Wet ⇌ Dry ⇌ Thick ⇌ Thin ⇌

(Getting beyond The raw and the cooked)

Wet ⇌ Dry ⇌ Thick ⇌ Thin ⇌
(Getting beyond *The Raw and The Cooked*) 5

Beyond the Cooked and the Raw:
Abjection and art as transgression | *Estelle Barrett* 7|19

The Japanese Jewel Beetle: A painter's challenge | *Franziska Schenk, Bodo D. Wilts and Doekele G. Stavenga* 21|37

Painting. Materials. Matters. Pip Seymour in conversation
with the painter Yvonne Hindle | *Yvonne Hindle* 39|47

The Archive and Public Art:
Archiving the materialities of our times | *Sian Everitt Vaughan* 49|57

Material: Photography
Art that draws on, with, and against photography | *Andrea Jespersen* 59|71

[Un]common Sense and [Un]disciplined Gestures | *Sheena Calvert* 73|79

There is a gardener that works night and day… | *David Cheeseman* 81

Through the Looking Glass:
The cryptesthesia of photography | *Grace Williams* 83|89

The Anti-Materialist Ontology of Mystical Realism:
How speculation can work against the speculative absolute | *Ole Hagen* 91|102

At Every Given Moment | *Dane Worallo* 103

Pixelpaisleyportal:
The materialisation of imagination in 8 pixelated steps| *Jennifer Wright* 105|112

Becoming Grey (the unending of) | *Samira Nejad* 113|117

Biographies 118|121

Wet ⇌ Dry ⇌ Thick ⇌ Thin ⇌

(getting beyond *The Raw and The Cooked*)

In the now famous move led by Lévi Strauss to awaken the humanities and social sciences to the minutiae of life and the way in which one might be able to access this minutiae, quite a strange, diverse and oddly "old fashioned" approach (read by this: scientistic, possibly sexist, homophobic, racist, classist, anti-art – the usual culprits) seem to have been quietly creeping back into both theory and practice. Nowhere is this more clear than in the current research environs, where that which is seen to be rigorous and objective manages at the same time to strip out the complex, the messy, the "that which does not fit in" in order to support a logic which itself admits only a problematic and seemingly privileged set of actors to its boardroom metrics and budgetary arrangements.

An international call was thus initiated, with the result that this current set of responses takes up the vital theme(s) of materiality, but this time from the very arena so often relegated to a second class status: the senses. This is not done in contradistinction or binaric divide from, or privilege over, "reason." Quite the reverse. The focus on the senses (perhaps we could say, echoing Deleuze, on the *logic* of sense) is to remind all who may need reminding (including ourselves) that intellectual rigour can never be siphoned from the very blood poetics to which it is attached.

The artists, scientists, philosophers, designers, mystics and archivists whose work constitutes this volume of **Zētēsis** have set out to reconfigure materiality/ies by taking *seriously* art, including the arts, humanities and sciences, in all their excremental, messy and oddly slippery sensualities. No longer do we have to ask the endlessly annoying question "can artists work with scientists?" (yes); no longer do we have to ignore the political implications of "objectivity" and "neutrality". This is to say, further, that no longer does materiality itself remains wedded to a Universal reason, dialectically historical, speculative, realist or otherwise. Instead, it is made manifest, becomes "present", through an iterative and immersive expenditure steeped in the immediate terrain of multiversal logics. Instead, this neither-nor *ana-materialism* marks out the oddly cathected feed-back loops of the raw and the cooked, ones that form radically discontinuous economies (libidinal or otherwise) and therewith, establishes the limits (of meaning, identity, carnality, hunger, smell) without so much as leaving a trace.

Welcome to **Zētēsis:** research generated by curiosity. A provocation – if ever there was one – to *dare* to be rigorous in all our possible uncertainties and practical romanticisms. It's a delicate game we are playing after all – one not just for fools and horses.

Johnny Golding
The Editor

Beyond the Cooked and the Raw

Abjection and art as transgression

Abstract: What lures people to frightening and disgusting images? What draws us towards the bizarre, the strange, the repugnant and the dangerous? Why do sensations related to slime and decay (for example) take on different valencies in different contexts? In this paper, Barrett argues that Julia Kristeva's notion of abjection challenges the dichotomies derived from Levi Strauss's categories of the "raw" and the "cooked." In doing so, she shows how Kristeva's re-assessment of abjection – as that which can transcend the arbitrary and repressive laws of the symbolic – the emergence of the subject and language is not solely predicated on repression and antagonism, but is also constituted through an amorous striving for the unnameable Other, what Kristeva designates as the abjected maternal body. This, argues Barrett, accounts for transgression, perversion and "aberrant" human responses as well as the polyvalent images that arise in art. An examination of abjection, as expulsion and demarcation of boundaries – that is as material process – implies spatiality or a dynamics of movement, streamings of libidinal drives and fluid heterogeneities. Such processes are precursors of pleasure and fear that produce the aesthetic image as both a renewal and expansion of the symbolic through art. The argument is developed further with reference to a number of artworks, in particular, the work of Australian artist Catherine Bell. Barrett concludes by suggesting that the jouissance of straying towards this object of want ensures an infinite process of differentiation that unsettles binaries and closure.

Material process refuses binaries. The multiple and ambiguous nature of aesthetic experience and the aesthetic image give testimony to this and to the slippery nature of pleasure and non-pleasure, fear and *jouissance* that are the wages and currency of living process and art as negation-transgression of boundaries. I will draw on Julia Kristeva's psychoanalytic notion of abjection to challenge Lévi Strauss' idea that the purpose of myth is to provide a logical model of meaning that overcomes contradiction by organising thought into binary opposites.[1] If the raw and the cooked draw up demarcations between what is natural and socialized and by extrapolation what is good and bad, permitted and forbidden, wet and dry, attractive and repugnant – abjection as material process perpetually unsettles such arrangements by reconfiguring

1 The purpose of myth as providing a logical model of meaning organised via the binaric divide is famously developed by Claude Lévi Strauss in his path breaking and foundational work *The Raw and the Cooked.* But see in particular, "Overture" and "Part Three: 1. Fugue and the Five Senses, 2. The Opossum's Cantata," in his *The Raw and the Cooked: Mythologiques, Vol 1,* translated from the French by John and Doreen Weightman, (Chicago: The University of Chicago Press, 1983), pp. 1–34 and 147–199. For the primary work by Kristeva see in particular, Julia Kristeva, *Powers of Horror: An Assay in Abjection*. Translated by Leon S Roudiez, New York: Columbia University Press, 1982.

abjection
fear
jouissance
transgression
art
material process

psychic spaces and the objects of our wants and desires. The works of a number of artists and in particular, that of Catherine Bell will augment the argument visually, enabling one to traverse the tricky paths and tributaries that link living process with how we come to make meaning.

Abjection assumes different codings from culture to culture and according to various symbolic systems. Some of its variants include: defilement, food, taboo and sin, all of which turn on the prohibition of certain behaviours. The underlying principle of rites and rituals that determine the sacred and that separate the clean from the unclean is the prohibition of incest. In Christian iconography and ritual, for example, the image of the wounded God, and rites of communion mediate death through the prospect of transcendence. The mediation of death is also a mediation of the deepest fear – horror of the un-representable, or that which cannot be seen – and which, through Kristeva's concept of abjection, can ultimately be understood as the pre-symbolic or archaic mother. In psychoanalytical discourse, fear of the un-representable is linked to the fear of castration invoked by the sight of the mother's genitals. In art, this is often represented as a cut, a wound or decapitation.[2] Fear of the phallic mother (life giving and life threatening) is the underlying symptom that has given rise to images of female monsters in mythology and to various images of the monstrous feminine in art and popular culture.[3] One of the most horrible of these is the Medusa's head, mouth agape and writhing with serpents – a representation which Freud suggests, takes the place of representation of the female genitals.[4] Artist harnesses and externalises such images and in doing so expands cultural imagination and language. An understanding of abjection as psychic/material process provides an explanation of how this comes about.

Abjection as Material Process

Prohibition turns on issues of fear, pleasure and pain. The paternal law, which establishes a separation from objects that are forbidden, dangerous and unclean, is also concerned with the primary object of pleasure and desire, ultimately, desire for the mother and the pain of separation. Herein lies a challenge to Strauss' structuralist schema. Kristeva suggests that abjection is an indication of an incomplete separation from the mother and is also a process that instigates primal repression. Her account of abjection goes beyond a concern for the socializing impetus of abjection to an examination of the way

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2. Kristeva, "3. From Filth to Defilement," *Powers of Horror: An Assay in Abjection*, pp. 56–89.

3. Barbara Creed, "Horror and the Monstrous Feminine: An Imaginary Abjection," *Screen*, Vol. 27, No. 1 Jan–Feb, 1986, 41–70.

4. S. Freud, "Medusa's Head," in his *Writings on Art and Literature (from the Standard Edition of the Complete Psychological Works of Sigmund Freud, edited by James Strachey)*, Crossing Aesthetics edited by Werner Hamacher and David E. Wellbery, (Stanford: Stanford University Press, 1997), pp. 264–268.

in which, as a psychic process, it brings about alterations within subjectivity and extends symbolic competence. Her departure in this direction starts with an emphasis on the fragility of the law and its prohibitions as an effect of the beckoning force of the archaic mother.[5] She argues that confrontation with the feminine is not a confrontation with a primeval essence, but with an unnameable other that can engender both fear and *jouissance.* This ambiguity is the basis for creative production in literature and art. It is what structures both the aesthetic image and audience's affective responses in ways that rupture language and meaning.

As Kristeva summarises: "The abject has only one quality of the object-that of being opposed to *I*."[6] It simultaneously beseeches and pulverises the subject. All abjection is recognition of want for the maternal body on which, being, meaning, language and desire are founded. Because want is preliminary to being and the object, the child has a sense of the abject even before things *are* – and drives them out even before they are signifiable. What is abjected in this first separation is the biological body of the mother as a means of staying the death drive, a drive predicated on the tendency for matter or life to return to a state in which everything is the same. Abjection as *process* takes hold when there is a failure of the capacity to identify with something outside that would constitute the subject as a separated entity. Kristeva describes the subject beset by abjection as the child who has swallowed up his parents and is therefore frightened by the act and by finding himself "beside himself alone."[7] Brushing up against the unnameable thing collapses meaning; it must therefore be excluded because it threatens the emergence of self.

However, abjection is an ambiguous border that attracts even as it repels. Even whilst releasing hold on the subject's entry into language, it does not radically cut the subject off from what threatens it, but rather demarcates a space from which signs and objects arise. In this sense, abjection is an indication of our being alive in the world – a physiological and psychic functioning or responsiveness that allows us to make sense of our encounter/ enfoldment in and with the world. Abjection is both a precondition of narcissism, is co-existent with narcissism and is what "causes it to be permanently brittle."[8] This brittleness is an indication of the instability of the symbolic function constantly threatened by a crucible of conflicting drives – pleasure and fear- related to attraction and repulsion of the archaic mother – and which Kristeva designates the *chora.*[9] It is here that life drives and death

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5. Kristeva, "Those Females Who can Wreck the Infinite," in *Powers of Horror*, pp. 157–173.

6. Kristeva, "Approaching Abjection," *Powers of Horror*, p. 1.

7. Kristeva, "Approaching Abjection," *Powers of Horror*, p. 14.

8. Kristeva, "Approaching Abjection," *Powers of Horror*, p. 13.

9. Kristeva develops the notion of chora as the named earliest development in one's psychosexual maturation (between 0–6 months). An important discussion of this move can be found in E. Geerts,

drives undergo cathexes or investments required to correlate a "not yet" ego with an object, in order, as Kristeva writes, "to establish both of them."[10]

Abjection as Precursor of Meaning

Abjection falls away once meaning takes hold. It is experienced only if the Other has settled in place instead of what will be: me. "Not at all an other with whom I identify and incorporate, but an Other who precedes and possesses me."[11] Abjection is experienced as fear and loathing when rational meaning fails to emerge. In Psychoanalysis, this "possession" refers to borderline states in patients who suffer phobia. In these cases the abject or fearsome object is only partially excluded. Although there is an insufficient differentiation between subject and object, the contents of the psyche are made evident in the speech and behaviour of the patients without being integrated into judging consciousness. This produces discourse (through psychic images) that, unlike rational communication and scientific discourse, is aesthetic or mystical.

Abjection points to a dynamics of fear prior to the emergence of the object and upon which the very capacity to symbolise external reality is dependent. Fear and the object are associated from the start because the first object of experience is that of the archaic mother. Something akin to fear is first experienced in the trauma of birth, a violent break that upsets bio-drive balance. The constitution of object-relations is a reiteration of the unsettling of this fragile balance. As Kristeva writes, "Fear and the object proceed together until the one represses the other."[12] This raises questions about the nature of objects that emerge within the psychic space as opposed to the forms of repression that permit objects to emerge as signs. Aesthetic images are related to inner psychic process that stray from and refuse cathexes that lead to full sublimation, hence the ambiguous multiple and often uncanny or unsettling effects of such images.

Before proceeding, it may be useful here to explain psychic processes that end in sublimation – those that allow objects to emerge as directly recognizable categories of thought through the transposition of energy and drive into language. Because subjectivity is heterogeneous, it should be noted, that both primary and secondary processes are contemporaneously implicated in the

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"Julia Kristeva's subversive semiotic politics. A conceptual analysis of Kristeva's notion of semiotic chora, maternity and feminism," at http://www.academia.edu/532083/Julia_Kristevas_subversive_semiotic_politics._A_conceptual_analysis_of_Kristevas_notions_of_the_semiotic_chora_maternity_and_feminism. See also Derrida's substantively different development of chora in his *Chora L Works*, co-authored with Peter Eisenman and edited by Jeffrey Kipnis, (The Monacelli Press, 1997).

10. Julia Kristeva, *Revolution in Poetic Language*, translated by Margaret Waller with introduction by Leon, S. Roudiez, (New York: Columbia University Press, 1984), p.14.

11. Kristeva, "Approaching Abjection," *Powers of Horror*, p. 13.

12. Kristeva, "Approaching Abjection," *Powers of Horror*, p. 34.

making of meaning. So how does sublimation take hold? Firstly, sublimation is always dependent on abjection, which as primal repression, occurs prior to the emergence of the ego and its objects of representation. Abjection is a structure within the body that occurs at the limits of the unconscious and prior to it; as a *symptom* or physiological response to objects in the "inner" and "outer" world; it is what the body must give up in order for sublimation to occur. Sublimation is the process by which, thing presentations, drives, sensations and affects are transformed into word presentations. This occurs because the subject of abjection is *also* an already constituted (heterogeneous) subject of the symbolic. In sublimation, cathexes are directed towards already constituted and/or externalised objects, which include already constituted categories or signs. This can be understood as a desire for language, an identification or desire that produces the sublime metaphor. This results in both a bonding with and a partial substitute for the lost ("good") mother which, as I have explained elsewhere via Kristeva, refers to demarcations/bondings related to the mother *prior* to the acquisition of language and even before separation at birth.[13] In aesthetic experience, condensations and displacements involved in sublimation give rise to the metaphorical or poetic language of art, which permits both a re-invigoration of language as well as its expansion. It is in this sense that the abject is lined with the sublime. "It is not the same moment on the journey, but the same subject and speech that bring them into being."[14] For Kristeva the abject subject is p*ar excellence*, the artist.

The Aesthetic Image: From the Material to the Conceptual

Let's have a look at how the ideas discussed so far might play out in relation to two well-known examples of art that have sometimes been placed within the category of so-called "abject art". The first work is that of Italian artist Piero Manzoni who produced ninety cans (numbered on the lids 001 to 090) labelled *Artist's Shit* (1961).[15] I want to suggest that viewing this work produces abjection in the sense of a fully constituted category of disgust: abjection *as* abjection as opposed to abjection as a *process* that suspends closure of meaning. There is no

13. See E. Barrett, *Kristeva Reframed: Interpreting Key Thinkers for the Arts*, (London and New York: I.B.Tauris & Co. Ltd, 2011), pp.81–84. Here I draw on Kristeva to outline the relationship between abjection and processes that occurs in the Kristevan Imaginary, a phase that commences earlier than that of Lacan where demarcations related to the handling and nurture of the child in early infancy and before the acquisition of language are laid down. These demarcations result in bonding and cathexes that produce the poetic metaphor. The key distinction here, are notions love and attraction as opposed to threat and repulsion. The impelling affects involved are therefore positive rather than negative.

14. Kristeva, "Approaching Abjection," *Powers of Horror*, p. 11.

15. For images of Piero Manzoni's landmark work, *Artist's Shit* (1961), see: https://www.google.com/search?q=Piero+Mazoni's+Artist's+shit+(image)&espv=210&es_sm=119&source=lnms&tbm=isch&sa=X&ei=cJJrUrWfNcvJswbhn4GADA&ved=0CAkQ_AUoAQ&biw=1436&bih=783

lack of recognition or identification in viewing this work. Despite disrupting and transgressing Lévi-Strauss' categories, the work serves to remind us that culturally, abjection refers to established demarcations between, clean and unclean, good and bad and so on. Our sense of disgust comes from an immediate recognition that the faeces is in the *wrong* place; not only that, but metonymically and metaphorically, the image transgresses all our laws of hygiene (coffee made from beans excreted by the Asian palm civet exempted!) related to food and eating. Thus the work operates within a paradigm of established binaries, at the level of *the law* – or predominantly at a *conceptual* rather than an aesthetic level. Manzoni himself suggests that this artistic gesture, along with others that include using his own blood and breath to make artworks, was conceived (amongst other motivations) as an effort to rescue the artist's body and art from postmodernist erasure ("art is dead") and also as a means of recuperating the artist as subject/creator.[16]

Shit as art, not only rescues the artist's corporeality, but with the fetishisation of art as precious object, also restores the idea of the sacredness of the artist as genius. This is linked to another of Manzoni's agendas: his critique of the consumption of art as commodity (ironic, since a tin was sold for €124,000 at Sotheby's in 2007). What I am emphasising here is that (disgust apart) and even as the valorisation of Manzoni's work confounds and interrogates accepted or customary meanings attributed to excrement, the work remains predominantly conceptual – a work of *language* and thought, rather than one of sensation and materiality.

Let me turn now to another controversial artwork, Andre Serrano's *Piss Christ*, (1989).[17] I suggest that this work demonstrates the way in which aesthetic experience and the aesthetic image engender an oscillation between abjection as a process that denies closure of meaning and therefore challenges binary logic and those processes of sublimation that give rise to the conceptual dimension of the image. The key to understanding the complex and ambiguous articulation of this work is the operation of colour and light as colour.[18]

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16. See Sophie Howarth's account of Piero Manzoni's work in her "Artist's Shit: Piero Manzoni," *Tate Gallery*, 2000. http://www.tate.org.uk/art/artworks/manzoni-artists-shit-t07667/text-summary. Accessed October 20, 2013.

17. See Andre Serrano's *Piss Christ* (1989) at https://www.google.com/search?q=Piero+Mazoni's+Artist's+shit+(image)&espv=210&es_sm=119&source=lnms&tbm=isch&sa=X&ei=cJJrUrWfNcvJswbhn4GADA&ved=0CAkQ_AUoAQ&biw=1436&bih=783#es_sm=119&espv=210&q=andre+serrano+piss+christ&tbm=isch

18. In her essay "Giotto's Joy," Kristeva tells us that colour operates through three interlocking registers which loosely translated, refer to: colour as it pertains to instinctual drive or pure sensation; colour as perception that is coded according to affects emotion, personal history and individual experience and thirdly, colour as systematic value that operates through shared socially encoded meanings. This point will be developed further, but see J. Kristeva, "Giotto's Joy," in her *Desire In Language: A Semiotic Approach to Literature and Art,* edited by Leon S. Roudiez and translated by Alice Jardine and Leon S. Roudiez, (New York: Columbia University Press, 1980), pp. 210–236.

Serrano's work is a Cibachrome photograph that depicts a plastic crucifix immersed in fluid that is purportedly the artist's own urine. Light has been adjusted to produce a glossy luminous surface of rich crimson against which the crucifix, holding the body of Christ, is illuminated with a brilliant yellow incandescence. The medium in which the crucifix is immersed is shot through with bubbles that appear as intense spots of light. The work is evocative of colour as it is used in Baroque paintings such as those of Caravaggio, where colour as light, evokes notions of the divine and the glorious.

Perhaps I should locate myself as viewer before proceeding. I come to this work as a lapsed Catholic (if this is indeed possible), who nevertheless, spent much of the first seven years of life in churches and graveyards. I can appreciate how the image can be seen as confronting, as a blasphemy that may evoke outrage. However if disgust and abjection are engendered, they are heightened by the visual realization of what the title is informing us. The effect is once again a result of playing on the view that things are not being in their *proper place*; that is, the contiguity of the sacred and the unclean produces abjection as abjection. The demarcations operating in this register produce meanings that belong to an established social semiotic or a system of binaries that operates similarly to that of Lévi-Strauss' semiotic schema. However, something more profound seems to be happening. As I continue look at this work, I begin to loose myself in a sensation of pure pleasure, a *jouissance*, perhaps born of the initial transgression of looking, but further intensified by the retinal impact of colour and light. Despite what the title is telling me, this image evokes a visual pleasure all the more compelling for being forbidden. Here the pressure of colour on instinctual drive ensures that abjection as process holds sway and overcomes cathexes or investments directed towards word presentations. The profane then is re-sanctified via material process as *jouissance,* which is predicated on abjection operating as a refusal of the law of the symbolic. This is the pleasure of transgression that underpins art's capacity for revolution and renewal.

Let us return now to consider in more detail, how fear is implicated in the production of the aesthetic image.

Phobia and Art

As we have seen, Kristeva's conception of abjection indicates that a class of objects exist prior to language: the need for food, air and comfort, which in early life are related to the mother. Absence of the mother, frustration or denial of these needs produces aggressivity, the violence of rejection and death drive. The phobic object, or object of fear, appears at the place of a non-objectival drive, which unlike the sexual or erotic drive that is directed towards others, is instead directed inward, towards self- preservation. The phobic object is therefore not an object of desire, but an object related to want and to primary

processes. What then, is the relationship between phobia and art? Kristeva tells us that the language of art is the language of want, and explains how this is so through her extended explication of phobia. She draws on Freud's account of Little Hans' phobia or fear of horses to describe phobia as "an abortive metaphor of want" and as such can be understood as material process.[19]

Unable to produce metaphors by means of signs, the phobic subject produces them within the materiality of drives. Phobic hallucinations are an indication of avoidance of choosing between an object of want and an object of desire. What emerges from this process is *affect* projected as internal images – hallucinations that are partial objects since they point to an object that remains un-nameable. Lacking any external or objective correlative, these hallucinations articulate a void that lies beyond the emerging play of signifiers. The arbitrariness of the phobic metaphor is illustrated in the account of how efforts to rid Hans of his fear of horses results in a transformation of his phobia into a loathing for raspberry syrup – the colour of which evokes the edge of a gash.[20] The phobic metaphor is a metaphor that has mistaken its place and as such does not belong to verbal rhetoric; it is a "fetishistic" and temporary preserver of life. In childhood, phobic drive produces symbolic activity, but not the object; in adults it produces a discourse devoid of meaning and the abjection of self. Hence the metaphors produced are not metaphors in the true sense but are an index of some non-thing or unknowable object, a hallucination of nothing.[21]

In such cases the phobic drive cathexes symbolic activity itself. This activity can be understood as a play of internal images that belong to pre-preconscious and unconscious realm, and in this sense, are similar to dream images. Phobic images do not correlate drive to any external object, however, they do prevent a total collapse of the subject and can find their way into works of art. As a process that determines borders between inside and outside abjection can be understood primarily as a spatial concept. Trans-spatial, composite and ambiguous, abjection is what does not respect borders, positions and rules. The place of the abject is the place of the splitting of the ego. Indeed, the abject implies an Ego that repeatedly, places, separates and situates itself.

[The Ego] therefore *strays* instead of getting [its] bearings, desiring, belonging or refusing ... instead of sounding [it]self as to [its] "being," [it] does so concerning his [or her] place: "Where am I?" instead of "Who am I?"[22]

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19. See S. Freud, "Little Hans (1909)," in his *Complete Psychological Works of Sigmund Freud, Vol 10 (Case Studies of "Little Hans" and "Rat Man")*, translated from the German by James Strachey in collaboration with Anna Freud, (New York: Vintage Classics, 2001), pp. 5–152. See also Kristeva, "Approaching Abjection," *Powers of Horror*.

20. Kristeva, "Approaching Abjection," *Powers of Horror*, p. 35.

21. Kristeva, "Approaching Abjection," *Powers of Horror,* p. 42.

22. Kristeva, "Approaching Abjection," *Powers of Horror,* p. 8.

This is aptly illustrated in the effects produced by a work such as Serrano's *Piss Christ*. To be abject is to be an exile or deject possessed by a non-object. As self-appointed exile and deject, the artist strays towards abjection and becomes a deviser of territories, languages and works.

More On Abjection and Space

Abjection is a demarcation before that which emerges in the *Gestalt* of Lacan's mirror phase; it posits a conception of space and locality that is ambiguously both subject and object, perception and consciousness, and simultaneously ambiguously neither subject and object, perception and consciousness. For abjection is not a space of external reality, but of psychic reality, where different objects may occupy the same space at the same time as in condensation in dreams, where subject and object may collapse into each other. As Freud develops in his "A Child is Being Beaten," psychic reality refers not to real objects but to hallucinations or fantasies: the collapse of the demarcation between the viewing subject and the so-called "object" of the gaze.[23] Victor Burgin, referring to Freud's analysis of the theatre of desire via his "A Child is Being Beaten," illuminates further how this embodied and desiring mental space constitutes a subject that can be positioned in the audience *and* on the stage, simultaneously occupying the role of both the aggressor and victim.[24] In the reception of artworks, this relation allows the viewer/audience to empathise or share in the experience of what is being presented and to occupy multiple viewpoints. This will be considered in more detail in the account of Catherine Bell's the work towards the end of this paper.

Abjection and Perversion: Queer Enunciations

As we have seen, by being "trans-spatial" and ambiguous, abjection a gives rise to the *jouissance* of oblivion and pleasure of transgressing the law. Thus the abject is related to perversion as indicated by a desire to look even when one is repelled or afraid. One can say further, then, that because abjection can soften or hold sway over the ego, and because the subject of abjection refuses to give up, nor uphold prohibition and law, but rather turns them aside misleads,

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23. Sigmund Freud, "A Child is Being Beaten (1919)," in Ethel Spector Pearson (ed), *On Freud's "A Child is Being Beaten"*, Contemporary Freud Turning Points and Critical Issues Series, The International Psychoanalytic Association, (London: Karnac Books, 1997, 2013), pp. 1–32.

24. Victor Burgin, "Geometry and Abjection," in John Fletcher and Andrew Benjamin (Eds), *Abjection Melancholia and Love: The Work of Julia Kristeva*, (London and New York: Routledge, 1990), p.111. Burgin also argues how Maurice Merleau-Ponty 's description of this ambiguous relationship between subject and object develops the notion of "chiasm", an enfoldment or intertwining of the seer and what is seen, "so that the seer and the visible reciprocate one another and we no longer know which sees and which is seen." (p. 113).

corrupts and misuses them, abjection is more closely related to the Superego. And because it is a composite of conscious and unconscious elements, the Superego constitutes ambiguous and fluid relations between the subject and the system of social laws and it is this dimension of abjection that is mediated in artistic practice. Evidence of this can be found in the tendency to defuse fear through humour and parody.[25] It can be found in the creative practice itself, involving as it does an ability to project oneself into the abject, to "introject" its logic and as a consequence, to pervert language through style and content. The work of Catherine Bell helps to illuminates the workings of abjection, parody and humour as fundamental to the creative process.

