eroded, washed away and deposited. Clay is the one of the most abundant end-forms of this 'grinding maw of geology' (Rhodes 1973: 5); its chemical make-up closely mirrors the heterogeneous composition of the Earth's surface itself. As Rhodes explains, we 'might think of clay...as being almost a representative sample of the crust of the earth after it has been pulverized to very fine particle size by the action of erosion' (ibid: 6).

The silica and alumina that make up the main body of clays are derived from the feldspar family of minerals, which make up the bulk of granites and basalts that form the Earth's crust. Feldspar minerals combine silica and alumina with one or more oxides of an alkaline nature (eg. calcium oxide). When these rocks come into contact with water, the relatively soluble alkali oxides are dissolved, leaving silica and alumina behind. In prolonged contact with water, these compounds combine chemically with water (hydrolysis) to form kaoline: the basic clay mineral. This chemical weathering by water takes place in parallel with (and is aided by) physical weathering; freeze-thaw cycles gradually fracture rock into smaller and smaller fragments, and erosion plucks particles of rock from their position of rest and grinds them together to ever finer particles. The main antagonist is water, but ice, wind, gravity, plants and animals also play their part.

As rivers wash this debris down and away from the mountains and hills, it sorts the soluble from the insoluble, and the insoluble from course to fine. The biggest rocks and pebbles are the first to drop as water slows, while the slightest silts that make up clay sediments settle in water at its very stillest: in swamps, estuaries, lakes and gentle seas. This threshing and winnowing by water leaves only the most inert materials of a very small size. These sediment beds often combine many different sources of eroded material from within the watershed, adding many different 'impurities' – metal oxides as well as carbon compounds from organic sources - to the kaolin base. Every clay is a composite: different earths bound together with water constituting the distinct geological and ecological *terroir* that gives each clay body its particular qualities and feel. While every clay body is unique, they all combine (to varying degrees) the qualities of plasticity, inertness, and relative impermeability that characterise this *resting point* in the 'grinding maw of geology' (Rhodes 1973: 5); qualities that underpin this material's protean usefulness, the countless ways it has been co-opted into human world-making.

Clay is eminently plastic. In its submission to the pressing foot, to the forming hand or the right angles of the brick mould, clay courts misrepresentation. In its seeming formlessness, clay stands in for all matter, patiently awaiting the creator's animated and animating touch that transforms a formless lump of nature into cultural form: the 'pedosphere made poetry' (Weiss 2015: 282). At first glance, clay seems to celebrate the *hylomorphic* model of making that separates a lively form and passive matter; a dichotomy underwriting the relative indifference of the social sciences to the material world in favour of cultural form, with its function, meaning and value within social life.

Detail from Alexandra Engelfreit sculpting clay from Tranchée project, Le Vent des Forêts. M. Higgin, 2013

But this passivity of clay is not a given property of all matter (as *hyle* from Aristotle onwards) but a very particular capacity or *affect* that sets it apart from, and defines its relation with, all the other materials of our environment. These qualities are not somehow pre-figured in the essence of clay (or matter) but emerge relationally. Phenomenologically (that is, from a human perspective), these qualities should be understood as *affordance*s (Gibson 1979, Ingold 2000), which take shape through the process of playing and experimenting with clay; from seeing its changes over time as it responds to the force of fingers and hands, as it dries and cracks in the sun and air, as it is eroded by water and wind, as it is transformed through fire.

Detail from Alexandra Engelfreit sculpting clay from Tranchée project, Le Vent des Forêts. M. Higgin, 2013

In 2013, I worked with the sculptor and ceramic artist Alexandra Engelfriet on a series of projects, including a performance with the musician Ab Baars at the Briqueterie museum in Ciry-le-Noble in the Burgundy region of France. For 10 days we worked to turn 25 tonnes of clay, delivered directly from the quarry in nearby Saint-Amand-en-Puisaye, into workable clay. With the help of a revolving cast of helpers, Alexandra and I would tread and knead through the clay, slowly working the water into its body. The clay gradually changed in texture from dry chalk, through lumpy cottage cheese, to a heavy paste. Every morning would take an act of will to overcome my reluctance to take the first step into the clay, to get bogged down in its viscosity, its way of turning my every movement against itself. For Gaston Bachelard (2002), this viscosity marks the 'innate offensiveness' of mud, its ability to unhand or, rather, unfoot those unfortunate enough to fall in its snare.

But on the last day of the clay's pressing, the clay underwent its final transformation: from a thick paste, earth and water seemed suddenly to emulsify, to turn fatty and

Detail from Alexandra Engelfreit sculpting clay from Tranchée project, Le Vent des Forêts. M. Higgin, 2013

unctuous, slippery instead of sticky, both wonderfully yielding and playfully resistant in its yielding. In the right balance with water, clay becomes what Bachelard calls *pâte:* the 'perfect earthen matter'. Its plasticity marks the exquisite point between the too hard or too soft, awakening a 'dynamic and profound participation that is truly the joy of the hands in the material sense' (ibid:61). As pâte, clay invites play, it invites the 'dynamic coupling' of material, hand and head, which, for Lambros Malafouris (2008), marks the relational achievement of 'material agency' that serves as a bridge between a 'plastic mind' and 'plastic culture'.

I'd spent these last days knee, sometimes thigh, deep in clay but this was the first time I moved into the clay with my whole body, a wary hesitation caught between threat and invitation. Playing with the mud, with the sensation of my body against the mud, the way movement and touch, doing and undergoing, alternated together, there seemed no end to the possibilities this pâte afforded. The unnerving, joyous sensuality of the experience wasn't exactly sexual but that would be the nearest approximation to the measure of desire and delight, with its underbelly of disgust and fear, with which it was filled for me. Over the months of fieldwork with Alexandra and others artists, I'd got a measure of clay's materiality; a sense of its different textures, movements and smells, a sense of the possibilities different clays afforded my hands, heart and eyes. But for a moment that afternoon, it felt as there might be no end to the process of opening up into the clay; no end to what it was possible to *do* and *undergo* with it; a strange moment of vertigo in which I seemed to be falling both into the clay and into myself. With Bachelard, I'm interested in how a 'literary imagination' can provide a speculative, *intensive* description of experience that goes beyond the purely empirical or pragmatic, in order to divine and evoke in words the fullness and fleetingness of the felt *sense* of working with materials. Not just the *doing* with clay but the *undergoing*, the sense of being overwhelmed and taken possession of by this substance and the dreams with which it populates experience.

References

Bachelard, Gaston. (2002 [1947]) *Earth and Reveries of Will: An Essay on the Imagination of Matter.* Dallas: Dallas Institute of Humanities and Culture.

Malafouris, Lambros (2008) 'At the Potter's Wheel: An Argument for Material Agency', in Knappett C and Malafouris L (eds) *Material Agency: Towards a Non-Anthropocentric Perspective.* New York: Springer.

CONCRETE

Re-casting Concrete

Judith Winter

Whilst concrete may be a leitmotif for 20th century modernism, humankind's discovery that rock could be made from a mix of *'slaked'* lime, sand and gravel stretched back much further – at least to ancient Rome (300BCE) in structures such as the Coliseum and Pantheon. In the aftermath of volcanic eruptions – the volcanic ashes, mixed with hot limestone powder and water from rivers and rain – created a new bubbling mix of materials that could be shaped and formed. '*You start with stone. You make a powder. And then in the process of building, you add water and end up with a new form of "stone" in accord with the shape desired. It sounds like magic but we call it technology*' (Taussig 2004: 162; Harkness, Simonetti, Winter 2016). At the turn of the century the combination of iron reinforcement to improve concrete's tensile strength made its structural possibilities seem limitless. This combination with metal rods and wire created a composite material that resisted not only compression but also gave the material room to bend and flex.

For a moment in time, a new generation of modernist architects, artists and designers used this composite material to break with tradition, to move beyond historicism. In doing so they questioned the limits of pre-formed learning and endeavored to push concrete to take on new forms; to bridge spaces; to push upwards and outwards; to anchor and to contain and defend against natural and manmade forces. These 'modern' pioneers from across the world (Perret, Le Corbusier, V Doshi, Gropius, Mies van Der Rohe, Breuer, Niemeyer, Lina Bo Bardi, Carlo Scarpa, Kenzo Tange etc.) worked in close collaboration with engineers and an army of anonymous production workers, who didn't just think about materials, but handled them, listened to them, understood them. The scale of this experimentation demanded not only new thinking, but also the reliance on skills and workmanship of previous generations. Concretes called for a closer bridge between learning, imagination and the experience of the worksite. A sense of the scale of concrete building during the inter-war years and post WWII, is perhaps most physically re-imagined walking around the sites that were once experiments in shaping public life. Add to this the countless drawings and un-realised proposals for concrete structures and here exists a nascent reservoir of material experimentation.

Thinking *with* concrete has drawn me closer to Marcel Breuer, an unsung pioneer of material studies; a designer, architect and educator who studied and taught at the Bauhaus and later influenced a new generation of architects and urban designers at Harvard (circa 1938 – 1946). Breuer is associated with his experiments in forming and handling materials; metal (tubular chairs), organic plywood furniture (ISOKON, England) and temporary architecture (Plas-2-point prefab 1942). Later, Breuer continued to experiment with the handling of concrete and challenges of production; with the Schokbeton company based in both Europe and US he became the designer associated with the development of precast concrete. These experiments have continued to flow across generations and in his digitized archives at Syracuse Univeristy (2012) it is possible to get a sense of significant aspirations and responsibility that this younger generation of architects carried. Breuer's concrete projects included: the Paris Headquarters of the United Nations' educational, scientific and cultural organization, UNESCO (1953 – 58); St John's Abbey in Collegeville, Minnesota (1953 – 61); the I.B.M Research Center in La Gaude, France (1960 – 61); and the recently renovated and renamed Breuer Building, Whitney Museum of American Art, New York. Contrary to more orthodox views of modernist building as rational and ordered system – an aggressive modernism born out of a search for technological progress or driven by either ideology or economics – what starts to unfold in the pages of archives and accounts of architects such as

Breuer, is not aggressive modernism, but perhaps more accurately *urgent* modernism; a continuous attempt to balance aesthetic, social and functional concerns of the times.

Whilst many moderns are criticized as being profoundly anthropocentric many of the designers and artists of this period were deeply interested in developing a sustainable environment necessary for all humans. Whilst we may associate modernism with functionalism and rationalism – a more cynical flattening and controlling without due regard for the environment – perhaps it is necessary in our time to re-balance this all too simple perspective, formed as it is from a distance. Given concrete's carbon footprint, it may seem contradictory to state that many of the moderns were at the forefront of eco-ethics, ecologically focused art and architecture and new discoveries in science and technology that were associated with the improvement of human life. Here the intersection of architecture and ecology were *'intertwined philosophically and pragmatically within an evolving field of ecological design'* (Anker: 2010). The idea that form should follow the laws of nature in order to function effectively have often been misrepresented as a rationalist slogan "form follows function" and for architects and designers material experimentation in the early 20th century were inextricably linked with concerns in making the most out of limited resources (here the slogan "less is more" has also been misappropriated. Many of the Bauhaus architects and designers (Walter Gropius, Breuer, Moholy-Nagy) continued to develop an interest in building better lives when they engaged with ecologists in London following their migration from Germany. They became associated with a circle of environmentalists (architects, scientists, urban planners, writers and educators) including Julian Huxley and Williams-Ellis. Their efforts were fixed on saving mankind from environmental, economic and social destruction through scientific planning. This all found its voice in Political and Economic Planning Organisation (PEP). These moderns also met as part of the Modern Architectural Research Group (MARS) who became advocates of environmental sensitivity.

Equally one could look at designers who were exemplary experimenters in concrete in Japan such as Kenzo Tange, Kisho Kurokawa and Kikutake (later went on to form the Metabolist movement) who were inspired by many of the modernist experiments, but clearly preoccupied by this relationship between modern architecture and the environment.

Even precast concrete can be revisited as a significant process allowing greater control off-site, at a more manageable scale. Experiments in prefabrication were taking place across the world. The schokbeton patented technology flowed to the US through the migration of many mid-century modernists who knew of the process from their experiences in Europe. All this movement was also aided, of course by The Marshall Plan and 'via secret United States coldwar military construction projects' (Pyburn: 2004)

As a material, reinforced concrete made possible a new spatial vision and one that above all embraced the transition from manual to machine production. Concrete also emancipated the architect from borrowing styles from antiquity and perpetuating historical prototypes in decoration. Reinforced concrete allowed the building's form to find a new expression. What becomes clear whilst thumbing through the collections of hand-typed documents, letters and photographs in numerous archives, is the motivation to rediscover the material world *'without aesthetic or technical prejudice'* (Breuer 1937: 196). It is for this reason that Breuer and contemporaries became more vocal at distancing themselves from being captured under a label of 'international style'. The notion of 'style' for these experimenters was problematic because it labeled and superficially reduced modernism to the use of specific materials, such as concrete, glass and steel. It further limited the form associated with these materials and misrepresented designers' motivations as

rationalistic and economic. For Breuer what marked out this epoch were not these limits, but a new way of handling and thinking with materials, 'the new mentality; that is *to say, the view we take and the manner in which we judge our needs. Thus modern architecture would exist even without reinforced concrete, plywood and linoleum...'* (Breuer op.cit)

Let us not forget that concrete at this time also seemed to offer solutions to solving 'real problems' from housing shortages, facilities for public life and welfare, economic production and transportation. Furthermore it could be poured on-location, mixed with other aggregates, enable new structural possibilities and offer employment to skilled manual workers.

Concrete is then a powerful material to think with in our time, not just because of its ubiquity but also because of its perceived failures and the way that it throws a spotlight on questions of social and human responsibility. Loved and hated in equal measure it is the material that has a reputation both 'authoritative' and controlling. For its detractors it is a material that expresses ideological collapse of post-war Europe (dystopian landscapes, concrete jungles and an era being imploded). For its *militant moderns* (Hatherley 2008) concrete might personify a moment not yet realized, pregnant *with* possibility, a defense of Modernism against its defenders. The concrete recipes that were practiced in the early part of the 20th century were a way of imagining new forms of constructing a future. Concrete created a sense of security for a generation that craved a new order, equilibrium and stability. Whilst, we might have justified misgivings about concrete's uses and ruination in 'an epoch of disengagement, elusiveness, facile escape and hopeless chase' (Baumann 2000: 120), perhaps there is something that needs to be said about the impulses to create a sense of harmony and acknowledge mutual engagement between materials, people and places.

Perhaps this is due in part to concrete's separation from human handling and responsibility. Concrete demands a particular kind of care in gathering of materials, forming and finishing. It is in the very imperceptible state of concrete curing, that concrete's strength grows. 'Careful curing determines our understanding of the material's success or failure in the world of 'solid modernity' (Baumann 2000). Solidified concrete is expected to endure, and the attention it is paid in this forming or nascent state is the process that allows it to meet an expected life. Concretes are then contradictory, both solid and fluid (in their making and ruination). Our definition of concretes might be returned to the Latin *concretus,* or *concrescere* 'grow together', rather than the early grammatical term that is used to designate a quality belonging to the solidified substance.

In the archives of moderns exist countless concretes; within the mix aggregates are added from sawdust to terrazzo to industrial ash, these concrete recipes changed characteristics (texture, surface, warmth, acoustics etc). Whilst designers were seeking on the one hand to break with the past there was also recognition of conversation between the present materials and the lived experience and skills of the worksite. In some cases the concrete was polished like glass to create a kind of equivalent of marble and in Germany there were experiments in stone-worked concrete to expose the aggregate (Forty 2012), in other cases the concrete was physically pounded with a 'bush hammer' to pucker the surface and give modern concrete a feel of weathered or physically hewed material. It was this mix of imagination and experience that created real-life conditions for material studies. It is this way of working and learning with the material described by Breuer that might be useful to revisit in our present time.

Most recently I am drawn to search for concrete projects that were never built, but might have been. These moments of imagined spaces need not be hard-fast plans, but responses to changing situations and

imaginaries of futures that are unknown. Perhaps it is this play or potential to recast or throwaway pre-formed ideas that offers something to future generations?

As Breuer noted, there was little work for architects in the early 1930s. He used these uncertain times to travel and lecture in Europe and North Africa. It is in these moments that all sorts of future projects are triggered: housing, hospitals and road systems and thoughts about temporary architecture. In countless descriptions he describes materials and buildings in anthropomorphic and sensory terms: 'buildings should not be moody, but reflect a general durable quality.' Architecture 'should be anchored in usefulness; its attitude should be more direct, more directly responsible, more directly social' ; 'the taste of space on your tongue'; 'the fragrance of dimensions...'

Before Breuer headed to the US he spent two years in England, joining other Bauhauslers, including the founder of the Bauhaus, Walter Gropius, Moholy-Nagy and he remained in close contact with the designer Herbert Bayer. He became part of a modernist gathering of intellectuals living at that time around Hampstead. Primarily working for Jack Pritchard and ISOKON designing plywood furniture, he also worked in association with the British architect F.R.S Yorke and built two domestic dwellings: one that still stands, 'Sea Lane House, West Sussex'; and another for the furniture retailer Crofton Gane in Bristol, 1935. However, arguably the most significant and influential project in Britain was the imaginary proposal for 'A Garden City of the Future' sponsored by the British Cement and Concrete Association in 1936. This utopia was devised for a seaside English town and presented at the Ideal Home Exhibition of the same year. The proposition was to construct a city around the notion of a honeycomb, where concrete would connect leisure with work and dwelling with social and cultural services. Flats were raised above the traffic and road-systems, on stilts to enable people to have views out and beyond the built environment, in many ways creating concrete dwellings that might almost be seen as analogous to the SLR camera positioned at a fixed viewpoint on a tripod, enabling its residents to observe everyday life. Whilst these visions were never acted upon, they were part of a contemporary *zeitgeist*. In Britain they remained in the ether to be revisited by countless town-planners and architects at the service of local authorities after the war: played out as a new vision for schools, recreation, working environments and transport networks. Remove for a moment any judgement you might have about the success and failure of these projects and return to concrete's possibilities.

Whilst experiments and testing continue today, worksite procedures are monetized, with more stringent regulatory systems; there seems to be a widening gap between aesthetic and imaginative processes and the worksite. Material experimentation is driven now by technology rather than seeing technology as a tool. Experimentation inevitably has a different meaning and sensibility when played out using digital tools; we might want to pause to consider what might be lost if we no longer rely on the experiences, skills and knowledge built through years of trial and error, modifications and human handling?

With the crisis in utopian thought in the last third of the twentieth century, long-term and large-scale developments are understandably regarded with suspicion. What might happen if we remove some of our pre-formed judgments (prejudice)? How might we foreground instead concretes in their making and pay greater attention to the relationship between materials, places and process? How do we continue to rediscover concrete's spatial possibilities, challenge the limits of the material for the betterment of our world and use concretes as a trigger to help us shape new and different forms of change for the future?

References

Anker, P. (2010) *From Bauhaus to Ecohouse: A History of Ecological Design.* Louisiana State University Press.

Baumann, Z. (2000) 'Time Space' in *Liquid Modernity*. Cambridge: Polity Press in association with Blackwell Publishing.

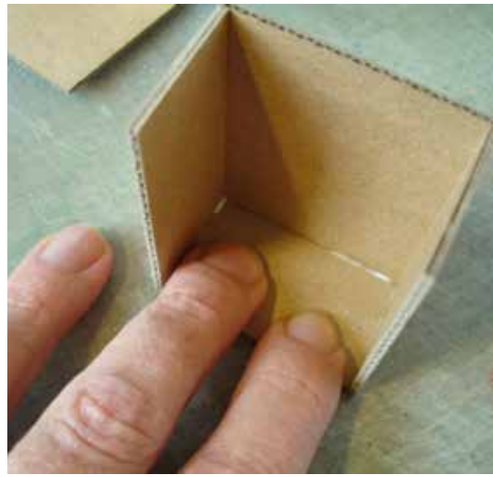
Breuer, M (1937) 'Architecture and material', in Nicholson, B. & Gabo, N. Circle, *International Survey of Constructive Art*. London: Faber & Faber.

Harkness, R. Simonetti, C. & Winter, J. (2015) 'Liquid Rock: Gathering, Flattening, Curing', in *Parallax*, 21(3): 309-326.

Pyburn, J. (2004) 'The Role of Architectural Precast Concrete Technology' in the *Proceedings VIIIth International Conference: Import-Export: Postwar Modernism in an Expanding World, 1945 -1975, New York.*

Taussig, Michael (2004) *My Cocaine Museum.* Chicago: University of Chicago Press

Corrugated cardboard - the material and its application in architectural modelling, cortecscenery.com / D. Neat



CORRUGATED CARDBOARD

Architectural Modelling Beyond the Catwalk

Leonidas Koutsoumpos

Making models is an essential part of architectural practice and education. Although immaterial digital models have, nowadays, become integral part of the design process, physical models are still irreplaceable, since they provide a tangible and instant overview of the project, allowing the eye to grasp the whole entity at once. Moreover, they do not turn off; their material substance is always there on the desktop allowing constant reflection. This is why students of architecture learn to construct models from day one in schools of architecture.

Probably the most popular material for making physical models is cardboard; and the king of cardboard modelling is the corrugated one. Its crown, though, is not made of gold, but of recycled paper. Due to the fact that it is a cheap and widely accessible material, it has become a valuable resource that constantly gives shape to *informal*, *exploratory* and *preliminary* research phases, where the model is not used as a show-off of a fixed and finalised shiny object, but as a matter that helps the design process to evolve.

In physical terms, the main characteristic of the corrugated cardboard is that although it is made out of thin paper, it gains rigidness, not through mass (as is the case of paperboard), but through the form of its geometry- an undulated paper surface stacked in between two flat ones. A simple idea, that made corrugated cardboard widespread and widely available worldwide.

This geometry has a historical and geographical topography: It starts in 1856 in England when corrugated cardboard was patented as liner for tall hats. At the other side of the Atlantic, in the U.S.A, Albert Jones added in 1871 one liner (single-face) to the corrugated initial design and in 1874 Oliver Long added another liner on the other side, making a rigid flat surface suitable for multipurpose packaging. Long described the innovation of the new material in the text of his patent with the following words:

> «...two sheets of strong paper, between which are placed shavings or finely-cut strips B of the same or any equivalent article, said sheets and strips being held together by the application of any suitable adhesive substance or mixture, as mucilage, glue, or flour paste."[1]

In 1890, Robert Gair, a Scottish-born printer and paper-bag maker at Brooklyn, invented the pre-cut paperboard box.[2] During the twentieth century and especially after the economic flourish that followed the Second World War in western societies, cardboard boxes became the familiar package of consumption and prosperity.

Corrugated cardboard next to a bin with a handwritten note: 'To Take Away for Free', L. Koutsoumpos, University of Aberdeen

Very little is known about when architects started using corrugated cardboard in building models, but it can be guessed that its use in architecture developed with the widespread availability of the material. Nowadays it is very popular exactly because it is cheap, lightweight and can be found everywhere. For example, David Neat, an educator who identifies himself as "a maker and a teacher of making," in an online blog about model making, suggests that "in the first place it is one of the cheapest forms of card I've found."[3] Furthermore, when two educators, Heike Matcha and Ante Ljubas decided to set up an architectural and educational project about parametric origami, they set the criteria for choosing their material as having to be cheap, easily available, transportable, lightweight and recyclable: they finally came up to choose corrugated cardboard.[4]

Another reason that explains the popularity of this material is that it is very easy to use: it can be cut off with a scalpel, a pair of scissors or by hand (tutors in the design studio are notorious for cutting models in pieces, often using only their hands, in order to 'show what they mean'). Nevertheless, under standard conditions the best friends of the corrugated cardboard are: a scalpel, a flat metal ruler, a cutting mat and a cheap water based glue.

Modification of a corrugated cardboard model during a tutorial - before (top) and after (centre and bottom), L. Koutsoumpos, University of Edinburgh, Scotland

1 Long, (1874) Improvement in Packings for Bottles, Jars

2 Twede and Selke, *Cartons, Crates and Corrugated Board*, 41–42, 55–56.

3 Neat, "Basic Architectural Models in 'Kraft Board.'"

4 Matcha and Ljubas, "Parametric Origami," 326.

Corrugated cardboard has some distinct material characteristics that give it a certain character. It usually has a very matt, dusty look, and for this reason, it is often used to represent the earth, in contour models, where lots of layers of cardboard are stacked in order to represent the slope of a site. Sometimes it is used in a way that it deliberately exposes its geometry, either by peeling off the one side in order to represent different types of earth, or by showing the undulated line that is produced through its section, in order to represent other more complex structures (like steel frames).

Some architects prefer corrugated cardboard for the immaterial characteristics that it has been associated with. For example, it is known for giving an informal character to the models that are 'friendly' to look and touch. It has even been attributed of having moral virtues, since it has been described as a "very honest, unpretentious and direct material."[5]

For all the above reasons, corrugated cardboard is constantly used in everyday sketch models, diagram models, concept models, massing models, and sometimes, in presentation models [Images 5 & 6]. Nevertheless, it is rather the former uses and not the latter ones that characterize it as a material in the architectural model making.

Especially in the schools of architecture, students are often encouraged to work with this material and, for this, it has become an inseparable part of the studio culture, in which students are introduced from the first year of their study. For example, teachers at the Faculty of Architecture and Design at Riga (RISEBA) describe in an online blog about the 1st year studio that "students successfully passed their first assignment... spending some sleepless nights at studio, recycling piles of the cardboard, working hard to build the models and realizing their first architectural ideas."[6] [Image 4]

Massing Model, RISEBA University, Latvia, architecture.riseba.lv

Conceptual Models, L. Koutsoumpos, NTUA, Athens, Greece

5 David Neat https://davidneat.wordpress.com/tag/massing-model

6 *School of Architecture Blog, RISEBA, University of Latvia*,"1st Assignment for 1st Year Students Passed."

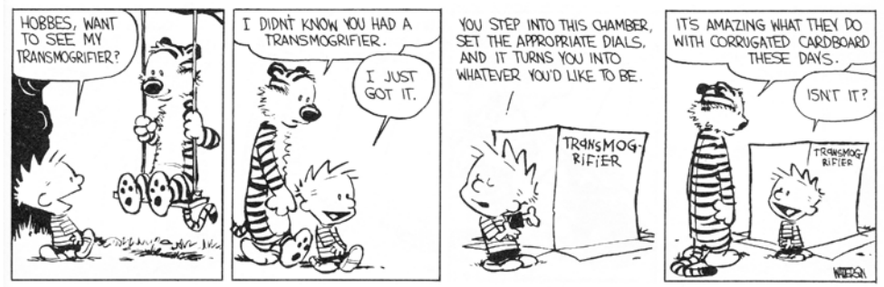
Contour Model, L. Koutsoumpos, IZTECH University, Izmir, Turkey

What lays in the future of the material and its applications in architectural modelling? One cannot be sure, especially since digital technology has stormed in the architectural design studio. Nevertheless, there is evidence that corrugated cardboard will keep on having a role to play. In 2014, Google developed a Virtual Reality platform for smartphones that was named *Google Cardboard;* the name of which was originated by the low cost viewer apparatus that holds a smartphone in front of one's eyes, like the well known View-Master. Users were encouraged to print out and make themselves the apparatus out of corrugated cardboard, playing with the association that corrugated cardboard has, as a vehicle for imagination. In this case, a high-tech device is combined with a low-tec apparatus, in a do-it-yourself fashion, in order to create a playful virtual reality experience, where the digital meets the physical.

Corrugated cardboard has strong cultural allusions of having the power to give concrete form to abstract ideas. This is mainly because children, from a very early age, often use cardboxes, which are usually made out of this material, in order to create their own imaginary places of being. A box with minimal hacking can become a cave, a kitchen, a boat, or a rocket. This is illustrated in the well known comic *'Calvin and Hobbes'* where little Calvin turns a cardbox into a *transmogrifier*, a machine that will transform you into "whatever you want to be," while his imaginary friend Hobbes comments: "It is amazing what they do with corrugated cardboard these days."[7] [Image 7]

One can imagine that, in the future, virtual reality and digital technologies will be more and more part of the architectural design studio. Nevertheless, the most intriguing twist of this evolution is the way that digital technologies will come to blend, in various different ways, with the material pre-existing methods of making; ways that one cannot imagine right now. In this sense, one can presume that if corrugated cardboard will continue to be the cheap material that wraps our consumer habits, it will keep on giving shelter for children's imaginary worlds and, in parallel, it will continue to help architects and students of architecture to model their spatial ideas throughout the design process. And although its dust will keep on covering the architects' studios, the material's dusty look will continue to keep it mostly hidden from the lights of architectural catwalk.

7 Watterson, *The Essential Calvin and Hobbes*, 229.



Calvin and Hobbes: the Transmogrifier, Watterson

References

School of Architecture Blog, RISEBA, University of Latvia,"1st Assignment for 1st Year Students Passed." October 15, 2012. http://architecture.riseba.lv/public/blog/2012-10-15-1st-assignment-for-1st-year-students-passed.[Accessed: 2016-07-26]

Long, Oliver. *Improvement in Packings for Bottles, Jars.* Patent US 150588 A. New York, issued May 5, 1874. http://www.google.com/patents/US150588.

Matcha, Heike, and Ante Ljubas. "Parametric Origami: Adaptable Temporary Buildings." In *Home 28th eCAADe Future Cities: 28th eCAADe Conference Proceedings.* Zurich, 2010. https://www.academia.edu/30858604/Parametric_Origami_Adaptable_temporary_buildings. [Accessed: 2017-03-10]

Neat, David. "Basic Architectural Models in 'Kraft Board.'" *Davidneat, a Maker, a Teacher of Making*, Spring 2014. https://davidneat.wordpress.com/tag/massing-model/.

Twede, Diana, and Susan E. M. Selke. *Cartons, Crates and Corrugated Board: Handbook of Paper and Wood Packaging Technology*. DESIGN HOUSE Incorporated, 2005.

Watterson, Bill. *The Essential Calvin and Hobbes: A Calvin and Hobbes Treasury*. London: Time Warner Books, 1995.

Untitled (toilet piece), Kjersti Sletteland
Found object in porcelain, 2015

CRACKLE GLAZE
Elizabeth Hodson

It reminds me of veins and nerves and maybe it emphasises something a bit bodily. I think the added lines are drawing attention to the inside of the material. The lines are taken from architectural and masonry drawings. They often use lines and dots to describe what is an internal or external wall, so you will understand what you are looking at. It's a fascination with the inside of materials; it's about the mass. I think it's a strange abstract thing that everything has a mass. I've always been fascinated by the inside of walls. That's why I've made pipes in the past, taking you behind things in a way. Regarding toilets anyway, that's what they do: they make a canal from one room to the next, they go inside walls and out. In a way it's the same thing as what a pipe does. It breaks the barrier between the inside and outside. In this piece, a wall of a toilet, you can see the inside and outside; the way it's broken.

I found it on the walkways in front of Edinburgh Sculpture Workshop. I think they were demolishing a house, but a long time ago. It was probably sitting there for years. It was just along there, in these weird little spaces. There was some house debris. But most of it had been removed and there was grass and nature had taken over. I just picked it up. After other peoples reaction's I cleaned it more and I put boiling water on it to make sure it had been cleaned properly. I wanted it to be pristine.

You asked about the shape and form, if it was a priority? Which it is; and I would say that that's the second priority. And that's maybe when the crackle glaze comes into it. I've always being interested in architectural or toilet furniture; sinks and toilets and that, because of the shapes, very beautiful shapes. Always very smooth and white porcelain. If it is not white, it is pink or light green and of course that's to cover up what it really is: transporting filth. It's a big contrast to what it is actually doing and I think that this is interesting and I think it has been pretty much like that from the start, when toilets started to come inside people's houses. Of course the material was very user friendly and easy to clean; those soft lines. A lot of ceramists work very hard to get the cracks. You have to experiment a lot and of course when you get it you don't get to control where the cracks will be and how many. And I think a lot of ceramists like the un-predictability of it. It really fits with a ceramist way of working and feeling about the material; it's always a bit unpredictable compared to a painter, where you know what you get and you get it straight away. I don't think that that's shocking either: to put a toilet in a gallery. People don't ask if it's art though anymore. Because it's already been decided that it is art. Putting pieces of furniture into a gallery has been done so many times that I don't think I need to question that. Conceptually this piece is quite an important piece for me and I will keep going with it. I do see my work as very much an exploration. I've worked a lot with the inside. Sometimes I think when we look at sculpture we feel it with our own body, rather than the intellect. And there is a tension there. You see everything with your body.

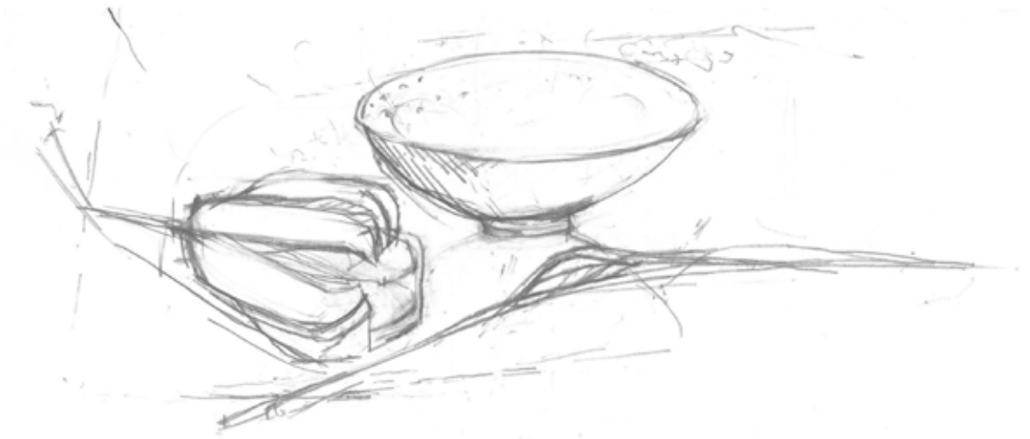
Kjersti Sletteland

Extending beyond the world of ceramics, 'crackle' belongs to the craquelure family, which refers to the ubiquitous pattern of cracking on a surface. Most often an indication of the object's age, the crackling can be used as a means of gauging authenticity. This is often the case in the realm of oil painting. Within ceramics, craquelure is more commonly known as crazing, and can be a deliberate technique sought during production; it is both defect and aesthetic choice. It was during the Song dynasty (960–1279AD) that crackle was first celebrated as a deliberate effect. And craquelure, like the white porcelain it decorates, is intimately bound up with its country of origin, China. China first developed porcelain over 2000 years ago, and its famed strength and delicacy – that

translucent white coasted out of white earth – was exported across the globe as the symbol of luxury and wealth. Its trade opened up empires and cultures. Imitations and reinventions of this highly skilled ceramic pepper every world tradition. Anonymous artist-craftsman manned the Chinese kilns, reaching temperatures of up to 1,400 degrees Celsius, the splendour of the objects hidden inside was entirely alchemic. Crackle grows: its composition is not determined by the hand of the artist but by the chemical reaction on the surface between the glaze and clay. The fineness of the crackle, its leaf and cellular pattern are by products of a chemical reaction in the firing where the glaze 'fits too tightly' over the surface: patterned chance often revealed over time. Crackle is the history of the technician-alchemist: the ceramist's earliest attempt at mastering the will of the material. This story can be read as one of harnessing chance, and a truth to materials.

Sculptor Kjersti Sletteland's 'Untitled (toilet piece)' (2015) celebrates crackle. The pattern of the fine meandering lines that cover the surface of the found object are also devoid of any artisanal control. They speak to chance, the history of Chinese porcelain and for Sletteland, the corporeal. The glaze's autonomy contrasts with the drawn red lines added by Sletteland onto the edges of the broken, fractured porcelain. Taken together they compete for attention and create a sculptural composition that, whilst it has no front or back but instead porcelain curves, simultaneously highlights both the outer surface and the material's depth. The final form of the glaze is determined by its interaction with the body of the porcelain. Much like skin, glaze draws attention to what is underneath. But like skin that covers lesions, scars and tires with age, crackle glaze is not formed through continuous growth but is a temporal, partial process of degeneration from generation. But 'Untitled (toilet piece)' is also married to the history of art. The provenance of the piece as a 'found object' is testament to this. And as a 'found object' it speaks to the history of how the appropriation of everyday things, materials and objects came to be regarded as art. The echo of Marcel Duchamp is not only present here as the champion of the found object, but also as the author of the infamous 'Fountain' (1917). Duchamp's 'Fountain' stands as a central piece of modernist art. The white porcelain urinal, signed with the pseudonym R.Mutt, was a then radical and subversive commentary on the nature of the art object. The piece ushered in conceptual art and the perceptual ability art has to reframe the everyday, the quotidian and the hidden as something worthy of consideration. The readymade's affective potential was however based on its radicality, a status which it has now lost: its very success undermining its purpose. But unlike Duchamp's 'Fountain', Sletteland's object is not a piece of toilet but a piece of toilet wall. And for the artist, it is less a corollary to the conceptual imaginings that Duchamp's piece inspired, than a experiential concern with the apparatus that mediates between the inside and outside, or, like a house or body, holds both in place at the same time. As a form 'Untitled (toilet piece)' reminds us how our home's architectural masonry comprises of layers, which demarcate the inside from the outside. Canals of pipes run across and within buildings, and Sletteland's piece takes us inside the material that whilst constitutes our domestic boundaries, nevertheless remains routinely unseen. Her act of appropriating what she describes as 'toilet furniture' is not intended to aggrandise this functional apparatus. But like her attraction to the object's crackle and the association of the readymade, both of which disavow the 'cleverness of the hand', which acts as an metonym for the entire person, her interest is fuelled by their separation from her. For crackle and readymade are both effective only when they can take back control and impart their own will.