Waste Not Want Not

The first work entitled *Waste Not Want Not* by Catherine Bell (2011), is an installation using what appear to be rat droppings strewn on the gallery floor and in an empty Pizza box (Figure 1). Adjacent to the pizza box, are a set of blank business cards mounted on the gallery wall that resemble bathroom or kitchen tiles on which the rat droppings have been transposed into what looks like the rice pattern often seen on Chinese plates and other eating utensils. The metaphorical and metonymic allusion to food and location of the faces in and near the food container disrupts our customary expectations of the gallery space and the proprieties of place. Conceptually, this produces similar effects to those that emerge in the viewing of the Manzoni work already discussed in this paper. Here too, the sense of disgust and abjection engendered has a clear objective correlative. Moreover, the double parody operating through the work is quickly grasped because we are told that the droppings are, after all, made of plasticine. However, the image of excrement paradoxically appears more real that the thing it imitates. It is all around sullying the sanctity of the gallery as white cube and all that this implies, but at the same time, through the works material and formal transpositions as well its location within the gallery "system", it tends to perpetuate the mystification of the artist as alchemist and the artistic product as precious commodity.[26]

Nevertheless, because viewing is embodied, the seemingly random arrangement of the droppings on the floor against the whiteness of the walls exerts the pressure of colour on instinctual drive so that abjection as *process* takes hold during the act of looking. This tends to disrupt and invert logical meaning. Also in this work, as the "faeces" are not contained and labeled, but

25. As developed by Freud in his well known, *The Joke and Its Relation to the Unconscious,* edited by James Strachey with Introduction by Peter Gay, (New York: W.W. Norton, 1990), especially, "The Purposes of Jokes" and "The Relation of Jokes to Dreams and the Unconscious," pp. 106–142 and 197–223.

26. For a useful, early discussion, see for example Thomas McEvilley, "Introduction," in Brian O'Doherty (Ed), *Inside the White Cube*, (Santa Monica: Lapis Press, 1986), pp. 1–11.

are everywhere and anywhere, it precipitates a primal fear of contagion. Here the viewing process involves a double articulation of abjection that gives rise to the multiple and ambiguous effects of the work on the viewer. This is further complicated by the wall-mounted cards where the visual effects of the placement of the droppings on the white tiles and a morphological switch from droppings to "tile pattern" pulls the viewer's responses in several directions creating an ambiguous play between fear and disgust, sensory pleasure engendered through the formal qualities and arrangement of the "wall tiles" and the more cerebral pleasure derived from engaging with the conceptual concerns of the work as a visual trope. Certainly there are well-rehearsed binaries at work here, the pure and the unclean, white and black, food and excrement. However, the structure of the work as *aesthetic image* persistently destabilises, ruptures and reconstitutes meaning. This is evidence of abjection as material process at work in both in the making and viewing of art.

Making a Baby

Commenting on the series of practices that are related to the performance work, *Making a Baby* (2006), Bell acknowledges the dimension of ritual and catharsis that is involved in making art, but also alludes to how the works permit a more nuanced examination of social transgression.[27] The power

27. Catherine Bell,"Cooking up Crimes and Maternal Misdemeanours: From Food Ritual to

FIGURE 1 Catherine Bell, *Waste Not Want Not*, 2011.
Plasticine rat poo, pizza boxes, ink on blank business cards.
Courtesy of the artist and Sutton Gallery, Melbourne.

FIGURE 2 Catherine Bell *Making a Baby*, 2006. Performance Still.
Courtesy of the artist and Sutton Gallery, Melbourne.

of these works lies in their capacity to harness working abjection to produce what I would call queer or mutant enunciations. These enunciations can be understood as the effect of *displacements* that render the everyday in a strange and disturbing light whilst at the same time giving rise to humour.

The performance involves cooking and the painstaking decoration of cakes so that they closely resemble newly born babies. One image, humorously displays a baby on a fridge shelf amongst other comestibles. Kristeva tells us laughter is a means of displacing and restoring abjection; it is an inherent aspect of artistic practice because it designates irruption of the drives against prohibition. Like the expulsion of unwanted food in vomiting, laughter involves an ejection of the abject, resulting in repression of what is feared and intolerable. The humour in work brings the viewer back from the boundaries of abjection to which the artist has strayed in the making of the work. Hence unconscious psychic processes that occur in viewing of the works reveal meanings that go beyond manifest intentions.

Beneath the everyday activity of cooking as nurture, the artist suggests that the work is concerned with expiating the anxieties of motherhood and giving birth.[28] However, another image, the performance still below, of the mother cutting the baby cake, lacks the ameliorating effect of humour. Here I would like to return to the analogy made by Kristeva of the abject subject/artist as the child who has swallowed up his or her parents and is therefore frightened by the act and by finding him/herself "beside him[her]self alone" and also to Burgin's notion of "chiasm" which aptly conveys the ambiguous space of abjection where subjects and objects are no longer separated. This is a space that not only dissolves demarcations between "I" and Other, but also renders them interchangeable. The fascination of this image and the transgression towards which it gestures, lies precisely in the ambiguity of the relationship that is revealed through the structure of the work as aesthetic image. Fear of motherhood, and the performative violence it incites can be understood precisely as fear of the self – the threatening un-nameable named thing from which we must separate in order to live.

Kristeva's notion of abjection provides an explanation of material processes that underpin creative practice. A mastery of language and rhetorical codes allows the artist to negotiate the risky borders of abjection whilst maintaining a hold on identity. This leads to expansion and of language and thought; it allows us to account for revolutionary changes that occur in art and culture. It also provides and alternative explanation of how we make meaning that is not solely predicated on binary semiotics such as that of Levi Strauss. Indeed, it leads to the queering of transgression, not to mention "civility."

Transgressive Performances," in *Double Dialogues*, Issue 15 Winter 2011.

28. Bell, "Cooking up Crimes and Maternal Misdemeanours," Ibid.

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FIGURE 1. A female Japanese Jewel Beetle, *Chrysochroa fulgidissima*.
A Dorsal view. *B* Ventral view; bar: 0.5 cm.

Franziska Schenk, Bodo D. Wilts, Doekele G. Stavenga

The Japanese Jewel Beetle:

A painter's challenge*

Abstract: Colours as dynamic as the metallic-like hues adorning the Japanese Jewel Beetle have never been captured on canvas before. Unlike, and unmatched by, the chemical pigments of the artist's palette, the effect is generated by layered microstructures that refract and reflect light to make colour visible. Exclusive to nature for millions of years, such jewel-like colouration is only now being introduced to art. Sustained scientific research into nature's iridescent multilayer reflectors has recently led to the development and manufacture of analogous synthetic structures, notably innovative light interference flakes. For the first time this novel technology offers artists the exciting, yet challenging, potential to accurately depict nature's iridescence. Mimicking the Japanese Jewel Beetle by using paints with embedded flakes, we demonstrate that the resulting painting, just like the model, displays iridescent colours that shift with minute variation of the angle of light and viewing.

1. Pigmentary and structural colouration

In pictorial art, pigments have been used since time immemorial. However, natural colours are not only of pigmentary (or chemical) origin, but often have a physical (or structural) basis.[1] The mechanisms causing each type of colouration are fundamentally different. A substance containing pigments, such as paint, is a light-scattering material in which a certain chemical component selectively absorbs in a specific section of the visible wavelength range.[2] The colour impression, the remaining part of the light, changes neither hue nor brightness, even when viewed from different angles. Structural colour, on the other hand, is caused by light interacting with transparent, colourless nanostructures that selectively reflect light in a certain wavelength range. Here colours are made visible via the optical phenomenon of light interference, resulting in a colour that changes with the direction of illumination and viewing angle. Although numerous attempts have been made to capture the visual impression of structurally coloured animals in painting: "... colours of this type, by their very nature, defy our best efforts at visual reproduction."[3]

However, thanks to sustained scientific research into nature's iridescence-causing microstructures, the eye-catching optical effects of structural colour

1. S. Kinoshita, Structural *Colors in the Realm of Nature* (Singapore: World Scientific, 2008).
2. Many white paints may seem to lack an absorbing pigment, while they do absorb in the UV.
3. As Quoted in Hilda Simon, "Preface," in her *The Splendour of Iridescence: Structural Colors in the Animal World* (New York, USA: Dodd, Mead, 1971). See also John Gould, *A Monograph of the Trochilidae, or Family of Humming-Birds*, (Londres: *par l'auteur*, [1849–1861], *Supplement*, Henry Sotheran & Co., [1880–1887, 1804–1881]). Added footnote from the original.

biomimetics
iridescence
paint
colour
multilayer
polarisation

can now finally be introduced into painting. The development and manufacture of synthetic reflectors, notably the latest multilayer interference flakes, has recently led to a technology that offers artists the potential opportunity to accurately depict nature's iridescence. Interweaving the findings of optical physics, material science and artistic studio practice, we demonstrate here that the study of nature's ingenious colour-generating mechanisms can indeed aid artistic innovation and application.

2. Jewelled beetles in art: past, present and future

2.1 Jewel Beetles in artefacts

As an exemplary case we have chosen the Japanese Jewel Beetle, *Chrysochroa fulgidissima*, a member of the family Buprestidae, the jewel beetles (Figure 1).

The comparison is, of course, invariably made, for these beetles, small, compact, and frequently solidly iridescent, are the most jewel-like of all insects. [...] There can be no doubt, that if the only criterion applied were beauty and the brilliance and intensity of colour, some of the metallic beetles would get the prize if they were exhibited side by side with objects made of gold and precious stones.[4]

Perhaps not surprisingly, the splendour of the *Buprestidae*, the "living jewels", was not lost on the native people of those regions where they occur. Many indigenous people have traditionally used their elytra to make ornaments, often for ceremonial robes and regalia. For example, in certain Asian countries, such as India, Thailand and Japan, species of *Buprestidae* have been utilised in beetle-wing jewellery, decorations, textiles and also precious artefacts. In India, some of the oldest documented uses of beetle wings are found in early Basohli School miniature paintings (1690–1730), where it was customary to utilise pieces of jewel beetle elytra to symbolise the effect of emeralds.[5] The Japanese Jewel Beetle was used as ornament in ancient Japanese times. Indeed, its Japanese name, *Tamamushi*, derives from archaic Japanese "*Tama*" meaning jewels or beautiful things, and "*Mushi*" meaning small animals. The famous seventh century Japanese national treasure *Tamamushi-no-zushi*, the beetle wing shrine, was decorated with elytra taken from about 2600 specimens.[6]

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4. Simon, *The Splendour of Iridescence*, pp. 217–18.

5. V.Z. Rivers, "An overview of beetle elytra in textiles and ornament," in *Cultural Entomology Digest* 2:1994, 2–9. See also: Beetles in textiles: http://www.insects.org/ced2/beetles_tex.html

6. T. Hariyama , M. Hironaka, Y. Takaku, H. Horiguchi and D.G. Stavenga, "The leaf beetle, the jewel beetle, and the damselfly; insects with a multilayered show case," in S. Kinoshita and S. Yoshioka (Editors), *Structural Color in Biological Systems—Principles and Applications*, (Osaka, JP: Osaka University Press, 2005) pp.153–176. See also: J.P. Vigneron, M. Rassart, C. Vandenbem, V. Lousse, O. Deparis, L.P. Biro, D. Dedouaire, A. Cornet and P. Defrance, "Spectral filtering of visible light by the cuticle of metallic woodboring beetles and microfabrication of a matching bioinspired material," in Physics Review, E

Still, rather than being a mere preoccupation of the past, the apparent human fascination with jewel beetles still endures, as evidenced by the recent return to the spotlight of a magnificent stage costume made in 1888 for famed Shakespearean actress Ellen Terry. Incorporating 1,000 jewel beetle wings, the dress was originally created for Terry's portrayal of Lady Macbeth and a year later immortalized by American painter John Singer Sargent in a portrait now part of the London Tate Gallery collection.[7] Finally, after two years of restoration work, amounting to 1,300 hours of labour, her famous costume is back where it belongs – taking centre stage in a new contemporary display at Smallhythe Place, in Kent, where modern audiences continue to be wowed by its beauty.

Jan Fabre's work provides further compelling evidence of the enduring appeal of jewel beetle iridescence. In 2009, the contemporary artist decorated the ceiling of the Royal Palace in Brussels, which had remained unfinished since 1909, with 1.6 million shimmering green iridescent jewel beetles. Fabre and 30 other diligent artists, armed with a truck-full of beetles and glue, transformed the empty ceiling into one bejewelled with a sea of swirling and twinkling green. As one gazes up at the masterpiece from the floor, the whole mass of wing cases appears to move as the light reflects from different angles.[8]

All this demonstrates that, throughout the ages, iridescent jewel beetle specimens have been widely used in artefacts across the world. Yet, using real organisms for decoration and art may not necessarily be advisable from the naturalist's point of view. This considered, artificial materials are certainly a welcome alternative. The Japanese craftsman Shun Koiwa (artist name: Komei) may have been taken this into consideration when he developed, in 1932, the *Tamamushi-nuri* lacquer coat, a hard surface treatment of wood requiring the application of up to 50 layers of special lacquer by hand, separated by thin films of metal dust. As the technique's name indicates, this beautiful finish is claimed to resemble the iridescent *Tamamushi* (i.e. Japanese Jewel Beetle), and, in particular, the purple stripe on its back.[9]

Around the same time, similar breakthroughs were made in North America and Europe, which would eventually lead to synthetic colours even truer to those of the Japanese Jewel Beetle. Sustained attempts by industry to synthesise various lead, arsenic and bismuth salts for application as pearl lustre pigments finally came to fruition. This time continuing a search that began at least 3000 years ago when, as proven by an ancient Chinese document, humans

73:2006, 041905. For a more recent discussion, see: D.G. Stavenga, H.L. Leertouwer, P. Pirih and M.F. Wehling, "Imaging scatterometry of butterfly wing scales," in *Optics Express* 17:2009, 193–202.

7. See http://www.thehistoryblog.com/archives/10481 which gives a general overview of the dress and its painted commission by John Singer Sargent.

8. See: http://www.instructables.com/community/Ceiling-art-made-from-beetle-shells/.

9. Vigneron, et al (2006).

already sought to imitate the lustre of precious pearls by mixing different substances.[10] While a major advance at the time, it has since taken industry a further seventy years, and a succession of pearl lustre pigment-generations (i.e. basic lead carbonate in the 1960s, bismuth oxychloride platelets in the 1970's, followed by mica/metal oxide platelets since the late 1970's), to eventually arrive at synthetic multi-layered pigments capable of mimicking nature's iridescent hues.[11] Unlike chemical pigments, the latter do indeed resemble the multilayer reflectors found in, for example, pearls and beetles. Also consisting of alternating layers of transparent, colour-less materials with differing refractive indices, the platelets in question reflect and transmit light instead of absorbing it, creating colour by interference.[12] Gradually introduced since the late 1990's, the principal author of the present paper has since worked on converting these challenging materials for fine art painting.[13]

2.2 Biomimetic art: the future

Although industry has exploited the novel properties of iridescent flakes for over a decade, fine art painting has been slow to assimilate them. Difficulties in sourcing the materials are partly to blame. Although paints based on first-generation mica technology can now be bought from specialist art suppliers, latest multilayer pigments unfortunately often can only be purchased by industry, are prohibitively expensive and unavailable as artist paints. The major apparent hindrance, however, is the incompatibility with – and the resulting confusion caused by the material's non-adherence to – colour theory as applied in painting.[14] Centuries of extensive experience with light-absorbing pigments have led to firm rules of subtractive colorant mixing. When faced with the raw material, a whitish powder (no matter what the colour on the label), it immediately becomes apparent that the rules of easel painting no longer hold. In fact, quite in contrast, styling with transparent, interference-effect pigments is additive – a concept alien to most painters. The central tenet of this paper is, however, that the new technology mimics nature's technology. As a result, systematic analysis of the mechanisms that cause iridescent colour-mixes in animals can inspire analogous artistic methods. And indeed,

10. A. Krüger, *Perlen*, Bibl. d. Unterhaltung und *des Wissens* (Stuttgart, G: Union Deutsche Verlagsgesellshaft, 1919).

11. F.J. Maile, G. Pfaff and P. Reynders, "Effect pigments—past, present and future," in *Progress in Organic Coatings*, 54:2005, pp. 150–163.

12. G. Pfaff, *Special Effect Pigments: Technical Basis and Applications* (Hannover, Germany: Vincentz Network, 2008).

13. F. Schenk, "Nature's fluctuating colour captured on canvas?," in the *International Journal of Design & Nature and Ecodynamics*, 4:2009, 274–284.

14. H. Kueppers, *Color: Origin, Systems, Uses* (London, UK: Van Nostrand Reinhold Ltd, 1972). For colour synthesis and basic colour theory, see also: http://cs.nyu.edu/courses/fall02/V22.0380–001/color_theory.htm.

building on earlier work on liquid crystals,[15] previous work by Schenk has demonstrated that the considerable challenges posed by the technology can be overcome by adopting a biomimetic approach.[16] As will be shown in this paper, due to the unique expertise thus gained it has become for the first time possible to simulate the dynamic, metallic-like colouration of the Japanese Jewel Beetle on canvas.

3. Iridescence-generating mechanisms of the Japanese Jewel Beetle and effect pigments

To arrive at vital clues on how to best reproduce the Japanese Jewel Beetle ample scientific data was drawn on. The optical mechanisms involved in the jewel beetle's body colouration have been clarified in detail.[17] The elytra, modified hardened forewings, covering the flexible, transparent hindwings when the beetle is at rest, reflect maximally in the green region, with longitudinal, dark-purple stripes interrupting the pattern; at the borders in between the green and purple areas, the cuticle is red/orange. The underside of the beetle is highly curved and coloured orange (Figure 1).

In line with the above, we have categorised the jewel beetle colours into three cases, the main green of the elytra, the orange of the underside, and the purple stripes of the elytra (Figure 2A–C). Transmission electron microscopy conducted on samples of cuticle taken from each of these areas demonstrates that the colours are due to interference reflectors, consisting of differently spaced, alternating layers of chitin and melanin (Figure 2D–F). In all cases, an about 1.3 µm thick distal sheet, forming the epicuticle, features several layers with alternating high and low electron density, about 16 in the green, 22 in the orange area, and 12 in the purple area. Multilayer reflection is without question the most common and the best understood iridescence mechanism causing structural colouration. Optical multilayers consist of a stack of layers alternating in material properties, specifically in the refractive index (Figure 3). The refractive index values together with the thicknesses of the layers determine the colour of the reflected light.[18]

15. For early work on liquid crystals see: Y. Charnay, "A new medium for expression: painting with liquid crystals," in *Leonardo* (MIT), 15:1982, 219–221 and R. Lembert, "Liquid crystals: a new material for artists, *Leonardo* (MIT), 2:1969, 45–50.

16. Schenk (2009). See also F. Schenk and A.R. Parker, "Iridescent colour: from nature to the painter's palette, in *Leonardo* (MIT) 44:2011, 108–115. P. Ball has since referred to this work in *Nature's colour tricks*, in *Scientific America*, 306:2012, 74 and also the accompanying online feature: *Paintings made with iridescent nanopaints change color on the spot*: http://www.scientificamerican.com/article.cfm?id=schenk-franziska-iridescent-nanopaints

17. Stavenga et al (2011).

18. Kinoshita (2008) and Stavenga *et al.* (2011).

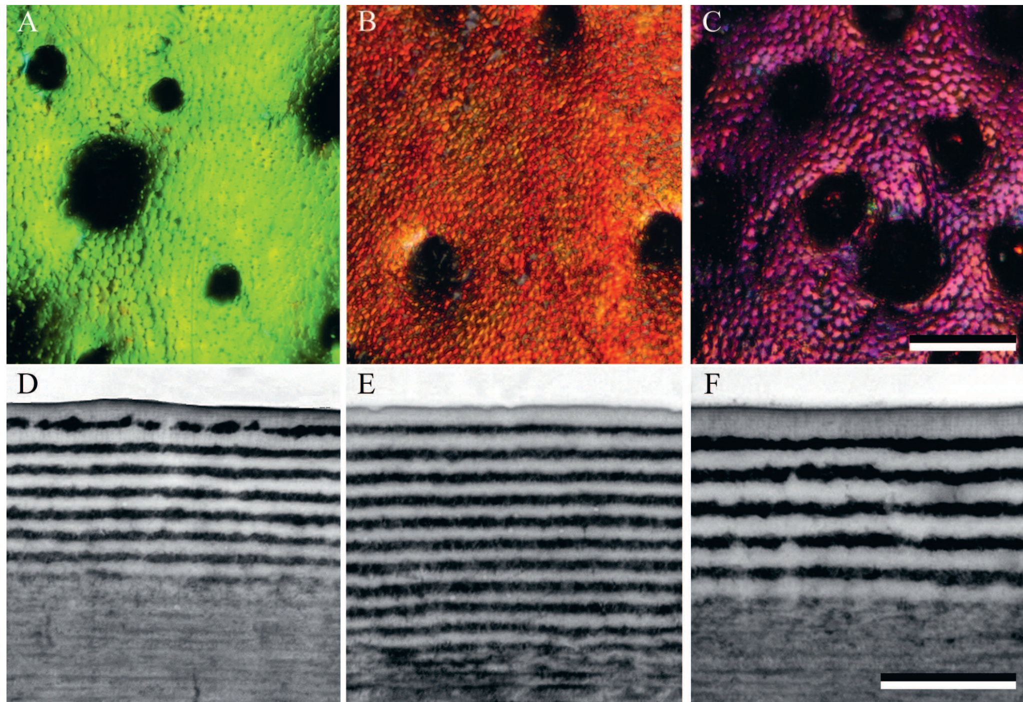


FIGURE 2

FIGURE 2 Photographs and transmission electron microscopy (TEM) images of the cuticular surface of the Japanese Jewel Beetle, *Chrysochroa fulgidissima*. *A* signifies the Green part of the elytron. *B* signifies the Orange ventral area. *C* signifies the Purple stripe of the elytron; bar: 100 µm. *D–F* Transversal TEM sections of the cuticle of the three cases of A–C, showing the multi-layered structure; bar: 1 µm.

FIGURE 3 (next page) Quarter-wave multilayer and reflectance properties. *A* Diagram of a multilayer consisting of a stack of 5 plates with alternating refractive indices n_1 and n_2 and thicknesses d_1 and d_2. When the optical thickness, that is, the product of refractive index and thickness, of the plates is the same, then the multilayer is an ideal or quarter-wave multilayer and reflects maximally light with wavelength λ following from $n_1d_1 = n_2d_2 = \lambda/4$. Incident light is TE- (or TM-) polarized when the electric vector is perpendicular (or parallel) to the plane of incidence. *B* Reflectance spectra for TE- and TM-polarized light and their mean of an ideal multilayer with refractive indices $n_1 = 1.6$ and $n_2 = 1.5$, and thicknesses $d_1 = 93.8$ nm and $d_2 = 100$ nm, when the angle of light incidence is 0°, 40° and 80°. *C* Peak wavelength as a function of light incidence. *D* Peak reflectance for TE- and TM-polarized light and their mean as a function of light incidence.

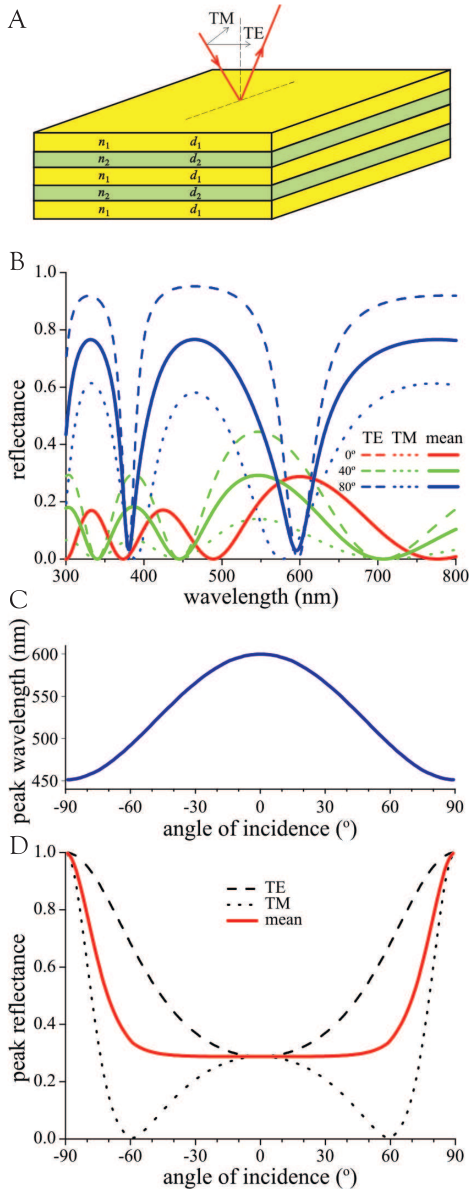


FIGURE 3

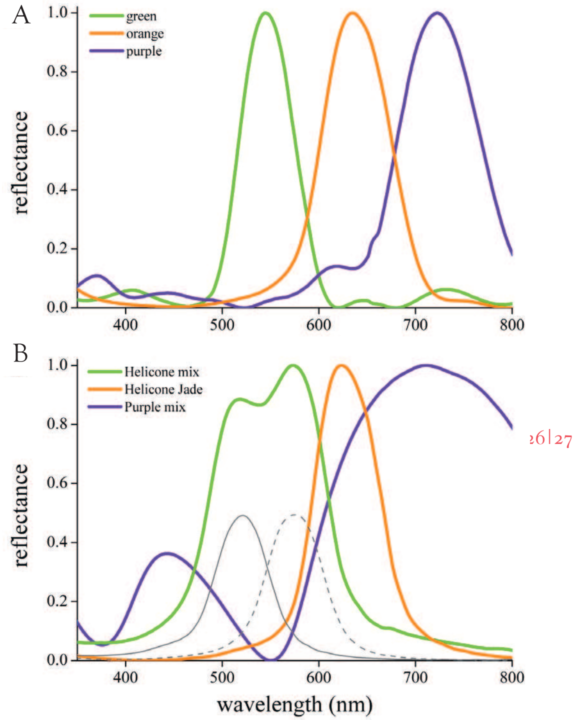


FIGURE 4

FIGURE 4 Normalized reflectance spectra with perpendicular illumination of the Japanese Jewel Beetle and effect paint. *A* The reflectance spectra of the green part of the elytra, the orange underside and the purple stripes of the elytra of the jewel beetle. *B* The spectra of the effect paints used in mimicking the beetle colours. The grey curves represent the reflectance spectra of the two components that together make up the green Helicone® mix spectrum.

The first explanations of multilayer reflections go back to the early 19th century, where Sir George Biddell Airy, Astronomer Royal, derived a formal description for the reflection of light by a thin film. The reflectance, i.e. the fraction of incident light that is reflected, depends on wavelength and angle of light incidence. Subsequently, formal expressions were developed for a stack of thin films, where each layer has the same optical thickness (nd), the product of the refractive index (n) and the geometrical thickness (d).[19] Such a multilayer is called an ideal or quarter-wave multilayer, because when a light beam enters normally (that is, perpendicularly), light with wavelength value, the quarter of which equals the optical thickness ($nd = \lambda/4$), is maximally reflected (Figure 3).

Crucially, the layers present in the Japanese Jewel Beetle are not discrete but graded (Figure 2 D–F). As a consequence, the refractive index does not change abruptly from layer to layer, but its value oscillates between about 1.6 and 1.7, with a periodicity depending on the location, thus causing different reflectance spectra (Figure 4A), that is, a different colour (Figure 2 A–B).[20] Obviously then, the Jewel Beetle multilayers are far from so-called ideal, but the basic principle of interference reflection holds. When a light wave experiences a change in refractive index it is partly reflected. With a repetitive changing refractive index all reflected waves add together, resulting in a reflected light flux. The relative phases of the waves determine the magnitude of the resulting reflectance.

Figure 3 presents a characteristic example of an ideal multilayer, consisting of 5 layers, and its reflection properties. The refractive index of the layers is alternating, 1.5 and 1.6, and the thicknesses are such that $n_1d_1 = n_2d_2 = 150$ nm, so that with normal illumination the reflectance peak wavelength is 600 nm. When the angle of light incidence is not normal, the reflectance depends on the polarization of the light, which is called TE (or TM) when the polarization is perpendicular (or parallel) to the plane of light incidence (Figure 3A). Figure 3B shows the TE- and TM-reflectance spectra for three angles of incidence (0°, 40° and 80°). The average of the TE- and TM-reflectance is the reflectance for unpolarized light, which is representative for a human observer, because the human eye cannot discriminate polarization directions. Interestingly, insect eyes generally do process polarization information, and the Japanese Jewel Beetles most likely can detect each other's presence via polarized reflections, meanwhile their predators, birds, do not possess polarization vision, like humans.

The most prominent property of a multilayer reflector is its iridescence, the change in the displayed colour when the angle of illumination and/or observation changes. For the multilayer of figure 3A, the iridescence is

19. M. Born and E. Wolf, *Principles of Optics* (Oxford, UK: Pergamon Press, 1999).
20. Stavenga et al (2011).

exemplified by the angle dependence of the reflectance peak wavelength, which shifts from the red (600 nm) at normal illumination to the blue (450 nm) at 90° light incidence (Figure 3C). As noted above, the peak reflectance for TE- and TM-polarized light strongly depends on the angle of incidence, but for unpolarized, natural light, the reflectance at the peak wavelength remains fairly constant up to an angle of incidence of about 60°. Above this value the reflectance rapidly rises to 100% (Figure 3D).

Generally, when the multilayer consists of layers with optical thickness alternatingly n_1d_1 and n_2d_2, the reflectance peak wavelength is given by the interference condition $\lambda_{max}(\theta_0) = 2(n_1d_1 \cos\theta_1 + n_2d_2 \cos\theta_2)$, where θ_0 is the angle of light incidence for the first layer and θ_1 and θ_2 are the angles at the interfaces of the multilayer, determined by Snell's Law: $n_1 \sin\theta_1 = n_2 \sin\theta_2 = n_0 \sin\theta_0$ (for the ideal multilayer with $n_1d_1 = n_2d_2 = 150$ nm, $\lambda max(\theta_0)$ is given in figure 3C, but the interference condition also holds for non-ideal multilayers).

Half a century ago, the optical theories for multilayers were extended to light reflections by an arbitrary stack of thin films.[21] With the computational power of present day personal computers, the reflectance spectra of complex multilayers can now be easily calculated with so-called transfer matrix formulae for any angle of light incidence. In fact, measurements of the reflectance of jewel beetle elytra could be straightforwardly interpreted with modelled spectra using the by now classical matrix theory.[22]

In the case of multilayer effect pigments, just as with natural reflectors, the interference colour is determined by the intensification of specific wavelengths and, if two or more layers in a multilayer pigment possess the same optical thickness, the colour of the reflected light becomes more intense as the number of layers increases. These quarter-wave multilayer effect pigments generate an intense metallic-like reflection colour (visible at face angle) that shifts towards adjacent shorter wavelength at grazing angle (e.g. from red to orange). Featuring fewer layers but a larger difference in refractive indices than their natural counterpart, the most sophisticated examples to date being the effect pigment families Firemist® and Miraval® – both based on TiO_2-coated borosilicate flakes.

Notably, the reflectors present in the jewel beetle cuticle also give rise to angle-dependent colours that shift towards the shorter end of the spectrum, but across a wider range of wavelengths (e.g. from violet to red and yellow-gold). At present only synthetic non-quarter wave pigments that feature layers of varying optical thickness – such as Variocrom™, Colorstream® and Firemist® Colormotion – display a comparable range of colour travel. By a suitable choice

21. H.A. Macleod, *Thin-film Optical Filters* (Bristol, UK: Adam Hilger: 1985).

22. D.G. Stavenga, B.D. Wilts, H.L. Leertouwer and T. Hariyama, "Polarized iridescence of the multilayered elytra of the Japanese jewel beetle: Chrysochroa fulgidissima," in *Philosophical Transactions of the Royal Society: Biological Sciences:* 366:2011, 709–723.

of differing layer thicknesses these goniochromatic, multi-quadrant multilayer pigments achieve a particularly marked variation of colour in dependence of viewing angle.

The strategies adopted to select for colours with both – increased brilliancy and colour travel – differ for jewel beetles and effect manufacturers. While the number of layers present in the beetle's cuticle has increased to compensate for the limited refractive index range of organic materials, industry, pursuing similar aims, is instead opting for fewer layers and materials with a large difference in refractive index. However, the recent emergence of ground-breaking non-quarter wave multilayer coating technology has made it possible to simultaneously increase the number of layers and minimise the platelet's overall thickness.

Crucially, however, the overall iridescent effect is not solely determined by the reflector type. There are a number of additional factors to consider. Firstly, the black melanin pigment present in the beetle cuticle plays an important role in determining the metallic-like, changeable colours. The melanin absorbs the light fraction backscattered from deeper layers in the cuticle, which markedly contributes to an increase in the intensity and purity of the reflection/interference colour. Without the melanin the reflection colour would be pale and insipid. This considered, when working with effect pigments, it is advisable to choose a black (rather than white) substrate as this, due to the transmitted light being fully absorbed, results in the purest, most vivid colouration.

In addition, observation of the beetle cuticle under the light microscope at high magnification offers further important insights, namely that the colour of each of the three areas identified above (i.e. the green, red/orange, purple) is not uniform but varies somewhat. For example, what appears green (when viewed with the naked eye) consists in fact of tiny patches of green, yellow and purple, which indicates that the properties of the colour-causing multilayers located below the surface locally vary (Figure 2 A–C). Yet, while the reflectors differ slightly in layer thickness and/or refractive index, the various individual hues blend into an overall colour (Figure 1). The pointillist mixing principles observed in the beetle do in turn suggest useful colour-mixing strategies for the effect painter.

4. Mimicking the jewel beetle's colours

Adopting a biomimetic approach, the scientific data presented above was drawn on to arrive at vital clues on how to best reproduce the Japanese Jewel Beetle in painting. Comparative optical measurements, performed on the beetle and on paint samples (incorporating interference flakes), confirm that the beetle's iridescent colouration can indeed be matched.

Figure 4A shows the reflectance spectra of the three cases when illuminated normally (that is, perpendicularly), and Figure 4B presents the

spectra of the mimicking effect pigments. Not only the appearance with normal illumination but also the colour impression at various angles of incidence could be satisfactorily mimicked (figure 5). Upon an increasing angle of light incidence, the colour of the reflected light is shifted towards the shorter wavelengths. The iridescence, that is the angle-dependency of the colouration of beetle and paint, was further studied by imaging scatterometry (Figure 6).

The various attempts and procedures leading to this result are described below. In an attempt to faithfully reproduce the colour of the Japanese Jewel Beetle, all multilayer pigments currently available were investigated. There is, however, one notable exception: a second class of special effect pigments exists, namely metallic effect pigments. Nature's metallic-looking reflectors, on the other hand, are non-metallic, i.e. they consist of dielectric materials that are often colour-less and transparent.

We therefore focused our search for suitable materials to mimic beetle colouration on pearlescent technology and the respective pigment lines launched over the last decade. Because it proved easiest to match the orange underside of the Jewel Beetle we first describe how this particular colouration can be mimicked.

5. The orange underside

Imaging scatterometry and angle-dependent reflectance measurements of a piece of cuticle from the underside shows that the reflected light is orange for angles up to about 45°; at larger angles the colour changes first to yellow than green and green-blue to finally, at angles above 70°, turns into a broad-band white. The effect pigment initially selected by eye was subsequently confirmed, via imaging scatterometry and spectrophotometry, to be indeed a very close match (Figure 5, 6). The interference pigment in question, LCP Helicone® Maple, incidentally belongs to the first ever effect pigment family (introduced in the mid 1990's) to generate distinct angle-dependent colour effects.

A subtle point to be emphasised here is that the optical properties of the chosen flake differs, in an important aspect, fundamentally from the Jewel Beetle's cuticle. Helicone® effect pigments are not classical thin-film multilayer reflectors, but a subtype based on liquid-crystal polymers (LCP), known as cholesteric effect pigments. Unlike thin-film multilayers, LCP's do not consist of alternating layers of two or more isotropic materials. Instead the helicoidal orientation of a single type of a birefringent unit provides the change in refractive index necessary for reflectivity.[23] In other words, while cholesteric pigments also take the form of a transparent, colourless layered platelet, here all layers are composed of the same material, namely a highly cross-linked,

23. Pfaff (2008).

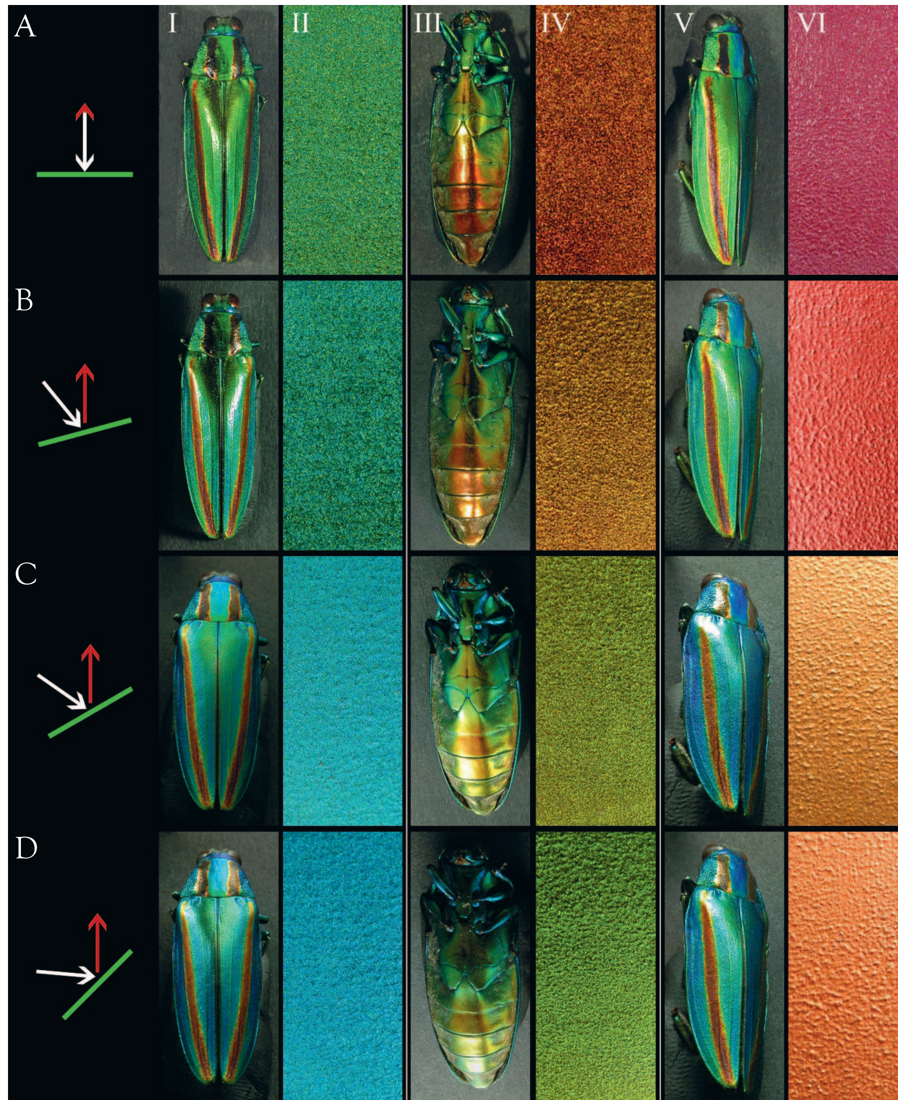
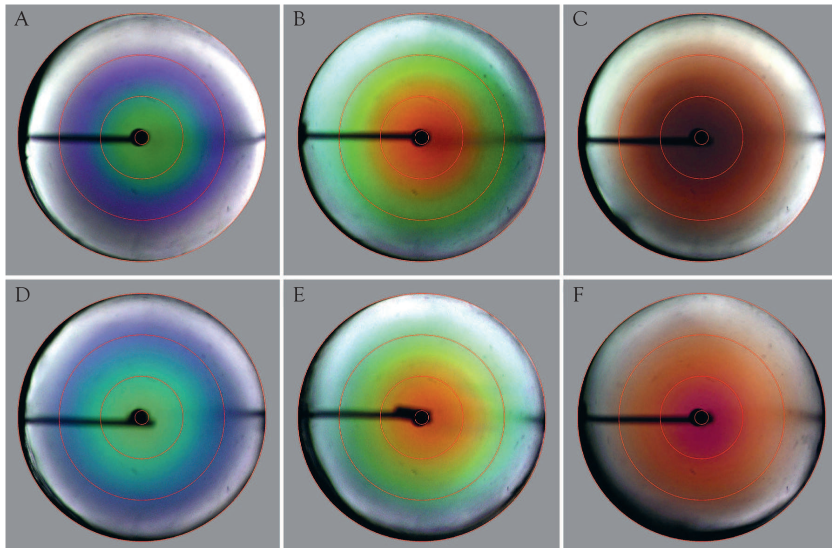


FIGURE 5 The three colour cases of the Jewel Beetle, the green part of the elytra (column I), the orange underside (column III) and the purple stripes of the elytra (column V), together with the mimicking effect paints (columns II, IV, VI) illuminated from various angles and observed from the mirror angle. From row *A* to row *D* the angle of light incidence increased in steps of about 10°. The animal and the colour samples were rotated around an axis perpendicular to the longitudinal (viewing) axis.



liquid crystalline organic polymer with a helical superstructure. Each layer, consisting of an array of aligned elongated liquid crystal molecules, has a different orientation with respect to the neighbouring layers. One turn of the helix, the pitch, represents a rotation of 360° and determines the colour of the resulting flake (Figure 7).

According to Parker (2003), this can be best understood by considering the platelet in its entirety as a stack of thin layers.[24] Each half turn of the helical molecules covers a quarter of a wavelength in distance or "thickness", and is equivalent to a single thin film. Consequently the whole cholesteric platelet, from top to bottom approximates many thin films piled up (Figure 7). In analogy to a stack of thin-films, the intensity of the total reflection is strengthened by reflections from each of the various layers of the helix. To obtain maximum reflectivity, at least six helices or a thickness of approx. 4 µm is required.[25] However, as with other effect pigments, the overall particle

24. A. Parker, *In the Blink of an Eye: How Vision Kick-started the Big Bang of Evolution* (London, GB: The Free Press, 2003) pp.111–113.

25. D. Makow, "Reflection and transmission of polymer liquid-crystal coatings and their application to decorative arts and stained glass," in *Color Research and Application*, 11:1986, 205–208.

FIGURE 6 Scatterograms of the Japanese Jewel Beetle and effect paints. *A* Scatterograms of the green part of the elytra. *B* The orange underside. *C* The purple stripes of the elytra. *D–F* Scatterograms of the effect paints mimicking the three beetle cases. The red circles indicate angular reflection directions of 5°, 30°, 60°, and 90°. The black bars at 9 o'clock are due to a glass pipette holding a piece of cuticle (*A–C*) or a piece of effect paint (*D–F*). The central black circle is due to a small central hole in the scatterometer's ellipsoidal mirror (for details of the method of imaging scatterometry, see Stavenga *et al.* 2009, 2011).

diameter is also important. The larger the circumference, the brighter the effect; here pigments with particles having an average diameter of 35 microns have been used.

6. The Elytral Green

After careful consideration, two effect pigments were chosen by eye as possible matches for the elytral green (visible at angles up to about 45°), which at larger angles changes into blue and violet, and at angles above 70° becomes a broad-band white (Figures 5–7).[26] However, while neither flake proved entirely suitable, when combined, the resulting colour mix closely resembles the beetle's green – as confirmed by subsequent imaging scatterometry and spectrophotometry (Figures 4, 6).

Once again, at closer interrogation, the pigments in question turned out to belong to the Helicone® family (i.e. Helicone® Jade and Scarabeus). This further confirms that the difference between thin-film and helicoidal systems is somewhat irrelevant to the human observer, because of the incapacity of the human eye to distinguish between the interference effects generated. Both reflector types cause visually identical angle-dependent shifts in iridescence, and thus it does not really matter which of the two the effect pigment painter chooses. The same holds true for other decorative applications. With no immediate advantage over "true" thin-film technology, the relative thickness of first-generation cholesteric flakes, together with stability/workability problems in certain applications, has led to the Helicone® pigment line being discontinued in early 2012.[27] However, other special effect pigment manufacturers are springing into the breach, developing ever more sophisticated and thinner cholesteric effect pigments – the main incentive being specialist security applications.[28]

For there is yet another unexpected twist to LCP technology: the reflected light is circularly polarized in the same rotational direction as the helix of the liquid crystal line phase. While this property is not visible to the naked eye, it is easily revealed: when viewed through an appropriate polarizing filter, the reflected light vanishes. This can be exploited when using cholesteric pigments for anti-counterfeiting markings on documents or banknotes.[29]

Circular polarization can also be found in certain beetles, predominantly

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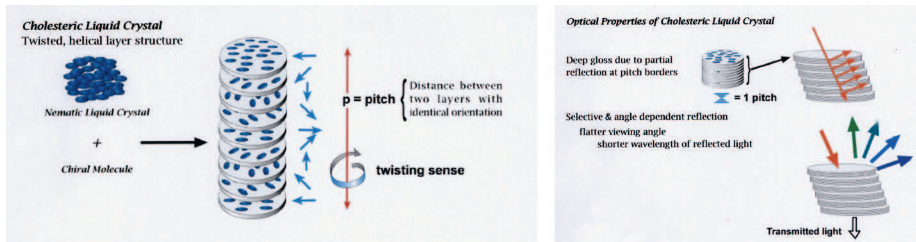
26. Stavenga et al (2011).
27. Maile et al (2005).
28. See further: http://www.chelix.com/products_pigment.html accessed 21 October 2012.
29. Y. Jiang, B. Wilson, and A. Hochbaum, "Novel pigment approaches in optically variable security inks including polarizing cholesteric liquid crystal (CLC) polymers, Optical Security and Counterfeit Deterrence Techniques IV," in *Proceedings, SPIE, The International Society for Optics and Photonics,* 4677:2002, 247–254. See also Pfaff (2008).



in scarabs, and may well have evolved for similar reasons: to generate signals not detectable by potential predators.[30] Notably certain scarab beetles with circular polarization, such as *Potosia aeruginosa jousselini*, do display colours that, to us at least, look almost identical to those of the Japanese Jewel Beetle. Non-normal illuminations of the thin-films present in the jewel beetle's cuticle, on the other hand, give rise to linear polarization. There might be good reasons for this diversity in nature's polarisation patterns: various studies have suggested that species-specific polarized reflectance-signatures may act as a receiver-dependent signal system in beetles, detectable by polarization-sensitive conspecifics but invisible to vertebrate predators.[31]

7. The purple stripes

Angle-dependent reflectance measurements demonstrate that the reflectors positioned beneath the stripes adorning the back of the Jewel Beetle reflect dark-purple/red into angles up to about 30°, changing into red/orange at angles around 60°, and into yellow and broad-band white above an angle of incidence and reflection of 60° (Figures 5–7).[32] To mimic this colouration, effect pigments whose colour travel to some degree echoes this angle-dependent colouration were initially selected by eye – in the process sampling the key thin-film multilayer systems currently in existence.

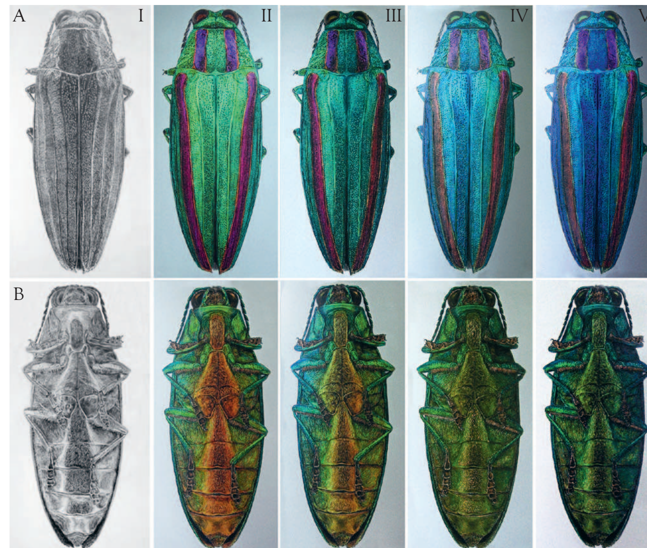
An initial comparison with the beetle's purple suggested that, due to the noticeable colour shift across a range of wavelengths, non-quarter wave pigment

30. A. Michelson, "On metallic colouring in birds and insects," *The Philosophic Magazine*, one of the oldest scientific journals published in English, 21:1911, 554–566. See also: S. Caveney, "Cuticle reflectivity and optical activity in scarab beetles: the role of uric acid," in *Proceedings of the Royal Society London, B*, 178:1971, 205–225; D.H. Goldstein, "Polarization properties of Scarabaeidae," *Applied Optics*, 45:2006, 7944–7950; and V. Sharma, M. Crne, J.O. Park and M. Srinivasarao, "Structural origin of circularly polarized iridescence in jewelled beetles," *Science* 325(5939):2009, 449–51.

31. A.E. Seago , P. Brady, J.P. Vigneron, and T.D. Schultz, "Gold bugs and beyond: a review of iridescence and structural colour mechanisms in beetles (Coleoptera)," in the *Journal Royal Society Interface*, 6 Supplement 2:2009, S165–S184. See also: P. Brady and M. Cummings, "Differential response to circularly polarized light by the jewel scarab beetle," *Chrysina gloriosa, The American Naturalist*, 175:2010, 614–620.

32. Stavenga et al (2011).

FIGURE 7 Optical principles of cholesteric liquid crystal pigments.
Courtesy of Kobo Products, Inc. (2008).



technology might be most appropriate. With this in mind, Variocrom™ Magic Purple, Colorstream® Royal Damask and Firemist® Colormotion Ruby (all suspended in the same binder and applied to a black substrate) were singled out for investigation. Incidentally, as their trade names suggest, the three "reds" in question do each belong to a different effect pigment family – each of which, in turn, marks a further stage in the evolution of pearlescent thin-film systems.

Neither of the classical multilayer effect pigments perfectly matches the deep-purple colouration of the jewel beetle. Consequently colour-mixing proved essential and, to this end, we intermixed non-quarter wave pigments with quarter-wave pigments in order to extend and adjust the hue and range of colour travel. The resulting colour mix, of Variocrom™ Magic Purple and Iriodin® Lava Red, indeed closely resembles the beetle's purple stripe – as confirmed by subsequent imaging scatterometry (Figure 6). Spectrometry shows a strong difference in the reflectance spectra, especially in the short wavelength range. This difference, however, is negligible for human observers.

8. Conclusions – the final artwork

To arrive at the final artwork, in the absence of ready-made paints and rules of application, the flakes selected had to initially be turned into paint suitable for fine art application. Only once an appropriate binder and formula had been found was it possible to consider potential artistic strategies – eventually

FIGURE 8 Final Painting of Japanese Jewel Beetle, mixed media on board, 90 × 60 cm, © F. Schenk. Two stages of the painting process are shown. Stage 1: Carbon drawing of the dorsal and ventral side (panel I). Stage 2: Introduction of iridescent colour and angle-dependency for different illumination of the painting (panels II-V, compare to Figure 5).

pinpointing "old-masterly" techniques as a possible way forward. Incidentally, so-called "traditional" methods (e.g. involving a tonal "under-painting" overlaid with semi-transparent glazes) are most in keeping with the complex layering present in the jewel beetle's cuticle – where the overall colour effect is due to black melanin overlaid with structural colour. Notably, as additive colour mixing is at work here, a black pigmentary base is crucial if the purest, most vivid iridescent hues are to be achieved.

With this in mind, as a first step, detailed tonal drawings of both the beetle's ventral and dorsal side were created, which subsequently were developed into black monochrome "under-paintings" – the latter not only constituting an inversed version of the original drawing, but also featuring a textured surface. Finally, drawing on our optical measurements, these were overlaid with iridescent paints based on the effect pigments selected to fully mimic the Japanese Jewel Beetle's colouration (figure 8). And indeed the desired effect is achieved – the final paintings, just like the model, change with every minute variation of the angle of light and viewing. This introduces an element of change, movement and transience into painting, traditionally a stationary medium.

In conclusion, whereas artists have been able to reproduce pigmentary colours in paintings since human's earliest memory, until now this has not been the case for structural colours. The example of the Japanese Jewel Beetle demonstrates, however, that with the help of latest iridescent colour technology, biological structural colours can finally be simulated in painting. Effect pigments, and the resulting paints based on light interference, are beginning to open up a completely new area of artistic activity. Thus, for the first time, an important segment of natural reflection can be recreated in art – potentially leading to novel artistic expressions and experiences.

It is hoped that this review of pearlescent effect pigments, together with the associated optical principles introduced, will provide artists with the intimate specialist knowledge essential to take full advantage of the manifold creative opportunities the technology has to offer – encouraging them to extend both their palette and repertoire. By harking back to the exemplar of the Renaissance painter as chemist, material scientist and, in this case, physicist, future generations of painters will inevitably develop diverse and imaginative ways in which to creatively employ this emerging technology. Basic ground rules for artistic application derived from biomimetics will, no doubt, further aid this process, thus helping to overcome the major challenges colour-variable flakes continue to present to the contemporary painter. For, given time and continued research, iridescent colour technology has the potential to revolutionise fine art painting.

ACKNOWLEDGEMENTS We thank Hein Leertouwer for collaboration; Merck KGaA & BASF Pigment Division for providing effect pigment powder; two anonymous reviewers for helpful comments and St John's College Oxford for awarding Franziska Schenk a Visiting Scholarship in support. This research was financially supported by Arts Council England, BIAD-Birmingham City University, and by the Air Force Office of Scientific Research/European Office of Aerospace Research and Development AFOSR/EOARD (grant FA8655-08-1-3012 to DGS).

FIGURE 1.1 Yvonne Hindle (Artist), *Melt down* (Detail), 2013. Courtesy of the artist.

Painting. Materials. Matters.

Pip Seymour in conversation with the painter Yvonne Hindle

Abstract: This interview presents a discussion of painting, its production and the ideas that motivate the painter's hand to move across the surface of the canvas. Hindle gives insight into the activity of painting, her approach to practice and her commitment to the lineage of abstraction, the (Neo) Baroque and the Sublime. As the paintings presented here testify, Hindle's intricate activations of paint mobilize a series of sophisticated material overlays and intensified use of colour. These paintings oscillate between image, formal abstraction and sculptural form and in doing so this work presses at the very edges of painting practice.

"I am interested in paint and its material qualities, painting that sits on the edge, somewhere between representation and matter."
Yvonne Hindle, painter.

P.S. Firstly, can you say something about how the use of materials impact on and inform how you make the work? I'm interested in getting a sense of the interplay between the doing and thinking about doing.

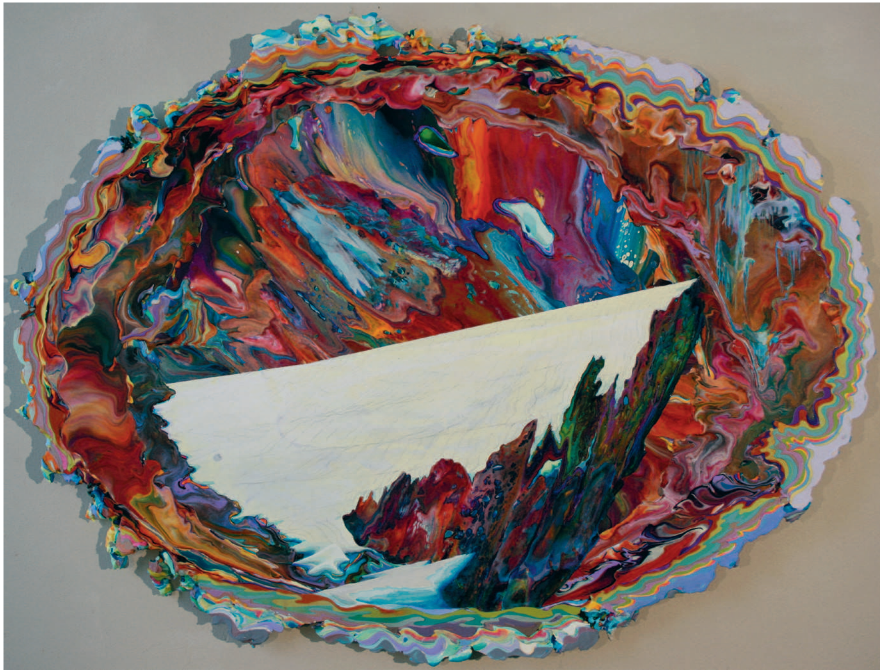
Y.H. The medium specificity of painting and the histories of abstraction paint and its materiality has always played a central role in my work. It's hard for me to determine which comes first, whether it is the materials that inform the work or the work the demands particular materials to be used. My work at this moment is inextricably linked to, and the result of, the last two decades of the material and conceptual exploration of the (Neo) Baroque. This has been complimented by my interest in the Sublime and an ongoing concern with modernism as providing the foundations of contemporary abstraction. Naturally there is a continual ebb and flow between ideas being formed through material experimentation and play, those things that emerge from acts of doing, and pre-conceptions that tend to act as the motivation, or impetus for beginning to paint. For me it is never quite one or the other, both aspects of this engagement are somehow entwined.