E A. Hodson



Everyday objects, Anne Douglas, 2017

DRAWINGS
Material from the Perspective of Drawing
Anne Douglas

Drawing as Commodity

Materials in drawing can refer to the physical substance or ground on which marks are made or to the tools for making marks. It can also mean the subject and/or content of what is drawn. Each of these meanings seek to place drawing substantively. They are rehearsed in everyday language and in cultural practices in ways that accrue authority. It is arguably the way that material is imagined in drawing that sets drawing up as an expert activity that is designed to produce a commodity.

Drawing as Energy

Alain Badiou, a philosopher writing on contemporary art, proposes a different understanding, one that renders the materiality of drawing insubstantial. The marks, traces and lines that make up a drawing, are, he suggests, without place. They do not fix in the sense of re-presenting reality beyond what is drawn. Drawings are generative in themselves, phenomenal, more vital force than substance.

> But what is a Drawing? A Drawing is a complex of marks. These marks have no place. Why? Because in a true Drawing, a creative one, the marks, the traces, the lines, are not included or closeted in the background. On the contrary, the marks, the lines—the forms, if you will—create the background as an open space. They create what Mallarmé names, "the empty paper which is protected by its whiteness." (Badiou 2011)

Thus the ground of a drawing is simultaneously material support for the marks that it holds and comes into being through those marks. Imagine focusing on a simple everyday object. The drawing emerges through the dynamic relationship between ground and mark and through this action opens up the imagination and perception of the viewer.

Teasel Head, Anne Douglas, 2017

Material as Energy

The notion of emergence is also quality of contemporary physics alongside philosophy. Quantum physics questions the dichotomy that the western world has tended to construct between the material and immaterial. So-called 'holes in reality' do not exist but instead particles knock about in free space and jostle for position, at times appearing solid, at others as movements of energy. They are without place in any concrete sense. What was previously imagined as either solid or void, is now found to be simultaneously particle *and* wave. It is in movements of energy between states of being, their combination and recombination, that life is created and sustained (Taroni 2016, pp 32–35).

Yet we find it difficult to grasp material as energy in everyday life. Currently we see materials as a resource to control and consume to the point of depletion. This is a story we narrate and inhabit throughout everyday life. In so doing we are effectively trapped in systems that can no longer be sustained, struggling to find a way out.

Stories we tell ourselves: two views of Genesis

What stories *do* we tell ourselves? How do these inform, and even misinform, our understanding of materiality and, importantly, ecology?

The anthropologist Gregory Bateson (1904–1980) traces a utilitarian worldview that predominates in Western thought, to Genesis.

> In the beginning God created the heaven and earth. And the earth was without form, and void; and darkness was upon the face of the deep. (Genesis 1:2)

Bateson's concerns with Genesis as a creation myth were threefold. First, Genesis sets up an agent – 'God' - who stands outside of the world, an agent on whom we become dependent. Secondly, man is given dominion over other creatures (Genesis 1:8). Dominion has become licence to create order through control, an order based in sorting and dividing, classifying and naming through an external agent that is invoked to do the sorting and dividing.

Thirdly and finally Bateson refutes the possibility of beginning from a void. This, he argues, is not founded in empirical observation or experience.

> "No man ...has ever seen or experienced formless and unsorted matter – a monstrous extrapolation".
> (Bateson 2000, p xxxii)

In this critique, Bateson exposes a crucial set of links between the power of the imagination through metaphor and storytelling to shape the ways we dwell in the world. He was aware that other creation myths existed within Western and non-Western cultures based in quite different ways of imagining material existence. He was in search of a narrative that could focus the deeply relational and mobile nature of organic and social life.

Such a narrative might be found in Paul Klee (1879–1940), a visual artist and musician also working in 20th century. Klee, like Bateson, saw the human mind as inseparable from a material base, as eco- rather than anthropocentric. Klee also drew on Genesis but developed a quite different interpretation from Bateson, one closer perhaps to that of the quantum physicist. Genesis was for Klee a continuing process of creation and recreation. We enter into this process in being born, 'unasked' and must find our way for better or for worse with whatever skills are to our hand (Klee 1989,p11).

Klee proposed that the task of the visual artist was to 'make visible'. What we can see and touch through the senses formed only a very small part of a largely unseen world. "In its present shape it is not the only possible world" (Klee 1989, p 45)

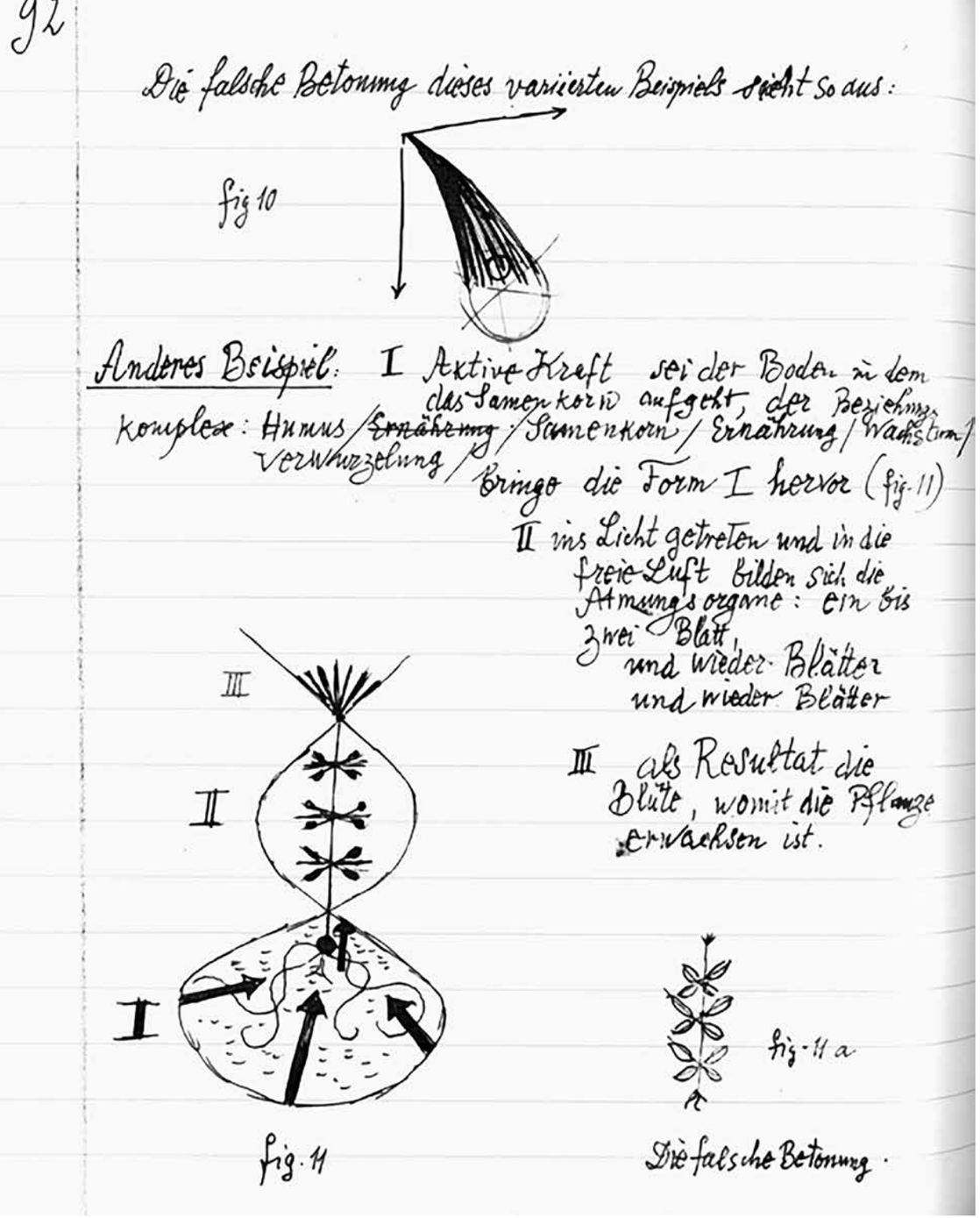
Klee explored this potential through drawing. Drawing brought into being one's own order of reality as part of the larger creative impulse of life itself. It was concerned with the opening of form to the imagination and to experience through participating, physically, mentally and imaginatively in the material world, of seeing oneself as part of the whole.

Material as living matter

Klee developed this idea through the metaphor of the tree. The artist, like the sap in the tree, moves between the elements of earth and sky, drawing energy from the roots through the trunk into the crown in a series of transformations. These transformations are only possible if the artist understands and follows the formal characteristics in nature through which growth occurs, immersed in the processes of their own material being as living matter. In this way, the crown of the tree does not resemble the root system. Each appears according to the process or function it performs in relation to the whole. In the same way the work of art emerges 'of itself', out of an inner necessity, not replicating, but creating a possible world, under the penetrating eye and depth of feeling of the artist (Ibid p 13-15).

"The artist is human; himself nature; part of nature within natural space"
(Klee 1972, p7)

In this narrative the artist interacts with an environment in which life is ongoing, simultaneously and continuously receiving and transmitting.


92

Die falsche Betonung dieses variierten Beispiels sieht so aus:

fig 10

Anderes Beispiel: I Aktive Kraft sei der Boden in dem das Samenkorn aufgeht, der Beziehungskomplex: Humus / ~~Ernährung~~ / Samenkorn / Ernährung / Wachstum / Verwurzelung / bringe die Form I hervor (fig. 11)

II ins Licht getreten und in die freie Luft bilden sich die Atmungsorgane: ein bis zwei Blatt, und wieder Blätter und wieder Blätter

III als Resultat die Blüte, womit die Pflanze erwachsen ist.

III

II

I

fig. 11

fig. 11 a

Die falsche Betonung.

Beiträge zur bildnerischen Formlehre Paul Klee, Page 92

Rethinking material

Klee sensed that his understanding of drawing entailed a radical shift in human imagination accustomed to viewing human existence as separate from nature in ways that privileged the needs of human beings above everything else. The shift needed to occur in our relations with the material world. To this end Klee focused on the formal elements of pictorial art itself. He proposed that the entities of dot, line, plane and space functioned in the world as spatial/temporal forces.

"..dot, line, plane and space – the last three charged with energy of various kinds... The elements should produce forms, but without losing their identity" (Klee 1920, pl)

Line, for example, is characterised as measure. It has properties - length (long or short), angles (obtuse or acute), length of radius and focal distance. Line works in very particular ways in the pictorial realm, dividing, taking direction, delineating, acting as the means (substance) from which something can be made.

It is in this sense that line, dot, plane and space may be considered to be materials, imagined as energy rather than as matter. Through such materials we are able to differentiate between intervals in time and space. Like the silences between sounds in music, the breathing spaces between words in a poem, the space between marks in a drawing help to establish rhythm and pulse, joining with the larger rhythms of life itself. This potential for variability is dependent upon grasping drawing as temporal, sensory and mobile.

As Klee remarks it is important not to lose the identity of each element. Qualities of line, tone, plane and space remain consciously present in a drawing. They are simultaneously discrete and part of a whole. Imagine how we follow a musical score or a poem. It is a process of oscillation between part and whole that enables us to grasp a work's quality of being alive.

This sense of drawing as an organisational medium is also evident (like its counterpart drawing as commodity) in everyday speech. We draw a distinction as the basis for making choices. We draw a conclusion to mark the end of a movement. We draw lines of continuity in family lineage, noting when these break. We draw people together in a process of decision-making. We line up for a race, move from point to point in a discussion or explanation, join the dots to gain an overview. Each plays between the discrete and the ongoing.

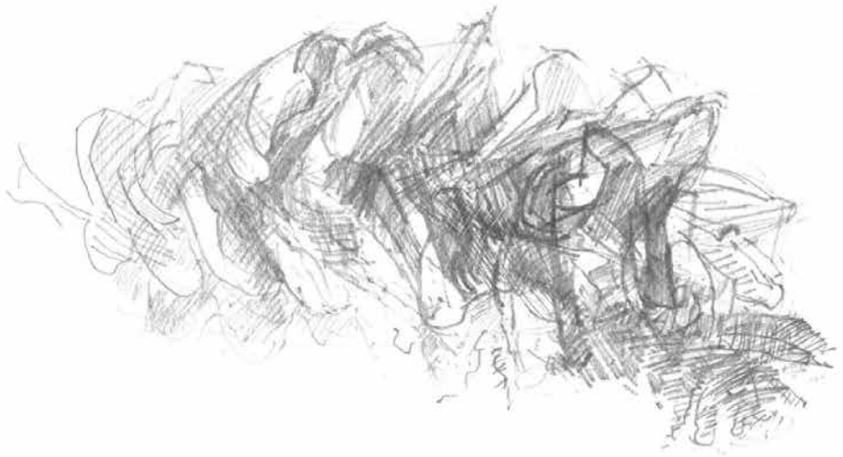
Further questions

Drawing as a practice is ambiguous not just in relation to what constitutes material but also in the market place. As commodities drawings exist to a degree on the edge of an art market but nonetheless hold immense significance as a vital force behind resolved works.

Is this ambiguity – the openness of drawing – its strength?

How might understanding material as energy rather than commodity affect our wider thinking about life?

Managing energy appears for example in the work of Helen Mayer and Newton Harrison. They observe how stable ecological systems are energy rich. They note how human beings have consistently created systems in which energy dissipates without the possibility of recovery. The transformation and dissipation of energy is an important dynamic within living systems as long as some order is restored and energy is recovered. Managing energy is fundamental to ecological understanding.



Fircone, Anne Douglas 2017

References

Badiou, Alain. 2011. 'Drawing' in *The Symptom 12*. [Accessible from http://lacan.com/symptom12/drawing.html]. Accessed 7.2.2017.

Bateson, Gregory. 1972/2000. *Steps to an Ecology of the Mind*. Chicago: University of Chicago Press

Harrison, Newton & Helen Mayer Harrison. 2016. *The Time of the Force Majeure*. New York: Prestel

Klee, Paul. 1999. *Beiträge zur bildnerischen Formlehre* Basel: Schwabe & Co Verlag

Klee, Paul. 1989. *On Modern Art* London: Faber and Faber

Klee, Paul. 1972. *The Pedagogical Sketchbook*. London: Faber and Faber

Klee, Paul. 1920/2014. 'Creative Credo' in *Paul Klee: Creative Confession and Other Writings* ed Mathew Gale, London: Tate Publishing

Maholoy-Nagy, Sibyl 1972. 'Introduction' in Klee, Paul, *The Pedagogical Sketchbook*. London: Faber and Faber.

Taroni, Andrea. September 10th 2016. 'Holes in Reality' in *New Scientist*, pp 32-35.

DUST

Enrico Marcoré

This essay is an attempt to evoke – through a phenomenological narrative – the extra-ordinary environment produced by the earthquake[1]. This aims to show the deeply material, unexpected and – might for this reason – surreal world of "things" emerged from the convulsions of the earth.

An earthquake is certainly a dramatic but - if you could luckily avoid death or permanent psychological traumatism - it is also a unique occasion for exploring the material interweaving of human body and built environment, by considering their reciprocal transfiguration and necessary interpenetration. In the chaos created by the quake, bones and flesh could be felt as more than human body elements, materialized in the environment with or without their physical presence. Indeed a kind of human-environment mimesis is articulated during an earthquake.

While put in motion by non-human agency, the earthquake allows objects to change their state. During this intense natural phenomenon, objects liquefy into materials mostly because of forgetting for a while their usual forms, positions, properties and functions. Thus, ephemeral and quite immaterial elements come into life and could be perceived by means of the quake because of movement.

During this kind of environmental liquefaction, a world emerges where dust is the physical contour given to a collapsed built landscape. Today, throughout its unintentional vitality, in many of L'Aquila's building-sites, dust is the stuff that guarantees continuity between destruction and reconstruction as the historical "fil-rouge[2]" that intertwines human and environmental decay and rebirth.

1 The 6th April 2009 at 3.32 A.M. an earthquake (6.3 MMS) hit the Italian town of L'Aquila.
2 In English this is 'red thread'.

By feeling with the quake it is probably the only way for perceiving the expanded and deeply material landscape (in presence or in absence) it produces.

For this reason, and in order to let the reader feel this event, I will use a quite impressionistic style and I will refer to the reader as the protagonist of this drama.

"We are sitting upon a fault line, we are a clot of blood undergone to the earth's madness".[3]

L'Aquila 3.32 a.m. in your bed

Water

BOOM! A deep roar and the new emergent world is put in motion from the earth's bowels. It is immediately transformed from stable to shaken, and the bed starts floating into wastes of darkness like a vessel adrift. You are suddenly plunged into a new dimension, navigating a liquid floor without compass. The earth has convulsions; your room is an ocean of objects that are moving all around, losing their given forms, functions and coordinates.

Flesh

Your life is something insignificant for the earth. Now you feel the fragility of your flesh as it is jostled against wood. There is nothing to control - just try to avoid being eaten by the whirlpool. You cannot govern the monster, let it go and hide. Hopefully it will be finished soon. Immediately plunged out of time: all is stronger than you in this stretched and alien environment.

Bones

Is your house able to resist? For the first time you realize that the same forces and principles of fall and decay govern your body's and your refuge's bones. You are part of your house structure, feeling your body as a bubble pushed around by enormous seismic waves. The architraves are the fragile

3 Theatre street performance in a square of L'Aquila (2010)

breastbones of your boat: they must protect your beating hearth.

Shelter

Structures are no longer stable certitudes in the dematerialization of your life. In this precise moment, you are the shelter you dwell. Probably because builders (that you don't know) built a bunker or a snare for you; likely you won't meet your shelter's unlucky destiny. There is a peak of flexibility that your house can reach, after this the collapse begins. Hopefully it could follow the high frequency movement as if it was within the flow of energies.

Walls

The sky is falling-down, the roof is fragmented in slices over your head. Vertical lines are no-longer defined, they are transformed into vibrations. New zig-zag shapes appear on the wall. Pipes are broken, a whistle is piercing your ear. The smell of overcooked air has penetrated in your lungs. It becomes clear now: the building is cracking, you can feel the walls crumbling. Burning newspaper in a giant cauldron.

Belly

The earth's shaking is too strong; you fall to your knees, until you are crawling. It's impossible to resist, the erect body cannot oppose the strength of all this explosive and lateral energy. There isn't nature to be against, only powers to which you must surrender. Your belly is against the soil now. The world is not an external whole; it is a very close-range sticky thing, an interweaving of forces and materials that are breathing on your neck.

Furniture

The big wave is at once climbing over your head and under your feet: the danger is everywhere. A windy sub-woofer is the constant noise. As furniture becomes undifferentiated things, ornaments become pure mass. They are transformed in their energy: as lead in its liquid state, they somehow express both, a lightness and an augmented drop-weight. Suddenly, objects assume agency and they become intentional killers: a window is a guillotine, a fallen closet a tree felled in the forest (and you are under it), a door becomes a big slap in your face.

Nest

You cannot escape. Your will is nothing compared to the wardrobe advancing in your direction. Find a fissure and follow the light that is entering through the cracks. The external world is coming-in, and this is real. Your room must be closed to the outside; it is the nest where you built safety. Why this intimacy's profanation?

You don't want to be there: it is just an unlucky twist of fate, however it is not a dream.

...

A few seconds later, the nightmare is disappearing as suddenly as it came to life. All is over now and you are still alive.

What happened here?

Go-down!

"Memento homo, quia pulvis es et in pulverem reverteris" [4]

L'Aquila 3.33 a.m. in the street

It's dark; you are outside.

All around the disaster, as if a breathless animal.

You start walking without direction.

4 The Bible, Genesis book (III, 19)

Rubble

Do you remember the huge pile of rubble that emerged from the roof collapsing? New crazy buildings have risen-up from destruction. Rubble is all that remains of the familiar built landscape. Rubble is the disenchantment of architectural tendency to rise-up. All is an enormous melting pot here: deformed buildings, noises, screams, smells, darkness and flashing lights cannot be differentiated under clouds of dust.

Rubble in the room, E. Marcoré

Snow of dust, P. Pellegrin - Magnum photos

Dust

Where was all this dust hidden before? The dust is the corpse's towel over the built environment's dead body. This stuff that seems so immaterial whilst it is floating in the air, is so thick when is bleaching everything upon the ground. The dust is the opaque environment where materialization and dematerialization are produced. It is a dry and dirty atmosphere where buildings are unmade. It is a grey snow. Do you remember all the dust that fell over the town? But this snow was rising-up with no-gravity. Its life depends on movement: on wind, on vibrations, on expulsion, on explosion. It could fly, but also stay calm. If put in motion it shows vivacity, otherwise it is just there, waiting and lasting. The dust is a volatile soil, it is the material expression of an absence or the outline of a movement.

L'Aquila: A few years later

Sediments

Today the dust shows the passage of time and the places' abandonment. It is inside forgotten houses, reposing over mummified objects and furniture. As nobody is taking care of these houses, the dust finds a comfortable place to lie undisturbed. Quietly, it muffles the scream of the violent moment the earthquake savaged the house.

Dust on the Sofa, Raffaele Gallo, Immotamanet project

Light and dust, Raffaele Gallo, Immotamanet project

Demolition, Claudia Pajewski, Le mani della città project

Dust in the L'Aquila's building sites, Claudia Pajewski, Le mani della città project

City centre's streets after the quake, Raffaele Gallo, Immotamanet project

Secondary Streets in L' Aquila, Enrico Marcoré

Vitality

Dust is the material arisen from construction and destruction. Today, new buildings rise-up and damaged ones die in clouds of dust. It was the sentinel that revealed the disaster when the buildings fell-down, but it is also the sentinel that reveals the work in progress on the building-sites. The dust settles in many building-sites nowadays. In the L'Aquila city centre it is an omnipresent cloud of dust, hammer bumps, workers screaming and electric saw sounds.

"Memento" house

Dust is at the beginning and at the end of a building's life. In L'Aquila it was after their death and now it is before their new life. It covers everything as voile that conceals a world to be forgotten and another to be rebuilt. For you now, the dust is the most material nexus with the quake and this is an ethereal link. If you weren't there for a while the dust remained as a guardian and now can tell you what happened in the meanwhile. So, ask the dust: she will display how much the decay of human bodies, the ruination of buildings and rebirth have in common.

EARTH
Clayfest and The Dreaming Grounds
Rachel Harkness

An unbelievably hot week in June 2015, and the organisation Earth Building UK and Ireland[1] hold a 6-day event in the village of Errol in Tayside, the earth-building heart of Scotland. The week, called *Clayfest*, consists of practical workshops, walks, talks, food and – to top it all – a ceilidh dance.

People who work with earth-building in its various forms, and others who are keen to learn, come together from all over the world to share their know-how and celebrate the art of building with earth. Conservation meets new-build here, expertise with experiment, local cultures with more global solidarities and wider environmental concerns.

There are workshops on Turf Construction, with Icelandic-trained instructors, and Adobe (earthen) Plaster with some of the most experienced teachers Arizona has to offer. You can learn to build in Mudwall (often called Cob) with its organic form or with Adobe Blocks (large brick-like earthen blocks). There are talks and tours that show how local architectural conservation of, and with, Mudwall and Adobe Block is being carried-out. Or you can raise a sledge-hammer and learn about Rammed Earth construction techniques.

For a long time I have been interested in the resistance of materials. I remember choosing a technology option called Resistant Materials at school, liking the sound of these practical and somewhat stubborn subjects and the potential they possessed for furnishing me with the ability to make. Later I began to work with people building things in their environments: shelters constructed from all sorts of materials, but predominantly from earth. Earth, for my teachers here on these building sites, was not only our planet and a symbol of environmental awareness and humanity's connections ("our one, shared planet") but also an important material for construction *and* that which

1 www.ebuki.co

their shelters dug down and bedded into. The idea of resistance has resurfaced many more times over the years, for example as I have watched the large-scale compounding of the earth that happens as sites are prepared for buildings. As I have laboured to compact earth into rammed-earth forms or plastered with earth alongside others, and as I have watched craftspeople use earth to defy gravity when they throw pots or raise impressive walls, I have thought about what the earth affords and denies.

Turning to others thinking about resistance, the philosopher Gaston Bachelard – a writer I very much like – in his *Earth and Reveries of the Will,* speaks of hardness and softness in relation to the resistant world. However, he is insistent in his use of the idea of 'mastery over' and 'struggle against' the resistance of the material world. I balk at this, partly because of the implicit gendering and militancy of the phrasing and partly because it does not reflect the building world I know.

And yet (or perhaps, rather ironically, *because* of this disagreement) I am very keen to think about how the resistance of materials, the stuff of the world – including that which makes us up – provides support for growth and play and building and dwelling. Without the compacting and hardening and inter-knitting of materials at, or down into, ground-level and then as one goes, building upwards would be nigh-on impossible. Could we think, therefore, of resistance as non-adversarial, and of the instances in which it supports or *gives grounds for*, rather than understand it as something to struggle to master?

I would argue that in the example of Clayfest, and earth-building more widely, we can see earth as something that is at once widely held in common, as a shared ground, as well as being understood as locally-specific. In building with earth, builders are turning a ubiquitous and often denigrated material into something valued, and they are doing so in ways that are appropriate to their place, skills, needs and time. Their recognition of earth, locally sourced, as an

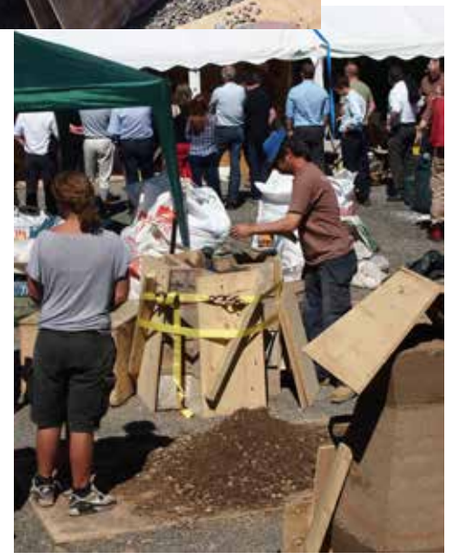
eco-material well-suited for widespread use in a world where addiction to fossil fuels and to cement, concrete, steel, glass, and even wood is hugely damaging, sometimes helps them in their reclamation of earth-building from associations of privation or poverty... but not always.

For many, earth is still base in the pejorative sense. But for earth-builders, it is plentiful and kind. It is appropriate to place, has often been worked for generations, and can be part of an environmentally aware future. It is base in the sense of being foundational, supportive, and that which other things, materials, or ways of living can rest upon or find footing in. As a practice, earth-building is both historically-rooted and future-oriented.

Building, then, is always building upon. Not in the sense of imposition or something being on top of rather than integrated with, say, a landscape, but rather of dependency. This is linked to the environmental notion of interdependency, which speaks of the fundamental interconnection and inter-reliance of things within our world and of the issues of culpability and responsibility that ensue from such a recognition. Seeing resistant earth as being *grounds for*, is to acknowledge dependency and work with it. As the architect Jeremy Till puts it in relation to his own discipline, this is understanding dependency 'not just as a truism but as a positive condition' (2009:193).

The turn here, then, is on how the everyday, the base, can be *basis for*. Basis for hopes, imaginings, creations.

In her book *Undermining* (2014), the writer-artist-activist Lucy Lippard, writes of earth the element in terms of mining, land art, adobe and archaeology. She draws attention to the ways in which our earthen activities always involve digging down and sometimes tunnneling under – including subversively. Earth, despite its variety, therefore demands that we stoop in order to rise. It requires, just as other modes of construction do, excavation in order to elevate (Harkness,



2014). And yet, its scale (rather modest in that it is largely dependent upon local materials and manual labour) is perhaps what separates it from other excavated construction materials.

Excavation in order to elevate.

I am reminded of the earthen homes of New Mexico, where I learnt of adobe construction, and where I witnessed digging into the earth for the material with which to build from. Where the earth sprang up in adobe forms: beautiful, culturally-specific, ecologically-sensitive and varied. Here, tall earthen walls held both beams and dreams of future lives aloft.

On the connection between elevation and the ground, I am reminded of the literary works of Italo Calvino and Angela Carter. Commenting upon them, the critic Marina Warner has stressed that they both 'believed in the connection of fantasy and reality' (2005: 448). In exploring this connection, Warner cites Calvino's description of how a shaman, faced with 'precarious existence', 'responded by ridding his body of weight and flying to another world, another level of perception, where he could find the strength to change the face of reality' (Calvino, 1996: 27 cited in 2005: 448). According to Warner, Carter's 'combination of fantasy and revolutionary longings corresponds to the flight of Calvino's shaman' (ibid).

Calvino's turn to the anthropological subject in the passage from which Warner quotes is interesting as it is from an essay on the subject of lightness (1996) in which he goes on to say that he finds it a 'steady feature in anthropology, this link between the levitation desired and the privation actually suffered.' (1996:27). This interest of mine in the movement between the ground and the air, between foundations and elevations, between sound footing and flights of fancy is one, then, that is widely shared.

I think of foundations: digging back to expose bedrock, or to undisturbed

earth which can hold the weight of the construction-to-be.

Constructing buildings out of earth (and returning to the Clayfest builders, they are building homes, schools, offices, hospitals in Kenya, France, England, Ireland…) is constructing the grounds of tomorrow: the walls and roofs that will shelter, the floors that will support, the doors that will open or will help contain, the spaces that will provide, shapes and forms that will inspire, textures and scents that will comfort. I think there's an acute awareness in earth-building of what anthropologist Tim Ingold describes when in his thoughts upon action and a sense of undergoing he speaks of the world in the future 'owing its existence – at least in part – to what we've done…because of what we owe the world for our own existence' (2015).

Thinking of the experience of cutting turf or digging into the earth for material then to stack or compact within forms or mix with straw and water, I think of this work in the field, on-site, in the ground. My fieldwork was and is in/on building sites, which often start as fields. My field was/is building. I was with others as they dreamed, as they hoped and as they planned whilst they built, and I too participated in these earth-building acts of dreaming. Together, we inhabited these earth-building places as dreaming grounds.

In his book *Spaces of Hope* (2000) cultural geographer David Harvey concludes a discussion in which he identifies two prevalent forms of utopia (Utopias of Process and Utopias of Spatial Form) with a proposition. Having shown how these utopian schemes are plagued with either social or spatial failure precisely because they focus only on one or the other, Harvey suggests an explicitly spatiotemporal or dialectical utopianism. Importantly this is a dreaming or a space of hope where 'the challenge', as Harvey puts it, 'is to work out a language for dialectical utopianism that is materially grounded in social and ecological conditions but which nevertheless emphasises possibilities and alternatives for human action through the will to create' (2000: 231). In the slippage

between the literal and the metaphorical of ground and earth and field and base, I think there is much richness here. As Till puts it, Harvey's spaces of hope 'arise out of a transformation of what is given' (2009:190). And what is given, if not earth.

Back to the field. In a conversation with Edinburgh-based programme ArtSpaceNature (2009) on the nature of fieldwork, the artist Marc Camille Chaimowicz describes the activity as perhaps definable as freedom (2009: 21). This idea, he says, has to be anchored in the real and not overtaken by romanticism yet still linked to an escape from grudging labour and poverty, making time for creativity. In the same conversation, titled 'Fieldwork as Reverie', the topic of the everyday comes up. The 'everyday' refers specifically to fieldwork in this context, but we can think of the everyday of labouring with earth (the multitudes around the world that labour with it and the ubiquity of it as a material). The everyday is spoken of as a possible arena for reverie, a strange word in its combining of sense of delusion, fits of abstracted musing, musical dreaming, and roots in rejoicing and revelry. It seems to be both calm and energetic simultaneously, active and passive – Chaimowicz talks of the trick being to 'tweak the real…in order to transcend it' (2009: 18). The subtlety of this movement described seems important. It makes me think of how Rowland, the rammed-earth teacher at Clayfest, climbed confidently and joyfully atop the experimental tower of earth that had until only a few hours previously been a loose pile of dirt dug from the ground.

Acknowledgements:

Many thanks to the organisers of and participants in EBUKI Clayfest, Errol, Scotland, 2015, to the earth-builders that have taught me in Scotland and New Mexico, and to Marc Higgin who invited me to a workshop and thus first precipitated this piece of writing. All images R. Harkness.

References:

Bachelard, Gaston (2002 [1943]) *Earth and Reveries of the Will*. Dallas: Dallas Inst. Humanities & Culture.

Calvino, Italo (1996) *Six Memos for the Next Millennium.* London: Vintage.

Chaimowicz, Marc Camille (2009) 'Fieldwork as Reverie', pp 16-25, in *Fieldwork*. Edinburgh: A/S/N Mutual Press

Harkness, Rachel (2014) 'On Stone Houses and the Co-Creation of Worlds and Selves' in *Space and Time in Mediterranean Prehistory*, Stella Souvatzi and Athena Hadji Eds. Routledge Studies in Archaeology. London: Routledge.

Harvey, David (2000) *Spaces of Hope.* Edinburgh: Edinburgh University Press.

Ingold, Tim (2015) *The Creativity of Undergoing* [Lecture to Creation of Reality Group (CRAG)] The University of Edinburgh. 11th February.

Lippard, Lucy (2014) *Undermining*: *A Wild Ride Through Land Use, Politics, and Art in the Changing West.* New York: The New Press.

Till, Jeremy (2009) *Architecture Depends.* Cambridge, Mass.; London: MIT Press.

Warner, Marina (2005) 'Afterword', pp447-454, in *Angela Carter's Book of Fairy Tales* Carter, Angela Carter ed. London: Virago Press.

FURS
Furs a la Basho
Jan Peter Laurens Loovers

Wolf's Brother-in-law in empty Cache.
Winter Parka trim, dog tassel,
- Wolverine

Splashing water in midnight sun
Male dancing slippers, winter mittens
- Beaver

White winter, brown summer dances
Female dancing slipper, children's parka
- Rabbit/Arctic or Snowshoe hare

Boy in the Moon.
Trading with Hudson's Bay Company
- Marten

Twisting tail, neat house
Fur hat,
- Muskrat

GLASS

Joseph Calleja

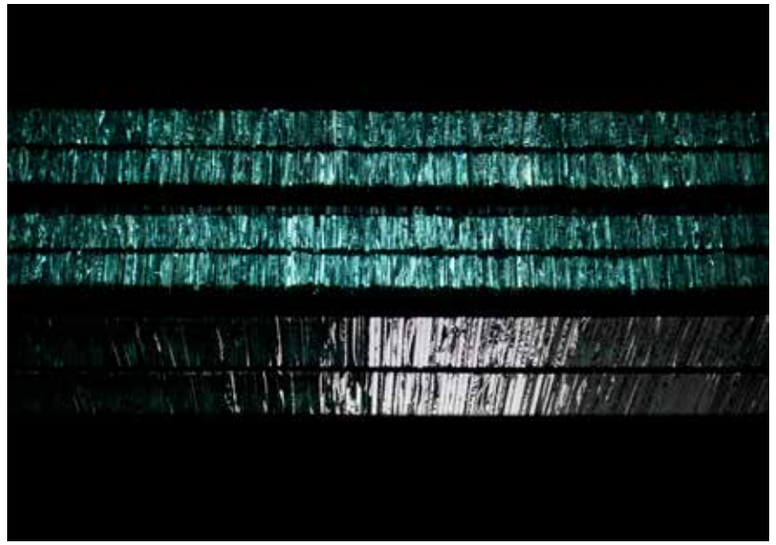
Reputation is like glass: once cracked, never repaired.

This Italian proverb sums up my attraction to glass, it being arguably one of the most unforgiving materials I have used. Deploying an experimental approach in my work often involves a playful way of finding the limitations of a material, and exploring how far these delineations can be stretched. Under certain conditions, glass can lend itself to being extremely malleable; however this is never without strings attached. As with wood, I was introduced to glass through my father, as he tamed it with a diamond cutter into shapes to replace broken glass panes. Otherwise, my knowledge of glass was close to zero before art school. However, at art foundation classes, I was introduced to glass fusion, stained glass, glass etching and glass painting. After familiarising myself with these techniques I have only used glass as a material in mixed media, where it fulfilled one particular task of having readily available reflective surfaces. When I started working on the series of pressed glass entitled 1.2.4.8.16., I learnt about its affinity with liquid rather than solid due to its molecular composition. It suddenly made sense why stained glass windows act like a centurion hour glass: each shard becoming thicker at the bottom that it is at the top over time. With this in mind, I felt glass added a transient quality to my work – that of a continuous yet unnoticeable state of flux, which accentuated the tension element in my pressure-held installations.

Glass took a more prominent role in my work when I was thinking less about it and more about wood, for a site-specific installation, Tixref. Both materials were chosen based on how familiar I was with their nature as well as their seamless manner of coexisting. At the time, I was struggling to find the link between the work's rationale and its formal aspect. I became inclined to facilitate the materials expressing themselves, instead of latching any meaning onto them. Generally speaking, I am more drawn to the complex, the deep, and the intricate; and less so to the minimal. In Tixref, glass has lent itself to providing the depth needed without adding any other layers, as well as hinting at the human presence through the reflective nature of glass, without overstating it. Tixref was pivotal in leading me to the series 1.2.4.8.16. and another work, Shards of Zen. After observing the interaction between wood and glass in Tixref, I was left with the question of what if the pressure exerted on the materials was temporary, unlike the permanent force that kept Tixref together? How would this accentuate site specificity, interactivity and the presence a work could hold over a particular space and the interacting public? It was at that moment that wood became the supporting act and glass took the leading role. I aimed at presenting the innate qualities of glass without embellishing it into anything that is pretty or beautiful; commenting on its surface reflection, inner transparency, weight and innate beauty, as well as its darker/hazardous side; accentuating the balance and edge of this material if further tested up to its limits.

The concept behind the series 1.2.4.8.16. is straightforward in terms of it being that the work should change shape and pressure according to the setting in which it unfolds. It is about the fine balance between the required pressure exerted for the piece and all the materials involved to exist together: glass, jacks, walls and supporting wood. Sometimes the work collapsed and had to be re-calculated and adjusted. In this instant, glass would reveal its darker and unforgiving side and becomes dangerous to handle. It is a work that is cumulatively organic, solid, unchangeable and yet impermanent, fragile and dependant. This work demands attention for the pure and simple reason: it exists only in this suspension, under pressure.

As an artist I have grown to realise the importance of respecting the materials I work with: respect not as in 'playing it safe', but as in seeing what glass is stating back.



Shards of Zen, Joseph Calleja (2013)

That is, looking at the possibilities it holds untapped, and considering how this can enrich my work and concept. In this case, glass itself has shed light on two proposals that would take 1.2.4.8.16 further.

Observing the ways light reflects, refracts and is absorbed across and through the surface of glass, provided a further possibility: I imagine any given site though the quality of its light rather than its space per se. The installed glass would aim to be illuminated by channelling the existing light source(s) of that space through itself, making it the sole source of light. The work unfolds then, in a manner similar to a parasite-host relation. Anthropomorphically, it alludes to fatality and mortality in a process that represents the installation as organic, almost alive in its own tension, in holding itself together and at the same time affecting its surroundings to such an extent. Public engagement with this installation occurs on a more profound level than passive observation.

That would be how glass would affect a site and its visitors. But since glass can draw people in via its visual qualities, as moths are drawn to a flame, I also wonder if it is possible to create a piece where, in reverse, it is the work that would be affected by public interaction. The innate qualities of simple clear glass lend themselves perfectly for this idea to be explored: in its original state, clear glass has a reasonably transparent edge, however If glass fractures, these edges become more opaque and, if not laminated, the whole work could easily crumble down. This second proposal aims to alter the pressure being exerted on the layers of glass depending on how many people view the work. The greater the number of people who see the work, the larger the pressure exerted. Fracture points will appear and, the more it is viewed, the more opaque the glass would become until it crumbles down. Visual sensory recognition technology (where computer sensors can detect the amount of views a particular point can get over a period of time), paired with the use of glass, would make an ideal match in exploring one element I have not yet been able to tackle directly in my practice: the repercussions of the human act.

ICE

Freeze-frames

Griet Scheldeman & Doug Benn

We watch the tiny air bubbles escape and make their way to the surface, emitting delicate elflike hisses as they do so. One thousand-year old air is being released in the amber liquid, and eventually into the room. Earlier that evening, as the late summer polar sky painted the still fjord a variation of pinks and blues, we had ventured out to the shore with bucket and ice axe to haul in a mini berg and hack off some ice.

A glass of single malt was never so interesting. So much is going on in there. A ballet of light, colours, sounds and textures. The clearest ice I have ever seen – no whiteness or fogginess about it- it looks like liquid water, in a solid state. It is so smooth and shiny I cannot resist touching it, feeling its dimpledness by tracing its gentle curves, sensing its slipperiness -increasing as the warmth of my finger creates more wetness- and unavoidably letting it slip. I do the same in my mouth, and end the thorough exploration by celebrating the ice's crunchiness.

Ice is poetry. The more you know about it, the more wondrous it is.

Ice is alive. It is water that freezes that can melt again, that perhaps once was snow. Ice can crack, expand, it can destroy or preserve. Ice is a suspension in time, a moment: after something happened and before something else is about to take place. It holds a past and a future but – and precisely because of that- it is very much present. It is NOW – for yesterday it was not and tomorrow it might be no more. Ice makes the most amazing shapes: concentric rings in frozen puddles, air bubbles near a frozen surface, frost needles, ice flowers, snowflakes. What fascinates me most is ice's transparency and translucence, showing bubbles, irregularities, swirls, trapped matter and organisms. Ice is a trace of movement and process, like patterns in wood, lines in rock. Ice shows how something came to be. Looking at ice I am reminded that things are not fixed, yet everything is connected and continuously in-the-making. We live in an ever-moving world and are part of it. And all this with just water and changes in temperature. Complexity in simplicity is poetry. In a single snowflake you see pattern, process and chemistry, an intricate record of its journey through the air.

Ice is a time traveller.

'Frozen' might have the nuance of lifeless, stuck. Far from lifeless, ice is brimming with potential and propulsion. Ice is a stage in a process. Thinking of ice as the solid phase of water enables a more dynamic view. Ice is continuously on the move, expanding, retreating, compacting, subliming, melting, refreezing. It reminds us of all the things ice can do. Once you have seen ice in every shape and form, from the short-lived delicate single ice crystal snowflake to ancient gargantuan glaciers, you cannot but wonder: where does this ice come from, and how did it form? Thinking of ice as the solid phase of water also allows us to bring in the necessary basic chemistry, that explains the wonderfully different structures and appearances of ice.

What happens when water freezes? Simply put, water consists of buzzing free flowing molecules of bonded hydrogen and oxygen, mixed up with dissolved air. As temperature drops, the water molecules slow down and at zero degrees they interlock in hexagonal grids. The air molecules that were dissolved in the water cannot join in these bonds and are pushed together. As water freezes in large crystal structures, air molecules get trapped between these crystals and form either large air bubbles or stretched air 'worms', along the crystals. This explains why ice has air bubbles, the air was always already there, dissolved in the water.

Ice is a time capsule. It traps, preserves and releases, atmosphere and air, but also organic and inorganic matter. It carries messages from the past and allows stuff to time travel to a far future. Whether it is about the atmosphere and quality of air, ancient microbe life, or what the environment was like all that time ago, ice tells a million stories.

A snowflake lands on my sleeve. I bring my arm closer to study it and I marvel at its beauty. Have you ever seen anything like it? Weren't snowflakes cotton-like odd-shaped clusters? Fun to catch on your stuck-out tongue, or to clump together into a ball. But that was it. There was nothing beautiful about them.

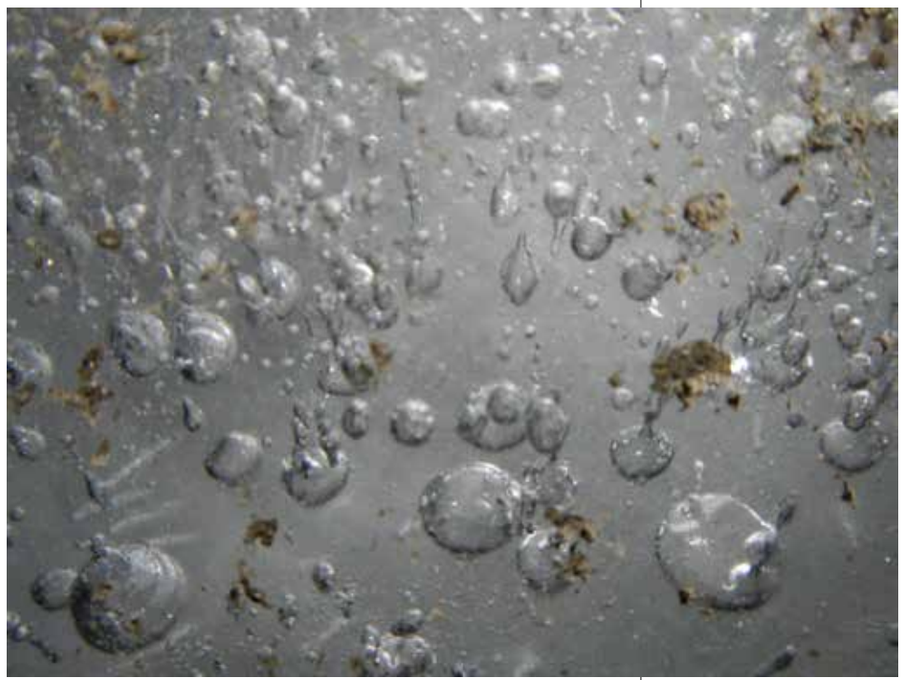
Perfect snowflakes like these only occur where the air is cold and still enough to allow them to fall to earth single and unbroken. Here on a misty mountainside in the High North it is -20°C, which seems to do the trick. In woollen silence more and more settle on my clothes, in my hair, each one a present from heaven. Every crystal perfectly formed, yet no two alike. How can nature keep inventing billions of different shapes that still all look like the iconic snowflake?

I struggle to grasp the enormity of this.

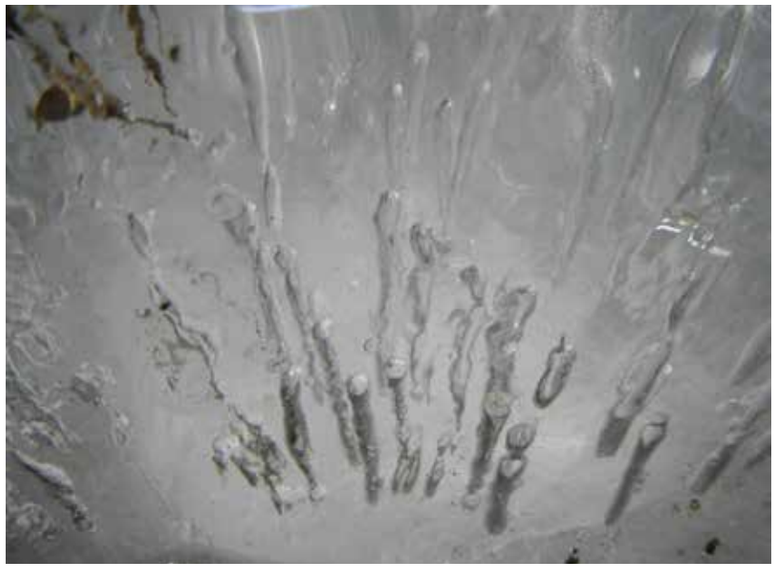
Winter falls
the air's moisture settles
every molecule takes its place
just so
beside its neighbour
in six-fold symmetry

A forest
hidden deep inside the glacier
branches boughs and roots
stilled by frost

Ice-ferns form in frigid air
so fragile
they would perish in the slightest breeze



Air and earth in frozen dance
like planets caught mid flight
as time stood still



Ice crystals growing down from the
freezing surface
trap pillars of air that strive towards
the light

If one day you find yourself at 79°N
do the glacier ice cube thing.
Also works great in G&T.

IRON ORE

Jan Peter Laurens Loovers

... but folk in the housen, as the People of the Hills call them, must be ruled by Cold Iron. Folk in housen are born on the near side of Cold Iron – there's iron in every man's house, isn't there? They handle Cold Iron every day of their lives, and their fortune's made or spoilt by Cold Iron in some shape or the other

> Puck in Rudyard Kipling's Rewards and Fairies (1910: 8)

The Iron Age, preceding the Stone Age and Bronze Age, saw the appearance of iron in people's lives as Puck illuminates. Tools, weaponry, machinery amongst other artefacts were endowed with the grey coloured substance. Iron, together with petroleum, could be considered to remain one of the most important minerals in the world. Iron, indeed, is essential for the movement of petroleum as the following tale will tell.

In the 1950s, Standard Oil (now Chevron) discovered (and now owns) one of the largest iron ore deposits of the world. The Crest property, located at the Snake River in northern Canada, has a 43–46%Fe gradient. The iron ore would be used to construct gas pipelines for northern oil and gas projects. In the vicinity of the Crest property is the Bonnet Plume Coal Deposits, now called Wind River Coal Field by its current owner Promithian Global Ventures Inc.

In 2002, Hatch, a multinational project management and consultancy company based in Canada, produced a feasibility report for Promithian to consider the development of the Crest deposit and the

Wind River Coal field. The report provides different scenarios to extraction and production of iron ore with the use of coal to run the necessary facilities.

References

Kipling, Rudyard. 1910. *Rewards and Fairies* London: Macmillan and Co.

JAPAN BLUES

Ao, Ai, Midori, Aizome, Ao-ja-shin

Jen Clarke

These impressions of blue have come from reflecting on visitors responses to my use of the colour blue during a residency in Japan that focussed on making and exhibiting 24 24-hour cyanotype photograms. The exhibition was arranged as an act of remembrance, an anniversary of the 'triple disaster' that devastated the region in March 2011. It took place in a snow-covered Morioka, Japan, March 2015.

1 Ao, Ai, Midori青,藍, 緑: an inventory

あなたは緑と青を見分けることができますか?

Anata wa midori to ao o miwakeru koto ga dekimasuka?

Can you tell green from blue?

Some linguists use the word 'grue' to talk about languages where green and blue are protean categories, versatile if not exactly interchangeable. Ao is a good example; in Japan, ao is the colour of grass and leaves, and traffic lights and the colour of the sky. It can be blue and green, or blue or green. It can also be an-almost black, if it is a horse's coat, or be used to imply something pale, green, unripe, unready, unpalatable. The boundaries are not the same, but more than this, to think about blue in Japan, I also think of green.

I spent more than six months living in Sendai, the biggest city in the Tohoku region, which was perhaps the worst hit by the disaster. I lived in Aoba-ku, 'the district of green-leaves', just a short walk from the central avenue, Aoba-dori, which was named, I supposed, after the ancient *kiaki* (luscious-leaved, giant Japanese elm trees) that line the street. Walking down the street in summer, they arch overhead, end to end, appearing to touch, their crowns gracefully crowding out the cars and buses that weave their way down the avenue in flashes of red. When I think of Aobadori I think of these vibrant greens, the green of the forest in a city, an atmosphere of viridescence (becoming green), in shades that can't quite be reproduced.

'Midori' is a name for green popularised during the American occupation of Japan after the Second World War. Midori didn't exist at all until the 'Heian' or 'peace' period 794–1185. According to historians, this was the final era of classical Japan, a time of high art and literature effected profoundly by Buddhism and Taoism, among other Chinese influences. Japan's traditional colour system, known as dentourio 伝統色 had been established not long before: in 603 by Prince Shot ku. This colour system was intimately connected with his 'Twelve Level Cap and Rank System' based on Confucian values and the five Chinese elements, a social ordering system that determined rank by merit rather than heritage and certain colours were used as symbols of rank in society. It is quite striking how many of his colours relate to plants, flowers and animals.

Ao, however, came long before. It is one of the four oldest colour terms, along with aka (red), kuro (black) and shiro (white). These words originally referred to contrasting sensations: light was aka, dark, kuro, clear, shiro. Ao, refers to a kind of vagueness, or obscurity of light. Blue is the sky, the ocean, vague light.

Blue is the only of these four original colours not to have a specific and sustained religious significance in Shinto (Japan's 'native' religion that incorporates the worship of ancestors and nature spirits, and is belief in 'kami', a sacred power that can be found in both the animate and inanimate). Red references the red tori gates of Shinto shrines; white the sacred places strung with 'shimenawa', the palest rope made of rice straw used in ritual purifications; monk's robes are almost-black. Only blue is secular. Blue is the colour of choice for school uniforms, in 'sailor style' and other classic navy variations, and associated with working class uniforms, and thus, work ethic.

The traditional Japanese Colour System is full of such vagaries, by which I mean wanderings. It includes ao-midori, a shade that one might assume can be easily 'translated' to a simple blue-green, like the familiar crayola-crayon colour the same blue-green since 1930. But not quite; ao-midori is a shade that totters on the very edge of the between, between blue, between green. It's a colour I can't quite match, it is neither numbered nor named on the 'Western' Panetone system. (It's close to the Carribbean green, but this has too much yellow, and the Sea green is too pale). After some thought, I settled on it being a kind of turquoise, but it is one that requires the opacity of the stone.

There are others from this system, more poetically, perhaps, translated. Colour in black and white.

'ao-kuchi-ba' is 'blue fallen leaves'.

'ao-ni' is 'the old mane of the blue-black cray'. But this is a yellow-green, closer to fresh asparagus, nestled next to to the 'inch worm' of Panetone colour (RGB 178,236,93).

'ao-ni-bi' is 'blue dull'.

'usu-ao' makes me think of a lie (because 'uso' is a lie, or an exclamation of incredulity: "really?!" Really, it just means dim or gloomy.

'ai-nezumi' is an indigo-tinged grey; nezumi means mouse.

'mushi-ao' makes me think of insects, used to names bugs of all stripes, crickets, moths, worms. This kind of 'mushi' is after the blue iridescence of the jewel beetle's wings (Chrysochroa fulgidissima), and the shimmer of a deep sea shark.

(mushi-ba can also mean being worm-eaten! To be eaten by worms; to spoil; to ruin; to undermine; to gnaw at one's heart; to destroy).

Such greens can be 'glaucous'. Grey-greens becoming blue, becoming dull and pale, like the waxy leaves of cacti that don't get wet in the rain, or the grey-blue of the glaucous gull, camouflaging with sea, in an Aberdeen sky.

Blue reflects the ocean, and in Japan, this mattersL the waters, the islands. Japan has six thousand eight hundred and fifty two (though only four hundred and thirty are inhabited). (I remember, years ago, proudly informing my Japanese students of Scotland's seven hundred and ninety, a figure I'd only just learned. Only later did I realise the extent to which the islands are essential to Japanese security, national and otherwise, in disputes with Russia and China).

I have not mentioned the tsunami. It is there, in the famous Hokkusai print, it's blue, the power of the waves; a religious terror of the overwhelming ocean.

2 Japan Blue

Aizome藍染め is known as 'Japan blue'. A painter made the marks of these characters kanji in my sketchbook, pointing out the differences for me between ao (blue) and (ai) indigo, in doing so connecting the blues I was making with cyanotype blue prints to a larger culture history, one marked by labour, made of the earth.

Indigo, one of the oldest forms of colour dyeing – the oldest evidence of indigo dyeing in Japan dates back to the 10th century – can be obtained from a variety of plants including indigofera, storobilanthes and polygonum. In Japan it is made from tade, a native plant of the polygonaceae family. The process requires plant-based matter including sukumo (tade leaves), fusuma (wheat bran), sake, wood ash, and lime.

The compound indican from the raw leaves is converted by fermentation over a period of up to a year. Seeds are planted in March, and plants are harvested in July and August, then fermented and dried, which won't be done until the end of the year. Every week or so, the leaves are sprinkled with water and mixed. The result is sukumo. The dyer receives the sukomo and makes his mix with ash lye, sake, water – lots of water – and lime, which slows down the fermentation process. Then, with care, eventually the flowers form – ai no hana, the indigo flower, a nest of metallic bubbles, forming on the top of the dye. Now the dye is ready for use, in an abundance of colour variations, with depths perhaps not possible with chemical dyes. For aizome craftsmen, natural indigo is 'alive'.

3 Ao-ja-shin, Prussian Blue

One of the oldest synthetic pigments, Prussian Blue began to be imported to Japan from Europe, mainly Holland, in the 1820s. More vivid than the indigo made from the native plants, with a greater tonal range and resistance to fading and capable of expressing depth and distance, some art historians have suggested that it was responsible for establishing *pure landscape* as a new genre of ukiyo-e print making. Katsushika Hokusai used it for his Great Wave off Kanagawa, the wave I mention above.

Prussian blue was first synthesised in the early seventeen hundreds, by experimenting with how iron salts (ferrous salts) react with potassium ferro cyanide, a yellow anion (which is a negatively charged ion molecule). First, this process makes Berlin White, an insoluble compound. The white then oxidises to blue pigment. The blue occurs because of light being absorbed at the right wavelength for electron transfer. Modern, commercial, methods are not all that different from this three hundred year old process, though usually the (cheaper) sodium Ferro cyanide is used. Still, a multitude of hues, deep-blue pigments, composed of complex iron cyanides. Iron blues. Prussian blue has a reddish tint, but chemically similar pigments only have differences in shade because of variations in particle size. Iron blues are commonly mixed with yellows, like lead or zinc chromates, kinds of salt with metals, making greens.

I explained to visitors, often, how this colour, Prussian Blue, is also a medicine. Used as an antidote to heavy metal poisoning, it traps radioactive caesium in the gut, and from there it can be excreted, limiting the time of exposure within the body.

I had read that Prussian blue was used on the sheep hills of Wales after the Chernobyl Disaster. By spreading it on the soil, scientists hoped it might absorb radiation, inhibiting the uptake of Caesium 137 in the animals grazing on the green grass.

In many ways, Prussian blue is a blue of places

Prussian Blue

Berlin Blue

Paris Blue

All painters' blues.

A blue of traces. 'Ao-jashin' directly translates to 'blue-copy' or 'blue-trace', on other words, the blue print. The trace a palimpsest, in and of the landscape, but really, Prussian Blue is a blue expressed in material: in iron, Iron Blues.

Many blues.

LIGHT
A (Collaged) Symposium on Light as a Material
Rachel Harkness

"All material in nature, the mountains and the streams and the air and we, are made of Light which has been spent, and this crumpled mass called material casts a shadow, and the shadow belongs to Light."
—Louis I. Kahn[1]

"In our time, light has turned into a mere quantitative matter and the window has lost its significance as a mediator between two worlds, between enclosed and open, interiority and exteriority, private and public, shadow and light. Having lost its ontological meaning, the window has turned into a mere absence of the wall."
—Juhani Pallasmaa[2]

"...it is a fact of human nature that the space we use as social space is in part defined by light. When light is perfectly even, the social function of the space gets utterly destroyed: it becomes difficult for people to form natural human groups. If a group is in an area of uniform illumination, there are no light gradients corresponding to the boundary of the group, so the definition, cohesiveness, and the 'existence' of the group will be weakened. If the group is within a 'pool' of light, whose size and boundaries correspond to those of the group, this enhances the definition, cohesiveness, and even the phenomenological existence of the group.

Place the lights low, and apart, to form individual pools of lights which encompass chairs and tables like bubbles to reinforce the social character of the spaces which they form. Remember that you can't have pools of light without the darker places in between."
—Christopher Alexander, Sara Ishikawa, Murray Silverstein, et al[3]

"Light is something that I had to learn how to mold and form, because it isn't formed with the hand like clay or hot wax. It's more like sound. You make instruments to create what you want." **—James Turrell**[4]

1 As quoted in John Lobell (2008) *Between Silence and Light: Spirit in the Architecture of Louis I. Kahn*. Berkeley: Shambhala Publications.
2 Juhani Pallasmaa (2005) *The Eyes of the Skin: Architecture and the Senses. West Sussex: John Wiley and Sons*.
3 From 'Pattern 252. Pools of Light', p1161-1162, in Christopher Alexander, Sara Ishikawa and Murray Silverstein with Max Jacobson, Ingrid Fiksdahl-King and Shlomo Angel (1977) *A Pattern Language: Towns. Buildings. Construction*. New York: Oxford University Press.
4 James Turrell in 'Into the Light: a conversation with James Turrell' by Elaine King, in *Sculpture* (U.S.A.), November 2002, Vol.21(9): 24-31.

"Walter De Maria, an artist in America, showed me a new work he'd done for Japan. It was to be a huge hall [...] and it was to be open at the front and completely dark at the back. [...] Right at the back there were wooden bars, coated with gold leaf. And this gold leaf – we all know this but it really touched me when I saw it – the gold leaf shone right from the back of the room, out of a deep darkness. Which means gold seems to have the capacity to pick up even the smallest quantities of light and reflect them in the darkness. That was an example of light. **—Peter Zumthor**[5]

"I'm interested in delving into and exploring the architecture of space created by light. Mostly we have dealt with space by displacement or massing of form. While there is an architectural vocabulary referring to the space between, this has rarely been enlivened – it's more rhetorical than actual. The art that I make covers this ground between form and actually forming space using light. For example, when the sun is shining we see atmosphere – we can't see through the atmosphere to see the stars that are there. The same applies if you are on stage with footlights and stage lighting – you can't see the audience. However, if you step in front of the footlights the audience is revealed. The space is architecturally the same, but the location of the light actually changes the penetration of vision such that some people see each other and others cannot. It is a structured space without a massing of form. This quality of working the space in between so that it limits or expands the penetration of vision is something that intensely fascinates me. It means that the containing form has to be made somewhat neutral. What you're looking at is that in-between zone, not formed or made by the massing of material. This has a lot of ties to architecture, but not the sort of architecture that we use to build everyday structures. It certainly isn't how we light our buildings. Architects make a form and then they stick the lights in." **—James Turrell**[6]

"I have two favourite ideas about this and I always come back to them. Obviously we don't build something then phone up the electricians when we're finished and start asking ourselves: okay, so where are we going to put the lighting – how are we going to light this thing? No, we factor that in from the beginning. So the first of my favourite ideas is this: to plan the building as a pure mass of shadow then, afterwards, to put in light as if you were hollowing out the darkness, as if light were a new mass seeping in. [...] The second idea I like is this: to go about lighting materials and surfaces systematically and to look at the way they reflect the light. In other words, to choose the materials in the knowledge of the way they reflect and to fit everything together on the basis of that knowledge."**—Peter Zumthor**[7]

5 From 'The Light on Things' pp57-61 in Peter Zumthor (2006 [Text of lecture originally delivered 2003]) *Atmospheres: Architectural Environments, Surrounding Objects.* Basel: Birkhäuser.
6 James Turrell, op cit.
7 Peter Zumthor, op cit.

"Although light exhibits wave phenomena, nevertheless it is a thing – it is optical material. But we don't treat it as such. Instead we use it very casually to illuminate other things. I'm interested in the revelation of light itself and that it has thingness. It alludes to what it is, which is not exactly an illusion." **—James Turrell**[8]

"Thinking about daylight and artificial light I have to admit that daylight, the light on things, is so moving to me that I feel it almost as a spiritual quality. When the sun comes up each morning – which I always find so marvellous, absolutely fantastic the way it comes back every morning – and casts its light on things, it doesn't feel as if it quite belongs in this world. I don't understand light. It gives me the feeling there's something beyond me, something beyond all understanding. And I am very glad, very grateful that there is such a thing. [...] For an architect that light is a thousand times better than artificial light."**—Peter Zumthor**[9]

"I possess no specialised knowledge of architecture, but I understand that in the Gothic Cathedral of the West, the roof is thrust up and up so as to place its pinnacle as high in the heavens as possible – and that herein is thought to lie its special beauty. In the temples of Japan, on the other hand, a roof of heavy tiles is first laid out, and in the deep, spacious shadows created by the eaves the rest of the structure is built. Nor is this true only of temples; in the palaces of the nobility and the houses of the common people, what first strikes the eye is the massive roof of tile or thatch and the heavy darkness that hangs beneath the eaves. Even at midday cavernous darkness spreads over all beneath the roof's edge, making entryway, doors, walls, and pillars all but invisible. The grand temples of Kyoto – Chion'in, Honganji – and the farmhouses of the countryside are alike in this respect: like most buildings of the past their roofs give the impression of possessing far greater weight, height and surface than all that stands beneath the eaves.

In making for ourselves a place to live, we first spread a parasol to throw a shadow on the earth, and in the pale light of the shadow, we put together a house."**—Junichirō Tanizaki**[10]

8 James Turrell, op cit.
9 Peter Zumthor, op cit.
10 Junichirō Tanizaki (2001) *In Praise of Shadows.* London: Vintage. p28.

Acid test on limestone, C. Simonetti, 2017

LIMESTONE
Cristián Simonetti

This small piece of limestone comes from Ñilhue, a mine owned by Melón, the first company in Chile to mine the material industrially, for the production of cement. Melón's operations started nearly a century ago in Calera, a town not far from Valparaíso. Calera is famous for its name, which comes from lime ('cal' in Spanish), a chemical made by burning limestone at about 1,000°C. As in the production of lime, the stone releases carbon dioxide (CO_2) bubbles in reaction to drops of hydrochloric acid, added by the man in charge of mining operations at Ñilhue. This *acid test*, as it is known among geologists, corroborates the presence of calcium carbonate ($CaCO_3$), a mix of calcium oxide (CaO) – otherwise known as lime – and CO_2 that is the main component in limestone. Soon the stone will be burned at even higher temperatures (about 1,500°C), along with small quantities of sand and clay, to produce cement. The melting will take place inside Melón's kilns at Calera. Powered by coal and natural gas, flames in this type of kiln reach about 1,900°C, one-third of the sun's surface temperature. At such temperatures, all of the CO_2 contained in the stone will be released into the atmosphere, contributing to global warming. Globally, cement production is responsible for between 5 and 10 percent of all carbon emissions. Like the bubbles in the above picture, the CO_2 coming out of Melon's furnaces is both transparent and odourless. It remains unnoticed in a sensory climate where seeing is believing and strong smells are associated with precariousness.

Through the transformations of this small limestone I wish to briefly narrate some of earth's history, following the lead of generations of geologists who have perfected the skill of seeing the long in the now by paying attention to stones. This practice is often dated back to the publication of *Theory of the Earth* by James Hutton (1795), who is credited for making the abyss of time, solidified in the masses of the Scottish landscape, flow once again. Hutton was among the first to point out how things were constantly in the making. 'No vestige of a beginning, no prospect of an end' was his famous claim. Jan Zalasiewicz offers a recent contemporary example of this skill. As one of the leaders behind the controversial effort to formalize the definition of our current geological epoch – termed the Anthropocene, to signal humans as a leading geological force at the planetary scale – Zalasiewicz (2010) narrates the earth's history starting from a pebble. Unlike Zalasiewicz, my narrative is not through an ordinary pebble found on a beach, but from an industrially mined stone made of calcium oxide and CO_2. Imagine how many planets could be envisioned depending on which stone you pick.

Limestone makes up around 10 percent of all sedimentary rocks and is mined almost everywhere in the world. It has varied

industrial applications, including most notably the production of steel and cement, perhaps the most indispensable materials in the building of modernity. According to the *National Lime Association*, comprised of U.S. and Canadian commercial lime companies, we're talking about 'the versatile mineral, the building block of construction and human progress that is a fundamental part of your everyday life, whether you realize it or not'.[1] Before cement was rediscovered in the eighteenth century, limestone and lime had been used, respectively, as building stone and mortar in construction for over 8,000 years. A versatile material, lime is used in products with countless applications, appearing in many of the things that we now use daily, including industrial materials such as plastic, paper, ink, paint, glass, and rubber, as well as some foods.

However, our relationship to this piece of limestone extends even further back in time. Caught in an endless exchange of matter and energy, our stories entangle to the very start of life as we know it. Limestone is made of the same stuff that composes our bones. Just like our ancestors, this small limestone came out of the ocean, moved by tectonic forces. It is made of the fossilized skeletons of sea organisms. A process that is still underway, the geological formation of limestone dates back 542 million years to a sudden increase in the concentration of calcium in the earth's oceans, possibly triggered by a combination of erosion and volcanic activity. This calcium concentration resulted in a process of *mineralization* (skeletonization) in organisms from the so-called Cambrian explosion, where essentially all mayor animal phyla appeared in the fossil record and which subsequently led to the appearance of our vertebrate ancestors, who slowly crawled out of the oceans. In the words of Rachel Carlson, 'our lime-hardened skeletons are a heritage from the calcium-rich ocean of Cambrian time' (1950: 13–14). Like sea organisms, we humans are also somewhat lime-creatures.

1 http://lime.org/lime-basics/why-is-lime-still-important/ (13 February 2017).

According to DeLanda's (1997) *A Thousand Years of Non-Linear History*, this mineralization has been turned outside in and inside out a number of times during evolution. By burning the exoskeletons of sea critters at high temperatures to produce lime and cement, humans have created their own exoskeletons, to further protect the soft tissue which their endoskeletons support. In doing so, humans have accelerated deep time, fuelled by Promethean illusions. In their furnaces, they have released in an instant carbon accumulated over millennia, turning sedimentary formations into igneous flows. However, these are not the volcanic flows which DeLanda contrasts against sedimentary formations, in dialogue with Deleuze and Guattari's (1987) famous distinction between *rhizomatic* and *arboreal* models of evolution. Unlike the hierarchical view of evolution presented in Darwin's tree of life, which is modelled on a vertically stratified fossil record contained inside sedimentary rocks, rhizomatic forms and volcanic flows would flatten relations, challenging human exceptionalism.

In a totally contrasting mode, modern construction has turned limestone, a sedimentary rock, into an igneous cement, only to turn it back into the ultimate sedimentary layer on top of which the history of modernity is to be written. Concrete's impermeable surfaces – made of cement, sand and aggregate – have lifted humans above the land while suffocating nature. However, these are only provisory illusions in that no concrete surface is impervious to decay, each one depending on extended practices of care. Given enough time, all solid matter is meant to flow (Harkness et al. 2015).

Curiously, the Anthropocene – a word that most scholars in the humanities seem to simultaneously love and hate – resembles how Westerners have played God in their attempts to subdue nature below concrete surfaces. For geoscientists in charge of its formalization, the term stands for yet another layer in earth's history, placed atop all others in geological charts. This punctuated understanding of chronology is

revealed in how most efforts to formalize the Anthropocene have focused on identifying its date of birth (Simonetti 2017). Such an understanding of chronology risks sending into oblivion the much deeper history of the mingling of humans and the inhuman. No doubt we need a fair starting date for the Anthropocene, if we are at all to achieve some sense of environmental responsibility. However, this date should not be baptismal in nature, which would resemble how modernity wishes to place itself above tradition, once and for all.

Besides, how much more do we risk in reducing the present to the entanglements produced by one particular species? How many other entanglements beyond the human will be erased if we dare to place ourselves at the centre of the present? What would it be like to write from the viewpoint of shells, instead of humans? Would they consider us relatives, after we have destroyed all remaining coral reefs that still contain/trap CO_2? Ultimately, compressing deep time into a pebble and accelerating deep time in a kiln result from similar infatuations with human ingenuity. Both modern industries and science have been justified based on triumphalist narratives of progress.

Give way to the impermanence of surfaces on which modern values stand; challenge the fascination with narrating origin myths and stabilizing periodizations; leave the retrospective emphasis on a single *deep past*, opening up forward-looking speculations on how *deep futures* multiply. Hopefully, cracks will open, allowing for entanglements beyond the human to mushroom.[2]

References

Carlson, R. 1950. *The Sea Around Us*. Oxford: Oxford UP.

DeLanda, M. 1997. *A Thousand Years of Non-Linear History*. Zone Books.

Deleuze, G. and Guattari, F. 1987. *A Thousand Plateaus*, trans. B. Massumi. London: Continuum.

Harkness, R., Simonetti, C. and Winter, J. 2015. 'Liquid Rock: Gathering, Flattening, Curing'. *Parallax* 76, 309–326.

Hutton, J. 1795. *Theory of the Earth with Proofs and Illustrations, vol. I & II*. Edinburgh: William Creech.