In my current body of work I am interested in a more focused concern with the *edge*, the very edge of the painting, those points at which the surface might appear to be materially fetishized, that presents the viewer with a transition from a pristine surface to a more physical (perhaps sculptural) accumulation of material residue: something where the edges testify to the porous conditions of the edge itself. For example in the painting I'm working on now, *Melt down* (Figures 1.1 to 1.3) the pivotal aspects of the work are intensified through the dynamic interplay of the canvas edges where points of convergence occur between physical forms and empty spaces that animate

visceral
matter
illusion
surface
formality
representation

FIGURE 1.2 Yvonne Hindle (Artist), *Melt down* (Central Detail).
Courtesy of the artist.

figure 1.3 Yvonne Hindle (Artist), *Melt down*.
Acrylic on canvas, 110 cm × 80 cm, 2013.
Courtesy of the artist.



the structure and work in relationship to representation. Furthermore in *Melt down* (Figure 1.3) and also in another painting titled *Northern Waters Southern Fires* (Figure 2), we can see the edges of the canvases have become physically built up with precarious stacks and accumulations of paint. These formations teeter – they can be read in different ways, from the *actual* conditions of paint and its materiality to the connotations of the micro; from the paint itself to the imaginary space of, say, a rock-face, a cliff edge or an iceberg. (Figures 2.1 to 2.2)

The sense of image I am interested in is not literal and there is a continual vacillation between material and readable image. The paintings are intended to work on a cusp. This meeting point reminds me of the devices and constructs I have investigated in the Baroque where there are conflations between painted space and actual three-dimensional form. We only have to think of Martin Jay's investigation of Baroque ceiling paintings where he describes how the handling of paint both forms and deforms representation.[1]

1. See Martin Jay's seminal work, *"Scopic Regimes of Modernity,"* in Hal Foster (ed), *Vision and Visuality: Discussions in Contemporary Culture*, (San Francisco: Bay Press: 1988), pp. 2–23. The recent polemic by Angela Ndalianis, *Architeres of Vision: Neo-Baroque Optical Regims and Contemporary Entertainment Media* draws out Martin Jay's crucial concept: ocular regime. http://web.mit.edu/comm-forum/papers/ndalianis.html

FIGURE 2.1 Yvonne Hindle (Artist), *Northern Waters Southern Fires*. Acrylic on canvas, 67 cm × 90 cm, 2012. Courtesy of the artist.

FIGURE 2.2 Yvonne Hindle (Artist), *Northern Waters Southern Fires* (Detail). Courtesy of the artist.

Going back to the edge of my work the piles of residual paint from the painting process appear to be in a state of transformation, as if melting into the flat pictorial two-dimensional space; not the flatness of concrete or plastic abstraction but a *space*, which is akin to the photographic where flowing and visceral paint becomes like a moment caught and yet there should also be a sense that it holds an ongoing slow momentum. The materials have to be able to convey a complex and sophisticated range of physical, temporal and illusionistic qualities.

P.S. Is there a need to explain your material process or is it a story that should remain untold?

Y.H. I think the process involved is a story that should be told, especially as I work with students. As part of my teaching I am open with the students about my painting techniques and processes, I try to demystify paint by showing the students the fundamentals of paint: its compositions and formulations. Paint is one of the most conventional materials in contemporary art practice and in order to use it in an unconventional way you need to know how you can push it to extremes and this can only happen if you have an understanding of some basic formulations of paint and mediums. It is after all just coloured dirt in a number of different mediums whether they are oil or water based. Essentially I use a variety of acrylic mediums that range from being like syrup to a thick paste to this I add colour it's just getting mixes and timing right, it's like cooking. The processes of application I employ to make my paintings are temperamental, the slimy visceral rainbows of paint so prevalent in my work is hard to handle as it can easily turn into rivers of boring mud. The nature of my work is bound in the double play between the real and illusionistic, the authentic moment and that which is carefully and deliberately constructed.

P.S. How do you choose the colours that you ultimately will use? is this predetermined or open to suggestion? If there is a set group of colours used, what governs that choice?

Y.H. The choice of colours is very important: Red, Orange, Yellow, Green, Turquoise, Blue, Violet and Indigo are vital components of the palette, as are a few earth colours such as Transoxide Red, Orange and Yellow. To some extent there is an acute sense of control but I wouldn't say it is predetermined. There has to be openness, there has to be room for responsive moments in the process. Importantly they are all transparent and based on the colour system for photographic printing. This spectrum of colours when overlaid creates the allusion of the photographic giving the abstract flows and bursts of paint a precarious realism. The full spectrum of colours also offers infinite nuances of colour as they are layered and mingled while in the wet fluid state of

application. The colour can at times also imply a kind of sickly if rapturous delirium which is heightened by the sense of disorientation often apparent in the construction of the image.

P.S. Is the painting realized in the wet fluid stage of working or are there last minute tweaks?

Y.H. "Surface affect" and "hyperreal" illusion has become a more important part of my work. The traces of production, of application are held below a satin sheened surface of the medium. I have increasingly developed the techniques I employ through the wet and visceral paint in order to heighten the sense of "the emergent image". While the paintings look coherent and as if they have been made rapidly on closer inspection most of them are not what they seem. What may appear to be a drip or a gestural mark is in fact a fake or pre-fabricated element that is collaged to the painting surface. The paintings can take months to complete but hopefully appear as if they have taken moments to make.

P.S. How do you choose the materials you use and what governs the format for a painting?

Y.H. Much of my time in the studio is spent developing and adapting tactile paint mediums. The medium has to be sticky and irksome like tar so as to be able to convey notions of time and motion. The thick visceral and corporeal quality of the medium also asserts a connectedness with our own flesh and base materials in nature. Within each new piece of work I need to witness something new that the fluid material offers, the chance occurrence of an accidental collision between colour and gesture. If the material nature and behavior of the paint is too familiar or conversely too unpredictable and out of a certain realm of control, the work becomes visually boring and meaningless.

The oval shaped canvas has been a preoccupation for the last decade primarily because it removes the usual reading of the work in pictorial terms. The oval offers possibilities of being both perceived as object and porthole. It is less likely to be read as a picture and it amplifies the oscillation between matter and image. For me the oval paintings are melancholic bodies like satellites, moons or small worlds that have their own internal temporality. This is clearly evident in paintings such as *Enceladus* (Figure 3), and *Tethys*, (Figure 4.1 and Figure 4.2 – Reverse Detail), all completed in 2011.

Shifts in scale have become increasingly important and although many of the paintings are still modest in size their interior scale implies immensity, worlds that sit on the edge of representation and matter.

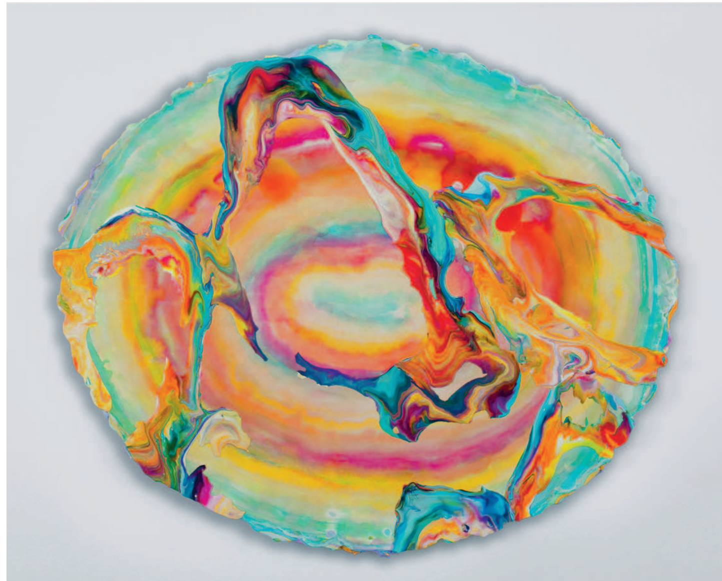


Figure 3 Yvonne Hindle (Artist), *Enceladus*.
Acrylic on canvas, 45 cm × 54 cm, 2011.
Courtesy of the artist.

Figure 4.1 Yvonne Hindle (Artist), *Tethys*.
Acrylic on canvas, 48 cm × 58 cm, 2011.
Courtesy of the artist.

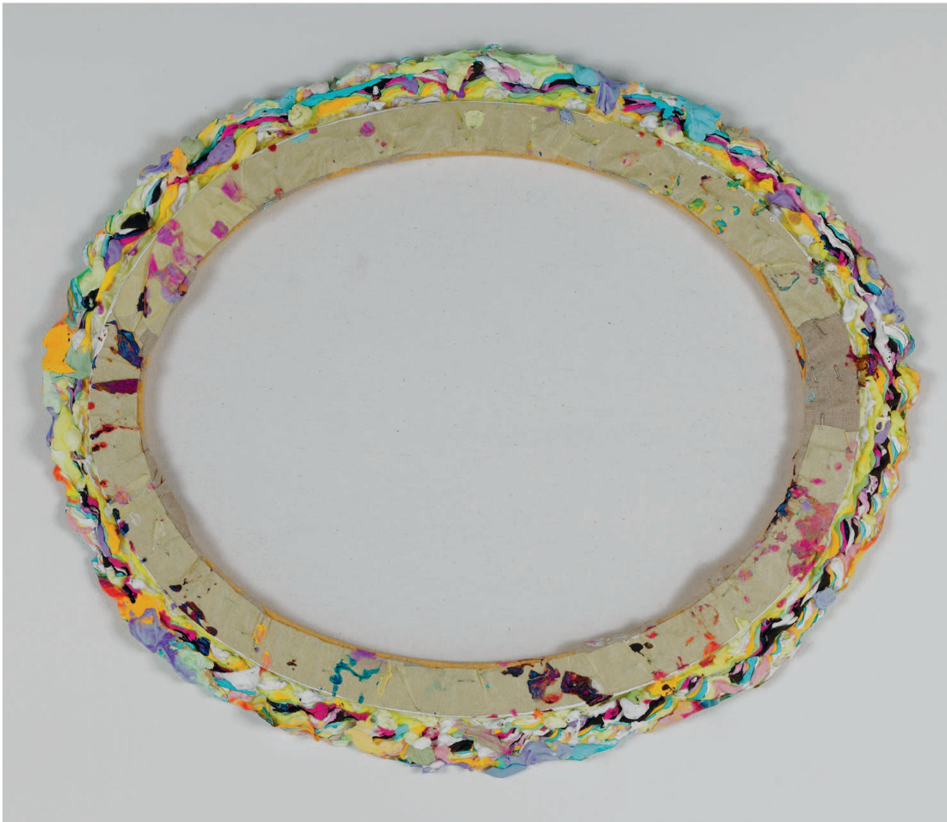


FIGURE 4.2 Yvonne Hindle (Artist), *Tethys* (Reverse Detail).
Courtesy of the artist.

*This article emerged from a series of exchanges and presentations, first raised several years ago at the *Public Space, Art and Collective Memory*, Centre for Chinese Visual Arts (CCVA), Third Annual Conference (Birmingham City University 2009) and later refined into a presentation at the *Intersections Duration* conference, (University of Newcastle, March 2012).

Sian Everitt Vaughan

The Archive and Public Art:

Archiving the materialities of our times*

Abstract: Public art practice generates a specific materiality of the moment. Its archiving forces us to deal with a number of issues ranging from the preservation of ephemeral artworks, digital and performance to the more traditional large scale public art pieces. This paper examines those issues and in so doing, raises the overarching problems of legitimation, power and control implicit in the very commissioning of an artistic practice, not to mention how the work may be considered "valid" enough to be documented. It then raises the central question of accessibility for current and future publics within the actual bricks and mortar of an archive, simultaneously offering the traces of the artwork's raw presence whilst, paradoxically, preserving it in memoir.

Problematizing the relationship between the archive and the practice of public art, the two seemingly disparate areas in which I work, highlights and questions the legitimisation of practice. As an art historian who researches and teaches about public art, I am also "Keeper of Archives" managing the Faculty's archival and artwork collections at the internationally recognised Birmingham Institute of Art & Design.[1] These two professional areas of practice are not as disparate as it might appear. In reflecting on authority and duration, the dissonances and intersections between archives and public art were thrown into relief.

The archive, as site and construct, occupies and embodies the tensions between permanence and temporality. Yet the argument for making information on public art available to the public and for preserving existing archives of public art seems somewhat self-evident. The range of documents and voices in an archive can capture the richness of intentions and meanings instrumental in the actualisation of each permanent artwork in the public realm. Surely it is also in the archive that we should be able to record and uncover the lost works, the unrealised, the temporary, the performative and the contingent.[2] The archivalisation of public art is both necessary and

1. The Birmingham Institute for Art & Design, Birmingham City University, was awarded the prestigious world-leading research environment status in 2008. Given the mandate of the Art and Design Archives to store and make accessible local and regional public works whilst simultaneously maintaining and growing its global archive, the need to re-think what is an archive, what should be archived, in what ways can it be archived and so on is a particularly urgent problem.

2. The definition of public art remains problematic. Arlene Raven opens *Art in the Public Interest* with the statement that "public art isn't a hero on a horse anymore," (New York: De Capo Press, 1993), p. 1. Her book then demonstrates this change with a far broader definition of late twentieth century public art as art in the public interest, rather than as a sculptural monument, which for Raven includes oral history, protest actions and guerrilla theatre alongside sculpture, painting and craft. In the twenty-first century we have to add virtual and digital art works to our understanding of the diversity of practice public art encompasses. The term public in relation to public art also has diverse

public art practice
public art as archive
archiving
legitimising practice
trace
public access

happening – in physical form, in the digital and indeed in, and as, art practice itself. Yet documentation is not a substitute for the experiential; it is at best the capture of traces, a translation and partial depiction of what was possible at a specific moment in time. The archive tantalises and intrigues, as much for the multiple voices it contains as for encouraging reflection on those voices that are absent.

To problematize the relationship between public art and archives forces us to confront anew issues of power and control implicit in both the process and function of archive creation and in all activity in the public realm.[3] Thus we have to acknowledge the politics and presumptions inherent not only in commissioning and artistic practice but also in the archivalisation of public art, the information and meaning to which current and future publics are given access. Each successive local, regional, national authority tends to promote public art works whilst simultaneously offering commissions to artists often already well-known or maintaining/establishing the predominance of the White Western/European Male.[4] In 1988 American critic Patricia Phillips had bemoaned that: "The studios of the artists who have learned the appropriate formula have become mini-factories for the churning out of elegant maquettes for current and future projects".[5] Sadly little has changed and the question is how are such works and the decisions that initiated them to be preserved and archived.

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meanings and connotations, some complementary, others competing and contradictory. Public has been interpreted as denoting a physical location, or an indicator of financial sponsorship, or, and more problematically, as defining the intended audience for the art – problematic give the assumption of a single homogenous cultural entity "the public". One of the best introductions to the subject remains Malcolm Miles, *Art, Space and the City*, (London: Routledge, 1997).

3. It could be argued that this is a problem that has plagued archives since the beginning of the keeping of archives. It does, however, take on another set of dimensions when dealing with art objects and their categorization. For quite some time, Art School archives were established chronologically or geographically – thus rendering individual art movements invisible. But for a general outline of the problem see A. Mbembe, "The Power of the Archive and its Limits," in C. Hamilton, V. Harris et al (eds) *Refiguring the Archive*, (Dordrecht, The Netherlands: Kluwer Academic Publishers, 2002), pp 19–27 and A. Burton (ed.), *Archive Stories: Facts, Fictions and the Writing of History*, (Durham & London: Duke University Press, 2005).

4. To give just one example, The Monument to the Women of World War II, a national commemorative sculpture on Whitehall in London (John W. Mills, 2005,) has seventeen sets of clothing symbolising the different services performed by women during World War II but the women themselves remain invisible (*War Memorials Archive*: http://www.ukniwm.org.uk/server/show/conMemorial.51288). Recent scholarship is beginning to highlight such gender issues in public art, for example see Erika Doss, "Women Warrior Memorials and Issues of Gender in Contemporary American Public Art," in *Public Art Dialogue*, Volume 2, Issue 2, September 2012, pp.190–214. More generally public art discourse has examined the problematics of an artist speaking to and on behalf of a community to which they may not belong, see for example: M. Kwon, *One Place after Another: Site-Specific Art and Locational Identity*, (Cambridge and London: The MIT Press, 2004) and G. Kester, *Conversation Pieces: Community and Communication in Modern Art*, (London: University of California Press Ltd, 2004).

5. P. Phillips, "The Public Art Machine: Out of Order", *Artforum*, December 1988, 93–6, p. 96

The Archive

The traditional definition and understanding of the archive has been challenged by critical works and contemporary practices, all the more so given the impact of the digital technologies.[6] As with many categorisations, the so-called "traditional" persists through a naturalisation and familiarity that renders it both pervasive, without question, and influential. According to the Society of American Archivists, the official "definition" of archive is defined as:

> n. ~ 1. Materials created or received by a person, family, or organization, public or private, in the conduct of their affairs and preserved because of the enduring value contained in the information they contain or as evidence of the functions and responsibilities of their creator, especially those materials maintained using the principles of provenance, original order, and collective control; permanent records. – 2. The division within an organization responsible for maintaining the organization's records of enduring value. – 3. An organization that collects the records of individuals, families, or other organizations; collecting of archives. – 4. The professional discipline of administering such collections and organizations. – 5. The building (or portion thereof) housing archival collections. – 6. A published collection of scholarly papers, especially as a periodical.[7]

As collection, organisational collector and also the designation of the physical and institutional repository that holds the archive collections, the archive has also been the site of the official records of government and institutions of State. These official records are preserved as archives, giving both the archival materials and repositories themselves a sense of officialdom, and the active legitimising of authority, whilst simultaneously constituting that authority. The one common thread all these disparate positions on the archive hold is that an archive is meant to be completely objective, without prejudice or whim."[8] It is this view that is now being challenged. In his *"Archival Science*

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6. The impact of the digital transformation in research and practice is discussed further in F. Cameron and S. Kenderdine (eds), *Theorizing Digital Cultural Heritage: A Critical Discourse*, (London: The MIT Press 2007). The expanding influence of digital humanities is examined in C. Warwick, M. Terras and J. Nyhan (eds), *Digital Humanities in Practice*, (London: Facet Publishing, 2012) and M. Terras, J. Nyhan and E. Vanhoutte (eds), *Defining Digital Humanities: a Reader*, (Oxford: Ashgate Publishing Ltd, 2013).

7. The Society of American Archivists, "Archives (also archive), n." as quoted in http://www2.archivists.org/glossary/terms/a/archives.

8. H. Jenkinson, *Manual of Archive Administration*, (Oxford: Clarendon Press, 1922). Indeed as Sir Hilary Jenkinson, Keeper of Public Archives in the UK, stated in what was to become one of the

and Postmodernism," Terry Cook summarises this shift, echoing the well-known work, *Archive* Fever, by Jacque Derrida.[9] Cook writes:

> Archival theoretical discourse is shifting from product to process, from structure to function, from archives to archiving, from the record to the recording context, from the "natural" residue or passive by-product of administration activity to the consciously constructed and actively mediated "archivalisation" of social memory.[10]

As Derrida saw it, society is suffering from an entropic, morbid fascination with authority and permanence, a need to record everything and anything at the very the moment of its happening; to hold the event fast, steady, and in some state of semi-regulative permanence. To hold the event *in memorium.* He famously named this need "archive fever": a bitter, destructive struggle against the modern ennui of contingency, change, relativity. Like the lifeless pinning of the butterfly to the wall in order to witness its colour, finery and beauty, Derrida's archive fever recognises the complexity of the archive: an impulse for destruction as part of the very creation of the archive itself; a drive to secure an absolute authority or truth to the captured event (document, art object, butterfly), a double-event whose survival renders the archive irrelevant whilst simultaneously making it central for the legitimation of innovation and change.[11]

Despite the aura of authority and completeness, Derrida argues that the archive, as both site and construct, also occupies permanence and temporality, whilst embodying the ambiguous tensions between permanence and temporality. That is, the archive also occupies the "unsayable" spaces, indeed, the secrets, of a permanent record and its utterances and the absences within each iteration and articulation, as situated in a particular moment in time.[12] One can say, alongside the Derridean move, that in the archivalisation of public art, it is critical to acknowledge these gaps; indeed, they are as important as the traces left in art objects and other forms of documentation; they make room for a certain form of movement and sensibility thus allowing, further, the generating of different meanings, interpretations and difference in each

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most influential texts on the subject: "Archives state no opinion, voice no conjecture; they are simply written memorial, authenticated by the fact of their official preservation, of events which actually occurred and of which they themselves formed a part." p. 4.

9. J. Derrida, *Archive Fever: a Freudian impression,* trans. Eric Prenowitz, (Chicago: University of Chicago Press, 1996).

10. T. Cook, "Archival Science and Postmodernism: New Formulations for Old Concepts," in *Archival Science*, Vol. 1, No.1, 3–24 (2000), p. 3c.

11. Derrida, *Archive Fever*, pp. 9–12.

12. Derrida, *Archive Fever,* pp. 91–95. But see also J. Derrida, *The Gift of Death and Literature in Secret*, translated by David Wills, (Chicago: University of Chicago Press, 2007), especially pp. 53–81.

successive encounter between the art, memories of art and a public curious to know, feel, smell the unsayable stories of each archived work of art.

Of course the other "unsayable" feature of the archive is its implicit – and sometimes explicit – decisions made by archivists themselves as to what materials, information and so on may or may not be deemed "selectable" during the official process of appraisal. It can be said, without putting too fine a point on it, that information not included has either consciously or unconsciously (usually the former) been "hidden from history" as the early feminist theorists would say.[13] Our recollection of events if not given archive status, particularly in a world where narrative memories are transmitted via the written law rather than the oral law, often means that the event as such is censored or destroyed. Derrida's writings have forced archivists to acknowledge that not only is the aura of the archive a site of power and authority, but also it promulgates the archivists complicit role in constructing and actively mediating its creation.[14] The question may become: who will break rank?

Archiving the Public / Public Art as Archive

In 2009 the Henry Moore Institute in Leeds held an exhibition based on the Archive of the Public Art Development Trust (PADT), which it had acquired in 2005. Founded in London in 1983, PADT was the first agency of its kind in the UK devoted to the instigation and development of public art projects. The exhibition, entitled *Art in Public Places*, marked the growing shift from static / large bronze or stone figures as "public art" to a public art more closely resembling, or indeed actually embracing, the performative. In one sense, then, the art objects and interventions that exist in the public realm could be considered collectively as constituting as an archive: public art as archive, where the archive moves away from its form as repository and becomes the outdoors, living memory of the everyday.[15]

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13. See the well-known discussion by Sheila Rowbotham, *Hidden From History: 300 years of Women's Oppression and the Fight Against It,* (London: Pluto Press, 1973).

14. In foregrounding the constructed and contested nature of the archive, I am not, of course, assuming revolutionary potential in this revelation per se. Grant Kester has recently drawn on Eve Kosofsky Sedgwick's interpretation of a "paranoid consensus" in contemporary critical theory whereby the act of revelation itself assumes almost mystical agency, to highlight the presumptions and limitations of such an approach. As Sedgwick puts it: "What is the basis for assuming that it will surprise or disturb, never mind motivate, anyone to learn that a given social manifestation is artificial, self-contradictory, imitative, phantasmatic or even violent?" As quoted in G.H. Kester, *The One and the Many: contemporary collaborative art in a global context*, (Durham and London: Duke University Press, 2011), pp. 52–3.

15. As the curators of the show point out, *Art in Public Places* charted the shift in public art from static/large art sculptural objects to performative, ephemeral interventions. This move challenged the traditional archive as repository and began to shift the meaning of archive itself as being embodied in the public art practices rather than simply acting as a repository as it had historically been designed to do. *Art in Public Places* gives a unique insight into the evolution of public art and charts the major shift

The PADT Archive is a bold, challenging approach to public art archiving. It is a model that the staff at the Birmingham Institute for Art and Design have been developing within our own archives. Originally founded by West Midlands Arts (WMA) in 1987, The Public Art Commissions Agency (PACA) donated its archive was donated to the University upon the Agency's closure in 1999. The PACA Archive is a large and complex archive consisting of nearly 47,000 drawings, sketches and proposals by artists. The files contain project documentation including correspondence, research notes, contracts, briefs to artists and minutes of meetings. They include photographs and slides providing extensive records of the public art projects with which PACA was involved, and there are images showing artists' work at all stages from proposals and maquettes through fabrication and installation to the views of the completed works in situ. The PACA Archive records the realisation of actual public art works as well as the possible (in the form of alternative proposals); it also captures the performative and the temporary.

As both a living repository of the present and an almost fossilized embodiment of the past, the PACA Archive is an extensive and complex paradox of material and materialities. The files (and within them their individual contents) are still in the original order in which they left PACA's Birmingham Office – this prior to computing and digital archiving as we might know it today. Preserved in the order it was created and used by PACA's staff, this original order reveals much about the context of the material, the methodologies of the Agency and perhaps also hints at the sometimes unavoidable operational inefficiencies when working with artists and the public realm. The contents of the individual files vary greatly in quantity, depth and both informational and evidential value. Intriguingly, there are gaps in the PACA Archive. Some projects are very fully documented; on others there is scant information. Such omissions may be significant. The differing levels of documentation may reflect differences in the status with which particular projects or activities were viewed. They may reflect staff changes within the Agency and the consequent alterations in working practices. Conversely, the omissions may be purely coincidental and based on the haphazard fates that befell individual documents. But whatever the reason, the richness of such documentary material, viewed holistically to include consideration of its mediation and absences, demonstrates the potential of the archivalisation of commissioning practice to enable nuanced and multi-layered readings of the genesis of art in the public realm.

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from permanent bronze and stone figures to temporary interventions, installations and projections. The exhibition also gives a snapshot of how an organisation is represented through its archive, with the complex genesis of sometimes controversial projects played out through ephemeral and documentary material." The Henry Moore Institute at http://www.henry-moore.org/hmi/exhibitions/past-exhibitions/2009/art-in-public-places.

The PACA and PADT Archives are just two examples of a new range of archival resources for public art that are being recognised for their potential academic and public benefits. In the USA in 2007, the *Creative Time* organisation donated its archives to the Fales Library at New York University, as did Joyce Pomeroy Schwartz, director and founder of the agency *Works of Art for Public Spaces*. Both Archives contain slides, video, drawings and other documentation of public art in New York, covering over 35 years of activity in the city. In describing the PADT Archive, the curators at the Henry Moore Institute commented on its reflection of what they described as an "evolution" of practice from the commissioning of permanent objects to include "temporary interventions, installations and projections". The University of Sunderland hosts the Locus+ Archive, recognised as the largest archive of time-based work in Europe, which documents over 30 years of performance, installation, sited and process works. Yet documentation is not a substitute for the experiential; it is at best the capture of traces, a translation and partial depiction of what was possible at a specific moment in time.[16] Yet surely it is in only in such archives that we should be able to record and uncover the lost works, the unrealised, the temporary, the performative and the contingent, art works which have left little physical trace in the public realm yet may have imprinted themselves in the memories of numerous individuals.