Simonetti, C. 2017. *Sentient Conceptualisations. Time in Archaeology*. London: Routledge.

Zalasiewicz, J. 2010. *The Planet in a Pebble: A Journey into Earth's Deep History*. Oxford: Oxford University Press.

2 The research behind this chapter has been supported by the projects 'Solid Fluids in the Anthropocene' (funded by the British Academy for the Humanities and the Social Sciences), and 'Concrete Futures' (funded by Fondo Nacional de Desarrollo Científico y Tecnológico, Chile, Nº 11150278).

Patterned tree roots, W.F. Xue, 2011

LINSEED OIL
Sally Duguid

All Images Sally Duguid

Linseed Oil

Linseed Oil

All Images Sally Duguid

METALS

Metals are Made and Metals Make...

Judith Winter

Georgius Agrricola 1556 , *De re Metallica (On the Nature of Materials)* a series of twelve books that attempt to document the complex and tacit knowledge of mining and processing of metals. It is interesting to note that this academic treatise on the nature of metals was first published in English in *The Mining Magazine,* London as late as 1912 and was translated by the engineer (later US president) Herbert Hoover and his wife the geologist Lou Henry Hoover. With this in mind the story of metal production is one that spotlights experiential knowledge, grown and practised over time and handed down through and across generations rather than one based on scientific methods. Master craftsmen, engineers and alchemists alike, who searched the streams for metal and gems that had been washed from the veins of rock, these craftsmen and anonymous makers experimented to develop all manner of refining processes - cupellation, scorifier, muffle furnace to crucible - attempting to either separate base metals of lead, copper, zinc... or aspiring to transform base metals into the noble and more precious gold and silver. The secret recipes of smelting and assaying to extract metal from its ore, the use of a touchstone and countless other production processes would have been, for obvious reasons, closely guarded between the communities of makers.

The story of metal then is one of human-material relationships and attempts at alchemy, changing the state of materials and attempts at transmutation. Where these experiments lead are to changing states of materials and possibilities to transform material characteristics. For example iron we might associate as the metal that supports bridges and forms the infrastructure of high-rise buildings, but what we are actually imagining is not the pure metal whose physical properties are silvery-white and just soft enough to cut through or hammer; what we understand as iron is an alloy of iron combined with carbon and other elements to improve strength or transform into more resilient forms of metal such as steel. Alternatively we may be thinking of Cast iron, heated to create liquid that is poured into a mold and cooled; or wrought iron - liquid mixed with slag (the by-product of smelted iron). As this has a much lower carbon content it became easier to manipulate with heat and is the way most black-smiths work, but was succeeded by the needs of the steel industry.

Having spent my formative years in the Tees region, a crucible of industrial and chemical production in the Northeast of England, I grew up with an interest and fascination in materials and the process industries. In common with many of those educated and living in the Tees region, I understand only too well how Iron ore discovered in the Eston Hills shaped and transformed lives and also how the material was in turn being transformed and traded. The story is thus told by heritage industry as a tale of two men, the industrialist and ironmaster, John Vaughan and his mining engineer John Marley, who take a walk in the Eston Hills in the summer of 1850, where they discover an outcrop of iron ore that changed Teesside from rural idyll into an Industrial heartland and Middlesbrough from village to 'iron-rush' town. Four houses and twenty-five inhabitants in 1829, an area described as 500 acres of bleak salt marshes, yet in less that fifteen years it became 5,463 residents. The discovery of iron ore, the birth of the railways and later the exploitation of natural deposits of salt by the chemical industries are ingrained with the fabric of the place and its people. The Tees region is easily bypassed, but drive into the region after dusk from the Cleveland Hills, off the Durham plateau or along the river's plain and you find a beautiful contradiction; a breathtaking valley lifted by its fading industrial glow. Whilst the truth is always more complex, more questionable than the history told, what is clear is that the social and environmental landscape was recast first through the discovery and exploitation of the material, then through crashes in world economies (90 percent unemployment in 1930s) to rise again through wartime requirements for iron and steel, then crisis and insecurity brought about by moving British Steel from public to private ownership until the final burn out of the embers of industry in 2015. Those from the region know only too well that metal is mined and processed by human hands and that control rests beyond their powers. At the same time the material also has the power to affect, shape and transform human conditions.

This small contribution is then dedicated to the anonymous production workers whose experiments and working lives are absent from material studies. This modest contribution came from my own formative experiences in the Tees region and in particular a conversation with a former steel worker in Normanby Road, South Bank, Middlesbrough in 1999 whilst working on a project with the sculptor Lewis Robinson:

> *You can't really put into words the experience.*
>
> *[pause]*
>
> *The first time I saw steel poured, it was a real sight, a red-hot experience and one you never forget. The blasts of hot air, the smell, the sparks and the beauty of the molten metal as it is poured into a mold, in the same way it had been done by our fathers. It was a handed down process, not so much a science, but understood through watching and careful handling, generations of trial and error if you like. Once it had been poured into the mold it was rolled, you had to warm it up again and roll it. Then I can remember when they brought in the con-cast machine that meant we could pour and didn't have to warm or roll it up again. I spent a time working in the rolling mills. The red-hot bars would come down glowing and then they rest on a bed of diagonal rollers. By the time the bars rolled off the end into a groove they were completely changed and cooled, ready to be used, transported and sold.*

Metal is made

Crude steel to new metals, watch-spring to battleship
the story opens with hills and farmlands, stripped of layers of topsoil
un-covering beds of iron-ore – silent for centuries beneath the earth until
mechanised shovels bite, loading tonnes at a time
In-transit to steel works
Not solid metal, Not found metal, but a heavy rock
impure mineral of silicon, sulphur and oxygen

In-transit, moved to disordered tangles of towering structures
Inferno of noise, heat and flame, alive night and day
skips of iron ore, limestone and coal, ushered into marshalling yards
vital coal
fed and rammed into ovens
coal to flaming red-hot coke
quenched by water and conveyed to blast furnaces

Mechanical feeds into blazing interiors
blasts of hot air roar through the charge
a bubbling seething mass
Metal sinks whilst impurities rise
[slag always rises]
Flowing rivers of molten metal meet red-hot air
Cauldrons of liquid need skill to watch over
the changing colour of flames
chemical clues for alloys - chrome? alluminum? tungsten?
count every second

Dramatic scenes of cast-off slag re-rooted
remove the rough so only the finest steel remains
open-hearth, bessermer or electric arc?
all processes flowing with and through carbons
Melt
Sample
Melt
Hands-on judgement, modifications

Whilst furnaces lined with fire-brick meld pig-iron, steel and scrap
shovelling alloys
sweeping movements make new metal
this time the oven needs pyrometer judgement
furnace men with skill and care, nurse and
tap the steel, release liquid metal into Ingot moulds
cooled castings solidified
glowing forms in-transit to stripping bays

Rolled and forged
Billets, blumes, bars, slabs, plates, rods, girders and tubes
Reheated in soaking pits from chariot to rolling mill -
compressed, crushed and formed by
silent crews who control machines
guillotines finish with precision

in-transit, shooting bars glide toward inspection
whilst other crews control the cobbles of metal running wild
high pressure water and flattening
thin plates of steel
raising shears form coils that turn and flex
then there are the heavy crews creating
steel for construction, for girders, joists and rails
for pit arches, jibs for cranes or beams for skyscrapers and bridges
for armour plates and battleships
steel for lightness and tensile strength

glowing hot metal slabs
cast, charged, rolled and reheated
surfaces are scraped and cleaned by teams of hands
throwing branches of trees onto rolling fire-hot beds
boiling sap burns away scale
whilst the forgemaster's craft creates dangerous decibels
hammering and pounding, hammering and pounding
for crankshaft, bells, gears and axels
labourers dwarfed by towering press and furnace
silent gestures and hand signals make metal
a tacit burning torch passed between generations.

MOOSESKIN[1]

Annie Jane Modeste, with
Jan Peter Laurens Loovers

Moosehide is used for

Slippers with beads, embroidery, fur rabbit or beaver

Crow boots, higher backs

Canvas winter boots: short or high up to knee

Stroud shoes with embroidered fronts, beads, embroidery threads with rabbit skin, beaver, rat [fur]

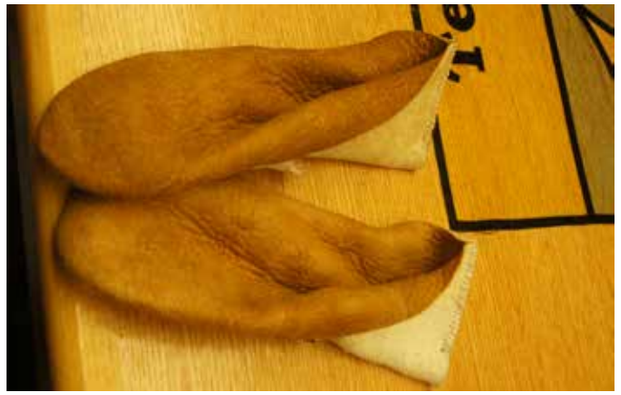
Caribou leg skin shoes: short for women, longer for men

Sled wrapper

Dog harness

Clothing jackets, vests

Canvas shoes: before rubber boots, spruce gum plus tallow mix – rub on canvas part and wear short rubbers. Used in spring on lakes, river when to hunt. [boats]



All Images Loovers/GSCI/ERC Arctic Domus

1 This contribution is dedicated to the late Annie Jane Modeste.

MORTAR

Mixed by Man, Animal and Machine

Sophie Hueglin

In the 1970s, there would be two characteristic noises on a Saturday during summer in the place I grew up in Bavaria: from the old village, the alternating shriek of electric saws as the farmers cut firewood and from the new housing estate where we lived the continuous grumble of concrete mixers as local craftsmen gave finishing touches to their houses. For the latter, sand would be piled next to the driveways and from these heaps the owner of the house would shovel the material into the cement mixer and add powder from strong paper sacks while the drum was turning with its opening half upwards. He would pour water from a hose until the right consistency was reached and the machine rotated continuously.

Later on, in the 1990s, I was involved in mortar making myself: I helped to restore a medieval house near the Swiss border in Germany. Again, we were working mostly on Saturdays. The foreman from Switzerland would bring his Portuguese colleagues and they would communicate in Italian, the *lingua franca* on Swiss building sites. We would always start with sand: either in the cement mixer, if we needed a larger amount or just on a flat clean surface, if we needed a small amount. To the sand we would add quick lime and also some cement depending, what the mortar was going to be used for. Inside the drum of the mixer was a spiral blade that helped – while turning in one direction – to mix the material and – while turning the other direction and turning the opening downward – to force the mixture out into a large rectangular tub from dark plastic. From here the ready mix would be carried in buckets to where it was needed: it would be placed bit by bit with a trowel between bricks or stones when building a wall, or would be used to cover or repair wall surfaces. After the work, all containers, the inside of the drum, the shovels and trowels had to be thoroughly cleaned with water from the hose, but some of the caked white lime remained always in clefts.

Beginning of the Millennium in Basel. I led an excavation on Cathedral Hill in an area which had served as a building site in the late Roman period and the Early Middle Ages. As the most prominent features in both periods, layers of hardened mortar stuck out like icing on a chocolate cake: they were hard and white, while the layers in between were dark brown and a bit like turf. Scattered throughout the dark layers were fragments of Roman pottery. The mortar remains from both periods looked very different: the Roman layer was about five centimetres thick and spread out evenly over almost fifty square metres. It was structured through parallel lines about half a metre apart. They probably represent some supporting beams of a wooden platform on which the mortar was mixed with shovels. The medieval mortar looked like a disc measuring two and a half metres in diameter; the layer was more than ten centimetres thick with indentations in concentric circles. Originally, there had been a round pit about half a metre deep and a central post around which something like a rake going in circles must have caused the concentric traces. I was excited, because I knew this had been a mortar mixer.

After earlier single discoveries of mortar discs only in the 1970s archaeologists in Switzerland and England understood how they were built and which purpose they served. A round pit with flat sole was dug and the vertical sides were clad with boards or wattle; a post was placed in the centre to act as rotation axis for a horizontal beam with vertical rakes pointing down into the pit. Then, sand, quicklime and water could be poured in and were mixed by turning the rake. Like this, a great amount of mortar could be produced in short time. Over sixty mortar mixers, from over forty sites all over Europe so far have been found. They are often associated with early churches or castles. No illustration or written source survives that describes this machine from the time they were used.

With the help of specialised laboratories, we explored several ways how to date the Basel mortar mixer scientifically. There are several possibilities: one method involves searching for organic material – like charcoal or bone – in the mortar and then doing Radiocarbon dating. In the case of Basel we found several charcoal pieces in the mortar, which gave us a date with a probability of 71.8 % between AD 936 and 1018. This is a well-established method, but there is the danger that the charcoal comes from the centre of an old tree or that old bones get into the mix and then the result will be too old. Another method can be to search for lime lumps in the bulk mortar and try to Radiocarbon date the hardening of the mortar. This has the down side that some mortars – depending on their composition and position in the wall – take very long to harden or undergo recrystallization processes, which results in an age that is too young. The other danger is that you sample a piece of half-burnt lime stone and get a mixed date somewhere between the hardening moment of the mortar and the geological age of the limestone, which will be too old again. A third method is to take a sample from inside a big lump and test the quartz grains for when they last were exposed to light. With the Basel example the second and third method produced either no result or dates from the Roman period, which is not possible from an archaeological point of view. An explanation for the Roman dates could be that the medieval builders ground Roman mortar and used it as sand ingredient, when they produced mortar in the same place about six hundred years later.

Recently, a two-year grant allowed me to study early medieval stone building and mortar production on a European scale: I went to the North of England to study one of earliest medieval sites with stone architecture: the monastery of Wearmouth and Jarrow near Newcastle upon Tyne. At Wearmouth remains of a mortar mixer have been found. Bede, the great scholar who lived in this monastery, tells us in his *History of the Abbots of Wearmouth and Jarrow* that in the year 674 Abbot Benedict Biscop was granted land by the king and went to "Francia" to bring back builders to erect a monastery in the "Roman style". Because there are hardly any mortar mixers in the region Bede refers to, the craftsmen from the Continent not only introduced, but probably invented mechanical mortar mixing in Britain. It is from an Anglo-Saxon building phase at Bamburgh Castle, about fifty miles north of Newcastle, that we know who went in circles to produce mortar in the mill: the excavator Brain Hope-Taylor documented hoof-prints of an ox.

Many of these early medieval sites with mortar mixers between the North of England and Scotland – Dunbar so far is the northernmost – are located surprisingly close to the sea or major waterways. This situation contrasts with mortar mixers in Italy, which are mostly connected with early medieval castles of the local nobility and all far from the sea and quite high up in the mountains especially in the region around Monte Amiata in Southern Tuscany. What unites the sites in Britain and Italy is that they are associated with pioneer phases of stone building be it with respect to a region, a period or a social class. Often specialists from afar seem to have been involved. As their appointment was likely contract-based, time-limited and rather inhibited by shortage of skilled helpers than of material resources, these craftsmen could have profited from constructing a machine, with which they could make use of their draught animals when producing large quantities of mortar. Before, in Roman times, or after, in the later Middle Ages, this method has hardly been employed. The reason seems to be the different circumstances under which building sites in urbanised regions operated where labourers were highly specialised, hierarchically organised and more readily available than materials and fuel. Under such circumstances, it makes no sense to economize on manpower.

Mortar reflects the environment – the social and natural landscape – around a building site not only in its composition, but also in the relative proportions, technologies and energies used. To produce quick lime a lot of wood is needed. The amount of mortar

and thus fuel can be brought down by shaping the stones more accurately, but human working hours will go up and the personnel has to be highly trained. To use a lot of mortar in the past usually was a sign of abundant and readily accessible resources of limestone and wood. In the past, to build in wood was to build for one generation, while to build in stone was to build for eternity, that is either for the dead or for individuals, who could own and pass on land. In a wall mortar holds the stones together and allows artificial caves to be shaped: if we see the stones as individuals and the wall as a social group mortar symbolizes what holds both together.

PAINT
Joseph Calleja

It doesn't take a degree in art history to realise that paint has been around for quite some time. It is also one of the most common materials associated with art, as well as being one of the most accessible, visited and tackled by those who attempt artwork. Like the art of icon writing, paint can be deeply rooted in narrative, subject matter, technique, expression, tradition, concept, ability, affinity - amongst other elements - by which one is directly or indirectly influenced when making art and when responding to work in this medium. With such an elaborate canon in mind, one that is clearly entwined in the history of art, I will aim to trace how I tackled paint, and the observations that have emerged in the process of working with it.

The first paintings I came across adorned and shrouded the stone of my village church in narrative, decoration, and prestige, with an ideology of transcending mortal life. I could never be removed from this context and meaning and such was my introduction to paint as an art form. Initially, aesthetics was the dominating parameter by which I measured the paintings I viewed; and photo-realism, the ones I made. The manner in which I related to paint has been a gradual interdependent process of viewing art and making art.

My interest in philosophy soon infiltrated my art practice and this has affected the direction I took with any medium I used, including paint. The relation between the appearance of an object and the essence of an object is a subject which has emerged through my work. This concept is strongly present in the rationale behind equilibrium, a project directly related to paint. For this compendium, I would like to focus solely on this project when discussing paint, as I feel it's my most relevant contribution in this medium.

If I had to single out four artists that shaped the path towards the concepts underlying equilibrium, they would be: Chaim Soutine; Robert Callender; Bertrand Lavier; and Katie Paterson. Discovering Soutine's Le Mas Passe-Temps, Céret, etched in me a bond with painting like no other. At the end of third year at Art College, my practice moved away from painting but Soutine's work maintained a fascination for this medium until I returned to it in equilibrium. These indefinable impulses are important and often they appear in ways that cannot be forced or planned. Callender's Plastic Beach and Lavier's piano both made use of paint on three-dimensional objects, in a manner that struck a chord with my interest in the metaphysical relationship between essence and appearance within the sensible world. Paterson's work, in particular History of Darkness and Lightbulb to Simulate Moonlight express for me her contemporary take on the essence of the subjects she deals with, especially in relation to how the art work unfolds, where meaning is innate to the medium she uses and never occurs on a symbolic level.

equilibrium takes paint as its subject matter, and deals with its existential aspects from three angles which are developing into a series of works: stratum – where paint is literally removed in a process that strips the visual meaning of the represented while simultaneously focusing on what the represented really means; residuum – where accidental paint stains become the subject which reviews paint through its quantitative measures; and depositum – where paint becomes the object it usually hides and is reconsidered in its own entity.

stratum is a series that uses impermanent pigment (gouache/tempera) to depict bodies of water. The source for these depictions is immaterial as long as the painting looks like water. These paintings are then subjected to water erosion from percolation, infiltration or rising water, ending in partial or total obliteration. This process would be documented and ideally shown against the final result to heighten the distinction between something that looks like water and water itself.

depositum, Nial Stevenson, 2013

residuum is a series informed by an intervention I did during the Robert Callender International Residency for Young Artists in Osaka. Onsite found paint-stain marks were the source of the intervention, which consisted of having these permanent stains painted out using impermanent pigment. In this process, the ground is made to look clean by actually adding more stains. The intervention concluded by washing the floor. This very act of cleansing made the ground look dirty again. The resulting series of pencil drawings relates to a selection of stains found onsite. These drawings allude to the quantitative nature of how we humans relate to paint sold in tubs by squared surface area coverage. These accidental paint stains are painstakingly drawn in pencil on paper at a scale 1:1. Their surface area is measured by calculating the pixilation on a computer programme. The same surface area is erased from the drawing in a square shape, quantifying the equivalent surface area of that accidental mark.

'Paint is rarely seen as an object itself. It adheres to what it hides and essentially becomes the hidden object'.

This statement came to me when I conceived the series depositum as inspired by the paint on the ceilings and walls of 77 Mgarr Road, Qala, Gozo. A combination of moisture alteration, sunlight and gravity caused paint to flake and fall. Intrigued by this fragile layer deposited on the ground, I collected these flakes and merely re-presented them resting on pins, hovering above the ground where they would have eventually ended. By this very act I am drawing attention to this layer more in a sculptural way than in a painterly manner. These installations take the shape of the parameters of the spaces they inhabit, whether it is on the ground or found altered frames.

These three series remove paint from the norm of being treated in terms of its aesthetic qualities or means of expression. Yet as the work unfolds, an unintended aesthetic emerges, that sees emotive expression make way for the expression of the idea.

PAPER PLANS

The Many Papers of a Particular Building Site[1]

Rachel Harkness

1 All photos by R. Harkness, 2014-15, on the building site of The Ecology Centre, Fife. With thanks to the staff and volunteers or the centre and all those contractors involved in the construction.

PEAT

Dispatches from the Source: Writings from Improvisations

Claire Pençak in collaboration with Merav Israel and Tim Rubidge

i

Imagine a path following along a curve.

The curve

The Tweed

And the imagining.

ii

It was a green – veined white, its wings, tributaries of a river, flowing towards the source.

iii

Who was the person to first put their hand into Tweed?

No, it wasn't me.

One of the others.

iv

And we listened

And we listened

What did you hear?

Trickling

Trickling?

Trickling underground.

You heard it even though you couldn't see it?

You see it through the listening.

What else did you hear?

The lark.

There was a silence between the sound of the river and the song of the lark.

A sound. A silence. A song. What else did you hear?

Footsteps

v

We found something.

A peat bog,

A curve in the landscape.

Somewhere to sit.

I didn't draw but one of us drew.

One of us dipped the paper into peat.

Later on I drew that scar.

I went with paper

I sat down on the edge.

I pressed the paper against it.

I used my fingertips to press even more.

It was a tracing, the print of a texture.

I wondered, should I do it a second time?

Don't repeat anything, I thought.

What do you call the colour of peat?

vi

I remember.

What do you remember?

I remember it was kind of emerging.

Is that emerging or kind of emerging?

It's not definable.

I wrote those words in my notebook.

Undefinable.

Emerging.

vii

Should I have written there is no source as such?

PIGMENT

Practical Lessons in the Material Properties of Paint

Ray Lucas

Mixing my own paint is a step I didn't anticipate taking in my painting practice, but does provide some insights into the nature and behaviour of paint.

This entry documents making two pans of solid watercolour paint: alizarin crimson and indigo blue. The material qualities of the paint itself become parameters for creativity when mixing the paint. Rather than relying on the manufactured paints available from manufacturers (who, to their credit, give elaborate descriptions of both the behaviour and process of making their paints; essential for professional artists), the qualities of translucency and opacity, smoothness and granularity, how glossy or matte the finish is. All of these are opened up to the artist, who can also mix and adapt pigments to their specific needs.

Equipment:

Tempered glass plate
Glass muller
Palette knife
Empty watercolour pans
Scales
Ramekins or other containers
Pigment
Binder

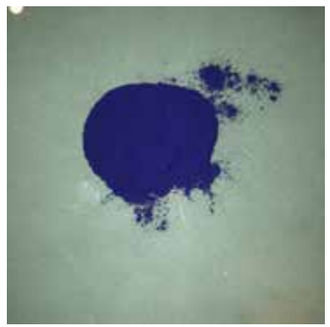
Different binder media are used for different types of paint: oil paint uses vegetable oils such as linseed, whilst watercolour binder contains oxgall (sometimes now a synthetic version rather than the traditional animal by-product) and gum arabic (acacia gum). Oxgall acts as a wetting agent, allowing the solid paint to be reactivated by water, whilst the gum has the property of binding the pigment in a stable form. Some sets of watercolour pans include a pan of oxgall for its properties in manipulating paint, increasing drying time or allowing dried paint to be manipulated further.

The pigment and binding medium are measured out, a proportion of 1 part pigment to two parts binder.

The wet binding medium and the powdered pigment are mixed together using the muller. The action is one of grinding in a circular movement. This takes time, to achieve a smooth finish without streaks. The work is surprisingly physical.

Once the consistency has been achieved, the paint is scraped up with the palette knife. The paint has been smoothed out into a surface by the grinding of the muller against the glass plate. The palette knife allows me to transfer the paint to an empty watercolour pan.

Equipment and materials laid out



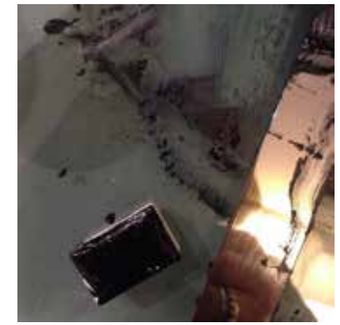
Indigo pigment powder

Pigment plus binder

Mixed paint

Mixed paint with muller

Paint ready for pan



Paint scooped into standard watercolour half-pan

Crimson pigment powder

Pigment plus binder

Mixing paint with muller

Filled pans of watercolour paint

All Images Ray Lucas

PITCH
Tim Ingold

In the beginning was a pine tree. There it stood, its roots bedded in the hard ground, its upright trunk firm but thinning towards the tip, its branches and twigs swaying in the wind, all adorned with fine green needles quivering in the sunshine.

Then the navy started to build great ships. It needed quantities of timber to build them. Our tree, along with countless neighbours, was felled. Brought to the sawmill, the trunk was cut into square-faced planks and beams. But for a while at least, the stump and roots remained in the ground. The ships, however, needed more than wood. They needed tar to coat the sails, ropes and rigging, in order to waterproof them and to protect them from rot. And they needed pitch to caulk the timbers, to ensure that no water could seep into the joints. For this purpose, the remaining stump was rooted up. Hacked into pieces, it was placed in a furnace and fired. The wood turned to charcoal but at the base of the furnace, a dark brown sticky liquid ran out along a pipe, at the end of which it was collected in a bucket. This was tar. To make pitch, the tar was boiled in a cauldron, driving off the aqueous content as steam. The result was a thick, highly viscous fluid that would dry into a hard lump. But however solid it appears when dried, pitch remains fluid. It just flows very, very slowly. In colour, it is absolutely black.

My story begins with the white light of the sun, as it is caught by the living tree in its canopy of needles, and ends with the blackness of pitch, drawn off from the roots and stump in their consumption by fire. It is a story of both wood and light. What happens to wood, as it is reduced to pitch, is also what happens to light, as it is extinguished. It is this connection between wood and light that I want to explore.

To do so, let me return to the sawmill, where the trunk has been turned into beams. These days we also speak of beams of light. When the rays of the sun, low in the sky, glance through broken cloud, we say we see sunbeams. In Latin they were known as *radii solis*, 'spokes of the sun'. But why should these spokes have entered the vernacular of English as 'beams'? What do sunbeams and beams of wood have in common, that would have led to the same word being applied to both? Could it have been their evident straightness or rectilinearity?

Early medieval literary sources tell a different story. For in those days, timbers were cut with axe rather than saw. Their lines were never perfectly straight, nor were their surfaces plane. For medieval writers the beam was not cut timber but the tree itself, living and growing in the ground. Though obsolete today, this usage survives in the names of common tree species such as hornbeam, whitebeam and quickbeam (otherwise known as rowan or mountain ash). In likening light to a beam, then, the comparison was to the living tree. This was the light of a fire. The beam of light was the flame, shooting upwards into the air as the tree rises from the ground. It was the equivalent of the Biblical *columna lucis*, the 'pillar of light' by which, in the Book of Exodus, the Israelites were guided on their way at night. The Venerable Bede, writing in the eighth century, used the word 'beam' to describe the column of light or fire ascending from the body of a saint. For Bede, as the tree-trunk grows from the earth, so light rises from the saintly body.

Understood in this sense, however, the beam of light is quite different from the ray. The ray is a line of emission, radiating from an energetic source as a spoke from the centre of a wheel. When we draw the sun, or a candle flame, it is conventional to depict rays of light as straight lines fanning out in all directions. This convention, too, gives us the familiar pointed form of the star. In themselves stars lack points, but they do with rays attached! The beam, by contrast, is neither perfectly straight nor oriented in any direction. Rather than issuing from a source, the beam-line describes the growth

or movement – literally the beaming – of the source itself. It is a line of combustion. It can flicker like a flame, swirl like smoke, or twist like the wind. With flame, smoke or wind, it is inclined to swerve in response to the aerial currents with which it mingles. Even sun-beams are depicted, in early sources, as the twirling flames of a great fireball.

Ray and beam, thus, offer two quite different ways of thinking about light: what it is, how it moves, and how it is apprehended. On the one hand, as ray, it is an energetic impulse that connects a point source to the eye of a recipient, across what could be an immense distance; on the other hand, as beam, it is an explosion that manifests as much in the eye of the beholder as in the cosmos. For in the moment of its apprehension, eye and cosmos become one, merged in the experience of an illuminated world.

But if there are two ways of thinking about light, then by the same token, darkness can mean different things, depending on which approach you take. The rays of the sun, when they strike a solid and opaque body, cast a shadow on the ground. Within the outline of the shadow it is dark – not completely dark, of course, since however strong the sunlight, a certain proportion of incident radiation is dispersed by ambient air. The shadow's darkness, nevertheless, comes from blocking out the light. Yet the shadow itself has no substance: the only substance is of the ground on which it plays. With the beam it is quite otherwise. To darken the beam is to put out the fire; not to block the light but to extinguish it. And the shadow of the beam is the material residue that falls from the conflagration. The same tree, which had once basked in the sun's rays and cast a shadow on the ground, *becomes light* in the flames of the fire – as beam rather than rays – and leaves its shadow in the material stuff of ash, charcoal, and finally pitch.

Of the blackest of black nights, we say it is pitch dark. But pitch darkness is one thing, the darkness of pitch another. One is defined negatively, by the absence of radiant light, the other positively, by the presence of material substance. Radiant light – the light of the sun – is said to be white. It is what we get by mixing every shade of the visible spectrum, for example by spinning a top decorated with a colour wheel. When the top is at rest we can distinguish the shades, when it spins they merge into white. These shades, corresponding to wavelengths, give us the colours of the rainbow. All the colour is in the light. No light; no colour. Black, then, is as void of colour as it is of light. The manufacture of pitch, however, tells a different tale.

Let's return to the tree from which we began. Having cut the trunk for timber, to be sent to the mill, the roots and stump are set alight. What runs out from the light of the fire? Brown tar. What do we get when the tar is boiled to eliminate its water content? Black pitch. As Johann Wolfgang von Goethe famously argued, in his *Theory of Colours* of 1810, black is not the absence of colour but colour at its most concentrated. As pitch is the extract of tar, black is the extract of light: the essence that remains after the light is extinguished. Conversely, to set materials alight is to lighten their colour. So long as the fire burns, the flames and glowing embers give off shades of yellow and red. But once the fire is extinguished, all shades recede into black. The blackness of pitch, then, is an index not of nothingness but of infinite density, from which colours explode in the ignition of our visual awareness. All colour pours from pitch; and all colour eventually falls back into it.

PLANT MATTER
"A Play of Forces": After Translating Entropy
Jen Clarke

June 2015/March 2017

This work explores ideas of excess and entropy, working with ikebana arrangements of plant matter at different stages of freshness and decay, partly in order to explore the related ideas of photosynthesis - essentially the ordering of disordered matter to make matter/things with light through the transformation of light energy to colour – entropy, and 'excess', in juxtapostion with Bataille.

'The living organism, in a situation determined by the play of energy on the surface of the globe ordinarily receives more energy than is necessary for maintaining life; the excess energy (wealth) can be used for the growth of a system (e.g. an organism); if the system can no longer grow, or if the excess cannot be completely absorbed in its growth, it must necessarily be lost without profit; it must be spent, willingly or not, gloriously or catastrophically.'
(Accursed Share Vol. 1, 21)

'Thus, at all costs, man must live at the moment that he really dies, or he must live with the impression of really dying'
(The Bataille Reader, 287)

'Everything is rich'[1]
(Accursed Share Vol. 1, 13)

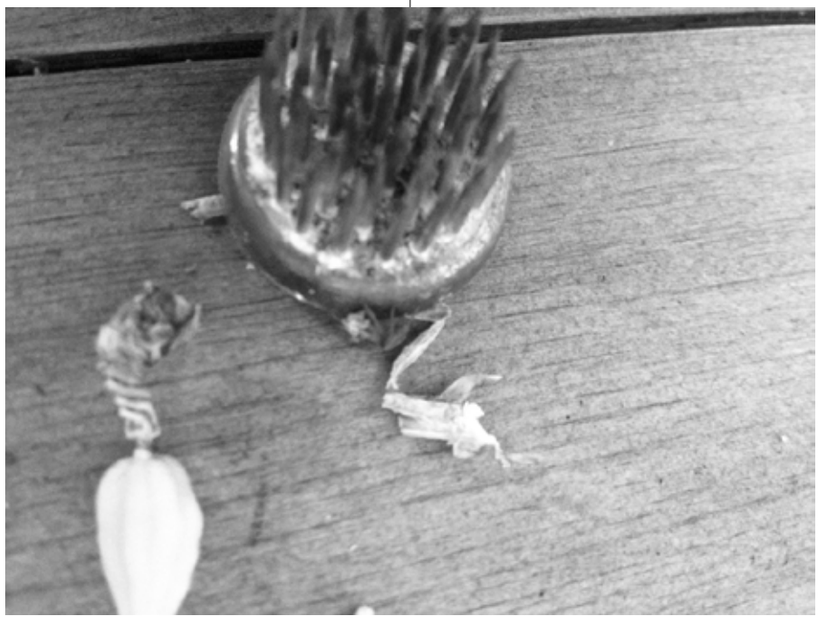
1 "Inner experience is an experience which is rich beyond comprehension, beyond being reduced to being an internal experience and beyond being captured within the concept of experience." (Noys, 2000:55)

‘The blind spot’[2]
(Inner Experience, 111).

2 Bataille uses “the blind spot” metaphorically to indicate the moment of non-knowledge: ‘knowledge which loses itself in it’

‘your life is not limited to that ungraspable inner streaming; it streams to the outside as well and opens itself incessantly to what flows out or surges forth towards it […]

‘I am and you are, in the vast flow of things, only a stopping-point, favouring a resurgence’
(Inner Experience, 94–5).



‘I was not insane but I made too much of the necessity of leaving,
in one way or another, the limits of our human experience …’
(Visions of Excess, 74)

References:

Bataille, G. Visions of Excess: Selected Writings 1927–1939, ed. and intro. A. Stoekl, trans. Allan Stoekl, with C.R. Lovitt and D.M. Leslie Jr (Minneapolis: University of Minnesota Press, 1985).

Bataille, G. Eroticism, trans. M. Dalwood (London and New York: Marion Boyars, 1987).

Bataille, G. Inner Experience, trans. and intro. L.A. Boldt (Albany: StateUniversity of New York Press, 1988).

Bataille, G. Guilty trans. B. Boone and intro. D. Hollier (California: The Lapis Press, 1988).

Bataille, G. The Accursed Share Volume One, trans. R. Hurley (New York: Zone Books, 1991).

Bataille, G. The Impossible, trans. R. Hurley (San Francisco: City Lights Books, 1991).

Bataille, G. The Bataille Reader, F. Botting and S. Wilson (eds) (Oxford and Malden: Blackwell, 1997).

PLASTIC

Wrapped in Plastic: Uses, Functions and Discards of Plastics in Contemporary Agricultural Practices

Erika Akariguame Armengol Sloth

As far as the eye can see, the landscape of Almeria is coved in plastic. Almería, situated in the south-east corner of mainland Spain, is the eastern most of the eight provinces of the autonomous region of Andalucía. This area has seen an agricultural development over the last 60 years that is impressive in scale. Starting with the erection of its first plastic greenhouse in 1962, a vast landscape of plastic greenhouses, covering an estimated 800.0000 square kilometres, has taken shape, gradually consuming the coastal plains of Campo de Dalías and Campo de Nijar. The province of Almería is now home to the largest concentration of greenhouse agricultural practices in the world.

Campo de Dalías, the most important growing region in Almería, has the largest concentration of greenhouses, with 600.0000 square kilometres covered in plastic. This region provides a relatively flat growing area in comparison to the otherwise predominantly mountainous topography of Almeria, encircled, as it is, on the one side by the mountainous range of Sierra Nevada rising 2519 meters above sea level, and, on the other side, by the Mediterranean Sea. In between these two geographic boundaries, if you imagine yourself on top of the mountain range, you might experience the vast concentration of greenhouses, sitting shoulder-to-shoulder, transformed into a shimmering sea of plastic, nicknamed 'Costa del Polythene' or 'The Sea of Plastic'. Underneath, 2.5 million tons fruits and vegetables are harvested each year, with a turnover of 1.8 billion Euros; this place has become a financial epicentre in Europe.

The area of Almeria has a semi-arid climate, and with an average of 3000 hours of sunshine annually. The preconditions for agricultural production in Campo de Dalías are perceived as 'extremely favourable', as fruits and vegetables can be harvested in Almerían greenhouses at the time of year when in Central Europe they are still being sown. This makes cultivation extremely profitable for farmers here, as the products can fetch high prices on the European market during winter. Prior to the emergence of agricultural production in greenhouses, however, Almería was described as a depleted, 'depopulated wasteland' and as 'a forgotten province' for its backwardness and lack of development. For many generations, it was the poorest province in Spain. To this day, Almeria remains the driest region in Europe, with an average of 200 mm rainfall annually, and some say it is the only 'true' desert in Europe. But something has changed drastically here and within an impressively short period of time. If you ask a greenhouse owner what allowed for this transformation to take place, they will give you a simple answer: *plastic*. Without it the sun would burn most of the plants before they would produce fruits and vegetables and, those who would survive, the wind would destroy. Plastic has made this semi-arid, barren and unproductive region prosper like a temperate or tropical forest. Agricultural production practices and traditions have developed in this landscape through, and with, differentiated uses of plastics. Agricultural practices in Almeria are, therefore, decisively a plasticulture: agricultural practices that exist as a result of plastics or that plastics are integral to.

The plastic films are made from uniform plastic pellets, which are transparent droplets of raw plastic (without additives) of about a half centimetre in diameter. The pellets are melted at high temperature together with selected additives and then moulded into plastic film. The width, thickness and particular chemical composition depends on the plastic manufacturers' machinery and the specific product range they offer.

The plastic films used to cover the greenhouses are Low Density Polyethylene (LDPE), High Density Polyethylene (HDPE), Ethyl Vinyl Acetate (EVA) or Ethylene Butyl Acrylate (EBA). All these different kinds of plastic films are thermoplastics[1] made from the monomer of ethylene, a derivate from the petrochemical industry. Monomers are molecules that can easily bond to another identical molecule at two points, establishing their ability to form long (three-dimensional) molecular chains of strong and homogeneous molecular bonds. In effect, the monomers are like identical railroad cars coupled together to form a long train. These chains are called polymers and all plastics regardless of form, colour or property are polymers, although all polymers are not necessarily plastics. The length, mass and particular structure of a polymer chain gives a plastic its physical properties depending on the various types of basic monomers used. With ethylene forming the basic monomer of greenhouse films, the plastics produced with this monomer have a high ductility and impact strength as well as low friction. It shows a strong resistance towards deformation under persistent force and, depending on the thermal history and film thickness these plastics can vary between almost clear (transparent), milky-opaque (translucent) or opaque. All plastic films used to cover the greenhouse structure are no more than 200 microns or 0.2 millimetres thick, while their length and width can vary, as this depends on the plastic manufacturer's machinery and product range.

To enhance existing or apply specific properties to the plastic films, a variety of additives are applied to the polymers. The additives do not form part of the polymer chains, but instead 'assemble' or 'sit' in between the polymer chains, adding a particular property to the plastic without compromising the properties of the polymer chains. The primary monomers applied to plastic films in Almeria are UV absorbers, such as nickel, applied to lower the amount of sunlight passing through the plastics and dissipate the absorbed light energy from UV rays as heat by reversibly intra-molecular proton transfer.

1 All plastics are divided into two main categories: 1) Thermoplastics, which soften on heating and harden on cooling and 2) Thermosets, which never soften again when they have been moulded once.

The greenhouse provides a microclimate better suited for agricultural production practices by protecting the growing plants from the harsh environmental and climatic conditions in Campo de Dalías. Moreover, the plastic films that constitute the skin of the greenhouses do not only protect the plants, but, as I was told repeatedly, they *transform* what are otherwise environmental and climatic hazards into a *resource* for agricultural production. With plastic covering the greenhouse, a passive ventilation system now ensures that the wind keeps temperatures down instead of causing plant damage. At the same time, the ventilating breeze sees the high levels of oxygen produced by the plants replaced with carbon dioxide, which is necessary for the plants to grow. With the plastic cover's semi-translucent quality, growing plants are protected from direct sunlight during the day; whilst at night, the plastic ensures that the greenhouse is kept warm by containing some of the heat produced during the day. Furthermore, the amount of water (a scarce natural resource of the region) needed to farm vegetable produce is significantly reduced by the use of plastic films, as the sun will not evaporate water from the soil underneath it and any water that is evaporated will be contained within the greenhouse. In these ways the uses of plastic film are perceived by the Invernaderos (greenhouse owners and keepers) as an economic negotiation between natural resources: preserved water for the costs of plastic production (environmental, economic, social, etc.) or the costs of using plastic for the fact that agriculture can be produced at all in these environmental and climatic conditions

The main greenhouse structure consists of two different layers of plastic film. Along the sides of the greenhouse and at particular spots along the roof, a semi- transparent and transaerodynamic plastic is applied. That is, a layer that lets air pass through the greenhouse structure. This plastic film is applied to the greenhouse structure to provide a passive ventilation system, while, at the same time, keeping out insects and undesired pests like a mosquito net keeps out mosquitoes. The second layer is a solid, windproof, although still soft plastic film. Along the sides of the greenhouse, the solid layer of plastic can manually be moved down or up by pulling a rope attached to the plastic film, in order to regulate the amount of wind passing through the greenhouse. During summer months, all possible ventilation systems will be opened during hours of daylight, while they will be closed at night to contain the heat within the greenhouse. To further regulate the temperature within the greenhouse during summer months, a layer of chalk is applied on the outer surface of the roof, as the 'whiteness' of the chalk will decrease the levels of sunlight passing through the greenhouse by reflecting the sunlight back into the air/atmosphere. This layer of chalk is washed away at the onset of winter months to reverse this effect.

A significant material attribute of the plastic films used is their ability to transmit the right kind and amount of light. Glass, in comparison, would allow almost all light to pass through, which in Almería, with 3000 hours of sunshine annually and over 320 sunny days a year on average, would result in deadly temperature within the greenhouse – for humans as well as plants and insects. With its semi-transparency and UV additives, plastic film produced for agricultural production practices only transmits 80-85% of visible sunlight whilst allowing about 28-33% diffused light to pass through. A material that would entirely exclude light would not be a viable solution seeing that the plants growing in the greenhouses need sunlight to do so.

Even with the UV additives added to plastic films, which significantly diminishes the transmission of sunlight but also protects the films from the effects of the sunlight, the plastic shell of a greenhouse needs to be changed every 2-3 years, as the sunlight and impact of the wind will alter the plastic films' ability to transmit the right levels of light. Greenhouse-keepers also report that the plastics are changed because the technology of plastic manufacture improves all the time, and weathering reduces their efficacy. In addition to material transformations, weeds, different kinds of fungus, sand and dust will accumulate across the plastic surface of the greenhouse, and also diminish the plastic film's ability to produce the desired growing conditions.

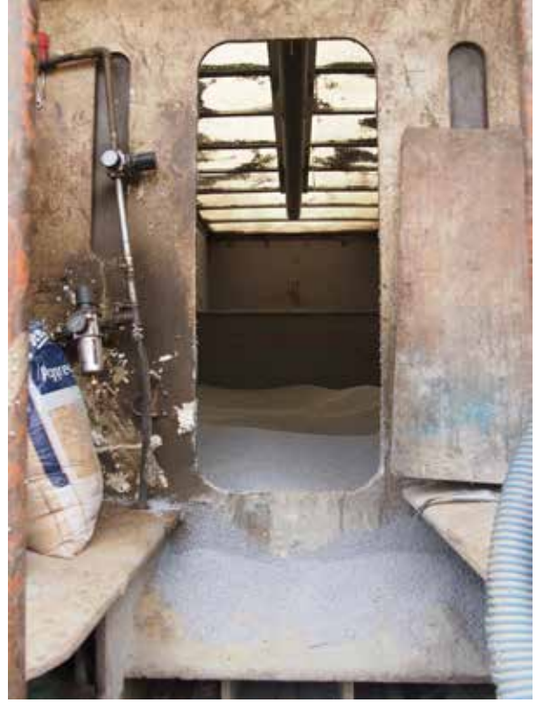
Seeing that the sun and wind are causing material alterations that are undesirable for the growing conditions in a greenhouse, the environmental and climatic hazards of the region are transferred from one 'impact zone' to another: from the plants and soil to the plastic films that now protect them. The need to change the plastic films every 2-3 years makes the greenhouse structure seem like a semi-stable or semi-permanent structure, not truly a building but rather something shedding its skin frequently in vain effort to beat the ravages of time and weather. This ephemeral quality makes plastic in its film guise appear to be always on 'the move': mixing, mutating, flowing and scraping from one material composition to another and from one location to another.

Once discarded, the plastic waste might take various paths through the Almerían landscape, enter into diverse material entanglements and undergo differentiated, processual material transformations. The material properties of plastics, thereby, emerge through and as part of the particular relations they enter into. The vast majority of the discarded plastic, almost all of it, I was reassured by Senor Antonio Escobar, head of Agriculture and the Environment in the municipality of El Ejido, is recycled because it has monetary value. With the technological development of recycling plants, discarded plastic can be transformed into plastic pellets once again, and these can be used to make new plastic objects. Or – as in the case of Plastic Energy, a specialized technology plant – the discarded plastics might be transformed into synthetic fuels, such as, diesel, light oil or kerosene. With the construction of recycling plants in Campo de Dalías, the discarded plastics have been re-valued from good-for-nothing to good-for-something and, thereby, reinserted into mainstream socio-material flows. The added monetary value of discarded plastics has created a subsidiary market, one in which Invernaderos can either sell their discarded plastic directly to recycling centres or to a group of people who make a living from collecting, sorting and selling discarded plastics.

The discarded plastic that is not brought to a recycling centre might be disposed of by its dumping alongside roads, or its being buried or burned. Several things might happen to the plastic once placed along the roadside: it might be picked up by an immigrant worker to use for housing, or by an Invernadero with limited funds to repair a greenhouse; it may be collected by the people who make a living from selling the discarded plastics; the wind might push the remaining plastics to dry riverbeds and other open spaces, such as the nearby sea or nature park; or it may just sit in a heap, waiting. Regardless of where, why or how discarded plastic 'ends up' in different places, once dumped along the roadside, one thing is certain: it will continue to flow, mix and mutate within and beyond the Almerían landscape for a long time if it is not brought to a recycling centre. Seeing that, depending on the type of plastic, it can take up to a thousand years or more for the material that is plastic to decompose.

When discarded plastics are brought to 'Plastic Energy', they will firstly be visually examined and evaluated for their level of weathering, fragmentation or decomposition. If the plastics are assessed to be in a 'bad state' (that is, dirty, fragmented and weathered) they will be used to make plastic pellets. If, on the other hand, they appear to be in a 'good state' they will be used to produce synthetic fuels. This primary segregation between visually 'bad' and 'good' states of decomposition between plastics is made because the processes of cleaning discarded plastics are energy, water and chemical intensive procedures. If they cross a threshold of 'dirtiness' it becomes too expensive and laborious to make the discarded plastics into fuel and they therefore opt for the process of transforming them into pellets. Because the process whereby plastics are made into synthetic fuels is in itself more energy intensive than transforming them into plastic pellets, the final output of synthetic fuels will therefore be greater in terms of energy consumption if the plastics are not too dirty.

The plastic that will undergo the transformation into plastic pellets is cleaned and chopped up into small, homogenous pieces regardless of its initial colour, texture and size. These pieces are then melted at high temperatures and the resultant material is formed into pellets once again. Greater care and organization is needed for dealing with the plastics that will be used to produce synthetic fuels. Here, different kinds of plastics will be used to produce different kinds of synthetic fuels. The 'raw' material plastics will therefore be separated out and organized into piles according to their materials colour, texture and size. Interestingly, these are the factors that disclose to the recyclers what kind of chemical composition a particular type of discarded plastic has. Managers of the recycling plants are familiar with the differentiated plastics used in agricultural production practices in Almería and can therefore recognize these by their visual impression. After the separated plastics are washed, they will go through a technological and chemical process that breaks down the long polymer chains of plastics into smaller molecules. These can then be transformed into new types of plastics or synthetic fuels and sold to companies all over the world and used for the production of new commodities or as an energy source for diverse practices.



POLYSTYRENE
Rachel Harkness

Expanded Polystyrene (EPS) cavity insulation is a sticking point for some ecologically-minded builders, despite it being a great thermal insulator.

As we walk along the path to the site, the architect tells me that some of the people here took some convincing.

"I told them," he insists, "it's ninety-nine percent air!"

I read the details about this product, EcoBead, online:

> *EcoBead is a high performance, injected, blown bead EPS insulation system. Platinum EcoBead is an EPS bead which incorporates a graphite component called Neopor®, manufactured by BASF, to provide significantly improved thermal insulation performance.*

BASF is a global multinational chemicals company. They produce chemicals, plastics, what they call 'performance products and crop protection products' and they work in the oil and gas sector. They make things like food additives, plastics used in household appliances, and chemicals to enhance the efficiency of fuels. They create herbicides and biological fungicides for application in agriculture and genetically modified crops such as of Maize and Corn. The list goes on and on.

As I think about it, this means that it is likely that they have had a stake in the production of most of the things around me: from my toothpaste to my phone, my clothes to the upholstery of the car, the crops growing in the surrounding fields to the mechanical systems that power the ships just visible out on the River Forth. Their products probably enter into what I have eaten, the cosmetics I am wearing, and the fabric of the buildings I spend time in.

A long line of production has led to this moment of injection.

I don't speak this language yet!

I find myself creating a glossary:

Zero ODP

(Ozone Depletion Potential)

<5 GWP

(Global Warming Potential)

A+ BRE Green Guide rating for generic EPS products

(The Building Research Establishment's Green Guide provides environmental impact data for building materials.) (Expanded Polystyrene)

CFC, HFC and HCFC free

(Chlorofluorocarbon) (Hydrofluorocarbons) (Hydrochlorofluorocarbon). (These 'greenhouse gases' are organic compounds that contain Chlorine, Fluorine and Carbon, or Hydrogen, Fluorine and Carbon, or Hydrogen, Chlorine, Carbon and Fluorine. They contribute to ozone depletion.)

No wastage on site

Green guide summary 'A' rating

EcoBead is 100% recyclable

EcoBead has been awarded BBA certificate No: 04/4167.

(British Board of Agrément: Technical Approvals for Construction)

It is manufactured to the requirements of BS EN 13163:2001 and under an ISO 9001:2000 approved quality management system.

(British Standard European Norm)
(The International Organization for Standardization's ISO 9000 standards are a 'family' of international standards to do with quality management systems.)

The EcoBead system is guaranteed by CIGA in all retro-fit installations.

(Cavity Insulation Guarantee Agency) (To retrofit is to add features or components to an older, already existing system that did not have them upon manufacture.)

EcoBead has a K value of 0.040 W/mK

Platinum EcoBead has a K value of 0.033 W/mK

(A k-value is a measure of a material's thermal conductivity: how easily heat is conducted by it. The lower the value the better for insulation, as you don't want the heat to travel but to stay inside the building without dissipating too much. It is measured in watts per square metre of surface area for a temperature gradient of one kelvin for every metre thickness, and this is written as W/mK.)

Calculations of how the building performs thermally are crucial for this building. When I meet others building similar buildings around the country, they too are full of calculations. I have never thought of comfort as something that could be engineered via an equation, standardised and measured, but here I realise that these are followers of a different path to eco-living.

EcoBead will be here for the long-haul:

The thermal insulation properties of EcoBead and Platinum EcoBead will remain effective for the life of the building. The insulation will not crack nor settle. It is a dimensionally stable, chemically inert product, which is resistant to attack from bacteria, moulds and fungi, and will not provide nutrient value for insects or vermin. It is also non-toxic and non-irritant.

Due to the unique design, the system will not transmit water across the cavity.

When used in a masonry cavity wall a Euroclass B classification can be expected and EcoBead will not prejudice the fire resistant properties of the wall.

Though I can see its attractiveness in the short term, and relish not working with fibreglass, there's something about the idea of the chemically inert that is very strange: not only the presence of an unreactive and unresponsive material but also the creation of something in the world that is inactive and passive. In my imagination, I see, between the walls, this frozen snowstorm of silver beads lasting through flood and fire. It won't harbour any life there, whilst entombed. I feel the rub of this version of 'green' against the 'natural materials' version I had been schooled in before, where insulation had been sheep's wool and strawbale, and I wonder what archaeologists of the future will find here.

Millions of tiny beads of polystyrene and a glue solution.

"It's basically PVA," says the man who has driven all the way from the northeast of England with a truck full of it.

I watch him pick the dried PVA out of the nozzle – it seems to clog a lot, from what he's saying – and I day dream a little of how we used to paint PVA on our hands sometimes in the Art class at school. Then, with satisfaction, we would peel the dried glue-skin off again.

RED OCHRE/TSAIH

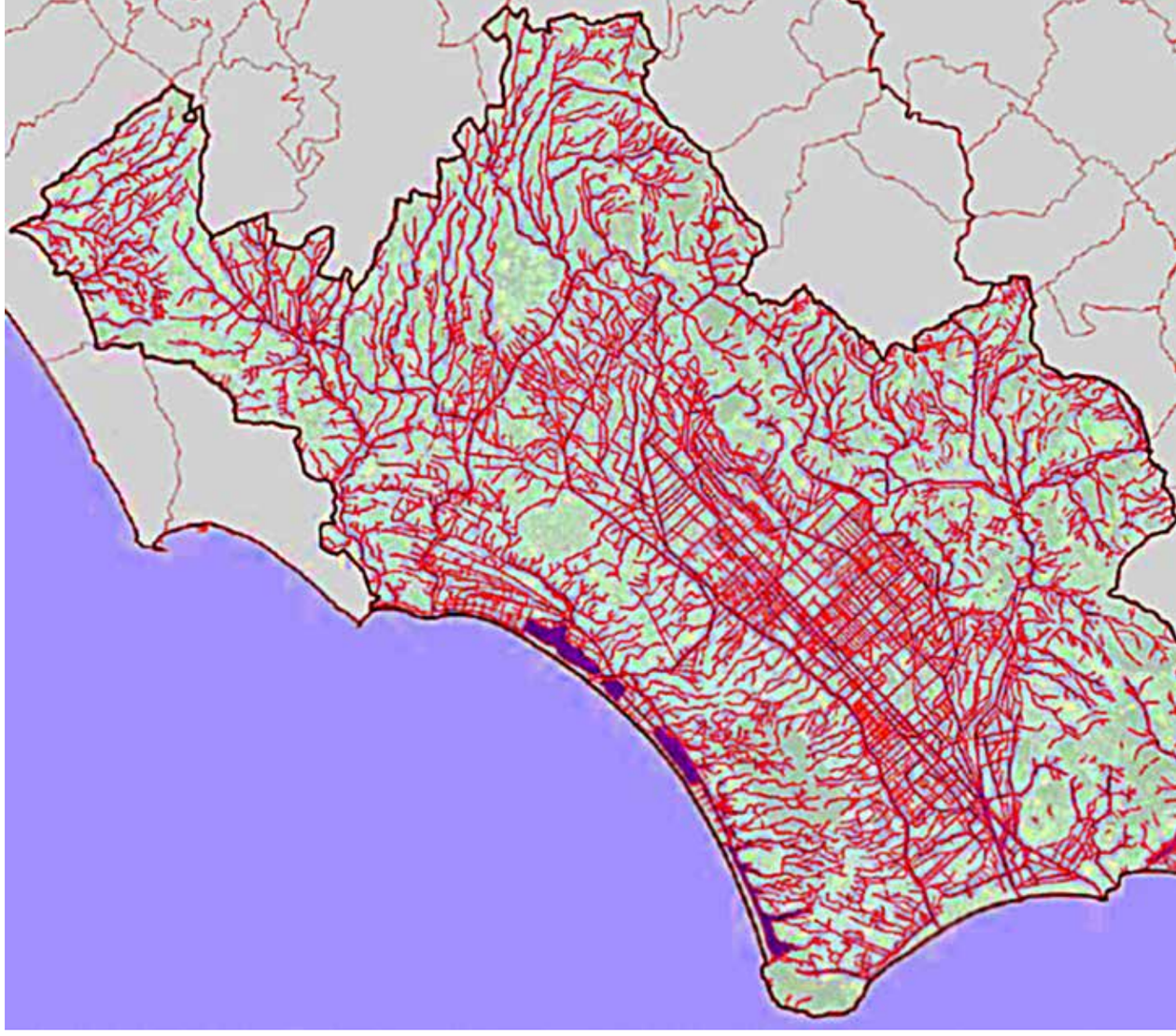
Jan Peter Laurens Loovers

This is a story about the sacred Gwich'in place *Tsaih Natr'oondak* located at *Chii Deetak* (Rock River, Northwest Territories, Canada). A Gwich'in elder recounted a similar story she had heard from her mother while I stayed at her camp.

'Dinìizhok [a renowned and notorious Gwich'in medicine men who lived many centuries ago] went on to lead a long life as the helpful leader of his people, but his old enemies caught up with him in the end. Two young warriors who had been sent ahead met him on a high cliff in the Rock River area ... The two warriors say down beside Dinìizhok when he suddenly grabbed them – one with his left hand, one with his right – and hurled himself and the two young men down from the cliff. Clutching the bodies of the two warriors as shields, Dinìizhok was able to lessen the impact of his own fall, but at the last moment he hit a sharp rock sticking out from the ground. His stomach was cut open and he began to bleed heavily, but he was still strong enough to club and kill the two young warriors [as told by Gabe Andre].

It may be that Dinìizhok threw himself down that cliff just to kill himself, but when his enemies reached him, he asked them to say that he had frozen to death, and not that they had killed him. And so Dinìizhok died. It is said that his blood turned into ochre, *tsaih*, that can be found near Rock River [as told by Chief Hyacinth Andre] (Heine et al. 2007: 30)'

Nowadays, *tsaih* (red ochre) is used as dye for snowshoes (and before for caribou skin clothing). When someone collects *tsaih* from *Tsaih Natr'oondak* it is important to leave behind a gift. Failure to do so leads to bad weather.



REEDS

Paolo Gruppuso

Small, narrow and straight channels cut the Agro Pontino. They are disciplined connectors of a hydrographic network widespread all over the region; the result of one of the most important projects of land reclamation ever made in Italy: the *Bonifica Integrale*. The *Bonifica*, as we call it in Agro Pontino, was carried out by the fascist regime, which reclaimed the largest marshland in Italy, the Pontine Marshes, perceived as an uninhabited and malarial wasteland. The modernist project transformed the marshland in an agricultural area of which channels, pumps, dykes and basins represent the circulatory system. As in the human body, this system works silent, invisible to the eye. Waters run often underground, appearing on the surface rarely or when something goes wrong, like when a body bleed because of a wound that needs to be stitched.

It is as if the landscape designed by fascism during the *bonifica integrale*, was thought to be water-free, as if water was an undesired element to conceal, in spite of being essential for agriculture; as if water was perceived to be like a remnant of the previous marshes, something to be feared, or of which to be ashamed.

In this kind of (only apparently) water-free landscape, I discovered the joy of following the water as a sparse and rarefied interstitial space in-between dry land. During walks along channels and around ponds, discovering the wetlands of Agro Pontino, I often found myself in groves of reeds, surrounded by reeds, walking on and amongst them, and finding my way through them.

Fascinating plant reeds. They inhabit wetlands, they wander along the channels that were dug during the *bonifica integrale* as a *memento* of the disappeared marshes. They are the remains of a disappeared landscape, fossils of the Pontine Marshes.

Reeds are neither aquatic nor terrestrial, they enjoy being in between land and water. They are amphibious plants that need soil, they build soil. Reeds are rhizomatic plants, they develop and grow underground where the rhizome unfolds and builds soil.

Reeds are fascinating plants. They track water, they are traces left by water, they route water. Now I have learned that where there are reeds, there is water nearby. They make water evident. They represent the *perdurance* of the marshes in the reclaimed land of Agro Pontino.

Reeds tell us about a past when marshlands were considered dirty wastelands to be reclaimed and transformed into agricultural fields. They speak to the future of environmental sustainability, as they are amongst the most important plants used for the purification of water. The agricultural landscape created by fascism, which tried to eradicate wetlands and reeds, nowadays needs reeds and wetlands, reeds in wetlands, to purify water that is polluted by nitrate, fertilisers and phosphates used in agriculture. Nowadays reeds are respected. And feared.

Reeds are tantamount to wetlands, but they can also cover, and eventually strangle and entomb, wetlands. "The real animal", writes naturalist William Burt, "is in the underground rhizome, which grows up to 250 lateral feet per year, sending up shoots every four or five inches"[1]. In order to have wetlands, reeds need to be under control. This much I have been told by farmers and environmentalists in Agro Pontino[2].

1 See Burt 2007:23
2 See Gruppuso 2016

If you see water amongst reeds it means that the land is managed, it means that it is a wetland.

The association of reeds with water, land and other living beings, something we can call the rhizosphere, reveal a particular kind of relations which is constitutive of wetlands.

Wetlands are the activities which human and other animals carry out to keep reeds under control and to keep the land wet. The presence of reeds, their distribution on the land and on the water, is revealing of this.

My walking among them, the possibility to see the water, and the birds nesting amongst them, reveals that wetlands are still present in Agro Pontino in spite of the *Bonifica Integrale*.

Wetlands, like rhizomes, are 'tough animals', they endure in the landscape where there is water on the land. In-between dry land, there is an interstitial wetland, reeds are there, they route me there.

References

Burt, W. 2007. *Marshes. The Disappearing Edens.* New Haven and London: Yale University Press.

Gruppuso, P. 2016. *From Marshes to Reclamation: there and back again. Contested nature, memories and practices in two wetlands of Agro Pontino, Italy*. PhD Thesis. University of Aberdeen. Scotland.

SALABARDO

Recycling and Adapting Materials for Fishing: Notes on Conversations.

Francesca Marin

Juan became a fisherman when he was twelve. He learnt how to fish with coastal nets in the isolated Riacho San José, where he had gone to live with his parents, brothers and sisters. The following year, he started sailing and used to help the seaman to pull the *salabardo* out of the water and get them on board. He still remembers when, at fourteen years old, he managed to get one aboard by himself for the first time. Watching how the divers worked for his father, he dived into the water himself and started to gather shellfish. That first time he gathered eight boxes of mussels (three hundred and sixty kilos).

"It took me so long to find a piece of net, because only few scavengers had it," complains Martín. He and his two young brothers are making new *salabardos* from recycled materials. They are using recycled iron rings, too. One ring got rather ovalized with the use and they discuss whether they it is a good idea to use it again. While making each new *salabardo*, the three brothers need to think how they are going to wear it underwater.

Experience has taught them how an ovalized ring must be used by divers so as to not impede their movements. The brothers also observe and pull out the net, so as to forecast how much and in which direction it is going to stretch under the weight of the mollusks. During the making, they will repeat the stretching many times, adjusting the sewing of the nylon thread to the net and the net to the ring.

An older fisherman, Antonio, knows how to make cheap rings, when old ones are not around. He buys an iron rod – twelve meters long and ten millimetres thick – for hundred and sixteen Argentinian pesos (less than six GBP). In February 2016, Antonio had been busy improving his house and thus learnt the prices of many construction materials. Each ring will take a meter of rod and cost nine and a half pesos. At the ironmongery, the rod is manually bent into a more transportable circular shape. The shop is some fifty kilometres from Antonio's place and he needs to take public transport or wait for a friend's lift, since he has sold his car. Antonio could ask the shop keepers to cut the rod to an additional cost of about fifteen pesos per cut, but he prefers to take the rod home and cut it himself, by means of a hacksaw. He uses a blade made for cutting steel, although he actually cuts iron. He learnt by doing that one can cut a material with any kind of blade, except for steel and aluminium that require a specific blade each. If you use any other blade with steel or aluminium, as he says, "you'll fuck it up".

He likes to cut the rod himself, focusing on each cut for twenty minutes or so. He then bends them into a ring shape and rounds them using a mallet. Finally, Antonio takes the rings to a guy who used to be a commercial diver like him, who will weld several rings for less than twenty pesos.

Like all fishermen, Antonio uses a recycled net. He tells me that he finds them at the dump, at the edge of the town. He buys the nets from the scavengers for almost nothing. "With fifty pesos you got a huge piece of net. Anyway it is just an indicative price, since nothing is fixed", he says.

Then you need the sewing thread. Antonio tells me that you have to buy that too; whilst the rope, the rubber and the wire, you can always find somewhere.

The *salabardo* is used also by the employees of the Provincial Secretariat of Fishery, in charge of collecting samples of mollusks for microbiological analysis detecting contaminations of these food products.






When I meet the employees, they have bought a steel rod, cut it into pieces and had it welded for eight hundred pesos.

"Welding stainless steel is much more expensive than welding iron and we had to pay for it ourselves. The secretariat does not pay for it."

They have found netting material made for fishing for anchovies. This net has smaller meshes and is what they need for their samples, as they will be collecting razor shells that would escape a less densely woven net.

The employees are not able to make their *salabardos,* so they ask Antonio to help them, in exchange for an *asado*[1].

1 *Asado* is the typical Argentinian barbecue.

Out of the water, dried by sun and wind, the *salabardo* gets rigid. This is particularly the case when it has been used for a long time and its threads are worn out. The rigidity is a brittleness: the salabardo appears likely to break under a certain pressure. Its net stitches are inflexible, their rhomboid shape does not show its malleability and it is impossible, for an inexpert eye, to understand in which direction they would stretch.

Under the water, the *salabardo* is strong and useful. A full *salabardo* weighs up to eighty kilos.

At the end of the 1960s, Tehuelche scallop dredging fishery spread out in Southern Argentine waters. A few years later dredging was banned since scallop stocks collapsed and local scientists had started studying dredging's environmental impact. Simultaneously, researchers and fisher folk developed a ground-breaking collaboration to develop a habitat-friendly fishing technique. It was called commercial diving and consisted of eight metre long boats built of wood or fiberglass, carrying an air compressor that provides air, through floating air hoses, to up to three divers per boat.

Salabardo was the locally designed bag that radically improved this fishing technique. Swimming close to the sea bottom, divers collect the mollusks with both hands and put them in the salabardo. When it is full, the divers hang it on a rope by which a sailor pulls the salabardo aboard and lowers an empty one to the sea bottom.

Since 1976, this is the technique used in the protected waters of the Argentine San José Gulf, targeting scallops, but also mussels, hardshell clams and few more mollusks (Orensanz et al. 2007).

Salabardos are used also during scallop monitoring campaigns, where biologists of the Patagonian Research Centre (CENPAT-CONICET) together with fisher folk collect samples of scallops, count and measure them. Resulting stock assessment informs the processes of establishing annual fishing quotas.

"What the divers need to take care of is when we are working very deep. We need to prevent the whales to get rolled up with the hose. That's when one can get into troubles. When you are deep, if you see the whale approaching, you have to try to move away. If the whale got rolled up on the hose that brings you air from the air compressor on board, you have to react rapidly. You take off both the *salabar*do and unfasten your diving weight belt. You can leave the *salabar*do on the sea bottom but you must carry the weight belt, otherwise you would dangerously go up to the surface too fast. You take the air regulator, and slowly consume the air in your lungs to reach the sea surface" (Rodrigo, April 2015).

Acknowledgments:

This paper would not have been possible without the help and collaboration of the fisher folk of the Valdés Peninsula (Argentine Patagonia). I would like to thank in particular Juan, Juanma, Martín, Pancho, Antonito, José, Eduardo, Rodrigo and "El gaucho" (who appear in the photos or texts). I also thank César and Marta (who provided me with the fifteenth picture of this paper) and the employees of the Secretariat of Fishery (whom I prefer to keep anonymous).

Reference:

Orensanz, J.M., A. Parma, N. Ciocco, A. Cinti 2007. Achievements and Setbacks in the Commercial Diving Fishery of San José Gulf, Argentine Patagonia. In *Fisheries Management: Progress Towards Sustainability*, eds T. R. McClanahan and J. C. Castilla. Hoboken, NJ: Blackwell Publishing, pp. 68–87.

SAND
Rachel Harkness

This morning I walked

between half moon and bright sun

to the beach

where I collected sand

with arcs of my arms

scooping up the luminescent surface

with only some idea of what sand is:

nothing solid.

And the leads which I was following included:

Hearing a musical composition entitled ‘Sand in My Shoe’;

And a poet’s musings on how community workshops took him

“...on a journey,” he says,

“from space

to a workman on the roof

and then into someone’s garden”;

...the fecund earth, I think...

And also, sand mandalas, with their impermanence

and their maker’s meditative practice;

And certain philosophers of the rhizomatic

referencing writing styles which are

“always in relation with the outside.

Open rings.”

...which intrigue...

And SiO_2 : silicon dioxide: quartz

the most common mineral resistant to weathering, they say

And/and

Both/and

Whilst collecting, I thought about what I was taking,

What I was taking from,

What I was contributing to,

And I wondered at the extents of making

Whilst remembering the distinctive

And repetitious rasping,

That sound of working with sand,

In the mix,

Scraped-up and spread-out in adobe plaster

Again in an arc of the arm under the bright sun.

SHIPPING CONTAINERS
Rachel Harkness

The doors of a shipping container, at The Ecology Centre, Fife.[1]

You see them sitting lonely in corners of carparks, dotted around deserted scrubland, behind herris fencing on building sites, in back yards and even driveways. They have become the all-purpose storage facilities for our times: whatever is excess, left-over or being saved for the future can be housed here, albeit temporarily. Their weather-worn and colourful facades tell nothing of what cargo they hold or what seas they have crossed.

Landlocked shipping containers: a strange phenomenon of our times. They are, as one of the people I work with at The Ecology Centre[2] put it, "really just big rusty boxes". They are big rusty boxes both in the public's perception of them and in the actual state that those who convert them often find them. The Ecology Centre is converting a number of these old shipping containers into The Tool Shed (a space where volunteers refurbish hand tools to then send on to craftspeople in various countries across Africa), a volunteer base, and an educational space. The container conversions have been, and continue to be, carried out over the last year or so that the centre has owned its site.[3] The labourers have been a large number of people, some with professional building trades or skills in carpentry or welding, others without. Together, they have placed the basic rectangular, corrugated metal forms of the containers in a staggered line and joined them together. The containers of the Tool Shed now house fascinating objects in various stages of refurbishment, with many stories of their own to tell. Along with the other containers they face into a triangular courtyard-to-be that sits between them and the Passive[4] building also being built on site.

The Tool Shed containers (flanked by others), facing a new Passive building.

1 All photos by R. Harkness, 2015
2 The Ecology Centre, Kinghorn, Fife / www.theecologycentre.org
3 I am very grateful to the staff and volunteers of the Ecology Centre, Fife and to John Smart Joiners, Kirkcaldy and their subcontractors, for letting me follow the progress of their build.
4 Passive buildings are low energy buildings, meaning that they are designed to require as little energy to heat and cool them as is possible. They tend to be heavily insulated and mechanically ventilated, with heat-recovery systems reclaiming the heat from the used air. Passivhaus or Passive House is an energy performance standard, first developed in Germany, but now found all over the world.

Containers from above, showing their age.

The containers were delivered to site after being chosen by Alison, the Ecology Centre's Development Manager. Alison describes (marvelling, but with some sense of the strangeness of the activity) how at the container depot in Cumbernauld, prospective buyers are encouraged to "get a few containers down" from the huge stacks of them that tower high above ground level in order to be able to "have a look" before purchasing anything. The quotation sheet she received for her purchase speaks of containers approximately ten years old or approximately fifteen to twenty years old, and reading this makes me suddenly aware of just how frequently these containers will have been packed and unpacked for ocean-going.

Delivered on site, these old mariners at first only provide functional inhospitable spaces – depressing to inhabit – suitable for containment and transport, but little else, the builders suggest to me. Slowly, they are transformed: the volunteers at The Tool Shed decide on a layout; a wooden frame is fitted within the interior; holes are punched through the metal sides for windows and where three containers will be connected together even larger apertures are cut in the side walls; welding makes sure they are structurally sound, joined where needs be, and weather proof still; reclaimed doors and windows are fitted; ventilation fans are installed and electricity cables are laid; insulation is pumped in and OSB board, painted white, is raised so as to line the space inside. Colourful signs, the shapes of unusual tools and groaning shelves now adorn the interior.

Mark measures up the salvaged window that will be fitted into the back wall of this container.

Drew fits out the container. The wooden frame will be insulated, and insulation is also laid between the original hardwood floor and a new floor.