The range of documents and voices in the archives documenting public art have the potential to capture the greater richness of intentions and meanings instrumental in the actualisation of each art work in the public realm, whether physical, permanent or temporary. These meanings intended by and motivating commissioners and artists may be embodied in the art work or they may be intelligible and legible to the viewer. Just as easily they may be hidden, perhaps intentionally illegible. The processes and procedures accompanying the genesis of the works also add nuances of meaning and signification. The argument for preserving existing physical archives of public art in all their static and ephemeral ways is incontestable. The question is: how do we manage the paradox? Or better yet: how can we grow, and, indeed nurture, the paradox?

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16. The relationship between documentation and performance remains as problematic for public art as it is for all forms of performance art including live and body art. Amelia Jones discusses the perceived ethical and hermeneutic difficulties in studying performance through its record rather than experientially and performance's "dependence on documentation to attain symbolic status within the realm of culture" in "Presence in absentia: experiencing performance as documentation," *Art Journal*, Winter: 1997, pp. 11–18. Philip Auslander has also examined the relationship between artistic performance and documentation in "The Performativity of Performance Documentation," *Performance Art Journal*, 1984, pp. 1–10. Tate Gallery in London has recently launched *Collecting the Performative*, a research network examining emerging practice for collecting and conserving performance-based art which brings together Dutch and British academic scholars and museum professionals with an aim to provide greater insight into the conceptual and practical challenges related to collecting and conserving artists' performance, see: http://www.tate.org.uk/about/projects/collecting-performative.

Archival Practice

The Centre for Possible Studies considers "the archive not as repository but as a living, contemporary entity mobilised through actions."[17] Hal Foster identifies the presence of a distinct archival impulse in contemporary art as artists seek to make historical information, often lost or displaced, physically present by reorganising bodies of alternative knowledge or counter memory.[18] But however it is positioned, the archivalisation of public art is both necessary and happening, in physical/institutional form, as well as via the digital and as art practice itself. The archive occupies and embodies the tensions between permanence and temporality. It tantalises and intrigues, as much for the multiple voices it contains as for encouraging reflection on its absences. The challenge with the archivalisation of public art is not to concretize or legitimise authoritative and static readings of public art practice.

To problematise the relationship between public art and archive forces us to confront anew issues of power and control implicit in both the process and function of archive creation and in all activity in the public realm. We have to acknowledge the politics and presumptions inherent not only in commissioning and artistic practice but also in the archivalisation of public art, along with the information, accessibility and meaning to which current and future publics are given "rights of passage." The archivalisation of public art must embrace numerous hazards: for whom and by whom should/could/will a work be remembered, selected, marked; but also for how long and in what form. In problematizing the relationship between the archive and the practice of public art in all its multi-layered possibilities, I do not wish to engage in some kind of deconstructivist paranoia, but to suggest a pause, a collective moment of reflection and consideration on the temporality and permanence of the collective materialisation of public art as archive, in an archive and of the archive – in the hope that this pause is productive, generative not only of awareness but also of discourse and possibilities.

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17. P. O'Neill and C. Doherty (eds), *Locating the Producers: Durational Approaches to Public Art*, (Amsterdam: Valiz, 2011), p.196. The Centre for Possible Studies is part of the Serpentine Gallery's Edgware Road Project which has brought together international collaboration of artists, archivists and curators with the Edgware Road neighbourhoods. See http://centreforpossiblestudies.wordpress.com/about/.

18. H. Foster, "An Archival Impulse," *October*, No. 110, 3–22 (2004) p. 3.

Laying Bare the Archive: The newly equipped Art and Design Archives, BIAD, Birmingham City University. Image by Fiona Waterhouse, Birmingham City University, 12 June 2013.

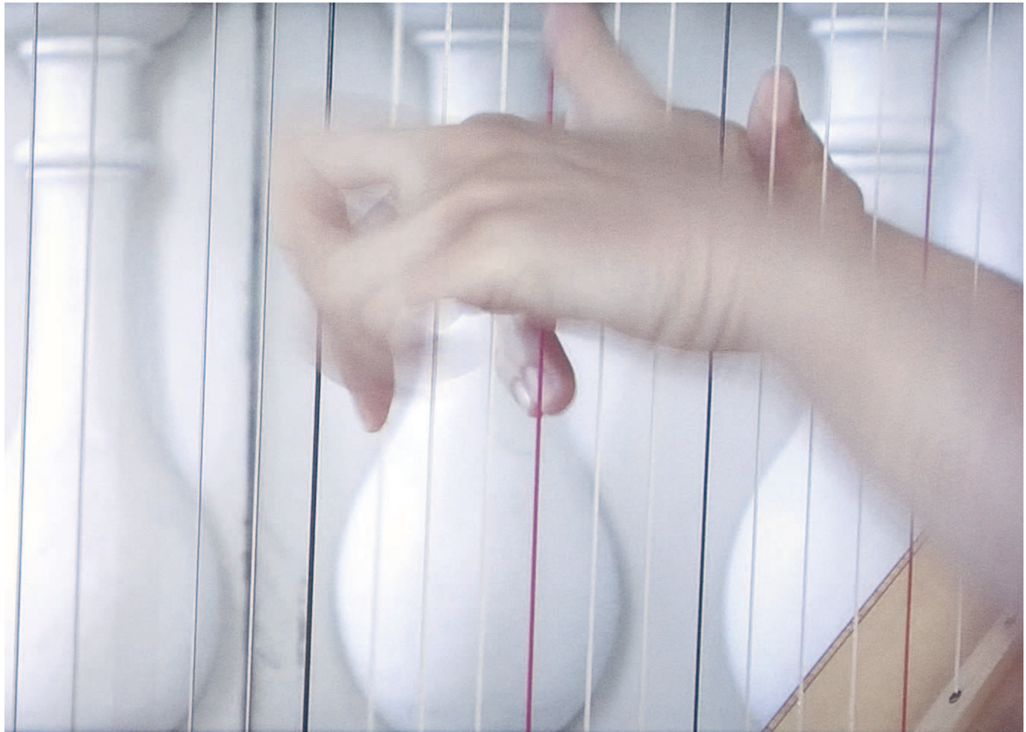

figure 1 Andrea Jespersen (Artist), *Concealed Ovation (part two)*, video 3.54 min, looped, no sound, with harpist Trine Opsahl, 2012. Courtesy of the artist and harpist Trine Opsahl.

Material: Photography

Art that draws on, with, and against photography

Abstract: Within contemporary art, there is a cluster of people who work exceptionally, adeptly and knowledgeably with photography. Still, they introduce themselves as "visual artists" rather than as "photographers," emphasizing, at least in part, that their photographic practice remains in the domain of contemporary fine art, and that their art practice relies on photography to nest fruitfully within a multiplication of materials and methods. This is where my work is situated. In the following paper the different roles photography performs within my art practice will be elaborated.

I am an advocate of art's active participation in cross-disciplinary sharing and questioning. Some of science's unanswered questions are a constant inspiration for my work; in particular, I am curious about physics and neuroscience's search to explore consciousness. During the last few years, some neuroscientists have focused on how the magician can teach them a thing or two about consciousness.[1] A *Guardian* newspaper article in 2011 on this subject used the Dutch 15-century artist Hieronymus Bosch's painting *The Conjurer* as an illustration.[2] Art history is not where I tend to draw my inspiration, but somehow *The Conjurer* became a talisman for this medical museum and photography project. When I consider photography for a new project, it is the medium's methodologies and social history that are weighed. If these conceptual considerations validate the medium's use, I go and dust off my photography gear. For this project, black and white analogue photography became my primary medium for this project partly as a result of the medium's use of silver. Since Hippocrates, the father of modern medicine, silver has been connected with healing and anti-disease properties. And even though antibiotics have replaced the medical use of silver today, further research into its clinical potential is ongoing, signaling a very human reluctance to surrender on its healing properties. Perhaps the same reluctance can be found in refusing to surrender the black and white of the photographic image.[3]

My latest body of work was made over a two-year period when I was visiting guest curator at the Medical Museion in Copenhagen. The large

1. Cf. Stephen L. Macknik, Susanna Martinex-Conde, *Sleights of Mind: What the Neuroscience of Magic reveals about our everyday deceptions,* (New York: Holt, 2010) and Bernard J. Baars and Nicole M. Gage, *Cognition, Brain, and Consciousness: Introduction to Cognitive Neuroscience 2nd Edition,* (New York: Academic Press – an imprint of Elsevier, 2010).

2. "Sleights of hand, sleights of mind. Magicians are teaching brain researchers new tricks," Mo Costandi, http://www.guardian.co.uk/science/neurophilosophy/2011/oct/14/1#.

3. Salome Egger, Rainer P. Lehmann, Murray Height, Martin J. Loessner, and Markus Schuppler, "Antimicrobial Properties of a Novel Silver-Silica Nanocomposite Material," *Applied and Environmental Microbiology*, 5: 2009, pp. 2973–2976.

visual artist
photographer
photograph as material
photograph as method

analogue photographs I produced were handmade during a two months residency at the Danish Art Workshops, and the finished works were exhibited in the solo exhibition *Human Silver Halo* at the Medical Museion. There were several reasons why I became interested in working with this particular medical museum. It is housed in a building that King Christian the VII of Denmark built for his surgeons in 1787, with a preserved original auditorium, where corpses used to be dissected; it is still in use today though for comparably tame university lectures.[4] My practice is based on a broad enquiry into society's built structures, the values we as a society uphold and the shadows of power they cast. To me this auditorium is a beautiful architectural manifestation of western society's value systems governing power and knowledge. It felt as if this building was begging me to reshuffle it; to embed some feminist knowledge – perhaps better put: some *female* knowledge – within the history of medicine, where it is so sorely missed.[5]

The methodologies I employed were chosen to explore how conceptual considerations and the handmade can coexist in mutual harmony. Furthermore, I wanted to investigate how photography can collaborate with other mediums, objects, or the viewer's active interaction. My methods have roots in the art of the 1960s and 1970s, when a new kind of photography turned it's back on a solely aesthetic aim; to become a medium widely used in conceptual artworks based on the dominance of the idea. These early conceptual artists saw photography as an open medium and tool that didn't have a heavy burden of ideologies that hunted both painting and sculpture.[6] American artists Edward Ruscha and Mel Bochner are often cited as two of the earliest artists who started to use photography non-pictorially to serve a specific idea. It is well documented that Ruscha has an ambivalent relationship to photography and has always maintained he is a painter.[7] Bochner, too, started his career as a painter and is now painting again, though in the 1960s he was

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4. Queen Dowager Julianne Marie donated the plot of land in Bredgade, near Frederiks Hospital, and a building was completed in 1787 to the design of Peter Meyn. As one might expect, forms of surgery in the late 18th c early 19th often were brutal affairs, making Artaud's "theatre of cruelty" seem like child's play in comparison.

5. I use this difficult term to highlight the supreme dominance of men in the history of medical knowledge. My intention was not to essentialise or even to focus on gender when I began the project at the Medical Museion, but the blatant lack of one of the sexes, made my work as a female artist take on a gendered dimension. I do not consider knowledge to be gendered in today's world, but in a historical context I believe it is. Generally, it is men that are represented in historical collections of specialist knowledge practices; hence to me historically the female comes to represent a non-academic and alternative knowledge. My art practice explores how to combine these supposedly different "kinds" of knowledge.

6. Until the 1960s art-photography had looked towards modernist painting and sculpture, favoring the pictorial traditions or modern art.

7. Margit Rowell and Ed Ruscha, *Ed Ruscha: Photographer*, (New York: Steidl and Whitney, 2006), p. 11.

frustrated with the "*...very little rigorous thinking about the photographic issues.*"[8]

Of course today photography is embedded into our everyday with the digital photograph's well-known mutability finally making all photography being perceived as potential "fakes." When I choose to work with black and white analogue photography, the aim is to consciously tap into the authority and idealistic notion of truth this medium stood for prior to the digital. I use this historic medium to contemplate how contemporary knowledge, for good and bad, is habitually structured by past beliefs and habits. My intention is not to make a flawless beautiful photograph as in the spirit of pictorial photographer Alfred Stieglitz). I am happy to leave evidence in the form of dust marks to document that a negative was used to make the photograph. That said, I do not seek to work towards what I would call the "non-aesthetic" of original conceptual art from the 1960s; photographic artworks that mimic the perfunctory industrial, black and white documentary style, in a familiar size, reminiscent of holiday-snaps processed at the chemist. Instead, I do embrace craftsmanship and beauty as part of my practice as is evident in for example, the piece *Female Entanglement* (Figure 2); a small photographic print dried in an embroidery ring leaving the medical auditorium with its "Fathers of medical history" beautifully scrunched up.

The 1960s and 1970s saw photography jump out of the confinements of the neat wooden frame, creating new possibilities of escaping its two-dimensional glass entrapment. Examples of this approach to photographic artwork and its presentation were displayed in 1970 at New York's Museum of Modern Art in the exhibition simply entitled *Photography into Sculpture*.[9] Artist Robert Heinecken presented several photographic puzzle works in the exhibition, artworks that encouraged the viewer to arrange parts of photographs into an image of the participant's own choosing.[10] Heinecken worked with conceptual strategies using mostly found photographs, and his practice has frequently been quoted as having "*...an irreverent attitude toward the photographic image that flew in the face of everything the medium was supposed*

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8. Mel Bochner, *Solar Systems & Rest Rooms: Writing and Interviews 1965–2007*, (Cambridge: The MIT Press, 2008), p.180. Bochner makes clear that his artwork was made in advance of the English translations of the seminal writings, all in relation to questions concerning photography raised by Walter Benjamin and Roland Barthes, respectively. He began his own investigation of photography between1967–1970, which led to his piece *Misunderstandings (A Theory of Photography)*, an artwork that consists of ten note cards, with one being a photograph and the rest photo offset hand-written quotations about photography – and where four are unidentified fakes. A lot has happened since Bochner's investigation into photography; in the intervening forty years several different strands of academia have thoroughly theorised photography. But see also: *In Conversation: Mel Bochner and Achim Borchardt-Hume* Whitechapel Gallery, 2012.

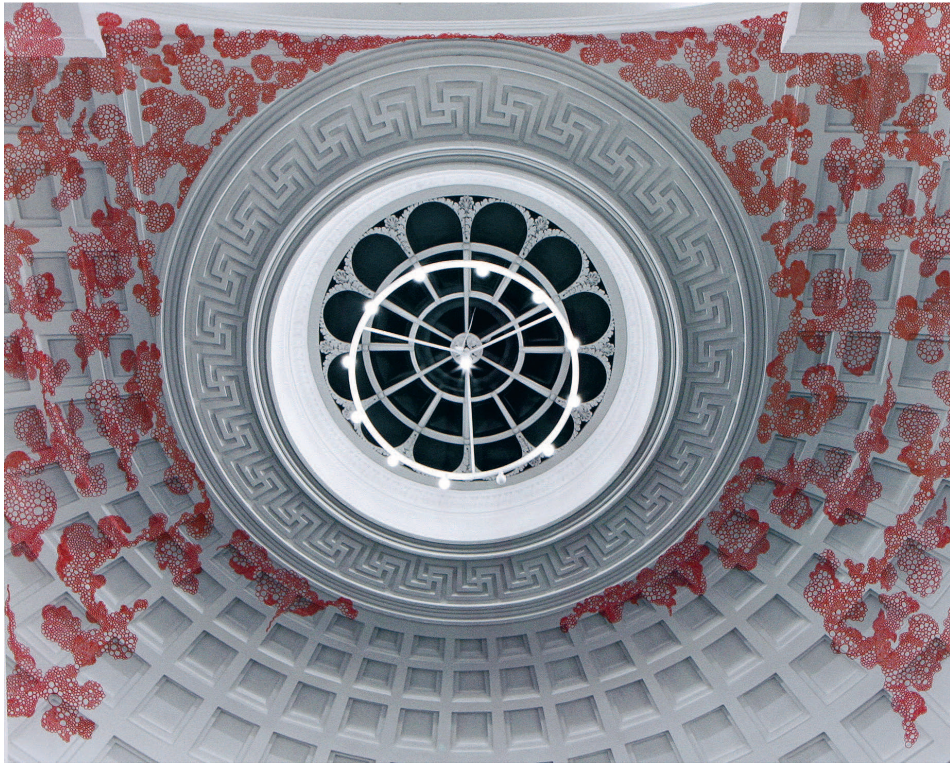
9. With Peter Burnell as curator See its early documentation at The MOMA archives http://www.moma.org/pdfs/docs/press_archives/4438/releases/MOMA_1970_Jan-June_0035_36.pdf?2010

10. Heinecken's work in this exhibition can be viewed at *Photography Into Sculpture Panel Discussion* http://vimeo.com/38248818.

to be..."[11] Still, his beautiful and playful geometric puzzles, gelatin silver photographs were cut to be carefully glued onto wood which, in my view, also demonstrates a deep respect for the medium, an aspect rarely focused on. It is this playfulness that Heinecken's practice radiates, which is vital to me as a practicing artist too. I photograph historical significant objects and spaces that were built by and represent predominately male power and knowledge, so that I can intervene in and contribute to some of the knowledge I believe is missing, but my motivation is to stretch the medium so as to widen the conversation. I have a lack of contentment with the photographic; so, I am constantly interested in supplementing photography's shortages through forms of revision. Often, this happens either by drawing, cutting, shaping, or by subjecting it to conversations with other mediums as well as entering it into dialogue with older works from my practice.

11. Armory Center for Arts at http://www.armoryarts.org/about-us/news/wallace-berman-and-robert-heinecken-together-at-last/. Posted on 7 July 2011.

FIGURE 2 Andrea Jespersen (Artist), *Female Entanglement*. 30 cm × 35 cm × 8 cm, analogue gelatin silver print relief, 2012. Courtesy of the artist.



The Human Silver Halo

The first piece to welcome the viewer at the *Human Silver Halo* exhibition is *gaze-following (holding hands)* (Figure 3) a photographic diptych that has been partly exposed to a previously established drawing strategy consisting of generating multiple circular forms on the photograph's surface. Ordinarily a drawing on a photograph could refer to defacement, but when I draw on a photograph made in a place that represent the unity of a specific social knowledge, my intent is to "flatten the hierarchy" of knowledge. I draw simple circles that anybody can do. They evolve into time-consuming drawings that seek to pleasingly interrupt, to instigate a contemplation of the drawing on even terms with the photograph behind it. I become aware that I am "spoiling" a perfectly decent photographic image. In some ways, I could be accused of corrupting the photograph and with it also the conceptual integrity of the representational system on which it is based. But instead, my motivation is to represent and highlight the presence of different value systems calling our attention, but where none is superior. I use the circle as a democratic symbol of symmetry, and I agree with conceptual

FIGURE 3 Andrea Jespersen (Artist), *gaze-following (holding hands).* Diptych [here one is shown] each 49 cm × 60 cm × 2.5 cm, 2012. analogue gelatin silver print and red ink. Courtesy of the artist.

artist Hanne Darboven's thoughts regarding the circle as "a symbol of infinity, everything; what is beginning, where? what is end, where?"[12] Included in the exhibition is the 2007 piece *Tidy Table: model 51* (Figure 4) one of my earliest works to incorporate these tiny circles drawings, originally inspired by histology, cell specimens. This artwork is also my earliest piece using another geometric shape, the hexagon, which reappears (Figure 5) in a 2008 patchwork piece that took the shape of two Antennae Galaxies colliding according to NASA's photographic documentation.[13]

At first glance, the two traditional photographic still-lifes exhibited, may look as though they are trying to impress Stieglitz, presenting themselves as flawless photographs of surgical instruments. Though at a closer inspection the photographic paper is disappointingly not flat, leaving a disrupting ghost of the less perfect handmade. In *Thought Transmission* (Figure 6), it becomes part of the piece that the reflection of the viewer's face is visually interfering with the photograph of two trepanning instruments from different historic periods. Trepanning is the surgical process of cutting a circular hole into the cranium, giving the earliest glimpses of a living brain. A brutal round cut hole, has now evolved into neuroscience and it's search to define consciousness, bringing us back to the image of the previously mentioned talisman, *The Conjurer,* that sensitively reminds us not to undervalue skilled hands.

The other still-life in the exhibition *part of the equation* (Figure 7) is presented in traditional, dark wooden frames, lending some due respect to these common surgical tools from the history of medicine. The glass in these frames is anti-reflective, removing the viewer's own reflection, giving the impression that there is no glass, so to invite the viewer closer. People have complimented me on not putting glass in these frames, allowing them in and it is hard to decide whether to break this specific illusion or leave it well in place.

Earlier I used the phrase to "flatten the hierarchy" to indicate my interest in liberating the categories of knowledge we value and under-value, as a society. In the exhibition's two large floor-based photographic pieces this notion becomes literal by making the viewer look down on that which the architectural space of the Medical Museion would normally require us to look up.

The piece *we are the ashes of dying stars, we are nuclear waste* (Figure 8) consists of a human-sized analogue photograph of the domed ceiling from the Medical Museion's auditorium. The gummed tape that was used to help the photograph to dry flat is left on leaving a rough brown edge as a witness to

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12. Hanne Darboven, "Statement to Lucy Lippard," in Alexander Alberro and Blake Stimson (Eds), *Conceptual Art: A Critical Anthology*, (Cambridge: MIT Press, 1999), p. 62.

13. Image of the Antennae Galiex NGC 4038 and NGC 4039, the National American Space Agency (NASA)'s Hubble website, at http://hubblesite.org/gallery/album/pr2006046a. Images made by the Hubble telescope on this site are open access and copy-free.

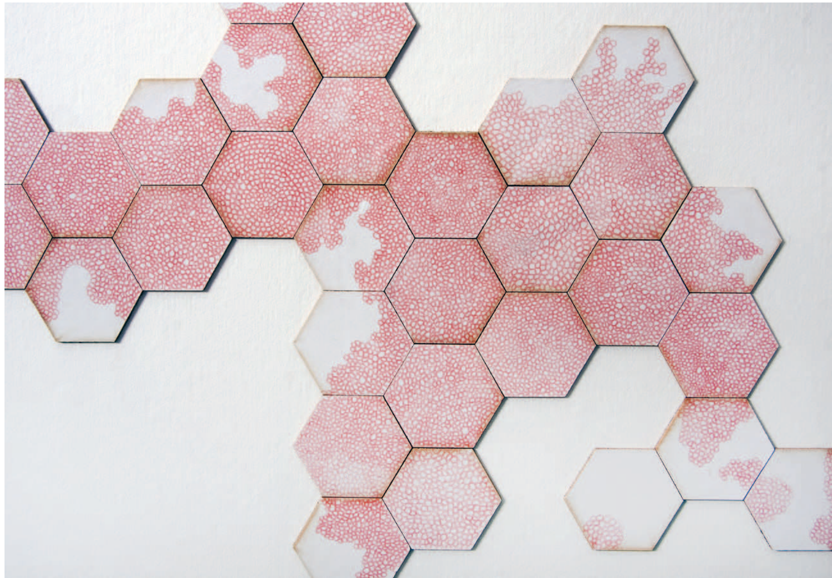

FIGURE 4 Andrea Jespersen (Artist), *Tidy Table: model 51.*
50 cm × 60 cm × 4 cm, 51 laser cut paper on wood hexagons, colour pencil, 2007.
Courtesy of the artist.

FIGURE 5 Andrea Jespersen (Artist), *eons ago when the universe was a lot smaller*, variable size approximately 300 cm × 300 cm × 60 cm, powder coated stainless steel structures, cotton patchwork, sterling silver. Exhibited in *Out of Space,* Intermedia Gallery at The Centre for Contemporary Art, Glasgow, 2008. Courtesy of the artist.

the physical handmade process that made it. The print is exhibited horizontally at knee height on a wooden floor to which it is pinned with four nails. On top of the photograph, a selection of glass objects is placed. One of these is a contact lens holder scaled up to hand size, and handcrafted in Borosilicate glass (medical graded).

Marcel Duchamp introduced the ready-made to the world in 1917 and since then everyday objects have had the potential, if so nominated by an artist, to be designated as art. I use everyday objects as an open catalyst for contemplation. The chosen objects are functional throwaway mass-produced items that are altered in size and material; removing their original function leaves room for a potential new type of value. The aim is not to critique the mass-produced, but rather to celebrate the human inventiveness and curiosity that has empowered it. I have used the contact lens holder in previous artworks, but it took me six years to find a glass-maker that had the expert knowledge to craft the exhibited object. It is joined on the photograph by three groupings of glass rods and red long lasting synthetic elastic bands. One of the groups is still intact, and the two other structures are failed versions. These constructions are inspired by polymath Buckminster Fuller's 1950s tensegrity structures (of continuous tension with discontinuous tension structures), and were originally used both within architecture and engineering. Today, the tensegrity has even ventured into biology, where some use the biotensegrity to better understand the human body, by integrating anatomy from the molecular level to the whole organism.[14]

Printing large analogue photographs inherently means one ends up with a pile of time-consuming prints that are not right for exhibiting due to a variety of darkroom inaccuracies. *Haystacks of Healing (part one, two & three)* is a piece made from such large failed photographs. It consists of three books where one human-sized photograph has been cut into twelve photographs that each becomes two pages in the book. The first book (part one) is a photograph of Stein, the aforementioned surgeon, (part two) is a photograph of a pair of common surgical scissors, (part three) is a photograph of the stairs parting the seats in the curved medical auditorium.[15] We all have an embodied experience of books, how they work, feel, and look; to me these books are Petri dishes collecting traces of the viewer. In a similar vein, and as few people have touched a thick mat gelatin silver print, it was important to have the viewer's hands imprint their interaction on these expensive silver containing, time-consuming

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14. For a more detailed discussion, see for example the work by Dr. Randel L. Swanson, "Biotensegrity: A Unifying Theory of Biological Architecture With Applications to Osteopathic Practice, Education, and Research," the *Journal of the American Osteopath Association,* 1: 2013 vol. 113 no. 1, pp. 34–52.

15. The Medical Museion has many more than they wish; the photographed scissors was so "common" that it was not logged and hence not part of the museum collection.

FIGURE 6 Andrea Jespersen (Artist), *Thought Transmission*, 56 cm × 66 cm × 6 cm, analogue gelatin silver print, 2012. Courtesy of the artist.

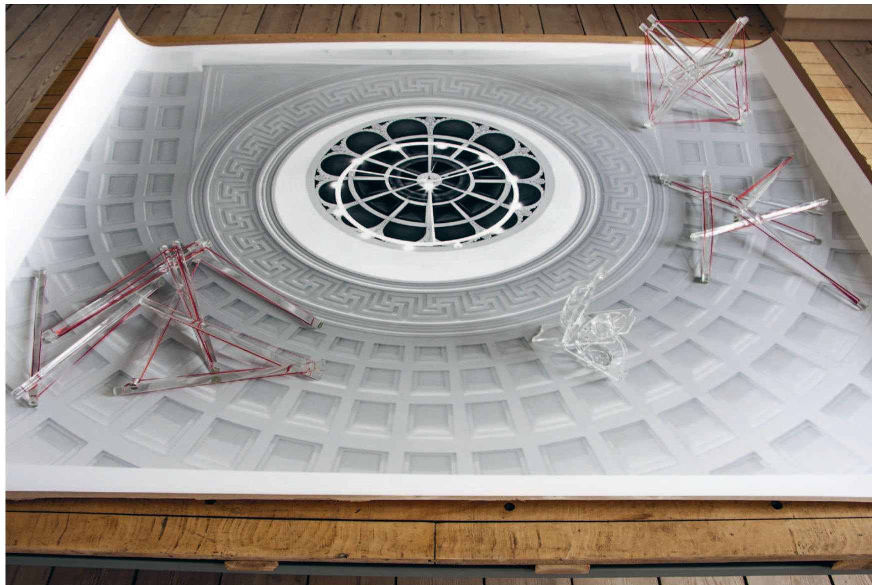

FIGURE 7 Andrea Jespersen (Artist), *part of the equation.* Triptych each 60 cm × 70 cm × 4 cm, analogue gelatin silver print, 2012. Courtesy of the artist.