To recycle, suggests the anthropologist David Graeber, is to try to impose a circular, equilibrium model on a system that is, at least in energy terms, far from an equilibrium (2012). His point carries some weight when thinking of the re-use and repurposing of reclaimed materials: the effort required to do so is great and the energy expended is often not carried out in a scientifically 'efficient' manner. In their previous lives, things that are turned material through practices and processes of re-use, have gained surfaces that are characterful and beaten, edges that are dented, shapes that are misshapen (or at least ill-fitting to the perfectly squared edges of the new). The shipping containers are no different: their doors stick and their roofs are beaten. The blacksmith has to make frequent trips to site to ease and coax the old mariners back to health.

To work with these thing-materials, then, whether they be offcuts of wood or old shipping containers, is to be flexible, to work around and with these characteristics, to gently coax back into usefulness the stuff that has been discarded. As the sociologist Richard Sennett (2008) describes when referring to craftsmanship, what is required is an ability and desire to work *with* resistance and ambiguity. Good luck, then, that The Ecology Centre – run with a 'make do and mend' ethic at its heart – has so many refurbishers and craftspeople to hand. These seem to be people who are willing and able to work with the resistant and ambiguous qualities of the old thing-maybe-material. And right enough, during the construction, though they might not have advertised it themselves, I thought it telling that a stockpile of salvaged materials they had kept to use sat behind the bank of containers. Full of discards, leftovers and things other people had deemed superfluous or unwanted, this reserve of materials-things spoke volumes about the Centre's principles and their talents for finding discarded things new purpose.

Mark and Fred sort donated tools in space made by joining three containers together.

Some of the stockpile of leftover materials that the Ecology Centre would try to use up and repurpose in time.

But, of course, containers have seldom been discarded. Their use and re-use make up hugely profitable global chains of business, and this is another way in which Graeber is right when he highlights the way in which commercial transactions allow for, or are part of, the circulation of stuff: producer to consumer and back out again to be resold, re-consumed... The shipping container is particularly telling of this: as a thing it can speak (through its identification plaques and import certificates, through its scratches, bumps and its insignia) to the movements upon which our lives, and often our livelihoods, are based. These are movements which range from the very localised (such as the container used to house an overflow of the domestic garage contents) to the global (such as the trade and transport of stuff from Seoul – where at least one of the Ecology Centre's containers was registered – to the UK).

In architecture, shipping containers seem to have become quite the fashion of late. They have become so, it seems, because of a characteristic not exclusive to architectural re-use: that is, the way that they offer cost-effective and instantaneous security and protection against the elements. With their repetitive form of box held together with welds and rivets, a wooden floor and two enormous doors at one end, they offer not only a perfectly neutral container for raw materials and goods ranging from vacuum cleaners to plastic toys, but also a relatively blank canvas for reinvention and repurposing once their seafaring days are over. For the Ecology Centre, and for other small-scale self-build or eco-builds I know in Scotland, the container offers a relatively cheap way to gain instant structure and shelter which can then be augmented and adapted in time. For those ecologically-minded, however, the attraction must surely also lie in the ability to re-purpose something which is ubiquitous (seventeen million worldwide according to a quick internet search), and in the way that their refurbishing can be understood as a complete and canny subversion of these steely representatives of globalization and mass consumerism.

References

Graeber, D. (2012) 'Afterword' pp277-290, in *Economies of Recycling : The Global Transformation of Materials, Values and Social Relations*. C. Alexander and J. Reno eds. London ; New York : Zed Books .

Sennett, R. (2008) *The Craftsman*. London: Penguin.

A small container ship on its way to the sea,
with Fife's coast in the background.

SOUND

Sound Waves as a Material
Counterpart to a Dancer's Body

Malcolm Atkins

The score attached is a response created through reference to Paola Esposito's drawings for her dance piece Dali Narcissus and my knowledge of her dance practice. It is written for piano. Although the score is a material object, the material I work with is not the score itself, as a script. It is the conjunction of the created sound waves with the dance through the way the music follows its own path of transformation that works in empathy with the transformation of the body in movement.

Initial material for the creation of the music was improvised response to Paola's movement. My first musical responses to a dancing body are often an intuitive response to the movement I see where I try and capture the emotive expression of the movement in sound. From there I consider the structuring of a response through the further selection and assessment of specific musical material – notes, rhythms, harmonic developments – which I then further investigate in collaboration. Through this cyclic process I can create a material object – a score of some sort – that by agreement with the dancer can be the basis for collaboration in performance. This can be a few simple instructions or musical notation or a mixture of both. In this case I have completed a score but this score is not an independent performance entity.

Each section in the score is a response to a separate image and as such should be seen as a starting point for a performance that supports the dance until the start of the next image – hence I have faded out the bar lines at the end of each section. The musical material was all derived from a simple musical phrase which goes through a series of transformations (in parallel to the metamorphic theme of the dance) before becoming a recognisable melodic line. Each transformation is suggested by the style of music but is open to further interpretation.

The score thus is open to re-enactment. The musician should try to reach the start of the next section of the music when the dancer is transitioning to the next image. Because I see working with dance as a dynamic process of collaboration, the ideal is for the musician to memorise the ideas of each section and use them appropriately to the performance, dance performers and performance space. Better to memorise a few bars and be attentive to the dancer than to attempt to fixedly play through all the notation with no empathy.

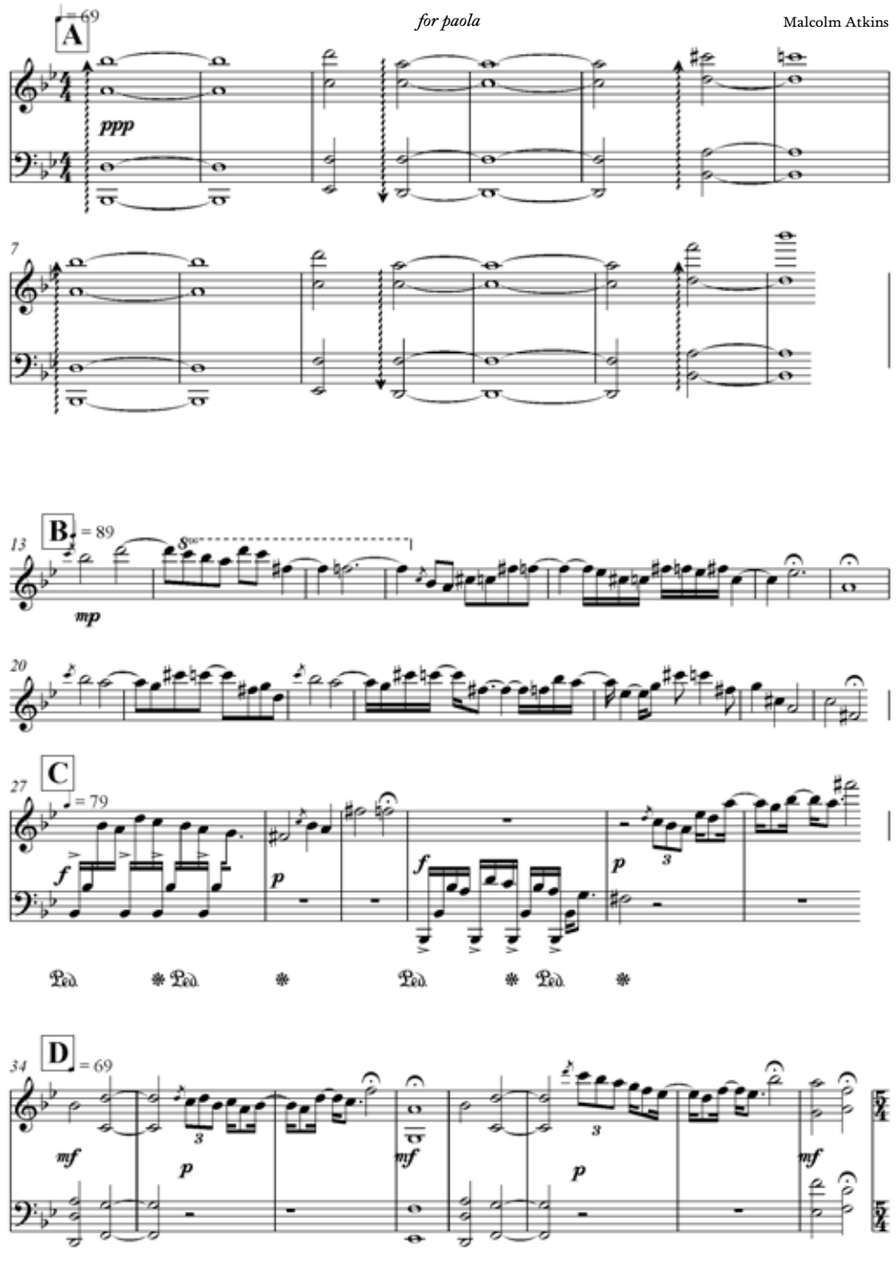
In this approach I seek to challenge the prescriptive and fixed nature of the traditional musical score and replace it with something that leaves space for the actions of the performer and the sounds he or she creates relating in the performance space to the dynamic presence of the dancer's body. The dancer will then respond to the sound and hopefully an empathetic feedback loop will be established. Thus the moving body is mutually linked to the unfolding sound. Clearly there are starting positions in the choreographic score and the musical score which constrain what can happen but the realisation is as flexible as all action. Scores for music or dance are just invitations to performers and audience to experience potential transient realities.

Dali Narcissus

A score to support a motional interpretation of a picture.
Each section is a starting point for interaction with the dancer

for paola

Malcolm Atkins



42 **E** ♩ = 79

f *dim.*

Ped. * Ped. * Ped. * Ped. *

46 rit.

p *mf*

Ped. * Ped. *

53 **F** ♩=70

mf *p* *mf*

58

p *f* *p*

64 **G** ♩=90

mf

73 **H** ♩=70

p

80

mf

87

p *mf* *f*

94

dim.

101 **I**

mf

110 **J** ♩=90 rit.

ppp

SOURDOUGH
Flour, Water, Salt
Agota Abran

Starter

Ingredients

100 gr. flour
100 gr. water

Mix and leave in a non-airtight container, in a relatively warm place, until it starts to be alive (bubble), to harvest (from flour and environment) the resident microbes. This process will take anytime between several days to a week.

The resident microbes:

Bacteria
(mostly lactic acid bacteria belonging to the genus Lactobacillus)

Yeast
(the most frequent species detected: Saccharomyces cerevisiae, Candida krusei, C. milleri, Pichia anomala, Pi. subpelliculosa, S. exiguus, Torulaspora holmi and C. humilis).

Feeding

The starter needs to be fed several times before it is stable enough to bake with.

Discard half of the starter (later you will bake with this instead of discarding it), and mix in 50 gr. flour and 50 gr. water.

I started to bake sourdough bread when my partner, suffering from IBS, decided to start a new diet, developed at the Australian Monash University for improving IBS symptoms. The diet, called low-FODMAP (Fermentable Oligo-Di-Monosaccharides and Polyols), aims to reduce the intake of certain (short-chain) carbohydrates, which are poorly absorbed by the small-intestine. Whilst not an impossible diet, it requires the close inspection of ingredients, favours cooking from scratch, and, hardest of all, prohibits wheat products. After searching for bread substitutes, and miserably failing at rice flour flat-breads, we discovered blog posts and comments from those who, also on a low-FODMAP diet, claimed that their bodies tolerated sourdough bread, as microorganisms living in the sourdough starter digest most of the sugars during the long proving time of the bread. Additionally, Monash University added sourdough spelt flour (lower in sugars than the average wheat variety) bread to its low-FODMAP, green-flagged foods.

Enjoying the idea of learning to bake bread – loaves that might one day remind me of the taste of my great-grandmother's handmade bread, baked in an outside clay fire oven – I started to experiment with online recipes and baking methods shown in videos posted on the internet. I also joined an online group of fellow sourdough bread makers, where it turned out that not just those with IBS, but those suffering from diabetes and even many with celiac disease find relief for their bodies through sourdough bread. For those for whom eating is a fine line between health and illness, pain and relief, their relationship with wheat is rather more a love-hate one, than a "love-affair with cereals" as Tsing (2012, p. 145) describes the long history of human and cereal entanglement: people cultivated cereal, cereal changed human bodies and societies.

Microorganisms, thus, become the "companion species" of human lives, and, in this case, guts. It is through these resident fungi and bacteria of sourdough starters that wheat becomes digestible to those with IBS, celiac disease, or diabetes. The microorganisms digest and transform the carbohydrates that make up a large percentage of wheat and transform the gluten structure of the bread. No wonder then, that there is an outrage at supermarkets advertising their bread as sourdough, riding on its rising popularity, yet not baking "real" sourdough, therefore not containing the much needed bacteria for people's bodies.

Bread[1]

Ingredients

100 gr. starter
300 gr. water
400 gr. white wheat flour
100 gr. whole grain flour
10 gr. salt

Mixing and autolyse

Mix starter, water, and flour. Cover with a damp cloth, leave to rest (30 mins – 2 hours). Called autolysis, through this process gluten development begins and simple sugars start to form as starch is broken down. While seemingly nothing is happening, the difference is tangible in that the dough becomes smoother and elastic2.

Folding and proving

Add the salt to the dough and mix by hand. Leave for 10 minutes for the salt to soak in. Start to lift, stretch and fold one side of the dough, then do a quarter turn of your bowl and stretch and fold again, a total of 4 times. Repeat 3 more times at 30-minute intervals, leaving the dough to rest for 15 minutes at the end. Next, put the dough on a clean, flat surface and shape it into a ball, forming an outer skin around it and tightening it. (As this is a process hard to describe in words, it is best learned by watching, for instance from the many videos bakers put on the internet.) Line a colander with a clean tea towel, dust it with flour and place the dough ball upside down into it. Dust the dough with flour, cover with a damp cloth, and place it in the fridge overnight (8-12 hours), or leave it at room temperature to prove until ready (see poking-test below).

Amongst my online sourdough community, the use of added yeast is regarded as 'cheating'. Discarding store bought (baker's) yeast altogether, and using only the sourdough starter, with its wild harvested yeast to leaven the bread, brioche or even croissants, is seen as an achievement. Thus, the complaint directed to a supermarket (that their sourdough bread is not real sourdough) accuses them of adding baker's yeast to the bread and thus avoiding the need to ferment the bread long enough for the lactobacilli bacteria to act upon the dough. In baking sourdough bread from a sourdough starter, it is this process that creates "the unique taste of a sourdough bread"[3]. For the proponents of 'real' sourdough, then, artificial sourdough raises not only problems of taste, but also the problem that the dough itself does not become digestible for those who have some degree of yeast or wheat intolerance.

Making sourdough bread does take time. The bread needs to rise, ferment and become digestible. As the anthropologist Abrahamsson puts it, food and bread are "intrinsically linked up with time", thus "cooking, eating, and digesting [...] produce temporalities, rhythms, and durations that punctuate life in di erent ways" (2014, p. 303). This time is crucial as it is a time spent on care; time for care that supermarkets might not consider relevant. Care for our bodies, or bodies of loved ones, care for guts, but also care for the bacteria and wild yeast that care for human bodies. The kitchen becomes a "site of care" (Yates-Doerr and Carney, 2015); care that needs time and adjustments of times, and, in this case, also needs space for the precariousness of, and attentiveness to, microbial life.

Attentiveness

Supermarkets tend to justify adding yeast to the bread-making process by claiming that they need to reduce variations in the final product, due to environmental changes. Sourdough life does depend a lot on weather, temperature, humidity, water, and flour. This justification, however, leads sourdough proponents to question the skills of those baking bread in supermarkets. They argue that most artisan bakers can reach a reasonable consistency in their final products without the need of baker's yeast. Sourdough bread making thus requires skill, learned through attentiveness to the other than human lifeworlds – lifeworlds made visible through flour and water. Learning also takes time. Time, in part, to experiment. Experimentation is key in knowing one's starter. The specific liveliness of

Bake

Pre-heat your oven to 220 C°, together with your baking tray. Put a tray filled with water on the bottom of your oven to hydrate the dough while baking. Take the dough out of the fridge, put it on the hot tray, score it with a sharp knife or blade and put it in the oven.

Alternatively, if you proved the dough in a room temperature environment, use the poking test to see if it is ready: poke the dough with your finger; it should spring back halfway. If it does not spring back at all, the dough is over-proved, if it springs all the way back, it needs more time as it is under-proved. (Note that this test only works with wheat flour.)

Leave the bread in the oven for 45 minutes on 220 C°, then turn the oven temperature down to 180 C° and leave it for another 10-15 minutes. Once taken out, leave the bread on a wire rack to cool. The bread is still cooking and developing its taste at this stage, so it is better to leave it to completely cool before cutting it.

There are many recipes, and techniques one can learn through making sourdough bread. It is best to experiment not just for the sake of the bread, but also to find the best times and rhythms to suit different lifestyles. Sourdough is flexible!

bacteria and wild yeast might elude those of us who are not working in laboratories with microscopes, but this life is knowable through flour and water, through attentiveness to their movement in the kitchen environment.

Bakers often name their starters, and many have histories of being passed down through generations, even transported across oceans. Starters migrate. Their microbial life might change, but their histories remain and grow. Starters need to be fed, but some waters, as well as bleached and additive-full flours, are seen to be harmful to the bacteria in the starter. Knowing one's starter through touch and smell is also necessary for baking good bread. Like Csordas' (1993) "somatic modes of attention", the baker has to pay attention *with* her body to the textures and smells, and *to* her body, to the feel, look, and smell of starter and dough; all in relation to the bodies of other bakers: what they say it should feel, look, and smell like. A putrid starter needs to be thrown out, but one that smells of vinegar, beer, or yoghurt is perfect. My starter smells of vanilla yoghurt in Scotland, but the same starter smelt like beer in Romania. Starters grow as microorganisms (both yeast and bacteria) feed on sugar and produce bubble pockets of carbon dioxide (fermentation), and they fall back, as the bubbles burst. Every feeding creates such growing cycles. The baker needs to realize through these cycles the time for feeding and baking. Also, where to put them? Is the kitchen cold enough not to have to bake twice a day? Is keeping the starter in the fridge a better option? Is the fridge warm enough for fermentation?

Bread making, too, relies on the attentiveness of the baker to the life that changes the texture of the flour and water. Knowing one's starter, flour, kitchen and oven is necessary, and results in many experiments. One game in sourdough bread making circles is called "bread by eye". Those more experienced can pull out beautiful loaves from the oven without the aid of scales, by relying on what anthropologist Cristina Grasseni (2009) might call their 'skilled eyes'. Alternatively, as a baker on our online group suggested, it is "more like, 'bread by feel'", as many bakers rely on their skilled hands to feel the texture of the bread through its different fermentation cycles. It is in this way that they manage to prevent under- or over-proving.

Therefore, skillfulness in sourdough bread making means attentiveness to the cycles of microbial life as

it exists inside flour and water, kitchens, and ovens. In an age of soaps and cleaning products trying to eliminate 99.9% of bacteria, these microscopic life forms are often seen as a risk to human health and cleanliness, particularly within the human body (Lupton, 2003). This fear of bacteria is paradoxically coupled with fears of antibiotic resistance. On the other hand, sourdough microorganisms enable us to imagine a different type of microbial life inside human bodies; ways of achieving health; and awareness of other than human lives.

References

Abrahamsson, S., 2014. Cooking, eating and digesting: Notes on the emergent normativities of food and speeds. Time Soc. 23, 287–308. doi:10.1177/0961463X14549511

Csordas, T.J., 1993. Somatic Modes of Attention. Cult. Anthropol. 8, 135–156.

Grasseni, C., 2009. Introduction, in: Skilled Vision: Between Apprenticeship and Standards. Berghahn Books, pp. 1–19.

Lupton, D., 2003. The Body in Medicine, in: Medicine as Culture: Illness, Disease and the Body in Western Societies. Sage Publications, London, Thousand Oaks, New Delhi, pp. 22–53.

Tsing, A.L., 2012. Unruly Edges: Mushrooms as Companion Species. Environ. Humanit. 1, 141–154.

Yates-Doerr, E., Carney, M.A., 2015. Demedicalizing Health: The Kitchen as a Site of Care. Med. Anthropol. 1–19. doi:10.1080/01459740.2015.1030402

Endnotes

1 Recipe after Vanessa Kimbell's a Basic Sourdough Recipe: http://www.sourdough.co.uk/a-basic-sourdough-recipe/

2 BakeryBits: Autolyse: What, Why, How? http://www.bakerybits.co.uk/resources/autolyse-what-why-how/

3 Real Bread Campaign: Supermarket 'sourdough'? http://www.sustainweb.org/realbread/supermarket_sourdough/

A temporary stone island at the confluence of the Ettrick and Yarrow rivers in the Tweed Catchment, Scotland.

STONE

Stone Lives

Kate Foster and Claire Pençak

Stone Lives was an exploration of a river-side habitat through improvisation, and emerged from a series of riverside meetings between environmental artist Kate Foster and dancers Merav Israel, Claire Pençak and Tim Rubidge. Our aim was to contribute to a Strategy for Land Use[1] by considering the many ways that places can be used, from a less anthropocentric perspective.

As a process-based approach, improvisation encourages thinking on your feet. It is about responding to and being in relationship to a person, a place, an object or an idea – at a given time, season and place.

Stone Lives was commissioned by the University of Aberdeen (Knowing From the Inside project). It was presented at the Association of Social Anthropologists' Decennial Conference, in Edinburgh, as part of a collaborative *Speculative Ground* Project with anthropologists Dr. Jen Clarke and Dr. Rachel Harkness in June 2014.

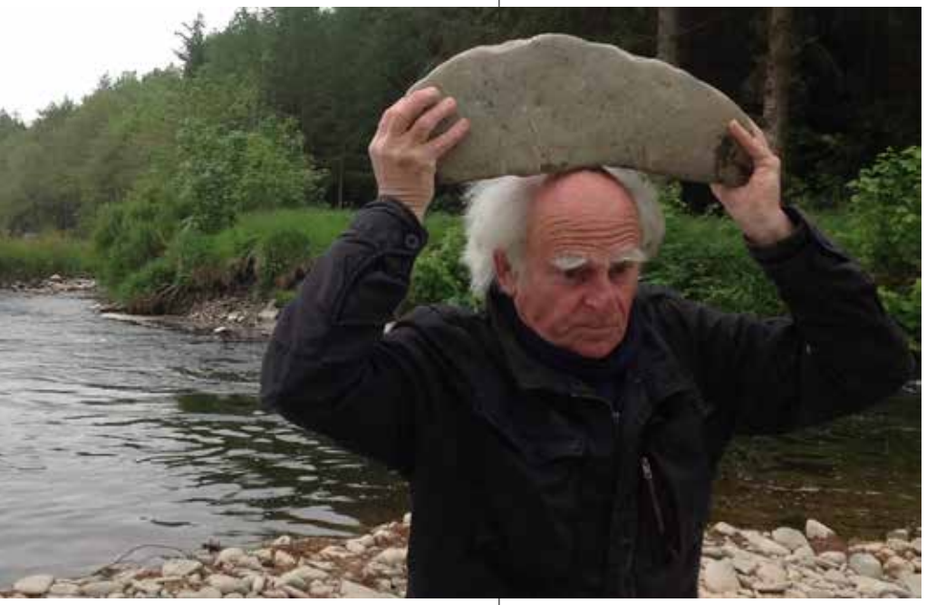
Whilst working at the confluence of the Yarrow and Ettrick Waters in the month of May, Merav Israel noticed husks of Stone Flies attached lightly to stones in the river-bed. These river stones are both shaped by the river, and shape life within it. Their flattened appearance could lead to questions of geological time and geographical process, while the presence of insects directed an enquiry into how river stones offer habitat.

The long evolutionary history of the Stone Fly contrasts with their individual short lives (short, at least, in human terms), which depend on clean river-water, niches between stony surfaces, and flight upstream for procreation. As such, they are an indicator species for the health of a river.

To move a river stone is more than an insect can do, though a river's water continually rearranges its rocky floor. The river stones we walked on had until now escaped human collection, though in this locality they can often be seen in steadings and towns.

1 A Scottish government Land Use Strategy initiative stemmed from the 2009 Climate Change Act (Scotland). Stone Lives was created at a time when agencies in the Scottish Borders along with Aberdeenshire had been selected to develop a Pilot Regional Strategy, to inform the revision of the national Land Use Strategy.

Stone Fly husk on river stone following insect emergence.



Improvisation by Tim Rubidge (dancer) at the river meeting.

The Stone Fly's emergence on a stone surface was followed by the dancers' experiments of wearing and walking with the stones. Thus the stones became known through the movement of a human body:

All these rocks are underneath our feet as we walk and move around on top of them – but carrying a rock on your head? Well the river can carry these rocks, and yet the river is so loose and flowing and fluid and here today and gone tomorrow, yet it can carry rocks with such lightness of touch. Whereas when we carry the rocks on our heads I didn't feel there was a lightness of touch ...
(Tim Rubidge, dancer)

Another dancer's actions led to reflection:

How do you know the shape of your skull?
(Merav Israel, dancer)

One answer was offered:

By placing a stone on it maybe?
(Claire Pençak, dancer)

At this time, we were preparing for exhibition in a modern university building with interior and exterior stony cladding. Here, stones were laid flat against dry vertical walls and had become a backdrop for student lives and academic conventions. Rendered static and submerged in concrete, they were now unable to offer habitat for aquatic insects.

The river stones we had collected became guides to explore the cobble-clad building. As Merav Israel sought enlivening possibilities through improvisation, we witnessed the exploration of a stairwell by a woman wearing a stone. Kate noted that it seemed that this river stone held a moment of shared dependence; geological and evolutionary timescales were counter-poised with insect and human biographies.

Stones set in interior wall of Appleton Tower, Edinburgh University.

Improvisation by Merav Israel (dancer) in Appleton Tower, Edinburgh University.

Acknowledgements

Philliphaugh Estate; the Tweed Commission (for permission to remove a few river stones); the University of Aberdeen *Speculative Ground* project; Merav Israel; Tim Rubidge.

These images were taken by the authors in 2014 as documentation of Improvisation and Stone Fly Adult Emergence.

References

Kate Foster and Claire Pençak. *Piloting Strategies: Arts and Land Use,* 2016. Available via www.ecoartscotland.net: https://ecoartscotland.net/2016/03/18/piloting-strategies-arts-and-land-use/

Kate Foster, Leah Gibbs and Claire Pençak. On 'passing-through places', 'so-far stories' and movement improvisation, 2014. Available on www.workingthetweed.co.uk:

https://workingthetweed.co.uk/2013/08/22/on-passing-through-places-so-far-stories-and-movement-improvisation/

Gibbs L 2014, *Arts-science collaboration, embodied research methods, and the politics of belonging*: 'SiteWorks' and the Shoalhaven River, Australia. Cultural Geographies 21(2) 206–226

Claire Pençak: Approaching Choreography: *A Proposal for Engagement* 2014

web version https://clairepencak.files.wordpress.com/2016/11/approaching-choreography-web-version.pdf

TARPAULIN
Denoting Opening and Closure
Ray Lucas

Namdaemun market in central Seoul is a longstanding general market located (in tune with urban design worldwide) near the restored city gate Sungnyemun, which dates from 1395 C.E.. The market is notable for the ways in which conventional city architecture is occupied for dynamic trading and exchange. Formally, the quarter consists of large blocks characterised by blank-facades: the buildings intentionally look inwards. The ground level of the market varies from one day to another, often reconfiguring itself completely over the course of the day. The ground floor of the buildings open out to the street, and have an allotted space of permitted spillage.

Materials are cheap, flexible, and easy to manage. Materials characterise the market's informal activities, with tarpaulin secured by fabric strapping and bungee cords. Rather than an architecture of concrete, steel, and glass, the market is comprised of parasols, castors, tarpaulin, cardboard, timber, buckets, plastic stools, and all manner of ready made and appropriated objects. The market is a prime example of appropriation–creative mis-uses of objects, where the qualities of something like a large multicoloured parasol are demonstrated: not only does this fragile structure protect from the sun, but it defines a territory below it, while the parasol also allows goods to be hung from it.

Tarpaulin refers to a range of water resistant fabrics, from treated canvas to polyethylene. Interestingly, the colour of the material is part of a code agreed amongst most manufacturers, indicating the weight of the material:

Blue – light-duty tarp – (approx. 0.15 mm thick)

Yellow/Orange – medium-duty tarp – (approx 2 mm thick)

Green – medium-duty tarp – (approx.0.25 mm thick)

Silver – heavy-duty tarp –(approx. 0.3mm thick)

Brown – super-heavy-duty (approx. 0.4mm thick)

The material has associations of impermanence and utility, and its military usages won't go unnoticed in South Korea, with its recent and ongoing history of conflict. As a tough sheet, it is multifunctional and often used to protect goods from the elements. In the market, various forms of sheet materials are used to define territory and to protect wares overnight. Mobile market carts are packed up overnight, and wrapped in tarpaulins secured with cords and heavy-duty fabric tapes. Modular carts are hooked into long trains and moved from one part of the market to another by quad bikes.

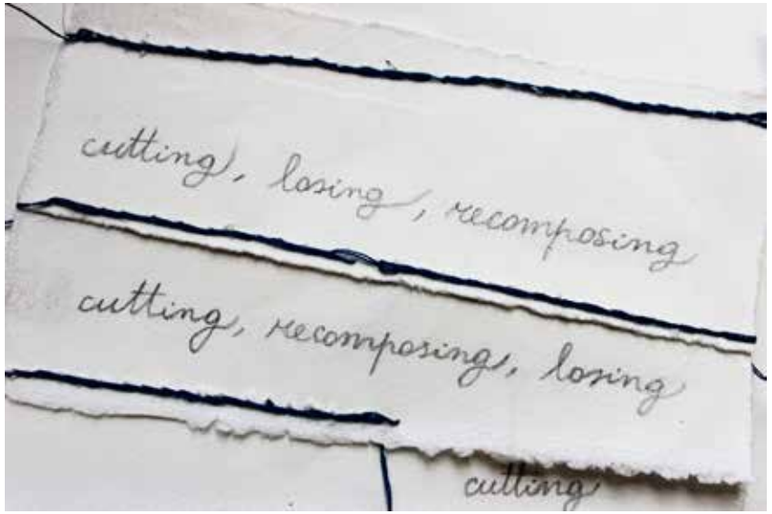
The tarpaulins are stored on top of market stall roofs, used to define parts of the ground plane as territory, or draped across large parasols in order to create a large covered restaurant area. Presented here are some examples from my *Graphic Anthropology of Namdaemun Market*: a series of architectural drawings focused on the form and geometry of these socially produced and iteratively designed pieces of architecture.

Blue tarpaulin covered market stall, Namdaemun Market, Seoul, Ray Lucas, 2014

Striped tarpaulin covered market stall, Namdaemun Market, Seoul, Ray Lucas, 2014

Yellow tarpaulin covered market stall with strapping securing plastic stool, Namdaemun Market, Seoul, Ray Lucas, 2014

Food stall with transparent and red tarpaulin covering, Namdaemun Market, Seoul, Ray Lucas, 2014



THREADS
On Cutting, Losing and Recomposing
By Valeria Lembo

Scene 1

Nottingham Trent University, Nottingham, UK.

January 2017. Here I am, at the closing discussion of the academic Symposium 'Missing Persons: Contemporary histories of textile knowledge, skills, technologies and materials' organised by Nottingham Trent University. It's a small and warm room inside the structure of the Nottingham Contemporary Art Gallery, nearby the train station.

I have just presented a paper on embroidery, memories and the performative dimension of skilled practice, reflecting on how my research with theatre, singing and personal memories is inspiring the way in which I think of crafts, artefacts and materials, especially threads. I feel joyful about participants' feedbacks and conversations, although tired for many days of travelling between Italy and the UK. It is late afternoon and my attention is floating, until I am suddenly captured by an observation of one of the organizers, Professor Tom Fisher. Referring to a personal conversation with anthropologist Tim Ingold, he makes a comparison between the knots in textile arts and in surgery. They are actually the same. I had never thought about this similarity.

Scene 2

William Guild Arts and Lectures Theatre, Aberdeen, Scotland, UK.

Part 1

February 2017. Less than one week to our theatre play: Mother Courage and her three children, by Bertolt Brecht. Outside of the lecture hall-theatre, we're in a room with sofas and tables where we can eat, sit, chat and relax. I joined the German Drama group at the University of Aberdeen just one month before. Now it's the end of February and the days are getting longer: we can

enjoy some daylight – at least until five in the afternoon. But it is dark outside now.

It's after rehearsals, and some of us stay with Claire, our costumes maker and anthropology student, to help her with the last details: mostly hooks and buttons. Claire stayed up several nights in order to finish the costumes on time. And she still has to write her assigned essays. Tea, coffee and biscuits, and hooks and buttons and a bundle of thread on the table. It's a subtle, creamy white, polyester thread. I have always used cotton, never a polyester thread, I think while picking up the spool.

Sewing hooks is quite boring and not too easy. I don't find it as relaxing as embroidering. In between intervals of attention and silence, we chat. I am marking where I should sew with the pen, on the jacket on which I am working: left side and right side, so that both sides can match and eventually the jacket can be firmly closed by the hook. I'm trying not to get it wrong, as I had done before, when I had to undo my sewing, cut the thread and sew it again.

Undoing takes even more time than doing, but it's part of the making, right? The invisible part of doing.

I noticed that Claire uses a silvery thimble. I always refused to use them, but perhaps she might be right. Perhaps I should have listened to my mother who has always reproached me for not being willing to use one.

"Claire, have you ever thought about becoming a surgeon?" Jonathan asks, suddenly.

My mind flashes back to the observation made by Tom Fisher about knots in surgery and textiles.

"Well, this is actually what I wanted to do when I was a kid," answers Claire.

"I have a friend who used to sew and eventually became a doctor," Jonathan keeps on. "She said to me: you know? I am actually doing the same thing that I was doing before. The only difference is that I am sewing bodies."

Jonathan has happily joined the sewing activity and he is now dealing with buttons. We are a 'gender neutral' drama group, we proudly say to each other. By taking the needle and the thread into his hands and starting to sew, memories of his grandmother come to him and he shares them with us:

"My grandmother used to sew. I remember her sewing, stitching cushions and smoking cigarettes. She was my bohemian grandmother living in Berlin."

Talking about grandmothers, I wonder whether Claire also had a grandmother who used to sew, knit, or embroider.

"Claire, when did you start to sew?" I ask.

"When I was twelve. Just putting pieces of fabric together," she answers.

"Did you have somebody at home sewing? Your mother, your grandmother?"

"No" answers Claire.

Part 2

On the other hand, I have been always surrounded by threads, doilies, spools, needles, buttons, sewing machines, hooks, embroidered towels, hand knitted garments. I even owned a toy sewing machine when I was a child.

My grandmother was a professional embroiderer, who learnt the arts and the discipline of the needle in an orphanage, taught by the nuns of the institution. My mother still sews and knits as a hobby, although hobby is not the right word. Her craft comes more from a sense that she can never allows herself the indulgence of being idle. She simply can't have nothing to do, *stare senza far niente*, in Italian.

While my mother and grandmother were busy with threads, I was invited to sew, knit and embroider, as a way to play, since I was very little. Sometimes I would just help them to unravel knots and make balls of thread out of a newly bought bundle. This was fun. I still remember the sensation and different rhythms of the thread looping around my arms, squarely bended, hands held up and kept parallel at distance, while my mother or grandmother would unravel the thread. Eventually I chose embroidery as my favourite textile art. I practiced until my early teenage years and then put it aside for more than a decade.

And now, what am I doing with these hooks? It just looks like a mess, *un pasticcio*. The stitches are irregular and the sewed parts have become too thick. Whilst I am sewing, the thread tangles up with the opposite side of the hook. It should not go there! Then I try to go back and untangle the thread, but it is not possible anymore. I leave it as it is, as everything is now too tight in order to be easily undone. Two generations of reproaches echoing within myself. My mother's voice resonating clear and loud through my ears, she is so close to me. But my deceased grandmother is far away, foggy and distant, I can just hear some mumbles and try to grasp some pitch. Her words have lost sound and I have lost her voice. I have lost the thread.

I should finish by tying the thread with a knot located a couple of centimetres away from the hook, as Claire carefully has explained. But I cheat. I just want to cut the thread.

"Always cut the thread with scissors, don't tear it off with the hands", said my mother. But scissors seem too far away. I stretch and pull the thread with my two hands. The stretched thread hurts my right hand, it almost cuts my little finger! I have never used a polyester thread before. It seems easier to break a rule than a polyester thread.

Scene 3

Sentiero degli Dei, Amalfi Coast, Italy.

November 2014. An exceptionally warm day. Out for an excursion on the Amalfi Coast, hiking the so called *Sentiero degli Dei*, the 'Paths of the Gods' on the Amalfi Coast, I am with a bunch of friends and strangers put together. We're praising the sunshine and rocks and sea and vineyards from above. A peasants' shelter sits in distance beneath the white calcareous hills.

Walking and talking, we pause and stop to rest and eat.

A goat is calling up on the hill. Her calls are long and loud, echoing against the rocky wall behind us and returning as boomerangs, striking our bones. The calls sound desperate: even though we are non-goats we understand this. Hiking uphill we reach the terrace where the goat is. A goat, two shepherds and a little kid, recently born, come into view. The kid is lying on the grass, trying to stand up.

The she-goat has just given birth, but something has gone wrong, a laceration probably. Viscera are pouring out of her. The shepherds are trying to push them back and keep them inside her, while keeping her still. Hands and blood all the way up their arms. The goat's calls become louder and louder, but pauses between one call and another become longer. Intervals of silence. Then I suddenly realize that there are other goats around us. There is actually a goat on every sharp peak of this rocky hill. There might be ten, or twenty, or I don't know. They stand on their peaks and call out, together with the she-goat. The mountain resounds with this lament.

"Does any of you have a thread and a needle?" asks one of the shepherds, eager to save the goat. By sewing and recomposing the laceration there might be a hope for the goat's survival.

But none of us did.

We leave the terrace and carry on with our walk, aware that the goat is going to die in the next hours. The kid is now standing up on its own legs.

This is the reason why, from that day hence, I have always carried a spool of thread and a needle. But if anyone asks, I prefer to tell that it is because, sometimes, I do embroidery.

Scene 4

University of Goldsmith, London, UK.

January 2017. A crowded University room for the lecture 'Talking Before the Dead›, by philosopher and social scientist Vinciane Despret. The lecture is on how to reframe our research questions in the Social Sciences about the relationship that the living have with the dead. Presenting her new work, Despret fiercely proposes that the question we should ask the dead is not: "do you really exist?", but rather "what are the needs that must be satisfied to contribute to your existence?" The question hits me, and shakes me. It makes me think of my engagement with embroidery, of my stubbornness in wanting to embroider (despite the slowness of the learning process – and the boredom sometimes) and of the reasons why I do not want to abandon it again.

If it is true that I have almost completely lost the sound of my grandmother's voice, I have not lost her gestures. How many times did she put the needle on the cloth and pull the thread towards the side? How many breaths did she take whilst threading loops through the air? I am sure they are more numerous than all the steps she ever took.

The more accurate my gestures become in embroidering, the more vivid her presence in the world becomes. She inhabits my gesture through the thread and, while I am here embroidering, together we shall tell silent stories of cuts, losses and recompositions.

Acknowledgements

This text has benefited especially from conversations with Jonathan Bogdain and Claire Delhumeau from the German Drama Group of the University of Aberdeen, as well as from the participation to the symposium 'Missing Persons: Contemporary histories of textile knowledge, skills, technologies and materials' led by Tom Fisher and Julie Botticello at Nottingham Trent University, and from the lecture 'Talking before the dead' by Vinciane Despret at Goldsmiths, University of London. I am also particularly grateful to Caroline Gatt for our discussions and her patient assistance in the editing process, and to Rachel Harkness for her precious feedbacks and edits, and for giving me the opportunity of being part of this collective project. A further acknowledgment goes to Viviana Malangone, who showed me the potential of Amalfi paper for stitching and embroidering.

TITANIUM

Mike Anusas

"You can't sink heat through wood and the metal sintering technology that's going to be used to make the lattice – uses titanium – which is, almost as *good as wood at transmitting heat* [laughs]."

The above quote is from an electrical engineer working on a project where titanium has been selected as the material of choice. Titanium has been selected for many of the usual reasons that titanium is selected on design projects. It is light. Almost unfathomably so. When one encounters a metal, one expects to feel weight. For titanium, one is drawn into a marvel of seeming weightlessness. It is exceptionally stiff, meaning it performs well in situations where forces require resistance and moderation. It is reparable and can therefore endure. It has captivating surface properties. Left raw, its surface has a dense visual density; and, at the same time, through alterations of light – it can sparkle. Its colours are tonal – a multitude of greys. Though it can also reveal warmth – hues of brown and green. It often seems strange that it is a metal. Its lightness, stiffness, ability to be reformed and aesthetic characteristics give it a sense of the something otherly; a material of the future, of advancement, of imagination.

All of the above properties of titanium were things I was familiar with prior to my conversations with the engineer above. As with many fellow designers and engineers, it is a material I have always felt drawn to. However, the conversation revealed that, as a metal, titanium is stranger still. It tends towards insulation, rather than conduction. This came as a surprise to me and I empathised with the engineer's feelings about how the material seemed to counter intuitions: "It's actually quite incredible; you'd think *oh, it's a metal, it'll be fine,* and it's not, it's not even close.". In this particular project, the resistance of titanium to conduct became a problem. An energy source radiated heat, which needed dissipating. Titanium did not help. For all its wonder, it created a puzzle. Most people understand that wood does not conduct. Here, the engineer and I puzzled over a metal, which was behaving like wood.

This technical conundrum was addressed through the introduction of a heat sink into the design; using aluminium as a material. Aluminium is light and stiff too, but it is at the other end of the conductive spectrum. It is highly conductive; it will take on the radiance of surrounds.

Materials are not always what they seem. When we approach them, we do so with a history of how we have come to know them. We draw them into usage for specific qualities and affordances. However, they sometimes reveal other qualities – perhaps counter to our learned intuitions – and we are left puzzled, forming a path forward through improvisation.

Titanium lattice part for baton of Queen's Baton Relay 'Glasgow 2014' XX Commonwealth Games, Photograph by Mike Anusas, 2013. Access to site kindly provided by 4c Design, Glasgow.

KFI Kitchen tracing paper exercise, Comrie Croft, Scotland, Ray Lucas, 2016

TRACING PAPER

Grounds for Invention

Ray Lucas

Writing at the turn of the 15th Century, the Florentine artist Cennino d'Andrea Cennini[1] described many practices and processes of Renaissance art. One such process was the production and uses of tracing paper:

> 'You should be aware that there is also a paper known as tracing paper which may be very useful to you. To copy a head, or a figure, or a half figure, as you may find it attractive, by the hand of the great masters, and to get the outlines right, from paper, panel, or wall, which you want to take right off, put this tracing paper over the figure or drawing, fastening it nicely at the four corners with a little red or green wax. Because of the transparency of the tracing paper, the figure or drawing underneath immediately shows through, in such shape and manner that you see it clearly. Then take either a pen cut quite fine or a fine brush of fine miniver; and you may proceed to pick out with ink the outlines and accents of the drawing underneath' and in general to touch in shadows as far as you can see to do it. And then, lifting off the paper, you may touch it up with any high lights and reliefs, as you please.' (1960:13)

Cennini accompanies this with a detailed account of how to make tracing paper (through various processes such as scraping or applying glues & oil) and parchment, but it is worth noting that his brief recipe for the production of tracing paper moves swiftly away from simply replicating the work of a master as accurately as possible towards an interpretative drawing which has some commentary or elaboration on the original work. Tracing paper allows another work to form the grounds for invention.

Any discussion of tracing paper is a discussion of copying itself. From Cennini, we have the practice of learning from the great masters, but the greatest use of tracing paper was seen in the practice of architecture, where the paper established itself as an essential part of the creative process. In architectural design processes, stacks of tracing paper would offer an archaeological site where iterations of a single design are visible. The architect could work on an idea and then, rather than abandon it and start again, work on an adaptation of it, modifying one part whilst others

1 Cennini, C. D'A. 1960 [c.1400]. The Craftsman's Handbook. D. V. Thompson, Jr. (Trans.). New York: Dover.

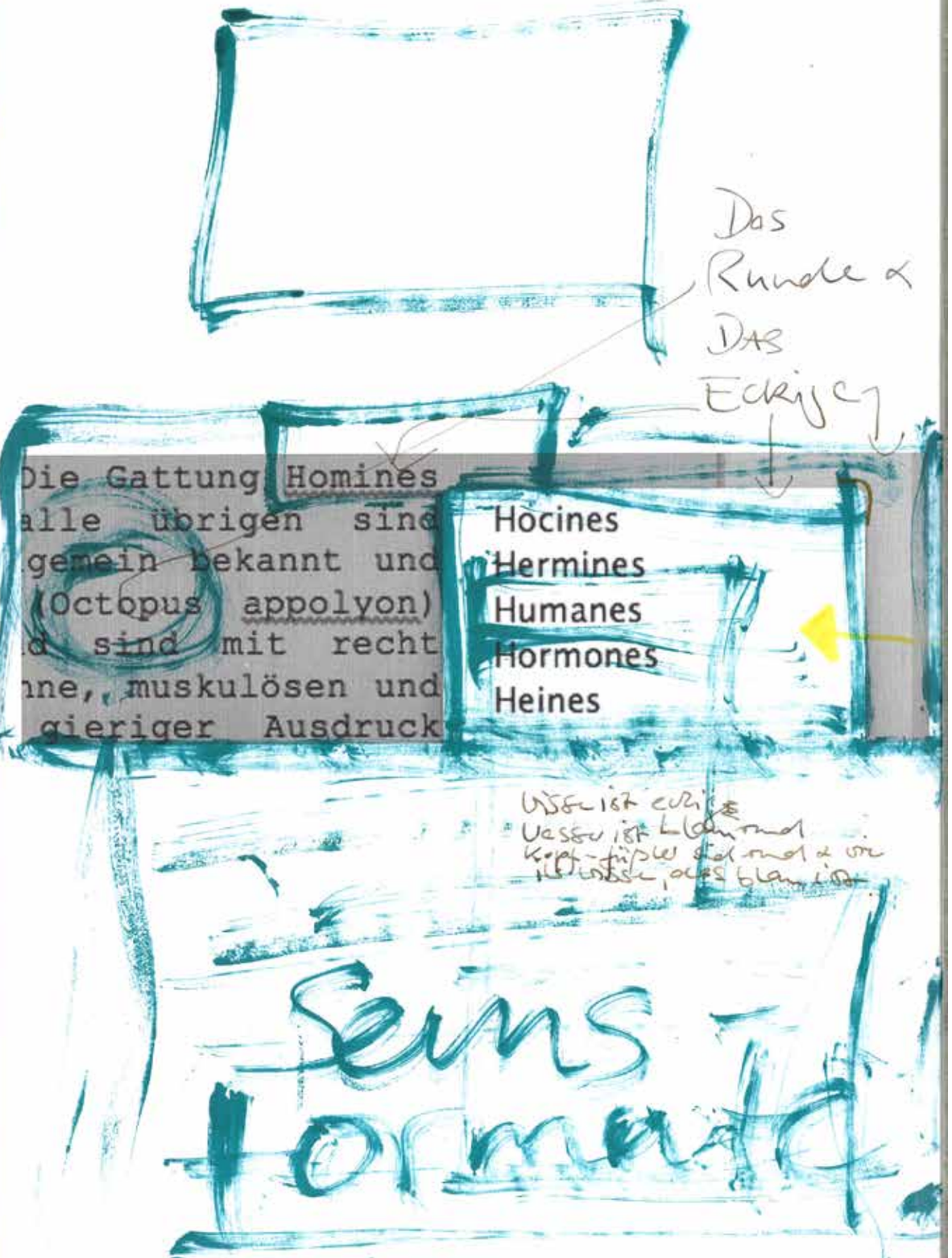
remain stable. The embedded logic of tracing paper is such that contemporary CAD packages replicate this in their layers of digital drawing.

Later tracing paper is manufactured by altering paper through the application of balsam, turpentine, and vegetable oil[2]. It is a chemical alteration of paper, now available in a range of finishes including the smooth, waxy tracing paper with translucency; thin *layout paper* with a smoother and more porous surface and limited transparency due in part to the thinness of the paper – but which allows a wider range of materials to be used; and drafting film which is more fully transparent, but resistant.

One might engage in an activity to examine the opportunities of tracing paper:

> Using a sheet of A3 tracing paper, select a drawing by somebody else and copy it. Then copy it one more time, using a different medium. Finally, copy one last time, elaborating upon and adding your own embellishments to the original.
>
> Take 15 minutes per drawing.
>
> The practice of working with someone else's work so intimately can be instructive, and often opens up an appreciation for that work as well as possibilities for reworking and adapting existing drawings. The qualities brought out by copying and tracing are of interest as the process of actually making a copy were are so substantially different from those which enabled the original drawing to be made. This is the most important distinction to think about: how the original was made as opposed to how your copy was produced.

2 Wheelwright, W. B.. 1918. How Paper is Made: a primer of information about the materials and processes of manufacturing paper for printing and writing. Chicago: United Typothetae of America. p.59



TRANSMATERIAL

Undine Stabrey

A screenshot.

As pattern for materials of knowledge it comes rectangular.

(This book, books in general: paper; schools, universities, mobiles ... stone, wood, metal, glass, clay, plastic, rare earth (metals), multi-materials ... they often come rectangular. Materials of knowledge are haptic. Less and less they smell.

Smartnesses. What a material "is" a screen-shot? What type of material, what kind of?)

Touch the screen: Scripture as an image of itself – Words. Lines. Boxes (pages). Rectangular. And here, unknown for this algorithm: 'Homines' (We, human beings – in its Latin plural [text unimportant]). Reaction: Proposals – lines, words, rectangularized, boxed again. And the material? Material is trans-ed. Why?

First/Pars pro toto: Traces of the Paper-Age. The paper is virtually inside while you touch plastic or glass or metal. Repetition. The computer mimics its whiteness and rectangularity. White pages – desk. The era of felt immateriality, so to say: touch plastic and see paper. Transmaterial. Wipe on glass and feel information. Material as simulation of itself: Evocation of contemporary feelings of the immaterial.

Second/Flatness: The Interface of Being is transmaterial. Onlife: beings, objects, knowledge, sounds, everything except smell (still): the world is inside, rectangular boxed: as image material is transed: Reality prefers its simulation *in* a (rectangular) smart object.

Third/Temporalization: Movement. Migration. Synchronisation: materialized mobility. The material is a medium not a reason. Heavy Metal and Stone Age. The industrialized digitalisation of being in the world: No leading material but more materialized mobility. Transmaterial. More smart objects than human animals. Material is self-active. Auto-motion new. Material is being-ed. New senses. Sensors: No touch: hand – material.

Sedentariness. Store=Material. Writing. *In situ*. Flatness: a way of seeing (knowledge as an image as a model of actual perception). Knowledge is material and angular.

Nonhuman animals often shape their material round. Perhaps: The hexagon of bees is between round (Das Runde) and angular (Das Eckige) . Dancing knowledge.

Water is round. The knowledge of the octopus: materialized by the body – ink to the outside. Blue clouds. Human animals materialize knowledge often angular. Other animals do not store up mental activities externally. The difference: the relation between the temporalization of durability by materials – manufacted, beak-facted, robofacted et cetera. The attitude to life is reflected in the material.

Transmaterial: The digitalized material of immateriality tends to go inside humans: transhuman. Knowledge internalized, material minimized. DNA=new store for information. ... ... Once upon a time one said form follows function. ... ...

TURF

Tanja Romankiewicz[1]

The Past: redeposited

Knap of Howar, Neolithic

A windswept island, no more trees, only stone and sand, grass and sea: Papa Westray, Orkney, 3400 BC. But the grass is green, to graze the first cattle, the first sheep (Ritchie 1983, 56–7). The grass grows green, roots grow dense, around the sand, around the ginger-brown stone, worked into a sharp, narrow blade, then lost by the first farmer (ibid., 84–5).

Only stone and sand to build a farmhouse? The grass grows green, on walls held by stones on either side (Loveday 2006, 89). The first sheep graze on the wall-heads of the first home (Fig. 1; Ritchie 1983, 56).

Dark inside, but warm. Warm burns the grass and its roots and soils. Light and heat from the turf, absorbed by the turf of the walls. What could be more ubiquitous in this life, more sustaining? The sods that feed the beasts, feed the fire, keep in the fire's heat, keep up the roof; absorb sound, water and urine, dung and dirt, steam and spill.

Deer's Den, Bronze Age

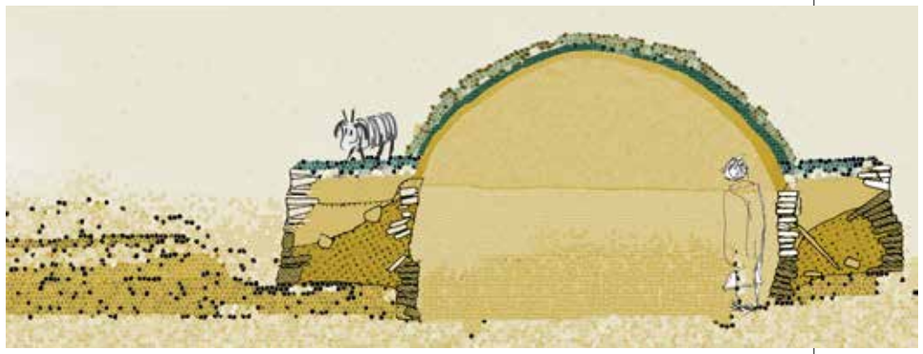
A field of barley, golden in the autumn sun. Now only a memory, as the stone plough cuts through the stubble, as lumps of turf get ploughed in and under. Another wooden cart arrives, more turf, dripping with dung, urine, soot, ash, nutrients. Turfs, enriched from keeping the cattle inside over the winter, bedding them on the same grass they feasted on in the autumn sun. Ploughing in the rich resource: from this will grow the golden barley (Holden 2004), as golden as the bronze blade that will eventually cut it. It is 1,400 BC, on a gentle slope above the floodplain of the Don: Deer's Den, Aberdeenshire.

The plough jumps. Up! Up, over the earthen bank, decayed roots, dark soil, over all that remains from the once tall wall, built of grass, and roots and soil (Alexander 2000, 68–9). In sinks the plough beyond the wall. Into the soft deposits that once formed the house floor, into the hearth in the centre of the roundhouse, pushing material into the gully on its periphery where the cattle kept warm over the winter (Fig. 2). In sinks the plough, into the traces of life that once filled this roundhouse: pots, stone tools, trace elements, nutrients. This house is not old and exhausted but a treasured resource. Enriched from the life it housed, from stories and memories, residues from children's laughter, and children's nappies, from brother and father, and mother and sister, from dogs and mice, from sheep and cattle. Rich now, this vessel that received all this life, rich to sustain life in a different form, is transformed, into the garden plot, the rich infield for the most demanding crop. The house, once home, now ploughed, to house the seeds of new life, for a new life. As round as the house is, the cycle turns. A cycle of building, dwelling, enriching, abandoning, ploughing, and growing, reaping, then building a new roundhouse on this spot to start again (Fig. 3).

Birnie, Iron Age

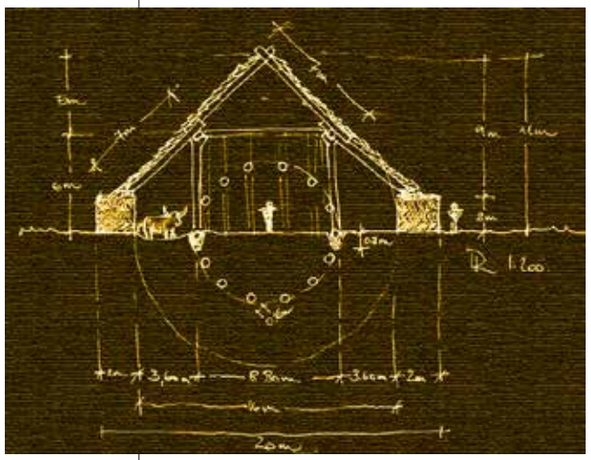
A field of barley, golden in the autumn sun. Even more golden as it reflects the golden flames. In the blink of an eye, the collapse. The cracking noise of timbers aching and failing, the thumping of the turf roof collapsing onto the flames. They die to amber, golden, in the autumn sun. The turf walls collapse on top, and the house, once with in all its height and beauty, is now a heap of steaming soil, reduced to a smoulder, a charcoal kiln (Fig. 4). Turf cooks: red and pink, orange and brown. It buries the timber, black as night, dark as pitch. Life comes to an end, but so does decay. Cooked and charred, the house will now be there, perhaps forever. It is the turf that shuts out oxygen, burying flames, and memories and stories, all. Still rich, still enriched, still

1 (ORCID 0000-0002-6401-5178)



Section drawing through the reconstructed Early Neolithic house with its turf wall core at Knap of Howar, Orkney, Scotland, T. Romankiewicz, after Ritchie 1983, Fig 4. 2017

Schematic reconstruction drawing through a later prehistoric roundhouse with turf wall and animals stalled inside, northeast Scotland, T. Romankiewicz, 2017



Circular economy, Bronze-Age-style: building a circular dwelling house, which deforms under use and turns into a byre, enriching its walls and floors with nutrients, then using this site as a garden plot, before building a new house on the same spot to start the cycle all over again, T. Romankiewicz, 2017

A turf house – decaying, burnt, T. Romankiewicz, 2009/17

visible, still detectable: at Birnie, Moray.[2]

No. 39 Arnol, 1836

A sheep grazing on the wall-head after the long, dark winter inside the black house (Fig. 5). The turf walls had kept them warm, but muffled everything, light, sound, wind. So proud, the walls, held by stones on either side; new grass just shooting up on its head, so delicious! Bring down that sheep, bring down that wall, and onto the wooden cart (Holden, 2004: 45). Here arrives another cart: more turf, dripping with dung, urine, soot, ash, nutrients. Turf, enriched from keeping the beasts inside over the winter, bedding them on the same grass they feasted on in the autumn sun. Now ploughing-in the rich resource, from which will grow the golden barley: 180 years ago, on the machair, Arnol, Isle of Lewis.

PRESENT: rediscovered

Birnie, 2010

The golden autumn sun reflects on the yellow machine: the toothless ditching bucket eats into the turf. Underneath, the golden sand, and black as night, dark as pitch, the charred timbers; and the colourful cooked turf. The trowel strokes across the soft, silty, silky soil (Fig. 6). Patterns appear. A chequer board of flattened turf wall. Digging deeper, sampling the soil, wrapping the charcoal, studying and dissecting – to tease out memories and stories – then keeping it, in the museum store, perhaps forever, to preserve what is left of the turf roundhouse.[3]

Deer's Den, 1996

A field of barley, golden in the autumn sun. Now only a memory, as the toothless ditching bucket cuts away the topsoil. Underneath, the golden sand, and brown and grey, the blobs of postholes, the curvilinear streak that demarcates the gully on the periphery and the outer edge of the roundhouse. No hint of the outer wall surviving? The trowel strokes across the soft, silty, silky soil. Finds appear. What looks like a half-digested Weetabix becomes a piece of ceramic crucible that once held molten bronze. More finds. Chipped, grey stones, worked by a Neolithic farmer. Then questions. But how? Bronze Age bronze and Neolithic flint? A round house built in the Neolithic when everybody else lived in rectangular ones? Then it still standing after more than thousand years in order to house a Bronze Age metal worker? The archaeologist is puzzled.

Yet the turf holds the answers, memories and stories. Roots had grown dense, around the sand, around the grey, worked stone, lost long before the Bronze Age smith arrived (Alexander 2000, 22). Yet the turf remembers. It retains. Cut from an area where flint was knapped, it carries these stories into the new Bronze Age house (Fig. 7), to confuse the modern archaeologist, years later, with the layers of life it has absorbed.

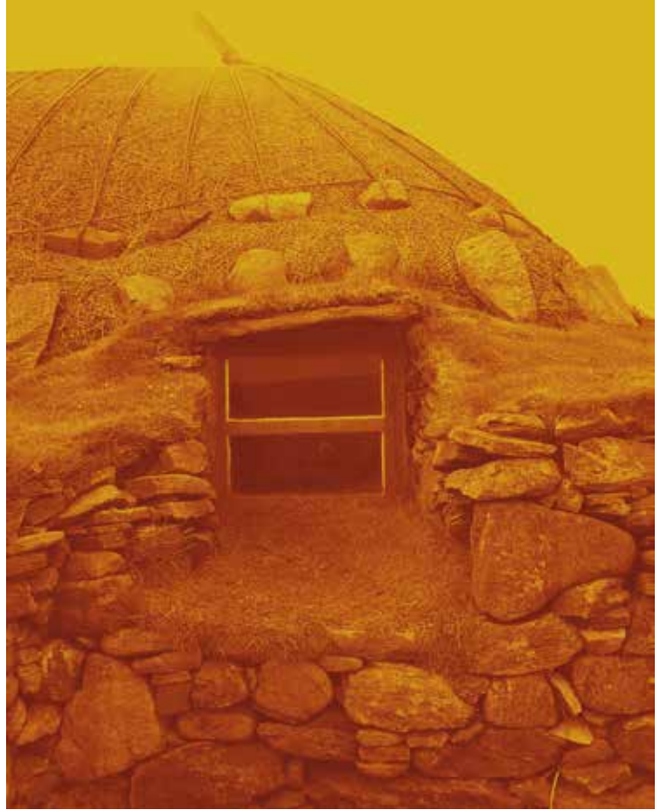
Yet the turf is also a chameleon. Unburnt at Deer's Den, it remains the same colour as the soil which came to overlay the house, which filled ditches and hollows, which was ploughed at the time and ploughed ever since. The turf chameleon disappears into the soil. Only the non-decaying memories, stones, charcoal, soil colour, ever-and-ever smaller petrified plant remains, allow the archaeologist to recognise the turf's traces, its memories, its stories.

Crew annex, University of Edinburgh, 2016

Golden in the summer's sun? More a pale, unhealthy yellow. The fridge is cold and dark. Suffocating. Wrapped in foil, there is no air to breath, grow or decay (Fig. 8). The spatula scratches, scales weigh, ceramic dishes heat up. Hot, too hot. Sweating,

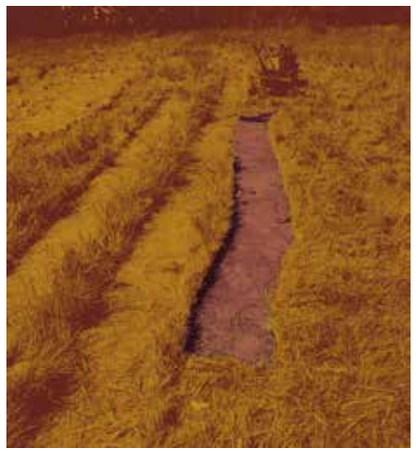
2 Excavations at Birnie by F Hunter, National Museum Scotland: http://www.nms.ac.uk/collections-research/collections-departments/scottish-history-and-archaeology/dr-fraser-hunter/ Research repository: http://repository.nms.ac.uk/cgi/search/simple?screen=Search

3 Interactive roundhouse interpretation http://www.nms.ac.uk/explore/games/build-a-roundhouse/.



The turf wall head at Arnol, Isle of Lewis, Scotland, T Romankiewicz, 2005

Digging turfs for a Clayfest, Errol, Perthshire, Scotland, T Romankiewicz, 2015



The turf from the Birnie roundhouse under excavation, F Hunter, 2009

Wrapped turfs waiting for analysis, T. Romankiewicz, 2016

steaming, the fresh turf samples dry off all their moisture. Weighed again, and heated again. Heated? Burnt! To ash, to get rid of all organic compounds. The laboratory seeks to halt the turf's decay. It extracts the turf's life, moisture, root content, in order to understand the turf itself, its strength and weaknesses, its architectural merits.

FUTURE: reused

???

The toothed ditching bucket brings down the walls, eats into the concrete slab. The bitumen roof collapses. This house is old and exhausted, unlived in, unloved. Children's laughter echoed hollow from these walls that could not hold life's stories. Nappies lie, not decaying, in the landfill. Poor now, the empty house shell cannot sustain life in any other form. Its lumps will meet the nappies in the landfill, where they will be, perhaps forever. Life happens elsewhere now.

Questions. What if our houses ended up not old and exhausted, but enriched with the life they once housed, the stories and memories? Residues from children's laughter, and children's nappies, from brother and father, and mother and sister, from dogs and mice. Rich then, they'd be vessels to receive all this life. Rich to sustain life in a different form, transformed. Into the compost heap, to grow courgettes or cavolo nero. The house, once home, now spaded in and under, to house the plan(t)s of new life, for a new life. As turfed as the walls of prehistory, it, too, could join the cycle of building, dwelling, enriching, abandoning, and growing, reaping, reusing, rebuilding again (Fig 9).

Turf – its grass, its roots – can still grow around sand, into a wall, a roof. It can enrich with nutrients and grow into a new life. Sustainable, renewable, it is full of stories and memories (Romankiewicz, 2016). Turf: for the future architects to build with, and the future archaeologists to disentangle.

References

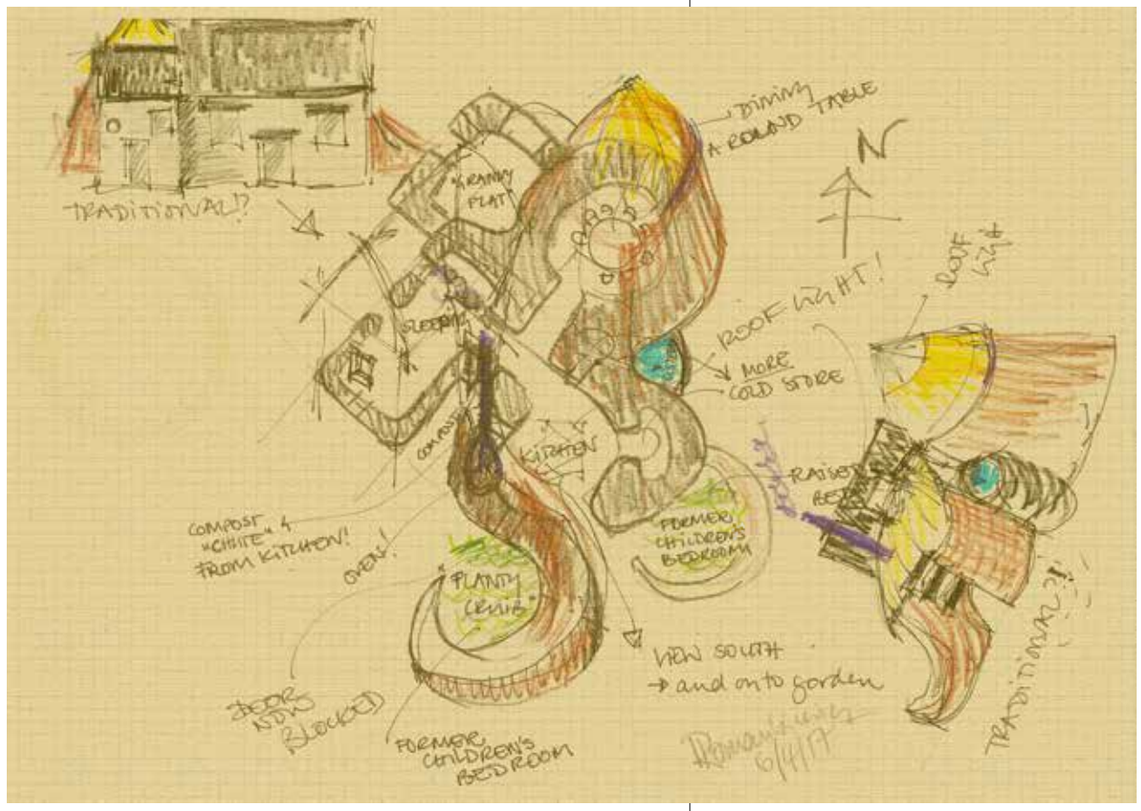
Alexander, D. 2000: Excavation of Neolithic pits, later prehistoric structures and a Roman temporary camp along the line of the A9 Kintore and Blackburn Bypass, Aberdeenshire. *Proceedings of the Society of Antiquaries of Scotland* 130, 11–75.

Holden, T. 2004: *The blackhouses of Arnol.* Edinburgh: Research Report, Historic Scotland.

Loveday, R. 2006: Where Have all the Neolithic Houses Gone? Turf – an invisible component. *Scottish Archaeological Journal 28 part 2*, 81–104.

Ritchie, A. 1983: Excavation of a Neolithic farmstead at Knap of Howar, Papa Westray, Orkney. *Proceedings of the Society of Antiquaries of Scotland* 113, 40–121.

Romankiewicz, T. 2016b: Building (Ancient) Lives: new perspectives on the past for a sustainable future. *The European Archaeologist 48*, 25–30.



Thinking on paper, T. Romankiewicz, 2017

WATERCOLOUR

Living with Mistakes

Ray Lucas

Watercolour is an unforgiving medium to paint in, and sits between drawing and painting in many ways. The paintings shown here are, crucially, part of a series. When making the paintings, it is difficult to see them as individual pieces, so much as a stream of images which reinforce and converse with one another. These paintings are studies of referees from a day spent watching Sumo in Ryogoku, Tokyo. The formality of the costumes made for an attractive study, and the procession of referees over the course of the day, increasing in seniority with the elaborateness of their dress.

The paintings are small (18 by 12.5 cm), a practice I started when I could not commit to larger pieces such as acrylic on canvas: the informality and discreetness of a watercolour is attractive. The paper, made by Fabriano (Italy) in this case, is produced as a block, glued on all four sides. This prevents the paper from buckling when a lot of water is used. The paintings are drawn from photographs, a mechanical pencil with moderately soft 2B lead. The folds of the kimonos are stiff and angular. This lends itself well to watercolour, with the main body colour applied first, the darker tone applied separately from the paler ones. Darker and paler tones are achieved by modifying the amount of water used with the paint. Using too little water makes the paint unworkable, too stiff and glossy to give decent coverage. Where the kimono and accessories are metallic, I have used metallic paints which catch the light when viewed. These often show as quite dark when scanned. The spot colours of braids and tassels are added later, and lines picked up with a strongly pigmented blue-grey. This covers other colours well, without bleeding between different colours occurring. This brush work produces lines which follow my gestures, broader lines when slow, deliberate movements are made, tapering to fine points with a swift flick.

I use a size 3 round watercolour brush. Whilst I have a range of sizes and shapes, most of the painting is made using this one all-rounder brush which allows small washes to colour an area of paper, as well as a fine point for detail work. I often use my left hand (being right handed) to blot the brush when it is overloaded with paint. The brush itself has natural hair, Kolinsky sable, a birch handle and nickel ferrule. Caring for brushes is an important part of the process, so vigorous cleaning in between colours is essential.

The paints themselves come from a range of places. I pick up materials when I travel, and use Windsor & Newton (UK), Sennelier (France), Shin Han (South Korea), Schmincke (Germany), Kaoirodori (Japan), Holbein (Japan), and Old Holland (Nethenlands) amongst others. Whilst colours and pigments can be common across ranges of watercolour, conforming to an accepted norm or set of standard colours, there are some ranges which have specific colours. Kaoirodori are particularly helpful here, with colours including *Kuro Cha* (black tea) and varieties of *Ume* (plum) which match the dyes used in the referees outfits.

Over the course of the series of paintings, I have developed a preference for hot pressed, satin finished paper; this is a very smooth paper which allows fine detail work. Cold pressed paper has a grain to it which introduces a chance element to the painting. This is ideal for landscape work where irregular forms can benefit from a looser style and less deliberate control. Mistakes are always made, colours misbehave and merge into one another if I've been too impatient and apply a fresh colour before the adjacent one has fully dried; a hesitancy in a movement or an unexpected spot of resistance between paper and brush, or a misjudged colour choice, are all impossible to repair. In many ways, watercolour is about living with mistakes, or unintended marks, incorporating them into the work rather than erasing them.

Watercolours of Sumo Judges, Ray Lucas, 2015.

WILLOWFLEX
Mike Anusas

The beauty of an organic material – such as wood – is its potential to reabsorb into ecologies of life; if wood is left in the ground, it will complicity decompose with the organisms and mediums it encounters. The beauty of plastic is its plasticity; through thermal transformation it can be shaped into an abundance of geometries, from micro to macro scales. To design a material which incorporates both of these qualities, brings biological principles to creating and making.