FIGURE 8 Andrea Jespersen (Artist), *we are the ashes of dying stars, we are nuclear waste.* Analogue gelatin silver print, reclaimed wooden floor (South London Gallery), Borosilicate glass (medical graded), Mobilon band, powder-coated stainless steel, 2013. Courtesy of the artist.

handmade photographs, bound into good old fashioned physical books. The work came to be about allowing access to something fragile, expensive, and unique. The book covers are produced from the medical barrier material that is used in surgeries. It is a cheap throwaway material that even if it has touched our bodies, we were most likely unconscious of it having done so, unless we work in an operating theatre. Conceptually it was important that the books were covered in this material as it gives us a conscious experience of a medical material normally only meant for the unconscious. In each of the three books, there is one drawing that is made on the back of one of the photographic pages. When I start drawing on a "finished" analogue photograph a certain tension emerges; it has taken a long time to make... I don't want to ruin it... the intention is to add to the work instead of reducing it to nothing. When I draw or I am in the darkroom I become aware of my own consciousness in a way that working at the computer does not allow me to do. The finished work does not necessarily make the viewers aware of their own consciousness, but they are confronted with a subjective effort/action, which does reflect on consciousness.

The two smallest pieces in the exhibition could lie in the palm of one's hand, but are instead contained in a display case with only a set of headphones as a way to invite the viewer's physical interaction. *common sense has no place at quantum level* is thus a 3.54 min looped video with harp music by Trine Opsahl shown on a hand-sized iPod with attached headphones. (Figure 10).

The video was shot from a fixed position towards the auditorium ceiling for 50min, while Trine was playing the harp for an empty auditorium with only the busts of the patriarchs of Danish Medicine in compulsory attendance. The finished video's 50min is fast forwarded to 3.54min the soundtrack duration of the harp piece played. The video becomes a static photographic image with only a slight movement of shadows as an indication of time. The video is kept company in the display case by a previous piece *Hubble* (2008), a sterling silver cast of a plastic strainer from a jar of gherkins, a move that is inverted in my later *Concealed Ovation, part two* (2012) (Figure 1).

FIGURE 9 Andrea Jespersen (Artist), *we draw some arbitrary line and rule out whole areas of investigation*, Analogue gelatin silver print, metal embroidery string, powder-coated stainless steel, 2013. Courtesy of the artist.

FIGURE 10 Andrea Jespersen (Artist), *common sense has no place at quantum level.* Video 3.54 min looped, 5.8 cm × 12.3 cm × 0.8 cm, music by Trine Opsahl, 2012. Courtesy of the artist and harpist Trine Opsahl. *Hubble,* 10 cm × 15 cm × 10 cm, Sterling Silver, 2008. Courtesy of the artist.

"The materia prima [raw material] is what exists prior to the division operated by meaning: an enormous paradox since nothing, in the human order, comes to man unless it is immediately accompanied by a meaning, the meaning which other men have given it, and so on, in an infinite regress. The demiurgic power of the painter is in this, that he makes the materials exist as matter; even if some meaning comes out of the painting, pencil and colour remain as "things", as stubborn substances whose obstinacy in "being there" nothing (no subsequent meaning) can destroy."

Roland Barthes, The Wisdom of Art *

*Roland Barthes, "The Wisdom of Art," in Nicola Del Roscio (Ed), *Writings on Cy Twombly*, (Munich: Schirmer/Mosel, 2002). p. 102.

Cy Twombly: *Untitled*, Lexington, 1959.
House paint, crayon and graphiteon canvas. 152.5 × 188.5 cm, 60 × 74 1/4 in.
Reprinted with permission, courtesy of The Cy Twombly Archive.

[Un]common Sense and [Un]disciplined Gestures

Abstract: Difference, not identity, is the primary quality of language. This difference is initially argued to be an "[un]common sense;" one which does not emerge from a ground, origin, or operate within a dialectic of essence/appearance, but which consists of an economy of acoustic surfaces/timings/spatialities: diffuse, interpenetrative, and unclassifiable: a "sensual" logic. Traditional philosophies of language tend to flatten out and simplify the space/time/material relations of language, in favour of a stable, timeless, fixed identity, which makes logical thought possible, through fixed, linear, disciplinary forms. This paper seeks instead to extend and complicate categories of logic, to include doubt, paradox, infinity and "[un]disciplined" forms of understanding, as evidence of difference as the primary quality of language: a "mimetologic" as Lacoue-Labarthe has termed it, formed of a wildly [un]disciplined set of (re-)marks and gestures.

In *Difference and Repetition*, Deleuze suggests that an understanding of difference might initially be conceived as occupying a midway position between two extremes. *In*difference, is either an indeterminate field out of which nothing distinct arises: "the black nothingness, the indeterminate animal in which everything is dissolved",[1] in other words, an abyss. Or it is comprised of a series of disconnected, mutually indifferent elements, which appear in the "[W]hite nothingness, the once more calm surface upon which float unconnected determinations like scattered members."[2] Such fragmentary, mutually exclusive determinations are no less indifferent than the first version, since they lack overall coherence, each being a singular indifference. In either case, the problem for Deleuze is that difference is presented as a relation *between* elements, and its production relies upon the ability to draw sharp divisions between the constituent parts of previously undifferentiated fields, concepts, or elements, such that the figure is set in a determinate relation to a ground.[3] This attitude, Deleuze suggests, invokes the allure of the deep cut, the either/or, the right/wrong, and the classical laws of thought as set out by Aristotle.[4] This paper will argue that the simultaneity of reading and seeing,

1. Gilles Deleuze, *Difference & Repetition*, translated by Paul Patton, (Continuum: London and New York, 2001), p. 28.

2. And further: "...a head without a neck, an arm without a shoulder, eyes without brows." Deleuze, *Difference & Repetition*, Ibid.

3. Deleuze, *Difference and Repetition*, pp. 31–69.

4. Aristotelian logic is based on the following three Laws of Thought: The Principle of Identity (where A is A), the Principle of Contradiction, (where A cannot be *both* B and not B at the same time); and the Principle of the Excluded Middle (where A is located *either* on one side or the other side, but not in between A and B). In *The Wisdom of Art*, Barthes suggests that Twombly's work is differently configured: "It is in a way another logic, a kind of challenge, on the part of the poet (and the painter)

materia prima
sense
gestures
immanence
difference.

of drawing as both trace and performance in Cy Twombly's work, collapses the relationship between figure and ground, and does so in a way that acknowledges an immanent notion of difference.

For Deleuze, pure difference is not to be found in the distinction *from* something else, in the *difference between* two things, but in an immanent, intrinsic (singular, unilateral) differing within the object, thought, event, in itself; one which nonetheless persistently carries along with it, its relation to that from which it seeks individuation. This form of difference then becomes the new extreme in thought, since, rather than a difference in which the boundaries are observable, exterior to the object or concept under consideration, and satisfyingly (clearly) drawn, Deleuze suggests that true difference is a question of "determination *as such*"[5] or difference in-itself: "[I]nstead of something distinguished from something else, imagine something that distinguishes itself–and yet that from which it distinguishes itself does not distinguish itself from it."[6]

Difference conceived in this way, is the ability to be both distinguished from, but at the same time to stay *with*, that which foregrounds it, such that figure and ground are mutually implicated. He uses the following example: while lightening might take its distinguishing character from the black sky, that sky is simultaneously, and inextricably, part of what gives the lightening its form (and therefore its meaning). In such a relation: "It is as if the ground rose to be surface, without ceasing to be ground."[7] Figure and ground are as one; empirically interdependent, but consistently interrelated, without being posed in a hierarchy, or severing the figure from a ground conceived as an origin. The sky trails the lightening, while the lightening insistently seeks to be relieved of that relation, in a tight and tense interlocking and weaving of the different and the indifferent. In the same way, Twombly's work is simultaneously a performance of the work, in which the process cannot be divorced from the outcome, and whose heterogeneity, or "excess" is always primary. Any satisfying unification of the disparate and dissolute, the sign

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to the Aristotelian rules of structure" pp. 107–108.

5. Gilles Deleuze, *Difference & Repetition*, p. 28

6. Ibid.

7. Deleuze, in quoting Artaud's definition of cruelty, as "[n]othing but determination *as such*, that precise point at which the determined maintains its relation to the undetermined," goes on to explain that such cruelty is the defining character of thinking itself. Here, Deleuze, in following Artaud, argues that thought maintains its precise and "unilateral" relation to the indeterminate. There is a cold, clinical dialectic at play in this withholding relation between the indeterminate and the determinate; one fraught with tension and paradox, since "there is no sin other than raising the ground and dissolving the form." This violence of distinction and form-giving is often named as reason itself, prompting Deleuze to concentrate on the "irrational" and "monstrous" as a way to seize productive difference. But see Deleuze, *Difference and Repetition,* pp. 28–40. See also Deleuze and Guattari, *Anti-Oedipus* and *A Thousand Plateaus: Capitalism and Schizophrenia,* Vol 1 and Vol 2, (Minnesota: University of Minnesota Press, 1987).

and the signified, under a final concept or representation, is withheld. Deleuze will call this experience a form of "cruelty" to thought, since the desired flight from the "elusive adversary" (the indifferent), can never fully take place.[8]
In other words: the "deep cut" which establishes meaning as difference, is illusory. Difference is the refusal of the power of representation (based on identity, sameness, resemblance, or similarity) as a means of unproblematically engaging ideas/objects. "Difference," explains Deleuze, "is not the difference between different forms, or the difference from some original model, difference is the power that over and over again produces new forms.[9] As a producer of "new forms", this Deleuzian form of difference offers instead an affirmative, immanent materiality, one which proliferates, and becomes productive. Being is understood, then, as a singular multiplicity, a unilateral distinction, not a distinction *from*, but a distinction *with*.[10] Rather than a "without," difference is "made" by the interpenetration of an autonomous ground rising to the surface, the form[s] which dissolve in it, and the movement of both, which collapses determinations and the indeterminate in a single move.[11]

A similar move can be seen with repetition as mimesis, the non-imitative, non-communicable form of expression, both immanent to art and language, and one that finds its home there, similarly collapses binaric determinations, in a fluid movement and exchange between word and thing, subject and object, forfeiting the kind of clarity and sharp delineations necessary for rationality to flourish, by bringing ground, surface and form[s] into a non-equivalent, pulsating relation. In rationality, real difference is cursed, made "monstrous", if it forfeits a willing surrender to the determinate. Similarly, that which constitutes "common sense" can be understood as that which is taken as a given in thought; it consists of consciously (or otherwise) "agreed upon" terms of reference, which allow thought to conspire around unexamined, unproblematic concepts.[12] In distinction to this move, and as

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8. Deleuze, *Difference and Repetition,* Ibid. This "elusive adversary" is posed as the intimate, entwined, but ultimately paralysing relationship between the different and the indifferent, which cannot be undone.

9. Claire Colebrook, *Routledge Guide to Critical Thinkers: Gilles Deleuze,* (London and New York: Routledge, 2002) p. 123.

10. Jean Luc Nancy, *Being Singular Plural,* translated by Robert Richardson and Anne O'Byrne, Meridian: Crossing Aesthetics, (Stanford: Stanford University, 2000), pp. 1–100.

11. See Deleuze, *Difference and Repetition,* where he writes, "Form distinguishes itself from matter, or the ground, but not the converse, since distinction is itself a form," p. 28.

12. Deleuze does not think of problems as there to be solved, but as ideas, which, unlike closed concepts, continue to proliferate and be productive. To be unproblematic, for Deleuze, is to deny the creative potential of thought. What is so "common" about common sense is that it relies upon specific analytic of judgment, one involving recognition, opposition, analogy and similarity (all mechanisms of the faculties). It recalls, rather than encounters an object of thought. Thinking, which for Deleuze can only be sensed rather than recognized (as in the form of a representation, grounded in identity-thinking), and which implies immanent encounters and events, ends, where agreement and conceptual

the starting point for Deleuze's philosophy of difference; we have what could be termed an "[un]common sense," one that explodes the mythical "common" which orients sense in relation to the same (identity), rather than to difference.

With this new orientation toward difference that Deleuze and Deleuze and Guattari suggest, a vital, urgent space for conceptualising real difference is established. Rather than presenting difference as a "not-belonging" (an outsider or other), it would make nonsense, paradox and "that which does not fit in" an attribute of, rather than a negation of, sense. Paradox would no longer be the insoluble, the unwelcome, the trivialized epiphenomenon, but evidence of real difference at work, and of multiple time[ing]s.

The gestures/traces of language seen in the sensual surfaces of undifferentiated marks and sounds, would be meaningful, and "name" meaning differently. In [un]common sense, cruelty becomes productive, and the monstrous becomes a refusal of assimilation to a norm. Both escape the tyranny of representation and identity politics.[13] In place of sharp determinations, difference founded on opposition, and a form of thinking grounded in identity and the same, one finds, indetermination, difference-in-itself, intensity, and paradox, all of which are posed as a violently "discordant harmony", which run counter to common sense, and in turn invoke the richly productive conflict between imagination and reason which drives the Kantian sublime.[14] Thinking, as this form of difference, becomes a material intensity without being sutured to the symbolic; logic-sense that embraces rather than opposes nonsense and negation; posing them as freedom, not loss. Such intensity, while escaping the trap of representation in thought, simultaneously denies the power of grammar and logic as imprisonments of thought.[15]

> The sign or point of departure for that which forces thought is thus the coexistence of contraries, the coexistence of more and less in an unlimited qualitative becoming. Recognition, by contrast, measures and limits the quality by relating it to something, thereby interrupting the mad-becoming.[16]

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identification begins. Thought's dynamic is tempered by the object of thought which has been tamed, de-intensified, reconciled via "a little bit of order" which takes us out of the pre-philosophical chaos, but halts thought, as it culminates in transcendence.

13. Cf. Kant's reference to the "prodigious" or "monstrous" as being at, or exceeding the limit of, the sublime as a pure (immanent) magnitude. He writes, "An object is monstrous if by its magnitude it nullifies the purpose that constitutes its concept." Immanuel Kant, § 26,"On Estimating the Magnitude", *Critique of Judgment,* translated by W. S. Pluhar, (New York: Hackett, 1987), pp. 109 and 253, respectively. In this sense, the monstrous can be seen aggressively to exceed and consume its own concept, courting self-destruction. This form of the sublime violates the commonality of judgments by exceeding our powers of apprehension.

14. Deleuze, *Difference and Repetition*, p. 146

15. Colebrook, *Deleuze,* p. 14.

16. Deleuze, *Difference and Repetition,* p. 141.

Paradox names or embodies such a "mad-becoming". Contraries co-exist in, at, and upon the interruption of this "mad-becoming". More and less are intertwined, and as a profound, radical simultaneity/contradiction, repetition and difference at one and the same time a paradox becomes the pure, unassimilable event; it features the "indissoluble something" which haunts the concept.[17] In the opening pages of *The Logic of Sense*, Deleuze develops the argument , showing how, via Lewis Carroll's "Alice stories," the paradox as "pure event" is revealed through the materiality of language. In the statement: "Alice becomes larger," the familiar linear time/space relations in language give way to an ever-deferred present, characterized by an essential simultaneity, involving two or more things happening at the same time. In this case, both larger and smaller in/at the same instant; pulling in/at both directions at once; unfixable, mobile in any present. Alice is both smaller and larger at the same time by virtue of a paradoxical fabric of language whereby in the instant of saying "Alice becomes larger," she is by necessity both larger than she was, but at the same time smaller than she will be. Language as "becoming" is irreconcilable with fixity, permanence and identity: its requirement is multivalent time[s].

The pure event, is one in which sense, speed, dimension, intensity, and direction are available at any given moment. Moving away from the rigidity and a-temporality on the part of identity-thinking, that have for so long thwarted conceptual suppleness, forces us to reconsider notions of permanence, fixed qualities, chronology [time/temporality] and the "present tense" of language upon which numerous accounts of meaning are founded. Bergson puts it like this:

> The real, the experienced, and the concrete are recognized by the fact that they are variability itself; the element by the fact that it is invariable. And the element is invariable by definition, being a diagram, a simplified reconstruction, often a mere symbol, in any case a motionless view of the moving reality.[18]

17. A point that echoes (though in quite a different manner) throughout Adorno's *Negative Dialectics.* For Adorno, The "indissoluble something" is the non-identical aspect of any concept, which cannot be absorbed into the concept nor represented by it, but nevertheless persists. Its incompossibility and indispensability brings forth truth. The collision of concept and object always leaves a remainder, which thought cannot erase by any effort. When the concept of paradox meets its object, a "something" is released which is irreducible to the concept. As we will see shortly, we move from Adorno's "non-identical" to Twombly's dissolute graphemes: his undisciplined gestures. But see Theodor Adorno, "The Indissoluble Something," *Negative Dialectics*, pp. 135–136.

18. Henri Bergson, *An Introduction to Metaphysics* (1903), (New York: Hackett Publishing, 1999). p. 42.

It is at this point that we return to Cy Twombly's work. Neither founded on invariable symbolic elements nor attempting to reconstruct the diagram (or any other entity) as something that lies beyond itself, Twombly refuses any form of pointing, proposing, or designating. Its grammar is non-indicative; its form non-denotational. In its inhabitation of matter as meaning[full]-in-itself, and its refusal to hold the figural to its promise of an uncomplicated and distinct relation to the ground, Twombly's work acknowledges the potential in Deleuze's claim that representational thinking based on the identical, the similar, the analogous, universal, oppositional and contradictory (thesis/anti-thesis; this/not-this and so on) is too limited; it cannot provide a space for real difference to emerge. In denying the inevitability of sameness or recognition, as a way to make meaning, it celebrates divergence, disparateness, and the dissimilar.[19] Twombly's work exemplifies the power of negative as *affirmation*, not erasure; of the mobile, transitory, and un-nameable contradictory impulses and drives of thought; of movement and becoming in place of abstract concepts; of immanence, mutability; of the infinite nature and instability of paradox, which coalesces in an [un]common sense, and a making sense of the uncommon.

For Benjamin, thought necessarily involves the discontinuous presentation of "fragments of thoughts", set in an interruptive relationship of infinite detours. Coherence is to be found in the "flashes" and gaps in and between perceptible knowledge, rather than in the coherent sequencing of ideas or in the relatively uncomplicated collision of ideas and their presentation. Dissolution and dissonance, rather than denotation; heterophony rather than homophony; elision rather than elucidation – all bring meaning [truth, sense] into view.[20] To put this slightly differently: ideas may precede presentation, but the materializing of meaning, of truth, can only be sought in the interstices, the oblique, the constellatory.[21] In this way, the

19. Barthes, *The Wisdom of Art*, op. cite.

20. Heterophony, a term originally found in Plato, is a form of music in which a single melodic line is the point of departure for simultaneous and overlapping variants, played at different rhythms, frequently at odds with conventional harmonic structure, and creating its own intricate dissonant textures. It can be found in many non-western forms of music. But see Plato, "Book II," in his *Laws*, translated by Benjamin Jowitt (The Project Gutenberg Ebook of Laws by Plato), last updated Jan 15, 2013 at http://www.gutenberg.org/files/1750/1750-h/1750-h.htm.

21. Originally developed by Adorno in his *Aesthetic Theory*, "constellation" was developed by Benjamin to name montage, fragmentary, disjunctive, often temporally unrelated configurations, which nevertheless produce meaning by allowing unseen correspondences to emerge instantaneously. Most famously developed in his *The Arcades Project*, (New York: Belknapp Press, 2002). This methodological preference shares the original affinity with Adorno's notion of constellation, developed by Adorno as the process that unlocks the "specific side of the object", and, in so doing, exceeds conceptual categories. For Adorno, "constellation" named, amongst other things, the political economy of advanced capitalism. See Theodor Adorno, "Constellation," *Negative Dialectics*, translated by E. B. Ashton, (London: Routledge, 1996), p. 162 and developed in detail in his *Aesthetic Theory*, (New York: Continuum Press, 2004), especially in "Situation," "Semblance and Expression," and "Towards a

mimetic faculty allows us to perceive what Benjamin calls nonsensuous (nonsensible) similarities, where the ordered surface[s] of language, which ordinarily conceal and subordinate the multiplicity of relationships of similarity within language, are abruptly broken, such that: "something similar can become apparent instantaneously, in a flash."[22] These types of discontinuous assemblages which Barthes, referring to the spatial qualities of Twombly's work, calls "rare" (from the Latin for gaps or interstices, sparse, porous, scattered), are not a subordinate form of understanding, but make meaning precisely an [un]common sense.[23]

Cy Twombly's work not only makes matter materialise; it makes matter *matter*. In place of concepts, which inhibit thought's intensity, permits ideas and problems to proliferate, without suffering the fatal closure of representation, it proposes an "event" of mark-making without determination, as an exemplification of non-representational thought, and a paradoxical, plural performance of *materia prima* [raw material] as stubborn indeterminacy and refusal to submit to a closure which proliferates a form of unproductive cruelty.[24] In its indifference to the harsh division of meaning (being immanently and obstinately *in*-difference), Twombly's work wildly materialises sense in all its provocatively undisciplined slices, gestures and immanent differentiations. Benjamin's proposal, that art "is always a question of, and questioning of, understanding" becomes, for Twombly – and for us – the embodiment and proliferation of such [un]disciplined gestures, which in turn form an [un]common sense.[25]

Theory of the Artwork," pp. 16–44, 100–117, 175–198, respectively.

22. Developed in 1933 as part of the general discussion on mimesis, see Walter Benjamin, *The Doctrine of the Similar*, (1933) originally in Benjamin, *Gesammelte Schriften*, edited by Rolf Tidemann and Hermann Schweppenhauser, Vol II, (Franfurt: Frankfurt au Main, 1977), pp. 204–210 and reproduced with permission at http://www.jstor.org/discover/10.2307/488010?uid=3738032&uid=2&uid=4&sid=21102817560141

23. Barthes, *The Art of Wisdom*, p. 105.

24. Cruelty, for both Deleuze, and Artaud, is a productive force, in its creation of a dynamic tension, and an aesthetic. Cruelty pushes thought to its limit, gives it definition, while simultaneously (paradoxically), enacting the deep-cut of meaning. However, in another reading of Deleuze (*Difference and Repetition*, p.28), determinations, and fixed points of reference, are conceits of the intellect, which restrain and limit thought. In other words: they are a cruelty within thought, and do it harm. In contrast, Deleuze also proposes that language is not representation, or comprised of a series of fixed, static points, but pure becoming. Concepts cannot fix ideas, since ideas will always expand beyond the boundaries that seek to contain them, and are thus simplified and restrictive in comparison.

25. Carol Jacobs, "Letters From Walter Benjamin," in her *In The Language of Walter Benjamin*, (Baltimore and London: Johns Hopkins, 1999), p.1. On the question of gesture and its paradox as "outside" and "dirtying" the logic of representation and semiotics, see for example an early discussion by Barthes, where he writes: "[T]hese gestures, which aim to establish matter as fact, are all associated with making something dirty. Here is a paradox: a fact is more purely defined if it is not clean. Take a common object: it is not its new and virgin state which best accounts for its essence; it is rather a state in which it is deformed, a little worn, a little dirtied, a little forlorn: the truth of things is best read in refuse. It is in a smear that we find the truth of redness; it is in a wobbly line that we find the truth of pencil. Ideas (in the Platonic sense of the word) are not metallic and shiny Figures, in conceptual corsets, but rather faint shaky stains, on a vague background." Barthes, *The Wisdom of Art*, p. 104.

David Cheeseman (Artist), *There is a gardener that works night and day in the garden, his name is Death*. Acrylic and soot (soot previously supplied), 200 × 200 × 200 cm (H). Installed at the National Trust Nymans House and Garden (2012) as part of the *Unravelled* commissioned projects, led by Polly Harknett, Caitlin Heffernan and Matt Smith.
Support by the Arts Council of England gratefully acknowledged.

There is a gardener that works night and day...

Artist's statement: Working within the Nymans house and garden context gave me an opportunity to make something that referenced aspects of both the inside and outside of location, soaked in privilege, perversity, decoration and death. There is a strange, dark hermetic quality to the atmosphere in the house, in contrast to the open and expansive feel of the topography in the landscape. These intense spaces, full of charm and privilege, feel divorced from the real world. The theatrical Manor house provided fuel for the fermenting of ideas, releasing fragile, fantastical bubbles that are burst by the fateful fire in 1947. The work in situ, *"There is a gardener that works night and day in the garden, his name is Death* remains my response to this extraordinary place and the loss of the unique archive of botanical illustrations.

As I am fascinated with how the body apprehends and interprets the world, my work has been trying to come to terms with this ontological predicament for some time. Sculptural activity has been my mode of analyses and means of exploration. A significant aspect of my practice has been an interest in responding to historical and cultural locations. In site-specific installations material processes and craft skills are selectively chosen to provoke or complement prevailing aesthetic or ideological values. Alongside these concerns formal preoccupations with surface, light and reflection generate phenomena that encourage the audience to focus on our haptic, experiential and temporal encounter with things.

privilege
perversity
death
decoration
suffocating
taxonomic bauble

A photograph of the photographic equipment used during séances at the home of Dr. Thomas Glendenning Hamilton. Unknown Photographer, circa 1920s. Courtesy of the T.G Hamilton Family Fonds, Archives & Special Collections, Elizabeth Dafoe Library, University of Manitoba.

A, B, C are flash devices, always loaded with flash powder ready for action. D. Three push buttons, which, when pressed, will explode three flashes in sequence. E. A deck holding a phonograph, operated by a motor-driven mechanism, which is controlled by a switch attached to Dr. Hamilton's chair.

CAMERA EQUIPMENT:

1. Goerz Stereoscopic, using plates or films.
2. 5 × 7 rapid Rectilinear camera.
3. 5 × 7 rapid Rectilinear camera.
4. 4 1/2 × 6 1/2 Thornton Picard Portrait camera.
5. 5 × 7 Quartz lens camera.
6. 5 × 7 Wide Angle lens camera.
7. 5 × 7 Seneca Portrait camera.
8. Woollensak Stereoscopic camera.
9. 5 × 7 Doppel Anastigmat camera.
10. 5 × 7 Zeiss Anastigmat roll film or plate camera.
11. 5 × 7 rapid Rectilinear camera.

Through the Looking Glass:

The cryptesthesia of photography

Abstract: Attempting to validate the "contacting of the dead" is something that persists in culture. This contact, often drawn out via the séance, dreams or between medium and audience (TV, radio, and other social networking platforms) is often accompanied by some sort of "scientific study" to provide ostensibly unambiguous proof to having successfully communicated with the "other side." Photography seems to have the dubious distinction as one of the most important evidentiary practices used to prove that the Supernatural exists. In the early 1900s and for almost thirty years thereafter, it was specifically employed as providing visual proof that the residue of a visiting entity, a specific material substance (ectoplasm) emitted via an orifice during the séance – was real. This apparently unparalleled "clear viewing" of the camera lens imitated the crypthesthetic ability of Mediumship making photography, beyond all doubt, the Medium's medium. This paper highlights the specific use of photography to document the séances organised by Dr Thomas Glendenning Hamilton & Lillian May Hamilton of Winnipeg, Manitoba, Canada, who, for almost thirty years, from 1918–1945, claimed to be able to photograph this odd sort of lubricious residue, a representational entity of the Spirit, channelled through the Mediums body. The unrelenting determination to prove the things that perplex via the reliance on the visual and the role photography plays in this, is the final argument put forward in this piece.

The alchemy of photography has led to the designation of those behind the camera as "face-peelers," "shadow catchers" and "soul stealers."[1] There is a certain magic and inherent violence to taking another's image but also an impressive ability to authenticate one's existence. Charles Richet first coined the term *cryptesthesia* to denote a paranormal perception or the clarity of Mediumistic vision and the practice of marrying photography's "truth telling" to the lucidity of this vision quickly became the common economy.[2] Photography, in being the sine qua non for providing a certain clear viewing, a *cryptesthesia,* is without doubt the Medium's medium. Its functioning seemed to require no interference with "normal sense channels."[3] It allowed *cryptesthetic* perceptions to appear just as real as those experienced in life.

Since photography was deemed to be the tool for evidencing

1. The term "face peelers" was first coined by Werner Herzog whilst in Canada filming the 1982 *Fitzcarraldo*. See Marina Warner, *Phantasmagoria*, (Oxford: Oxford University Press, 2006), p. 189.

2. "Lucidity" is also one of the well-used terms to describe clairvoyant abilities. See for example the work by medical doctor and metaphysician, Dr. Eugène Osty and Stanley De Brath, *Supernormal Faculties in Man*, (London: Methuen & Co., ltd.1923).

3. See T.G. Hamilton, "E.M Poole's Development," "If These Walls Could Speak, and "T.G.H. on Trance," found at Box 9, Folder 15, T G Hamilton Family Fonds, Elizabeth Dafoe Library, *Archives & Special Collections*, Box 9, 1920–1927. P.1a.

ectoplasm
cryptesthesia
photography
representation
supernatural
materialisation
myth
medium

All images courtesy of the T.G Hamilton Family Fonds, Archives & Special Collections, Elizabeth Dafoe Library, University of Manitoba.

untrammelled, "clear viewing," a most extraordinary application of the camera, as a snare to capture the supernormal's "residue," scorched and parched of all its dew, was set up to record and capture the manifestations of ectoplasm. This was an entirely new way of thinking around the use of visually recorded imaging, after-life and representation itself. From 1918–1945, The Hamiltons, an esteemed family living in Winnipeg, Manitoba, photographically documented séances held in the second floor apartment of their family home, in order to prove "once and for all" the existence of an afterlife, and with it, its violently issued residue: ectoplasm.

The Hamilton Happenings

Two flights up from the bustling Elizabeth Dafoe library at the University of Manitoba, hides the Archives & Special Collections Department, a place of curiosity and dark wood furniture; the only contemporary marker being the computers sporadically dotted between boxes.[4] This is the home of the Hamilton collection, where over seven hundred photographs documenting séances taken during 1918–1945 by Dr Thomas Glendenning Hamilton and his family remain some of the most recognisable, intriguing and inspirational to the visual realm.[5] Trained as a doctor, graduating in 1903, Hamilton quickly worked his way up to be the President of the Manitoba Medical Association and became a highly esteemed member of the community. Hamilton's success in medicine was, however, cruelly interrupted by the untimely death of his youngest son in 1918. Following this tragedy T.G embarked on a series of scientific experiments to explore the possibility of an afterlife; with the help of his wife Lillian, who conscientiously took notes throughout every sitting, they produced some of the most infamous images of ectoplasm, rivalling both Gustave Geley and Schrenk-Notzing's experiments.[6]

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4. *Archives & Special Collections*, Ibid.

5. The T.G Hamilton Archive is unique in its compilation, as it remained outside of an institution prior to its donation to the University of Manitoba between 1979–1986 by Margaret Hamilton Bach (Daughter). It is one of the most complete personal archives dedicated to the documentation of ectoplasm and bridges the gap between early scientific experimenters such as Gustave Geley and Schrenck-Notzing. Gustave Geley studied under Jean Martin Charcot at the Salpêtrière Hospital in Paris and the archive of Charcot's photographic studies became available for public research in 2011 as part of the Salpêtrière Hospital Records, Countway Library of Medicine, (Boston, MA). The Institut Mètapsychique International (Paris) also contains photographic documentation of some of Gustave Geley's experiments but this was comprehensively published see: G. Geley, *Clairvoyance and Materialisation: A Record of Experiments*, translated by Stanley De Brath, (London: T. Fischer Unwin Limited, 1927). The archive of Schrenck-Notzing is currently held at the *Institut für Grenzgebiete der Psychologie und Psychohygiene* (Freiburg, Germany). *The Harry Price Library of Magical Literature,* Senate House, University of London and The Society of Psychical Research (SPR), Manuscripts Room of the Cambridge University Library, both contain mixed photographic collections of the manifestation of ectoplasm. The SPR also houses the only known archived example of ectoplasm.

6. Gustave Geley was a physician who trained under Jean Martin Charcot at the Salpêtrière

Medium Mary Marshall (Mary M.). Residue, exposure of Sept. 8, 1929.
Photograph, T.G. Hamilton. Courtesy of the T.G Hamilton Family Fonds,
Archives & Special Collections, Elizabeth Dafoe Library, University of Manitoba.

The Hamilton's embarked on what they saw as the most extensive scientific study for contacting the dead.[7] Hamilton's experiments documented table tippings, rappings and trance Mediumship but his most famous images depicted the female body materialising ectoplasm. The Hamilton experiments took photographic evidencing to a remarkable level, using the photograph as a legitimiser of events.

What is Ectoplasm?

Gelatinous, swirling, moist, mucous like…Ectoplasm is the name given to the peculiar substance that exudes from the mouths, ears, noses and vaginas of the female mediums in Hamilton's images, as well as many others, in séances around the world. Its derivation comes from the Greek *ektos* meaning "external" or "outside" and *plasma* which means "to be moulded;" also referred to as teleplasm (*tele* "at a distance"); its material properties are expressly detailed in the accounts of those who witnessed its production. In the dark rooms of séances around the world a similar material began to be recorded; its very unique appearance proliferated in the images of the century.[8] Hamilton describes the substance in a very detailed way during his lecture to the British Medical Association, in which he showed his collection of photographs and referenced them in relation to the scientific experimenter Gustave Geley,

> Observation shows this ectoplasm (teleplasm) is an amorphous substance, which may be either solid or vaporous. Then, usually

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Hospital, Paris. His interest in the supposed supernormal biological ectoplasmic manifestations propelled him to become the Director of *Institut Métapsychique* (IMI) and to publish *Clairvoyance and Materialisation: A Record of Experiments,* translated by Stanley De Brath, (London: T. Fischer Unwin Limited, 1927). This work focuses on the various studies undertaken at the *Institut Métapsychique*, with a particular focus on manifestations of ectoplasm. Geley also famously wrote on the supernormal hand moulds of Polish male medium, Franek Kluski (1874–1944). See Maria Varvoglis, "The Kluski Hand Moulds," *Proceedings of the 45th Annual Convention of the Parapsychological Association*, (Paris: August, 2002), p.370–380, available at http://www.metapsychique.org/The-Kluski-Hands-Moulds.html. Baron Albert von Schrenck-Notzing was a German physician who, along with Sigmund Freud, studied hypnotism under Hippolyte Bernheim in Nancy in the 1880s. He later became interested in the hypnotic treatment of sexual deviations. Cf: Andreas Sommer, "Policing Epistemic Deviance: Albert von Schrenck-Notzing and Albert Moll," *Medical Histories*, Vol. 56(2): 2012, pp. 255–276. The most comprehensive publication of Schrenck-Notzing's experiments can be found at: A. Schrenck-Notzing, *Phenomena of Materialisation: A Contribution to the investigation of Mediumistic Teleplastics,* translated by E. E. Fournier d'Albe, (London: Kegan Paul, Trench, Trubner & Co Ltd, 1923).

7. The quest to scientifically prove life after death through supernormal means remains highly prevalent in contemporary society, as you read this the University of Edinburgh's Koestler Parapsychology Unit are conducting dedicated experiments to test the scientific possibility of psychic ability see: http://www.koestler-parapsychology.psy.ed.ac.uk.

8. Cf. Clément Chéroux, *The Perfect Medium: Photography and the Occult*, (London: Yale University Press, 2005).. See also, as earlier noted: Geley, *Clairvoyance and Materialisation* and Schrenck-Notzing, *Phenomena of Materialisation.*

> very soon, the formless substance becomes organic, it condenses and forms appear which, when the process is complete, have all the anatomical and physiological characteristics of biologic life. The ectoplasm has become a living being or a fractional part of a living being, but is always closely connected to the body of the medium into which it is absorbed at the end of the experiment. Such is the bare fact considered in itself, dissected, so to speak, down to its anatomical and physiological structure. This fact issubstantiated, with formal proofs, by the common consent of scientists from all countries.[9]

In tandem with Hamilton, Geley also found the substance to emanate chiefly from the natural orifices, the top of the head and the ends of the fingers; that it took on different aspects, sometimes the appearance of a kind of protoplasmic paste, sometimes a number of fine threads; at other times it resembled cords, rigid rods, or a thin tissue with undefined and irregular outline. Its colour, he observed, may be white, grey or black, the first colour being the most frequent. Both the volume and visibility he found to vary. One of the most remarkable of the findings shows the substance to be mobile.[10]

> It is sensitive even to rays of light. A bright and unexpected light perturbs the medium, but this effect of light is also very variable; in certain cases, even daylight is endured. The magnesium flash causes the medium to start violently, but the substance can stand it; this allows of instantaneous photography. […]
>
> In the effects of light on the substance and its reaction on the medium it is difficult to distinguish between what is really painful or only reflex; but whichever it be, it interferes with experimentation. For this reason, cinematographic photographs have been unsuccessful, with the exception of one taken by Schrenck-Notzing. Besides its sensitiveness, the substance seems to show a kind of instinct analogous to that of the invertebrate animals. It seems to have the same kind of distrust as a defenceless animal, and protects itself by retreat into the body from which it has issued. It seems to fear being touched, and is always ready to avoid this by reabsorption.[11]

9. Thomas G. Hamilton, "A lecture to the British Medical Association," *Quarterly Transaction of the British College of Psychic Science,* (London: The British College, Jan 1931), Vol. IX. No 4 and held at *the Elizabeth Dafoe Library, Archives & Special Collections*, Box 2, Folder 2.

10. T.G. Hamilton, *Quarterly Transaction of the British College of Psychic Science*, Box 2, Folder 2.

11. T.G. Hamilton, *Quarterly Transaction of the British College of Psychic Science*, Box 2, Folder 2.

An enlargement of a photograph taken by H.A. Reed of the medium, Mary Marshall, with a teleplasmic mass attached to her head, nose, chin and chest that contained the face of W.E. Gladstone during a séance at the home of Dr. Thomas Glendenning Hamilton on September 22, 1929. Courtesy of the T.G Hamilton Family Fonds, Archives & Special Collections, Elizabeth Dafoe Library, University of Manitoba.

Hamilton's concurrence with Geley on the description of "the substance" provides an intriguing notion of how we come to put together a "picture" of what a previously unknown entity may look like: for how we come to name something, to point it out and articulate it within a set of linguistic parameters, especially given that all observations around the possible existence of ectoplasm claim that this material substance must be guarded in its exposure to light and to touch. So how did the articulation of its material properties become so fixed; how did the "picture" of ectoplasm as a representational entity come to "make sense."

We know that the materials used to represent ectoplasm within photography were as varied as animal offal, skin and wool fibres but most commonly the results would be achieved through compositions of gauze and cheesecloth.[12] Many mediums would swallow and regurgitate small samples of fabric to produce an effect as believable as possible.[13] The colour of ectoplasm was nearly always white, with the occasional exception of a black manifestation; which perhaps unexpectedly speaks of the negative of photographic film. A common practice of checking the mediums body prior to entering the séance room would often occur, all foreign objects would be removed, such as jewellery and all orifices were examined.[14] In certain cases the medium would be forced to drink several litres of water coloured with "tincture of cudbear" (*Persionis*), a powder that would dye any foreign material a purplish red.[15] Despite all this – or perhaps because of it – the production of ectoplasm still remains, quite literally, a marvellous feat and anyone who captured the perfect photograph of its ever-changing form held an object of pure curiosity.

12. Karen Beckman, *Vanishing Women: Magic, Film and Feminism,* (London: Duke University Press, 2003).

13. The stuffing of the mouth with fabric also brings to mind connotations of female gagging, developed in Beckman's *Vanishing Women,* pp. 83ff.

14. Mediums were more often than not female and the checking of all bodily orifices was a common step in the almost ritualistic preparation prior to entrance into the séance room. A quote from the TG Hamilton archive, recording a command by the spirit guide known only as "Walter" announced: "Strip her naked, but don't touch her in this room! I have asked her clothes to be removed and her body to be washed. The person who removes her clothes should examine her; examine her; every part of her body – ears, hair, mouth, every part of her; but let there be no examination in this room without my permission." As quoted from T.G. Hamilton Archive, "The Mary M. Teleplasm of October 27, 1929," *Quarterly transactions of the British College of Psychic Studies*, Box 2 Folder 2. In the case of the Schrenck-Notzing experiments, there is also conjecture over the sexual relationship between the Medium known as Eva C. and her female "protector" and investigator, Madame Bisson. Cf. Beckman's *Vanishing Women* as well as Schrenck-Notzing's 1923 *Phenomena of Materialisation*.

15. Philip S. Haley, "Studies of Ectoplasm by Daylight" in *Psychic Research-The Journal of the American Society for Psychical Research,* No.10 (October, 1931), 414.

The Anti-Materialist Ontology of Mystical Realism:

How speculation can work against the speculative absolute

Abstract: This essay is part of a much larger work that aims to provide a platform for an anti-materialist ontology, one which reassesses the status of consciousness in relation to "absolute" reality. Central to this concern is the current relationship between philosophy and science. In this essay, Ole Hagen examines the "speculative realism" of Quentin Meillassoux as an example of how materialist assumptions are secured through a rationalist absolute. Ole Hagen examines arguments put forward in Meillassoux's book, After Finitude: An Essay on the Necessity of Contingency, that support a materialist paradigm.[1] By examining the status of Meillassoux's idea of the "arche-fossil" in relation to the speculative work of theoretical physicist Julian Barbour, he aims to show that the status of the arche-fossil as evidence of chronological time does not follow automatically from Meillassoux's supposed "mathematization" of nature. This throws into question the ability of his more central principle of "facticity" to support a materialist ontology. Elevating an act of thought to an absolute principle that supposedly validates materialist objectivity is then in the end an act of faith that is only supported by conventional common sense".

A Thumbnail Sketch of Mystical Realism

Under the banner of *speculative realism* we have recently seen a series of diverse philosophical projects arguing various types of materialism.[2] There is a massive span between varieties of physicalism and the Deleuzian "new materialism" advocated by Manuel DeLanda and others.[3] Physicalism propagates various degrees of determinism that in general support a mechanistic view of reality that implies an eliminative materialism where consciousness is regarded as an illusion devoid of agency and introspection is seen as fundamentally unreliable.[4] If this is a type of monism, there can also be many types of property dualism that still fit within a materialist

1. Quentin Meillassoux, *After Finitude: An Essay on the Necessity of Contingency*, second edition, translated by Ray Brassier (London, New York: Continuum, 2009).

2. Ray Brassier, Ian Hamilton Grant and Graham Harman are central names that, alongside Meillassoux, are associated with speculative realism. The terms "speculative" and "realism" of course encompass a number of other thinkers outlined in Levi Bryan, Nick Srnieck and Graham Harman's The Speculative Turn: Continental Materialism and Realism (Melbourne: re.press, 2011).

3. Manuel DeLanda, *Intensive Science and Virtual Philosophy* (London, New York: Continuum, 2002). The terms speculative realism and new materialism can be overlapping. The term new materialism was coined by Manuel DeLanda and Rosi Braidotti. See also Rick Dolphijn and Iris van der Tuin, *New Materialism: Interviews & Cartographies* (Michigan: MPublishing, University of Michigan Library, 2012).

4. For an introduction to physicalism see Daniel Stoljar, *Physicalism* (London, New York: Routledge, 2010).

materialism
anti-materialism
mystical realism
speculative realism
consciousness
ontology
philosophy of science

paradigm.[5] In contrast to these, new materialism opposes Cartesian dualism and the opposition between mind and matter, culture and nature.[6] New materialism proposes several ideas about virtuality, process and interdependency that would also be adequate to an anti-materialist ontology. But in this paper, when I raise the question of a shared materialist paradigm, I am referring to an underlying or accepted worldview that we can say, in a more naïve language, is founded on the idea that the world is really "out there" in a way that is external to conscious agents. This basic principle is what Meillassoux refers to as "the great outdoors", a world anterior to experience.[7] It follows from this view, that matter is unconscious or inanimate and that consciousness is the historical result of the complexity of material processes.[8] Another aspect of the same paradigm is that consciousness is merely a brain activity that either is illusory, in the sense that we are ultimately automates (determinism), or it is acknowledged to exist but only as an epiphenomenon of the brain (property dualism).[9] What seems to gather these ideas into a paradigm is the assumption that they are testable, proven and fundamental to science. When Badiou in his forward to *After Finitude* warns against the "return of the religious" and Meillassoux addresses the "religionizing of reason" and laments the idea that the fight against fanaticism is not carried out on principal grounds, the implication is that any diversions from their suggested materialist paradigm will play into the hands of fundamentalism and creationism.[10] Certainly Meillassoux envisions the Copernican revolution as an enlightenment project founded on the objectivity of mathematical truth. We will see that *After Finitude* is mainly an attack on what Meillassoux refers to as correlationism. Though I think correlationism can play a part in the philosophy of science, my aim is not to defend a correlationist ontology. I call the point of view from which I'm arguing here "mystical realism", firstly to distinguish it from Meillassoux's correlationism, in that from a mystical perspective, there is something reality "is like", which also means that some scientific theories are closer to describing reality than others. Secondly, because my view is likely to be labeled idealist by Meillassoux, I make a point of denouncing the solipsism and subjectivism he would associate with that label.[11] In other words by not labeling my position

5. For example it is possible to explain why physicalist reductionism fails to explain consciousness, while still holding that dualism is most likely true. See David J. Chalmers, *The Conscious Mind, In Search of a Fundamental Theory* (New York, Oxford: Oxford University Press, 1996).

6. Cf Manuel DeLanda, *A Thousand Years of Non-Linear History* (New York: MIT Press, 2000).

7. Meillassoux, *After Finitude*, p. 7.

8. This might be debatable in new materialism.

9. See the debate on this in Chalmers, *The Conscious Mind*.

10. Meillassoux, *After Finitude*, pp. vii and 47 respectively.

11. When Meillassoux in his example of facticity, (*After Finitude*, p. 55), refers to the "subjective idealist", the implication is that idealism means taking a feature of subjectivity, be it will, conscious-

idealism, I am refusing to accept the materialist monopolizing of the real. When I've chosen the label mystical, it is partly because when the word is used derogatively it is often given the opposite meaning to what it has in practice. The mystical does neither imply *quietism*, nor the *occult*, nor the *mysterious* or *obscure.* Implying a transpersonal territory beyond the psychology of mind or denouncing the notion that reality is understood through rational propositions alone, is not a refusal of language or philosophy (quietism). Operating with occult causal forces or claiming that there is an unexplained corner of the universe where a Supreme Being can be inserted is also not mystical.[12] Mystical traditions are, rather, those referred to as the traditions of nonduality.[13] Here the word nonduality refers to specififc traditions, but philosophically it also implies the refusal of Cartesian dualism.[14] Mysticism is first and foremost a radical empiricism. As a practice it involves a *first person empiricism* that in contrast to physicalism emphasizes introspection as the access to fundamental reality. What makes it radical is that, in contrast to materialism that always posits ultimate inaccessibility, mysticism claims to be a *complete empiricism*. What I call an anti-materialist ontology is one that in pseudo-scientific terms could be said to argue for a nonlocality of consciousness.[15] It would also be an immaterialism that argues for the

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ness or any other and giving it the status of an absolute. I am proposing that it is possible to think about consciousness other than as a feature of a limited subjectivity.

12. Just as we know that when for example we refer to Derrida's ontology as "negative theology", it is his view of Being and not a hyperessential being that is referred to. Likewise when some mystical traditions still use "God" as part of their terminology this should not imply that a mono-theistic Judeo-Christian-Muslim God – or for that matter, any set of Pagan gods and so on – are being invoked. Seemingly conflicting terminologies in different mystical traditions can refer to the same reality. We should also not be blind to the idea that the figure of a transcendental God can survive in materialist disguise as for example the "view from nowhere".

13. Cf traditions of Advaita Vedanta and Dzogchen. Many Western nondualist teachers are loosely associated with the tradition of of Ramana Maharshi and Nisargadatta Maharaj. Dzogchen is non-sectarian teaching in the tardintion of Tibetan Buddhism. See for example Sri Nisargadatta Mahraj, *I am That, Talks with Sri Nisargadatta Maharaj*, second American edition, translated by Maurice Frydman (Durham: The Acorn Press, 2012). For an introduction to Dzogchen see HH The Dalai Lama, *Dzogchen, The Heart Essence of the Great Perfection*, translated by Geshe Thupten Jinpa and Richard Barron, (Ithaca: Snow Lion Publications, 2000). But the term could possibly be extended to teachings from many other traditions, depending on how strict the definition is. See for example Jerry Katz, *One, Essential teachings on Nonduality* (Boulder: Sentient Publcations, 2007).

14. We can distinguish between a set of "nondual" mystical traditions and a nondual ontology as it would have to be worked out in mystical realism as a philosophical project, although it is more the case that the latter would serve the former.

15. Nonlocality indicates the non-causal connection of elements that are far apart. At the quantum level nonlocality is an essential feature of the universe. Because the wave function cannot be defined by components representing isolated localized systems, it lies outside the Cartesian point coordinates of space. I am indicating that nonlocality might be a special case of something more fundamental. Referring to consciousness it indicates a primordial consciousness beyond brains. This would not necessarily conflict with the idea of a secondary consciousness local to brains or possibly defined in terms of fields. We would have to distinguish between an atemporal "groundless ground" that is not devoid of consciousness in some absolute sense and an emergent consciousness belonging to a time

nonexistence of material substance. These are the basic elements of an ontology that would support a paradigm shift that would go beyond both the property dualism of orthodox religion and science and Meillassoux's "Copernican" (materialist) exclusion of consciousness. What needs to be developed further is what is meant by terms like consciousness or existence, taking into consideration the nondualism of mystical realism. There is not room for a further positive description of anti-materialist ontology here. This is merely outlining my reasons for addressing Meillassoux's speculative absolute.[16]

After Finitude?

What Meillassoux calls correlationism, he links to the post-Kantian view as it has been absorbed by recent continental philosophy.[17] The emphasis is on the idea that we cannot represent the "thing-in-itself", only the thing as it is "for us" as subjects, "always already" conditioned by our conscious relation to the world. In this way an objective vantage point becomes impossible, actuality becomes relative to us and scientific statements about the world can only be verified through intersubjective consensus. In this context, the thing as it is for us is then always a description of the correlation between the object and the observer. For Meillassoux this means that if one really takes this relativity seriously, then one looses the sense of the "great outdoors"; that is of a reality where objects have properties even when they are no longer apprehended.[18] What science challenges us to consider, according to Meillassoux, is what he calls "ancestrality", a reality that is anterior to the human species altogether and therefore cannot be incorporated in the correlationist circle. The evidence for this ancestral anterior is the "arche-fossil", which is fossil material that not only indicates traces of past life, but the existence of ancestral reality. What facilitates the arche-fossil is the precision of the scientific dating techniques that have been around since the 1930s, a precision which relies on the

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of interdependent becoming. The former would be immanent to the latter. Mystical realism would be an ontology of "pure immanence", but also of immateriality. Pure immanence would be accessible to introspection but could not be defined as an experience. All other phenomena would be experiences. There would then be no fundamental distinction between internal and external phenomena, both are immaterial, but the latter is structured dimensionally.

16. What Meillassoux calls speculative is the assertion of a "non-dogmatic" thinkable absolute. I use the term "speculation" simply as a way to describe theorizing on the margins of the consensual in relation to fields of knowledge. (But in saying this, I do not think speculation should have to answer to my own or anybody else's ontology).

17. Meillassoux does not specifically name his adversaries but it is natural to think of post-structuralism as the main target. However he does give Heidegger as a prime example of someone who formulated its principles, see *After Finitude*, p. 8.

18. Or as he puts it "existing in itself regardless of whether we are thinking of it or not". *After Finitude*, p. 7.

constant disintegration of radioactive nuclei, as well as the laws of thermoluminescence, the latter of which concerns the dating of the light emitted from stars. This is the type of factual evidence that on a relative level is seldom contested. Relying on this uncontested materiality, Meillassoux's aim is to prove that mathematical science is capable of describing the in-itself. But Meillassoux is not merely putting forward this view that is accepted by conventional science, he also goes on to support it with an ontological principle, by which we can "think" our own inexistence. To think this in-itself must differ from thinking the for-us. He illustrates the argument in the following way: Imagine, Meillassoux says, that a dogmatic Christian and a dogmatic atheist are arguing about the continuity of existence after death (the Christian arguing that the in-itself is being-in-God).[19] A correlationist dismisses them both in favor of a strict agnosticism because all beliefs strike her as equally legitimate given that one cannot know what is beyond the "what is given to us" as being in the world. With this she is rejecting both these types of realism about the in-itself. At this point a "subjective idealist" intervenes and says: I cannot think of myself as not existing, because an in-itself that differs from the for-us is unthinkable. In order to maintain her position the correlationist must argue that there is no theoretical preference between the idea of being wholly other in God after death and being annihilated. This argument, which Meillassoux terms "unreason" or "facticity", that names the possibility of being able to think the lack of a necessary reason for things being this way or that way, is what Meillassoux wants to establish as an *absolute*. He sees this position not as a lack of knowledge but as a principle of what it is possible to think. In the example, the correlationist inadvertently delivers this principle, which is then taken up by the "speculative philosopher". This possibility of thinking our capacity to be other is not, as Meillassoux sees it, a correlate of our thinking, for it includes the possibility of our own non-being. If the thought of inexistence was simply the correlate of the correlationist's thought of this annihilation, it wouldn't work in the argument against the idealist, says Meillassoux.[20] So even if one argues that it is not possible to decide in favor of either of these positions, the subsequent principle, as proposed by Meillassoux's argument, the distinguishing between the in-itself and the for-us, leads him to conclude that the capacity for everything to be equally possible is an absolute.[21] Leibniz and others used the notion of God as a *necessary* being, that could make the entire order of beings necessary and explain why there is something instead of nothing or why the laws of nature are exactly the way they are. Meillassoux argues against this

19. *After Finitude*, p. 55.
20. *After Finitude*, p. 57.
21. *After Finitude*, p. 57.

necessity.[22] Thought does not experience its "finitude" through his principle of facticity, but the lack of metaphysical necessity. But to Meillassoux this lack of causal necessity also means, in its ultimate consequence, that we must radicalize Hume's idea that the laws of nature merely describe regularities. According to Meillassoux, Hume still thought laws were relative because ultimate causal powers were unknowable, whether as for Meillassoux they are radically contingent.[23] To further this point, Meillassoux proposes a "time" belonging to facticity that he calls hyper-Chaos, which denotes the absence of any sufficient reason.[24] So he has to say, in contrast to conventional science perhaps, that there is no absolute reason things should be the way they are. Yes there is the regularity of natural laws, but in principle these laws can change for no reason.

How does this hyper-Chaos secure the idea of mathematical reality? If there is no necessary thing (that could not be different), and all things are contingent, there must be existent things to address; there still must be something rather than nothing. In this way contingency becomes the necessary, while the for-us hinges on our existence or non-existence. But the in-itself must exist. If nothing existed we could not have facticity, argues Meillassoux. We could say that this indicates that, according to him, though things can cease to exist, existence itself cannot cease to exist. There has to be existence and inexistence for facticity to work. Meillassoux gives the name factiality to the idea that facticity does not apply to itself.[25] In contrast, because of hyper-Chaos we can't say whether a specific thing will go on existing forever or perish. So the universe is, according to Meillassoux, acausal. Ordinary chance is just based on the idea of a limited number of probabilities, or a total set of conceivable possibilities that make a specific outcome conceivable.[26] If we apply this idea of numerical finitude to the universe we make the error of thinking of the possible as a Whole. This is were Meillassoux, in line with Badiou invokes Cantor's idea of the transfinite derived from the mathematics of set-theory.[27] According to Cantor's theorem if we count the elements of a set A and then compare this number to the possible groupings of these elements, the set B of possible groupings will always be bigger than A. It is possible to construct an unlimited succession of infinite sets, never arriving at a totality.

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22. *After Finitude*, p. 71.

23. I take this contingency to mean not so much "depending upon" as radically random.

24. *After Finitude*, p. 64.

25. *After Finitude*, p. 79.

26. He argues that having no laws, doesn't mean the universe would have to change frequently. It is not the case that probability must lead to the inference of laws. If the universe was a dice that has had very predictable outcomes so far, always falling with the same side up, it might still not have any finality even if it had an immense number of conceivable universes as its other sides.

27. For an introduction to Cantor's set theory see J.W. Dauben, *George Cantor: His Mathematics and Philosophy of the Infinite,* (Princeton: Princeton University Press, 1979).