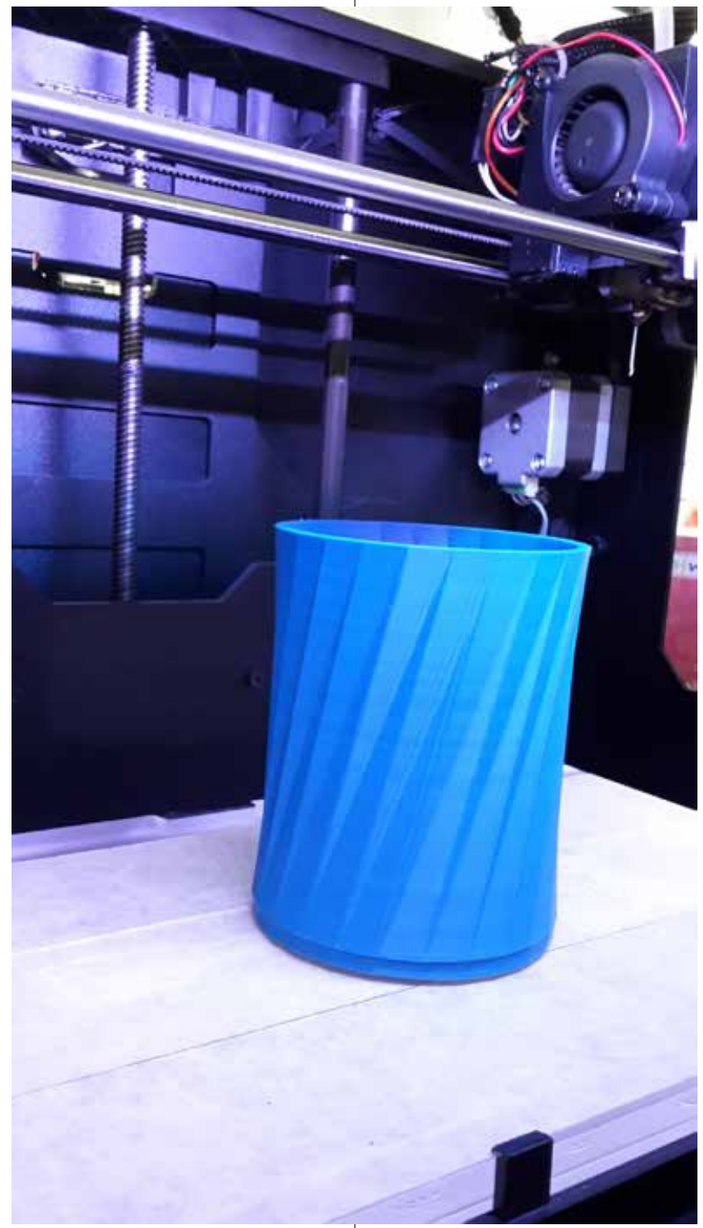
Bio-material developers - Brian Crotty and Thorsten Perl – have created such a material. Termed 'WillowFlex', it offers a performative potential which weaves through the biological congruence of wood, the sinuosity of the Willow tree and the malleability of plastic. WillowFlex has the plastic properties of flexibility, formability, resistance to water ingress and thermal variation, whilst being able to organically break down when placed in conditions of biological decomposition.

Furthermore, in being produced in the form of a 3D printer filament, it disrupts not only boundaries between the organic and synthetic, but also conventional notions of manufacture. Combining a compostable polymer like WillowFlex with the capacities of 3D printing means that making and waste processing can be drawn into more localised sites and design can focus more on specific, proximal needs. As a 3D printable filament, it can be deposited in adhering layers, formed according to the manifold possibilities of digital modelling. Material things could then be printed on-demand, according to local needs and further developed through communities of makers.

This approach to material formulation stands in marked contrast – and even in resistance to – conventional economies of mass production where design, making and waste processing are zoned through global logistics and consequently unresponsive to local needs and material conditions.

What is outlined here, are the social, environmental and economic affordances that can emerge through new materials and fabrication processes. Certainly, there are uncertainties around biopolymers and their processes of decomposition require ongoing investigation. However, this trajectory of enquiry points towards the possibility for materials to renew how we design, make and consider waste and work towards a practice of making that is more responsive to local conditions and variations of life.

WillowFlex: the sinuosity of the Willow tree and the malleability of plastic, BioInspiration



The WillowFlex filament can be formed in adhering layers through 3D printing, BioInspiration

WOOD
Joseph Calleja

Wood. Is it living, or dead? Is it seeping, or sanded and sealed? Is it protected or rotting away? I cannot recall wood ever stopping me in my tracks and demanding my attention. It is more a tale of gradual discovery. My earliest recollections relate to tasks that had to be carried out regularly: whether it was the living wood of the grape vine that had to be gently lifted above the ground as the earth around it was ploughed; or the wood making up our doors and window frames: dead, but still needing protection.

I came to associate this material with my father. He became a carpenter, like his father-in-law. His skill in working with wood matched the affinity he had for his machines, his boat and his fields. I never shared his enthusiasm for the methods he used, mainly because, when I was assisting him, things had to be done in a rigid manner with no room for self-expression, avoiding mistakes and wastage at all turns. This attitude was perhaps also a throwback to my childhood, when I found it difficult being around my father. He was very much an authoritarian figure and I was brought up in a culture and time where the parent-child bond was not valued.

Recently, when I recalled all the wood work my father has accomplished, together with his way of reasoning and being, I started to consider the possibility that he might be an artist. Having found a strong element I could relate to – this notion changed my whole impression and my relationship with him. Following my father's attempted teachings, all the characteristics of wood I was introduced to linger on and I cannot disassociate this material from him: its source; its sting; its smell; its look; its malleability; its finish; its preservation. Through this I have developed an affinity with it in my art. This choice sprung more from a need for familiarity with the material I was to handle, at a time when I needed the reassurance provided in that relationship. The process of getting from trunk to finished article is elaborate, yet we never met the wood at its source – the tree. Our first encounter would be choosing a tied bundle in a warehouse after its importation to Malta. My father would know from which tree a particular wood was sourced as well as the different countries in which that species of tree grew. He was familiar with the effect of the provenance on the quality of wood, especially in terms of its desired dehydration.

Even after being uprooted and cut into planks, wood still seems to be a living thing: the way it is stored, the way it bends as it dries, the way it oozes resin, the way its smell lingers, the way its colour changes, the way it bears the marks of time with character. It is a material that hovers between a perpetual state of life and death. This is also a quality which coincides with my concepts and interests. Having originally trained in theology and philosophy, one can trace a metaphysical inclination. I became fascinated by the repercussions of human actions, and, as a material, I find wood to make an intrinsic analogy.

In designing and constructing wooden furniture, my father has financially provided for my family and myself. As an art student, I first used wood in Tixref and Synderesis. Here, wood has conjured a very basic shift that made me reconsider art and my contribution to it by making 'non-functioning' objects towards non-financial ends, unlike those my father had constructed. Wood has helped me explore different aspects within artefacts that comprise design, aesthetics, function, concept, and identity. In Ghidli ma' min, a commissioned work about self-portraiture, the material provided an innate statement for the visuals that depicted this father-son relationship. In the creative process, all the construction was carried out by my father, while I executed the visuals – a manner of working which correlates to our distinct relationship.

Tixref, Joseph Calleja, 2010

Wood as a subject vs. wood as an object: this notion is implicit in most of my works that make use of this material. This becomes particularly clear in 05003034, where I deal with wood as a found object and carry out an intervention that explores this dual element. Originally a wooden door, slightly damaged during WWII in Bormla (Malta), brought home and repaired by my grandfather, appropriated into an enclosure for farm animals by my father, it was re-presented by myself as art for the first time in Auberge de Castille, Valletta (July 2010) for an awards ceremony. My father was quite apprehensive at the idea of me taking a woodworm-infested (but treated) barn doorway into the office of the Prime Minister. I suppose I did not see it that way. For me, it was more about the sun-bleached grain patterns of the door, its history, its transformation, and its re-presentation.

The work 77 is a film that treats the footage as a collage that documents and explores as much as it hides with a resulting obscure narrative. It was shot in a derelict house and wood workshop at 77 Mgarr Road Qala, Gozo. This was my grandfather's wood workshop, in which my father carried on working while accumulating his 'stuff'. As I was documenting this site, prior to decluttering and rendering it minimal, I realised that every speck of saw-dust had shrouded single objects into an accumulative oneness that itself anchors and blurs the past with the present. It felt as if wood was breathing in such a way as to affect the timbre of its surroundings. For me, it feels like this very breath has preserved answers and links to my past which gave me my current identity. It also triggered my latest proposal g -r-q, as inspired by the walnut crates that my father used for fermenting his wine. The proposal suggests collaborating with my father in making one more batch of wine using wooden crates. One of the few tasks that I enjoyed as a child was spending a day swimming at sea, keeping an eye on these crates that were immersed in sea water to make their wood expand; otherwise wine would simply seep through the crevices. This would be followed by thorough cleaning of the internal parts, rinsing with fresh water and burning a line of sulphur to kill any lingering bacteria. The juice of the grape then would be left to ferment in these wooden crates that would have been recycled from cherry-brandy or whisky crates. After fermentation and bottling of the wine, I aim to use the wood from these crates to sculpt a structure based on the shape of the grape-vine root. This would be presented alongside the bottled wine and proper documentation of the process.

I cannot explain my attraction towards this material simply by the fact that it is made out of wood. I tend more towards the idea of the wood workshop – a sanctuary of scents and sounds. Here, wooden planks contain past memories and future ideas. Here, the senses of smell and touch are as potent as the sense of sight. It is the realm that formed the bases of employing an experimental approach, dialogue, respect and tension with all other media I tackle.

WOOD
About Life

Christine Moderbacher
with Cise Ibrahima

A loud clash. A piece of wood on the concrete floor. Then, for a second, silence; only the ticking of the metal clock on the grey walls... until Tarek starts shouting:[1] 'Stop this camera already, it blinds me'! Followed by a stream of swearwords mostly about me, the anthropologist, disturbing his workflow with my focus on planks being cut meticulously. 'I do not care about the wood here', he says. 'This is about my life!'

A Few Minutes of Fieldwork

A few minutes earlier I am trying to get my head around calculating the measurements of a pin-wood door that we, ten apprentices in a small carpentry studio in Brussels, are working on. It is early morning. My fingertips are slightly stiff and somewhat numb from the fresh air that slowly creeps through the studio. 'Radio Nostalgie', one of Belgiums' most popular radio stations, is playing in the background. Some men are singing along with Elton John and Jacques Brel; some others scuttle around quickly to finish the last piece of work in time. The sunlight reaches the studio through roof windows and creates a beautiful scene of sawdust flying in the air, chisels scarfing the surface of the wood, metal tools glimmering while moving to the rhythm of the music.

Observing the somehow picturesque scene, I take my camera and start filming. Some men instantly perform. They change their posture, quickly put security glasses and noise-protection on and ask me to film especially difficult tasks. Through the lens, I follow appealing images of what took centre stage during the beginning of my research: woodwork. Within the first month of training, I noticed that wood featured as the unknown character. The people that were working around me with the same material only performed as second fiddles in a composition of jigsaws, sawdust and repeated right angle cuts.

Life Itself and the Stories it Writes

And then, suddenly, Tarek's anger: 'This is about my life!' is resonating in my head. I am faced with, and embarrassed by, Tarek's proposition: the harsh material we are sometimes working with is life itself. And the stories it writes: stories like the one from Tarek, whose main concern was not the making of carpentry, but the making of a decent life, a life worth living. Tarek wanted to move on. He had no time for my pleasing pictures.

Stories like the one from Hamuda, who came to Europe in search for a dignified life. *'Look at this plank!'* he told me once, *'Second class here in Belgium, first class in Tunisia – just like me!'*

And Stories like the one from Cise, who took his camera out of the locker the very same morning to start portraying the skilful daily craft of making a life on the margins.

Whilst walking home through the streets of Molenbeek that same afternoon, I find myself remembering Gabriel Garcia Marquez talking about literature, and his description of stories as 'nothing but carpentry'. With both, he suggests, you are working with reality, a material just as hard as wood.

Pictures: 1 - 14: © Cise Ibrahima and Christine Moderbacher, Brussels (December 2015, May 2016)

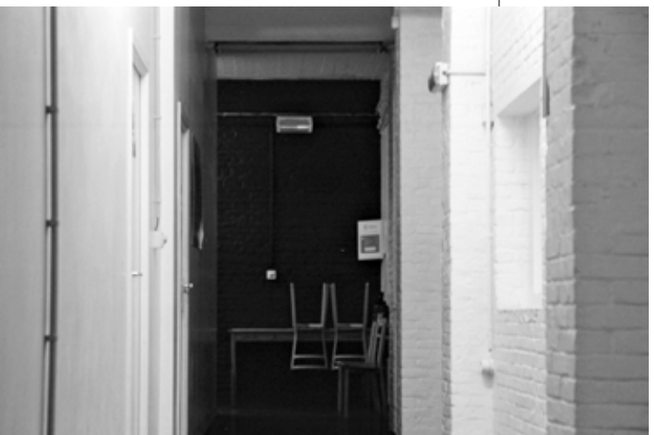
1 Originally in French: "Arrête ta caméra tu me rends aveugle !" Making life workl work she is f. amed, a bit later. ood.

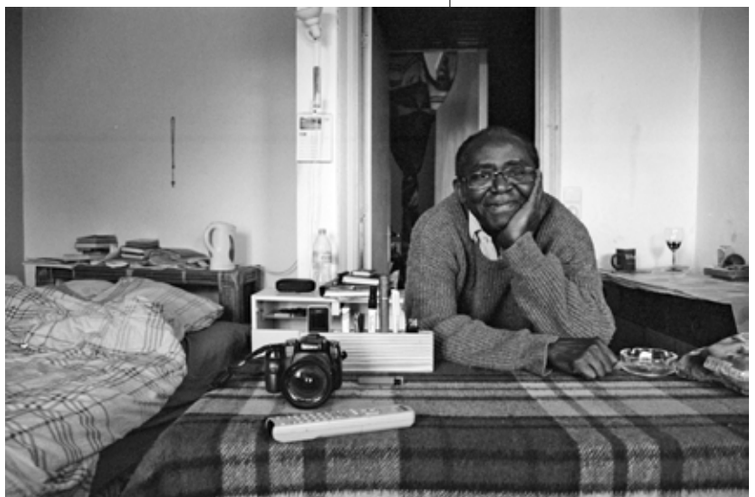
"I will never forget the first room I rented when I got out of the Petit Chateau", Cise said with his body shivering from the remembered cold. *"One morning I woke up, my woollen coat wrapped around my body, a hat covering my ears, on top of me a pile of old blankets. My eyes opening slowly, I saw, somewhat still a bit blurry, the water glass on the bedside-table frozen..."*

1 Belgium's largest and oldest centre (1987) for asylum seekers.

"There is one thing you learn well as an illegal migrant: waiting! I am an expert by now."

"I have not been in the carpentry for the last two weeks and once we started to work again, nobody really was concentrated and the doors were locked from the inside" complains Cise about the city's lock down that hindered his daily travel to the carpentry.





WOOD

Cutting Wood, Making Waste

Jo Vergunst

Wooden artefacts are made from larger pieces of wood, and the parts that are cut away are not seen in the finished form. These pages explore a making process in a way that focuses on this 'waste'. A series of notes describes an artefact being made as the wood interacts with tools and myself as the maker. The point is to think about a material that becomes what it is through conditions of use and change, rather than from a set of fixed or essential characteristics. A solid becomes a paper-thin scroll, or a fine powder, as a result of the kind of tool and the cutting gesture being performed.

The exercise also raises questions about waste, surpluses and re-use. Craft woodwork is not necessarily about producing no waste at all, though Rob Penn's book *The Man Who Made Things Out of Trees* describes the use of a whole ash tree for furniture and whole range of other items (Penn 2015). But craft is certainly different to industrial mass production that is geared towards both high efficiency and a disregard for the consequences of waste. When so much of contemporary technological material culture is meant to be disposed of relatively quickly, through built-in obsolesence as well as through commercially-led shifts in fashion, what can we learn from the production of a single artefact that is meant to last? In craft woodwork, the scraps of wood created along the way seem ephemeral but they have their uses and purposes. To find out about them, I posit this project as a kind of experimental archaeology that intentionally creates an artefact and its waste to learn about the process of its production.

At the same time these scraps might suggest an aesthetic of materials that is about absence and change more than the solidity and finality of a finished object. I take some of my inspiration here from Jane Bennett's *Vibrant Matter* (Bennett 2010), in which, she says, matter is not the raw material for human creativity but a source of action in itself. In the workshop, it is the offcuts, shavings and dust that fall off or fly off in all directions, clatter to the floor or float in the air, or stick in one's finger or clog a tool, with a will of their own. The 'piece' stays firmly clamped in place at the bench.

The item being made was a bread box, by means of hand tools. I worked in an evening class at Lethenty Mill in Aberdeenshire, under the guidance of woodworker Allan Fyfe. Allan has a long interest in craft skills and is keen to see the use of hand tools in woodworking continue.

Straightening the edges

The shoulder plane is used here to straighten the sides of two pieces of pine prior to joining them, in order to create a neat fit. Running the plane along the wood should make a series of neat coils by removing any high points or other discrepencies. The danger is in carrying on for too long with the plane, and thus cutting too far into the wood and altering its dimensions. You need to stop before too much of the wood becomes waste.

Drilling holes for dowels

The hand drill creates chips of wood as the handle is turned and downward pressure is applied to the turning drill bit. The waste needs to be fully removed from the hole in order to get the dowel to fit. The hand drill can also be wound backwards from the hole to remove most of the waste straight away. Otherwise, it means trying to knock or pick the chips of wood and sawdust out and away from the area to be worked on.

Cutting blocks for dovetails

The Gent's saw is short and rigid. It is good for small straight cuts that produce waste or offcuts in regular forms such as these. The more regular the shape, the neater the result on the artefact is likely to be. These offcuts show the occasional imperfection, such as break-out in which extra wood is unintentionally pulled away from the cut, and these will leave their opposites in the artefact.

Chiselling out dovetails

Cutting out dovetail joints from two pieces of wood means using a chisel and mallet. Different chisels and different techniques produce different kinds of waste. Generally it is good not too take out too much in one go, but very small, bitty pieces might result in a messy finish. A smaller chisel is used for finer work and will produce smaller pieces of waste, especially if it is being used just by the pressure of the hands rather than with a mallet. You also try to keep within, rather than on, the guidelines drawn on to the artefact, to allow for neat shaping and tidying up afterwards.

Chiselling dovetails with a larger chisel

These pieces of waste were made with a larger chisel, tapping out thin segments one after another to make the right shape for the dovetail joints. The wood tends to fracture along the lines of its grain, giving an irregular result that will need to be tidied up, perhaps with a smaller chisel, afterwards.

Further shaping of the dovetails

A coping saw will cut very flexibly and in hard-to-reach places, so it is handy for cutting out parts of the dovetail joints. A chisel can then be used. The lines created in these offcuts show the small changes in pressure and direction during the cutting.

Levelling up surfaces

The smoothing plane should make quite long, thin and light curls as it smooths and levels a flat surface of wood. If it is not set up properly, it judders and creates cuts, ripples and gouges in the surface, which takes more work (and the creation of more waste) to repair.

Making a groove in the sides to fit the box base

These thicker plane shavings are made by a groove plane, which actively shapes and cuts into the wood rather than just smoothing or leveling it. They will be a uniform width according to how the plane is set up to make a groove along the edge of a piece of wood. Thus, as with other planes, the waste produced corresponds to the action of initially setting the tool.

Cutting a rebate in the base to fit into the grooved sides

The rebate plane will also produce uniform widths of shavings according to how the tool is set up, with the length of shaving resulting from the gesture of using the plane along the length of wood. With all planes, the right amount of pressure on the front of the plane is also needed to create a good cut. The plane also cuts slightly differently along compared with across the grain, with different textures of shaving resulting.

Cutting back gibbies after they were fitted (1)

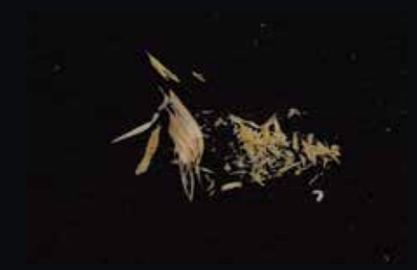
Gibbies are small pieces of wood made to fill in gaps in dovetailed joints. They are made too large and then cut down to size once in place, here with a sharp but flexible Japanese saw. They are angular fragments, themselves made from an offcut (i.e. offcuts of an offcut), and so re-using waste.

Cutting back gibbies after they were fitted (2)

The dust made by the Japanese saw from pine is fine but with a slightly bitty quality, and a few larger chips of wood also came away in the same action.

Cleaning up dovetails

Here the smoothing plane was used not to level out an entire surface of wood, but to cut back (or 'clean up') the slightly protruding ends to the dovetail joints. The waste is very fragmentary and chipped as small pieces are removed from the ends of the joint, while trying not to dig in to the main surface of the piece itself.



Dust from sanding

Sanding is carried out with different grades of sandpaper, starting with coarse grain and working towards a fine grain for the smoothest finish. Sanding by hand should produce a more uniform finish than using a machine sander, although if part of the wood is still rough, or resiny from a knot, the sand paper may get clogged up. The finest sawdust cannot be piled on paper like this, but floats in the air and coats every surface. This includes the piece itself, which needs to be cleaned with a damp cloth following each sanding (a process that also brings up the grain). A finish to the wood of oil or varnish can then be applied.

Cutting finger holes on the sides of the box

Sometimes larger pieces of wood need to be cut from the main artefact. Here two different saws (Gent's saw and coping saw) were used to remove sections for the fingerholes that allow the top to be lifted from the box. These are the kinds of offcuts that might be re-used to make gibbies, or as pads to cushion a metal clamp so that its ends do not press directly on to a piece. They also show how an initial cut with a saw can be

quite rough. Different kinds of waste are then made in the process of cleaning it up afterwards.

Shaping the top of the box.

Different kinds of wood also create different waste. The wood used for the main piece was pine, but the top of the box, which functions as a bread board, is ash. Ash is harder and has a much finer grain than pine. It produced these tight curls from a small hand plane used to make a bevel on each side of the board so that it can be gripped and lifted.

What might be made of all this waste? The diverse material qualities that I found are of course the results of metal (and in one case sandpaper) cutting into wood in different ways. Cutting through a piece of wood with a saw usually creates an offcut in a three dimensional solid form, but while this is the most common way in which we encounter wood, it is not the only way. A near-two dimensional scrolled shaving rolls off a plank if a plane is pushed along it. The shaving has length and breadth but little depth. Percussive hits or scrapes with a chisel take out small chips from the wood, often in the form of little one dimensional lines of wood, with length but little breadth or depth. Dust is made from the abrasion of sandpaper or a blade as heaps of tiny points. Each particle has hardly any length, breadth or depth but accumulates and persists as a powder in the air or a coating on other surfaces even so.

The result of this experiment is therefore that we should not think of wood as only a solid material, for each of the material forms I made is as much 'wood' as the final bread box, and the plank of wood, and before that the tree itself, and indeed the landscape, from which all the forms came. All these qualities of wood (landscape, tree, plank, block, scroll, chip, dust…) challenge common sense ideas or first impressions of the solidity of wood, and in doing so may suggest more open-ended relationships with materials where the presence or possibility of alternative forms are always implied.

Making the right kind of waste for the tool in hand is also a mark of using the tool well. Each is created by the movement of the sharp tool and the woodworking person working on the task. Neat shavings rather than scrappy slivers should come from a smoothing plane, while a saw is only sawing if it makes sawdust, rather than chipping at the wood, bouncing, or simply jamming. So producing the waste properly is central to making the piece itself. In this sense it is not 'waste' at all, but a requirement for a successful making process. They are also often a source of small usable pieces of wood, such as gibbies or pads as I described here, or they might be used for writing on to help the woodworker remember measurements or phone numbers, if a notepad is not to hand. Each piece of cut wood becomes a possible further resource.

At Lethenty Mill, even the remaining scraps, shavings and offcuts did have a further life. Apart from the samples presented here, waste from my bread box fell on to the floor and was periodically swept up, gathered into large bins, and fed into a kiln that dried out timbers cut from the Mill's own wood and also heated the building. This recycling created a local circuit of sustainability that encompassed what would otherwise be thought of as waste. Tragically, in April 2016 a fire ended the woodwork classes and furniture making at Lethenty Mill for good. Since then however we have been able to help Allan Fyfe set up new classes in a technical workshop at the University of Aberdeen, where we hope to sustain the kind of learning from materials that happened at the Mill.

References

Bennett, J. (2010) *Vibrant Matter. A Political Ecology of Things*. Durham and London: Duke University Press.

Penn, R. (2015) *The Man Who Made Things From Trees*. London: Penguin.

Images credit

All photographs are by Marc Higgin (2017).

AFTERWORD

This book has been put together over 2016 and 2017 as part of a project called *Knowing From the Inside: Anthropology, Art, Architecture and Design* (KFI for short) which commenced in June 2013, and will run until May 2018. Based in the Anthropology Department at the University of Aberdeen, the project is led by Professor Tim Ingold and is funded by a European Research Council Advanced Grant.

The contributors to the book are in many cases members of the KFI project: anthropologists, architects, choreographers, dancers, artists, and many people who work between and across a good number of disciplines and practices. Others include a number of the guests of and visitors to the project between 2013 an 2017, and importantly, also people that the project members have worked with in the course of their KFI research. The contributions themselves respond to a brief – generated within the project's discussions and activities – of speaking to the themes of traces, materials and future-making. As such, the book itself traces some of the themes of the project and connections between people, places, topics of interest, and moves beyond them, out into the world. The original invitation for contributions was consciously open in terms of format, in order to allow for experimentation and a creativity that might reflect the project's interdisciplinary context and make-up, and though contributors were asked to focus on a particular material, the interpretations of that focus vary widely. It is hoped that this variety, coupled with the unfinished-ness of the Compendium, will speak to the simple fact that investigation, knowledge and understanding of the world around us takes many forms, as can its representation and communication. What unites the entries in the Compendium is the idea that knowledge grows from our practical and observational engagement with the world around us. It comes from thinking *with*, *from* and *through* beings and things, not just *about* them. Finally, with the wider project, there is also a discernable thread overall aim is to show how research underpinned by this premise could make a difference to the sustainability of environmental relations and to the well-being that depends on it.

An Unfinished Compendium of Materials has been a joy to put together. The opportunity to have such freedom with a book's shape and content is quite unusual, and editing something that would hopefully reflect the rich diversity of the KFI project as well as some of its shared sensibilities, has been challenging but ultimately very rewarding. It has meant that I have been surprised and delighted by the creative contributions people have offered to the Compendium. I gratefully thank all of the contributors for the work they have shared and hope that others may now enjoy them too. Wherever the copies of this *Unfinished Compendium* now go, carried along in the life-courses of people, I hope that they will be critically and creatively engaged with and perhaps even added to, and that they will continue to inspire.

Rachel Harkness, May 2017

CONTRIBUTORS

Ábrán Ágota is a Ph.D. student at the University of Aberdeen writing up her research on the process of plants entering natural remedy commodity chains in Romania, where she is from. She is interested in human and nonhuman entanglements especially concerning healing practices.

Gey Pin Ang is a Singaporean actress, pedagogue and director. Ang holds a PhD in Drama by Practice-as-Research from University of Kent, UK. She performed lead roles and toured with the Workcenter of Jerzy Grotowski and Thomas Richards, Italy. Since 2006, Ang has initiated the *Sourcing Within* project where she tours performances and teaches internationally.

Mike Anusas is a designer, educator and social anthropologist. His work is concerned with developing practices of knowing and making that are 'beyond object', open-ended and that enhance senses of dialogue and correspondence with materials and energy. He works with the University of Strathclyde and the University of Aberdeen.

Malcolm Atkins is a European lapsed Marxist composer/performer perturbed by the corporatisation of learning and the privatisation of compassion instrumental in the decline of the small island he inhabits. His main interest is in bringing communities together through sharing the combinations of sounds and movements that define our cultural identities.

Joseph Calleja (b.1981, Malta) is a practicing visual artist and a current member of Lateral Lab. His work was shortlisted for Saatchi and Channel 4 New Sensations 2010 and selected for the RSA New Contemporaries 2011. He was the first recipient of the Robert Callender Residency for Young Artists.

Jennifer Clarke is a Lecturer at Gray's School of Art. She has a background in the arts and a PhD in anthropology. Her research, teaching, and public work combines and explores the borders of anthropology, philosophy and contemporary art practice.

Anne Douglas writes on drawing from within a drawing practice and from the perspective of improvisation. Trained as a sculptor, she has over the past twenty years focused on developing research approaches to the practice of art, in particular the changing place of the artist in public life. Within KFI she has collaborated with Dr Amanda Ravetz and Christine Moderbacher exploring drawing in relation to filming and with Paulo Maccagno, Marc Higgen and Nicola Chambury experiencing drawing in relation to the concept of 'whiteout' as an experience of coping with and breaking through profound disorientation.

Sally Duguid graduated from Painting at Grays School of Art in 2015. Sally continues to live and work in Aberdeen and currently holds a studio at The Anatomy Rooms.

Paola Esposito is an anthropologist whose main research interest is the interplay of sensory perception, movement and imagination. Paola specialises in *butoh* dance, but has worked with performers and makers from different artistic backgrounds. She cultivates her own creativity through a combination of expressive mediums including drawing, dance and film.

Kate Foster is a Scottish-based independent environmental artist. Biogeographies (see www.meansealevel.net) comprised a series of works on animal and human lives; current work focusses on land use, especially peatlands (see work in progress on www.inthepresenttense.net).

Caroline Gatt is a Research Fellow (Knowing from the Inside) at the University of Aberdeen. Her forthcoming book is entitled 'An Ethnography of Global Environmentalism: Becoming Friends of the Earth' (Routledge). From 2001 to date, Gatt has carried out training and research in laboratory theatre, with groups in Malta, Italy and the UK.

Paolo Gruppuso is Honorary Research Fellow at the Department of Anthropology of the University of Aberdeen. He is interested in environmental conservation, landscape, agriculture and wetland management. He has conducted ethnographic research in two protected wetlands in Agro Pontino (Italy), on topics including environmental conflicts, water management, and environmental education.

Rachel Harkness is a Lecturer in Design and Screen Cultures at Edinburgh College of Art, University of Edinburgh. Her research and teaching explores architecture and design as a peopled process, pays particular attention to the social life of the materials involved, and considers how people make manifest their ecological designs for living.

Marc Higgin is a research fellow in the Department of Anthropology at the University of Aberdeen. His current research is with visual artists and their practices of making, following the different contexts, each with their own regime of value, through which materials and things are transformed into works of art.

Elizabeth A Hodson is a research affiliate on the project 'Knowing from the Inside' based in the Anthropology Department at the University of Aberdeen. Her work focuses on contemporary art and in particular drawing, with a regional interest in Iceland and Scotland. She holds a studio at Edinburgh Sculpture Workshop.

Sophie Hueglin is an archaeologist from Germany, who does research on medieval mortar production technologies in England, Switzerland and Italy. More generally, she is interested in the theoretical concept of petrification, a process that for example can be observed in the change from wood to stone in early medieval architecture.

Tim Ingold is Professor of Social Anthropology at the University of Aberdeen, and Principal Investigator for the ERC-funded Knowing From the Inside project. His current interests lie on the interface between anthropology, archaeology, art and architecture. Recent books include *The Perception of the Environment* (2000), *Lines* (2007), *Being Alive* (2011), *Making* (2013) and *The Life of Lines* (2015).

Leonidas Koutsoumpos is assistant professor of Theory in Architectural Design at the School of Architecture of the National Technical University of Athens, Greece. His research has been exploring the designing processes through philosophical and ethnomethodological inquiries. He is also practicing architecture through by and constructing projects in various scales.

Valeria Lembo is Honorary Research Fellow at the Department of Anthropology of the University of Aberdeen, where she is carrying out research in collaboration with the project Knowing From the Inside. Her current work is exploring the interplay between breathing, linearity and skilled practice by experimentally engaging with embroidery, singing and movement awareness techniques.

Jan Peter Laurens Loovers (Ph.D., Aberdeen, 2012) is an ERC Arctic Domus post-doctoral fellow at the University of Aberdeen. Since 2005 he has been working with Gwich'in in northern Canada on pedagogy, ecology, and dogs, amongst other themes. Jan Peter Laurens Loovers wants to acknowledge the Gwich'in Social and Cultural Institute, Annie Jane Modeste, and Rachel Joy Harkness for their assistance and the community of Fort McPherson for their kindness and teachings. The contributions (Furs, Iron Ore, Mooseskin, and Red Ochre) have been made possible by financial support from the Royal Anthropological Institute's Urgent Anthropology Fund and the Arctic Domus ERC Advanced Grant.

Ray Lucas is Head of Architecture at the University of Manchester, and has a PhD in Social Anthropology from the University of Aberdeen; his teaching ranges from studio workshops on Knowledge Production in Architecture to lecture courses on Graphic

Anthropology. Lucas is author of *Research Methods for Architecture* (2016), *Drawing Parallels* (2018), and *Anthropology for Architects* (2018). Lucas' current research includes 'graphic anthropologies' on marketplaces in South Korea and urban festivals in Japan, describing the informal, social, and iterative architecture through the conventions of architectural drawing.

Enrico Marcoré is a PhD candidate for the University of Aberdeen in the ERC project "Knowing from the Inside". His research focuses on the rebuilding of the L'Aquila province after the 2009 earthquake. Through considering many forms of dwelling arisen from the quake, he wants to explore the role of building in the making of Aquilean post-catastrophic environment.

Francesca Marin is PhD candidate in anthropology at the University of Aberdeen. Her work focuses on interdisciplinary research, collaborative processes, conservation and small-scale fisheries. In Argentina, she works with marine biologists. Beforehand she did fieldwork in Kenya and Cameroon, in collaboration with volcanologists, cartographers and NGO members, studying risk perception, vulnerability and development.

Germain Meulemans is a PhD candidate in Anthropology at the Universities of Liège and Aberdeen. He is interested in hybrid, anthropogenic environments, and in the challenge they pose to both the natural and the social sciences. Recently, he has been conducting ethnographic research on the topic of urban soils.

Christine Moderbacher is an Anthropologist and Documentary Filmmaker. (Harraga 2008, Men at work 2010, A Letter to Mohamed 2013, A Summer in Nigeria (in progress)). She is currently finishing her PhD "CRAFTING LIVES in Brussels – Making and Mobility on the Margins" at the department of Anthropology at the University of Aberdeen, as part of the project KFI – Knowing From the Inside. In her films as well as her anthropological work she focuses on migratory and marginal worlds as well as visual and textual storytelling.

Claire Pençak is a choreographer and dancer whose practice extends beyond the studio and theatre to working in an interdisciplinary context. Her work may materialise as performance, installation, writings from improvisation and place making projects. www.clairepencak.wordpress.com

Tanja Romankiewicz first trained as an architect, interested in the people of the past. She is now an archaeologist, interested in how past people created their built environment. Her current project, a Leverhulme Trust Early Career Fellowship at University of Edinburgh, investigates how we can be 'Building (Ancient) Lives'.

Griet Scheldeman, an anthropologist from Belgium, and **Doug Benn**, a glaciologist from Scotland, met in 2012 on a glacier in Spitsbergen. Since then they have explored their mutual passion for ice, bringing together scientific and artistic perspectives in a holistic appreciation of 'solid water' in all its forms. They now live by the sea in Scotland.

Cristián Simonetti is Assistant Professor at the Programa de Antropología, Instituto de Sociología, Pontificia Universidad Católica de Chile and an Honorary Research Fellow at the Department of Anthropology, University of Aberdeen. His work concentrates on how bodily gestures and environmental forces relate to notions of time in science, the topic of a monograph entitled *Sentient Conceptualizations* (Routledge, 2017).

Erika Akariguame Armengol Sloth has studied social anthropology at Goldsmiths University of London, environmental anthropology at University of Aberdeen and is currently studying development studies at London School of Economics, (where she is working on a research project regarding material cultures in developing countries).

Contributors

Undine Stabrey currently focuses on pedagogical knowledge (at the University of Applied Sciences and Arts of Northwestern Switzerland) as well as on the phenomenon of water (at the Center for Global Studies of the University of Berne). In addition to research in Ancient World Studies and Philosophy of Science, she develops an archaeology of digital things in order to explain the formation of prognostic structures.

Jo Vergunst is a Lecturer in the Department of Anthropology at the University of Aberdeen. His research interests are in rural society and landscapes in Scotland and Europe, including farming, walking and environmental art. His current fieldwork is on traditional woodwork and forest management.

Judith Winter is an independent curator, social researcher and senior lecturer at Manchester School of Art. She was inaugural curator for the Middlesbrough Institute of Modern Art (MIMA), UK and Head of Arts for DCA, Scotland. Her curatorial approach is sensitive to the ephemeral qualities of works-in-progress and cross-disciplinary practices. Her current research and teaching returns to the Bauhaus as a crucible of the modern art school. By revisiting the reservoir of material experimentation, she hopes to link students separated by a century and consider the contemporary relevance of its approaches for future generations.

Unfinished