Though it is thinkable to have a world of limited possibilities, we cannot totalise the possible as such. Even though Meillassoux operates with a contingency that many scientists would be uncomfortable with, he still insists that mathematics has an ontological status, where mathematically formulated theories are true descriptions of primary aspects of reality. For Meillassoux, the strength of mathematics is that the world can be described independently of its sensible qualities. The Copernican revolution consists in being able to describe a world that is separable from man, because time and thought are dia-chronic. The "mathematization" of the world or nature is for him inexhaustible. He clearly states that it is meaningful to think of those aspects of the given, that can be described mathematically, as features of a reality that exists whether we are there or not. Precisely why mathematics as such should automatically exemplify the principle of facticity is not clear. The ontological status of mathematics seems to be something Meillassoux has inherited from Badiou, who uses the vocabulary of set theory to deny the existence of any "one" grand set, cosmos, Nature or God. In any case mathematics is given a privileged position to represent the ontology of fundamental reality, even if the axiom of foundation founds all sets in the void, according to the ontology of Badiou. It is clear that Meillassoux thinks ancestrality, or the idea of radioactive decay older than terrestrial life, is a case of a mathematically founded theory that does not make sense unless it is seen to be indifferent to the thought that envisages it. His conclusion is that what is mathematizable cannot be reduced to a correlate of thought, where thought here is seen as synonymous with the irreducible subject (the for-us). But it is clear that the subject can have an idea of an absolute principle (the in-itself) that implies its own possible inexistence.

Several years ago I participated in an art project called "Time Capsules and Conditions of Now".[28] During this project we had the pleasure of doing some gardening with theoretical physicist Julian Barbour, author of *The End of Time*.[29] Barbour's project, as he outlines it in his book, is of interest here in relation to the premises of Meillassoux's "arche-fossil" and the status of mathematics. Meillassoux could be said to have a Platonic conception of mathematics.[30] We should not take it for granted that all leading mathematicians in the field of pure mathematics share the idea that mathematics is Platonic rather than pragmatic. If for example it is possible to imagine that a pre-Copernican mathematics could sufficiently describe

28. For a description of the project see http://www.fatosustek.com/time-capsules-and-conditions-of-now

29. Julian Barbour, *The End of Time, The Next Revolution in Our Understanding of the Universe*, (London: Phoenix, 1999).

30. By "Platonic", I am here referring to Meillasssoux's claim that "whatever can be mathematizised can be rendered absolute," Meillassoux, *After Finitude*, p. 126.

the ruling worldview of that time, the question remains about when precisely we can say that mathematics secures its ontological status, even if we accept it to in principle be independent to the correlationist circle.

Let us set this point aside for the moment and agree for now that we accept the ontological status of mathematics in the manner of Badiou and Meillassoux. Let us say further that once we have made that operation, mathematics necessarily supports the notion of ancestrality. What gives the arche-fossil its status of being the evidence for ancestrality is the idea that chronological time can be measured precisely. The problem is that though linear time is perfectly adequate for most of our ideas of human history or Newtonian physics, since Einstein, it doesn't really suffices as a theory of time as such. Enter the scene is Barbour. He shares with Meillassoux the idea that mathematics is fundamental and certainly that the thing-in-itself exists. Barbour's theory is far from mystical, on the contrary, he says clearly that there is no special role for consciousness in his theory.[31] So I am not using Barbour here because he supports anti-materialism, but on the contrary because he is a realist who is conducting speculative science, perhaps even aiming to establish a "speculative absolute". Interestingly to our example he takes a particular interest in fossils, which form a central role in his theory.[32] But rather than seeing fossils as evidence of chronological time, to Barbour, fossils describe the idea that we live in a timeless universe. This does not mean that Barbour puts forward the idea that there must always have been humans. The question of human presence is irrelevant to his theory. It is also irrelevant to the issue at stake; whether mathematics necessarily must support chronological time. Barbour uses the Wheeler-DeWitt equation, which is a functional differential equation, to outline the quantum cosmological question of time.[33]

The equation already questions the existence of time and addresses the contrast between quantum mechanics and relativity, the problem that an intrinsic time to be extracted out of space violates the principle of general relativity. In the most direct interpretation of the equation, says Barbour, the universe is like a huge molecule in a stationary state where its different possible configurations are the instants of time. As he explains, there are so many different types of fossils that are all, in an extended sense, records or what he calls *time capsules*.[34] There are time capsules in cells, in physical organs, capsules of the geological Earth and of brains. It seems to us that these are histories of time-based events, or at least of motion, while according to him they are not. His claim is that we live in a timeless, static universe. These records are just particular structural instants of a configuration space.

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31. Barbour, *The End of Time*, p. 31.
32. Barbour, *The End of Time*, p. 30.
33. Barbour, *The End of Time*, p. 247.
34. Barbour, *The End of Time*, p. 33.

We have to imagine a landscape or surface where all conceivable states of affairs are present. Tracks across this landscape would describe possible histories. In this analogy there is no directionality or times-arrow, just a series of different Nows giving rise to different experiences. In this world, which he calls *Platonia*, every instant of what we call motion is like a series of eternally existing static freeze-frames.[35] If we imagine this world covered in mist, the mist would have degrees of intensity. In many of these Nows there might be no humans, no possibility of self-awareness, no records. The "mist" indicates the (static) wave function as it is directed by probability. Thus it is probability that accounts for the coherence of our historical narrative, what causes the wave function to "seek out" time capsules.[36] There is no evolution here. The universe is "created" in every instant. Barbour then goes on to explain why there are no quantum dynamics, only quantum statics in his universe.[37] There are no laws of nature either, just the one law of the universe. This is a universal equation, where the Shrödinger equation further assigns a probability to each conceivable static configuration. Just as Meillassoux has to imagine that nature produces the structure of thought in brains in such a way that the firing of neural correlates are such that we can understand objective mathematical principles, Barbour also, though he admits that nobody knows what causes consciousness, insists that there must be such a parallelism. Given the complexity of human experience, it must be possible for our brains to contain data of many snapshots at once to produce the illusion of movement played out in our brains. Barbour uses Bell's quantum mechanics to explain how records or the topography of "time capsules" are created, which all refer to present rather than past phenomena.[38] Put differently, sentient beings all have memories of different histories that convince them that they have a past. Of course Barbour goes into much detailed physics to support his position. The main point for our argument is not the degree of acceptance, rejection or indifference Barbour's theory has been met with. Important to us is that this is a mathematically supported theory that affirms the existence of fossils, but denies the existence of chronological time. It is further important that Barbour regards his theory as describing an objective universe, where the possibility of his own death or his own inexistence would be located within the total configuration space of the total matrix of the "thing-in-itself".

What the example of Barbour shows is the problem of the initial movements of Meillassoux's materialism, and the status of the absolute in this ontology. Of course his book is not directed at anti-materialism as an alternative realism. Rather it is directed at correlationists that, according

35. Barbour, *The End of Time*, p. 29.
36. Barbour, *The End of Time*, p. 308.
37. Barbour, *The End of Time*, p. 253.
38. Barbour, *The End of Time*, p. 284–296.

to Meillassoux, are idealists by default, in that every variety of correlationism is "exposed as extreme idealism".[39] This might be so within the logic of his argument, but it is likely that the personal conviction of his opponents is naturalized materialism. Because the success of the materialist paradigm is that it has managed to blend with common sense. This is not the case with extreme physicalism, where proponents have to argue against their own free will to argue, but is likely so with the more widespread property dualism. Personally I welcome a turn to questions of the ultimate nature of reality, without confusing this with a dogmatic or fundamentalist type of theology. It is for this reason I will conclude by addressing Meillassoux's other objective mentioned earlier. This is to secure an "absolute outside" that is implicit in the underlying assumptions that nourish the materialist paradigm.[40] Mathematics is used implicitly at the outset as the ontological foundation for the arche-fossil, it also returns later on as the objective guarantor for the "thing-in-itself" that remains even after the necessity of physical laws have been abolished. In this way, ancestrality is necessarily founded on the principle of chronological, linear time, the calculus of which tautologically relies on the objectivity of mathematics. But with Barbour, we have seen that it is perfectly possible to have a materialist worldview, founded on mathematics that does not ratify chronological time as an objective feature of reality. So the status of the arche-fossil as the evidence of ancestrality can perfectly well be doubted within a materialist paradigm. With Barbour, we have encountered a very different, speculative idea of the fossil. We could ask if Barbour's "time capsule" is an "arche-fossil", rather than just an ordinary fossil, i.e. whether or not it is a particular type of fossil that secures objective (material) reality. He would probably say yes, whether this type of "records" are found in subjects or in objects, they are in any case configurations derived from a mathematically secured objectivity.

But for Barbour, as for most physicists, the question of whether what he is examining and how he is examining it is objective or correlational does not arise. Materialism is taken for granted as the objective premise for conducting science. But because it is possible to speculate like Barbour, the notion that the arche-fossil is automatically supported by mathematics falls away. This is so regardless of whether we claim that there have always been humans or not. Neither Barbour nor a mystical realist would claim that. We can imagine a range of theories of time that might allow for chronological time to be real within a certain local reality frame, without it thereby accounting for a complete theory of time. Regardless of whether we think the arche-fossil is reliable evidence for a time before humans or not, what is under question

39. Meillassoux, *After Finitude*, p. 18.

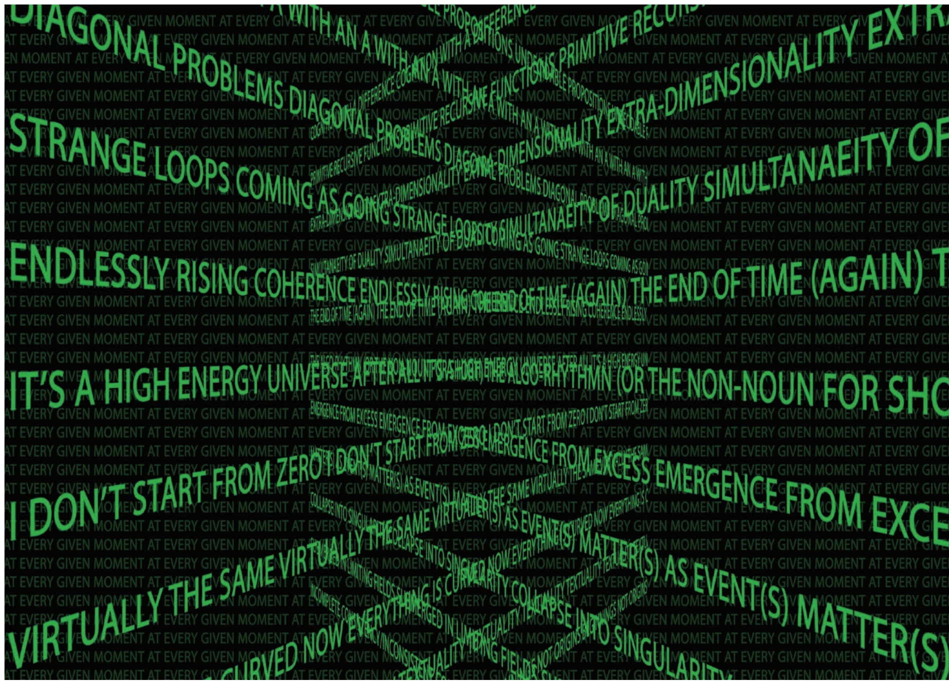
40. Meillassoux, *After Finitude*, p. 7.

is the assuredness by which mathematics as such can be applied to secure a particular evidence. If this example is annulled, how then does Meillassoux's ontology secure the "great outdoors"? What is left is a claim about the absolute status of mathematics and the notion that facticity, the foundation for making reality claims in Meillassoux's scheme, must suppose that there is something rather than nothing. To say that there must be something rather than nothing is not in itself a materialist claim. If we take this as true, we cannot thereby say that the supposed primacy of mathematics is secondary to facticity i.e. that if there must be a reality external to us, it must necessarily be of a mathematical nature. It is simply not clear what secures mathematical truth as an absolute and neither is it clear how mathematics can have the efficacy to secure a particular material evidence for "the great outdoors". Perhaps Meillassoux, in line with Badiou, does not think ontology can say anything about the event in the ordinary sense? After all, laws of nature, and I guess that could include time, are void. But that is a conclusion that does not tally well with his objective to secure the "great outdoors". Is it perhaps facticity alone that secures the materialist position of an external independent reality? Facticity itself as an absolute applies to the argument of "agnosticism" with regard to reality; that anything can happen. According to Meillassoux, this absolute favors a reality independent of the subject, as it must imply the possibility of thinking our own inexistence. But this "absolute" only applies to a classical materialism that takes for granted a type of "property dualism", where the senses operate in a finite domain of phenomenal subjective experience and objective material reality exists devoid of conscious potential. This is in the end the reason why mathematics gets to play the role of objectivity in Meillassoux's scheme. It is evident that he thinks he has furthered Descartes' distinction between the mathematical knowledge of nature and sensible qualities or the qualia of thought.[41] The more objectivity is purged from the notion of the subjective, the more one will have distilled the idea of a material world as distinct from mind. From the position of mystical realism, nonlocal consciousness would be an objective feature of the universe, not something identical to human mind or emergent consciousness, though the two would also not be mutually exclusive. Consciousness as an emergent property of evolution and brains can perfectly well be structured dimensionally without referring to material substance or having to exclude the potential of an immanent and impersonal consciousness. From this perspective, the ability to "think" our own inexistence is linked to the transcendental illusion of a separate individual consciousness to which thinking occurs. So facticity does not break the finitude of the "for-us" by opening towards the "in-itself". That is only if we imagine the in-itself to be some inaccessible structural premise

41. Meillassoux, *After Finitude*, p. 124–126.

external to experience. Why existence implies immateriality and excludes the possible persistence of any entity and what acausality would mean in the context of mystical realism is something I hope to expand on in the future. I would also have to address what an anti-materialist science would imply. But for the individual, finitude is abandoned not by gazing at the stars and contemplating inexistence but by noticing the intimate atemporal awareness that accompanies what we call experience (or consciousness *of*). At the personal level nonlocality is not a special experience of infinite extension in space, just a simple lack of limit or location associated with our own aware presence.

At Every Given Moment.



virtually the same
endlessy
emergence
the non-noun

At Every Given Moment. Image by Dane Worallo
Medium: Installation: Video, text and sound, 2013.

*Artworks (Figure 1–7) are from the group exhibition *Exploding the Teardrop,* curated by the Patternlab (Artists Jennifer Wright, Jane Langley & Kathleen Mullaniff), The Pittshanger Manor Gallery and House, (London: November 2007–January 2008). The artists' work in the exhibition was discussed as a feature on Women's Hour, BBC Radio 4, November 23, 2007. Artwork (Figure 3) is from the exhibition *The Journey of Paisley,* curated by Frances Pritchard, textile curator. The Whitworth Gallery (Manchester: August 2009–July 2011). It is now a part of their permanent collection.

FIGURE 7 Jennifer Wright (Artist), *DMCBHUTTAPARK.* Digitally Printed Window Vinyl. 276 cm × 184 cm (Approximately). Courtesy of the artist.

Pixelpaisleyportal

The materialisation of imagination in 8 pixelated steps*

Abstract: Wright draws our attention to a range of actual and metaphorical relations fused together in her engagement with a practice built on the overlooked repetitious units of craft and the virtual unit of the digital pixel. This is a dialogical practice steeped in historical and cross-cultural materialities, references that Wright reflects upon and deploys in the form of the Paisley teardrop motif. Wright mobilizes hallucinatory fabrics, the once acknowledged uniform of Psychedelia, towards a contemporary materialization of the Sublime and informed by her feminist approaches to practice. Here the use of light is the ethereal substance of the imaginary.

1. A pixel is a pill.

Before pixels, (common sense said) a thing was a thing, made up of other small things, which were made of other small things. After the great *pixelisation*, it was no longer clear (to common sense) that things were made from other things. It seemed like some things were made from some other substance (or non-substance?): the substance of light. Some (or perhaps all) things were made of pixels, or, in fact, *were* pixels: buttons, beads, stitching, any mark or object might be pixels of a kind, particularly when the colour or quality of those things seem to have a weight (more weight than any substance). But… the decorative introduced the pixel into our lives long before the computer. Decoration (interior design, needle craft, pattern-making, cake decoration, tapestry) long banished from serious environments (and art) for substance abuse, pioneered a form of radical pixelisation, freeing materials from functionalism and substance-identification. So some – the pattern makers – swallowed the pill long ago.

pixel
stitch
teardrops
hallucinatory fabrics
embroidery
portal
cross-cultural materialities
ethereal substances
light

Figure 1 Jennifer Wright (Artist), *DMCPAISLEYPORTAL*. Digitally Printed Vinyl with Embroidery. Triptych 92 cm × 167 cm. Courtesy of the artist.

2. Teardrops fell when the pattern pill was first consumed.
This is ancient knowledge. This is an ancient technology. The pixel is a light-decoration-pattern-virus and its most intense and oldest viral-form is the Paisley motif, originating in Babylon as the Bhutta "tear-drop" shape. This teardrop virus manifest by addictive symptoms travelled, via humans to India and then infected the colonialists and traders of Europe in the 18th Century who brought the virus home. The industrial revolution of Europe increased the spread of the Bhutta teardrop virus, which was mass-produced in the textile factories of Paisley, Scotland. The now hallucinogenic fabric, complex and layered in compositional form and hue later become the uniform of Psychedelia. So some – the captains of industry – swallowed the pill not as long ago, but still long ago.

3. The era of material-moralism is the era of pattern prohibition.
The era of truth to materials of modern art and design attempted to curb all decorative delirium. Substance abuse was domesticated: the pattern makers went into the shade… or into the margins of life…until the Great Pixelisation that is. So now, everyone has swallowed the pill.

4. Paisley is a teardrop of the most intense pigmented materiality.
The paisley teardrop is suspended in mordant (alum acetate, citric acid, urea), bound to the fibers of fabric, ignited by light. Its materiality is the same as that of the Pixel. Electricity travels along cables deep in the ground, carriers of energy made from fossil fuels, the movement of the sea, the turn of a turbine, the rays of the Sun. The electrical current ignites the plastic or glass screen; tiny pieces of colour flicker, changing (colour), at speed, to produce… things: talking heads, digits and letters, dramatic scenes, Google maps, knitting patterns. And like the screen, the Paisley hallucinates light like a well-designed drug. It is a pill, a pixel pill that delivers the *uber*-anything-whatever.

5. And where did this Paisley pixel pill revolution have the biggest impact?
It was in domestic environments, in homes, front rooms, kitchens, bedrooms, amidst the tiles, carpets and bedspreads. And to those who kept such places in order, who get close to surfaces, who dust and scrub, who are involved in the detail and the minutia of living, it was clear they had been dealing with pixels (long before Apple, long before television sets, long before electronic communication). Those who keep such environments in order, who get down on their hands and knees and wash and brush every square inch of space, they realize that the domestic is best understood as a haptic environment – one great big pixel-land. The domestic space had become an information processor, presenting information that hovers between material and virtual forms. The introduction of screens (one or more in every room) was just the total-hapticization of domestic space and life: all noses to the grind-screen.

6. The step change.

One or more screens, one or a million portals, and one million x million pixels in every home: this is the step change. Where previously perhaps, common sense would say every surface, everything has its specific qualities (hard, soft, shiny, dull), the new portals had all qualities and none: every *thing* is bitmapped, or a vector file, everything is jagged or smooth: everything is light (lit from inside). Only those immersed in domestic, haptic space (in cleaning and polishing) knew this without thinking. For they had known about the mutability of things from the first day of their domestic duties, they knew about the ambiguity of things (the excesses, multiplicities and mutability of material and things), for it was their job to keep these things in their place, and these qualities becoming chaos. And now, they inhabit the places where space is small and crowded, where screens glare, and where dials blink amongst the walls and furniture that equally present a myriad of surfaces and patterns. And it is their job to keep these things operating. Their job is to make sure these qualities remain operational, buff every button, de-static-ize and degrease every screen and table-top, polish every pixel. Pixel pills never sleep.

FIGURE 2 Jennifer Wright (Artist), *DMCPAISLEYPLASTICITY.* Plastic HAMAR beads 365 cm × 182 cm. Courtesy of the artist.

FIGURE 3 Jennifer Wright (Artist), *DMCPAISEYPLASTICITY2*.
Digital Geclee Print with Embroidery mounted on Acrylic. 98 cm × 76 cm.
Courtesy of the Whitworth Gallery Manchester (Permanent Collection).

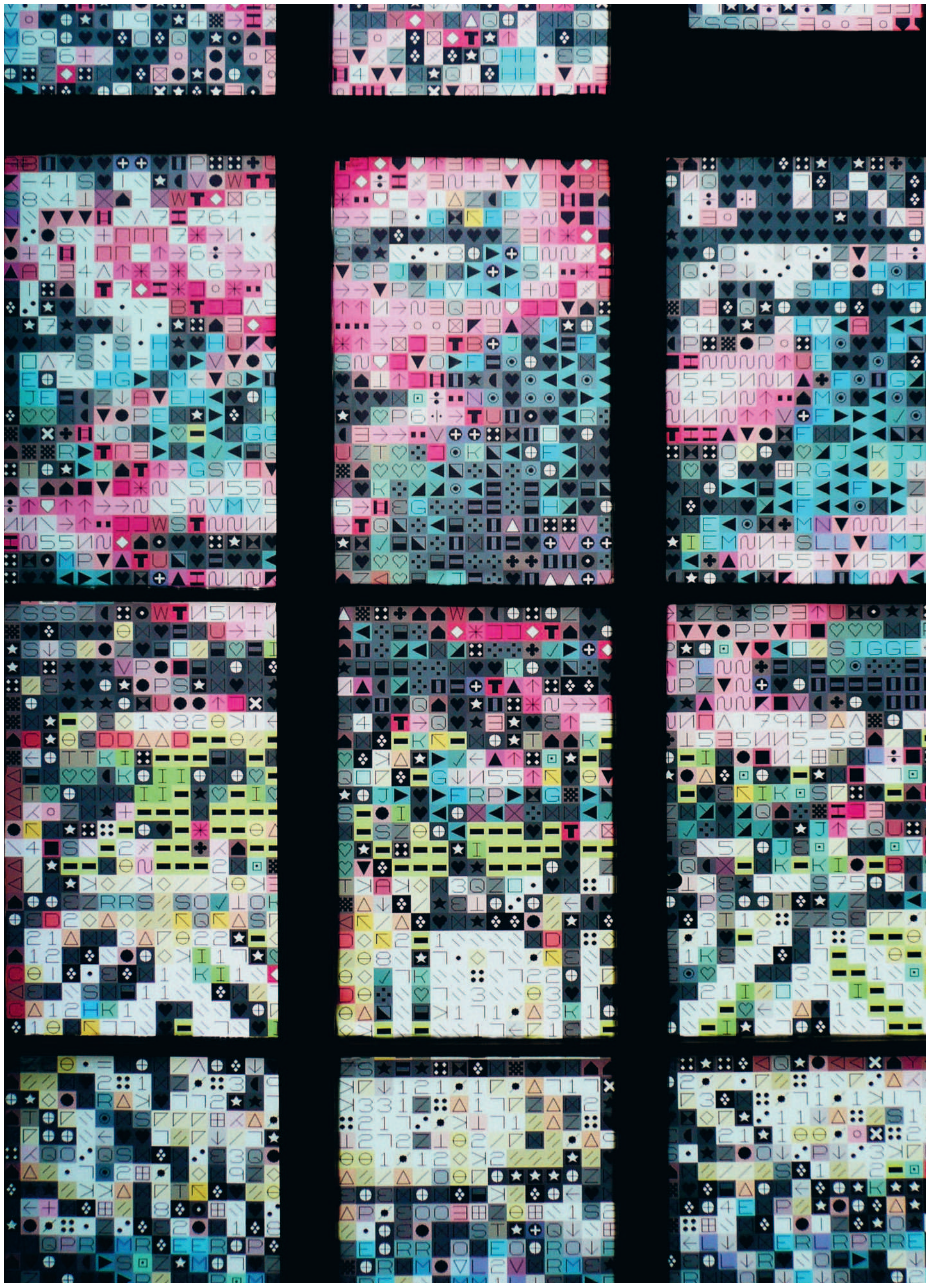


FIGURE 4 Jennifer Wright (Artist), *DMCPAISLEYBHUTTAPARK.* Digitally Printed Window Vinyl. (Detail). Courtesy of the artist.

FIGURE 5 Jennifer Wright (Artist), *DMCPAISLEYPORTAL.* Digitally Printed Vinyl with Embroidery. (Detail). Courtesy of the artist.

FIGURE 6 Jennifer Wright (Artist), *DMCPAISLEYPORTAL*.
Digitally Printed Vinyl with Embroidery. (Detail). Courtesy of the Artist.

7. This is the time of the surface.
This is a "surface-time", a continuous surface differentiated by task and touch. The velocity and discontinuous time of rapid screen edits are woven into an order by the body and of the pattern of the day. When this is the job, qualities cannot be taken for granted, the pill must be, will be swallowed. A thousand portals blossom, hallucinating the beautiful and the sublime.

8. Light is infectious, invasive, intoxicating.
It straddles both quality and thing; as such, it slips out of domesticity, being both too loud and ethereal at one and the same time. And even though the new wide-boy object oriented ontologists state otherwise, re-state the obvious Hegelian mantra that things have qualities, but these things are not the things themselves, etc etc and so on and so forth – as if to say: Don't mistake a thing for the angle of the sun, the reflections of the surrounding environment and whether you are standing still or moving or casting a shadow, for that's what produces the qualities often mistaken for things. But we say: Light is infectious, invasive, intoxicating. It is the substance that stimulates (produces) the imaginary and imaginings. The great pixelisation has made this clear.
Swallow the pill.

Becoming Grey (the unending of)

blurring
becoming
surface
ground
grey
unendings

FIGURE 1 Samira Shafiei Nejad (Artist), *the unending series*. Acrylic, oil, and polyurethane on canvas, 2012. (Detail). Courtesy of the Artist.

FIGURE 2 Samira Shafiei Nejad (Artist), *the unending series*.
Acrylic, oil, and polyurethane on canvas, 2012. (Detail).
Courtesy of the Artist.

Artist statement: My paintings are a result of an intuitive process in practice; a zone of constantly metamorphosis that draws on other genres, such as sculpture, architecture and photography. My practice is an open-ended investigation about the nature of painting, a messy, unending process, often involving materials and modes of making that are not traditionally of painting. My practice in some way is about the tension between heterogeneity and homogeneity. This means that I am not interested in only one or the other, but in the transference between the two; always in a state of becoming.

These paintings are both my research and my words. I myself consider these paintings as a texture of seeing, pure products of the imagination, something beyond perception. When I paint, I am looking for something comparable to an essence, something more than rational thought, something poetic. The images offered to us by these paintings now become, now they mark, now they are an expressive becoming that attempts to locate them between illusion and physical mass.

This "unending" series of uncanny creations emphasizes the fluidity of life in opposition to any fixed and systematized world. My paintings are not about the act of seeing or about the world, but about their interaction, the tension between self and world. They are not about autonomy of colour, but about heteronomy: the unstable contradictions of black and white, the psychic confusion of darkness and light, the various spatial configurations, a shifting sense of depth and a variety of tactile textures. They are about making connections between mind and matter.

I do not for a moment concede that the "*I/Eye*" is what *paints/thinks*. Instead, I take the *"I/Eye"* itself to be in the construction of *painting/thinking*, of the same rank as "colour," "foam," "form," "substance," "being," – all as a regulative fiction, inserted into, invented into... a world of *becoming.*[1]

I am interested in the process of blurring, which involves the question of becoming, becoming of presence, mind/body and I/eye. *These paintings do not only involve presence, though presence is active and fundamental part of it.* They emerge as something that cannot be reduced to the presence of the surface or of the ground (or both). My painting is about the spacing that simultaneously connect and disconnects the surface and the ground, thickness and thinness, painting and sculpture, space and the viewers, where silent surface of blurring brings everything together, revealing to the point of departure, an eternal return to the I/eye.

The *unending* series, where the walls, the space, the ground no longer frames the surface (painting) but become part of the surface (painting) itself. The wet surface is no longer wet but becomes a dry ground, for another surface.

1. Friedrich Nietzsche, Nietzsche's Writings from the Late Notebooks, edited by Rudiger Bittner, translated by Kate Sturge, (Cambridge: Cambridge University Press, 2003), p. 20.

Here architecture and painting can be dissolved into each other the same way that sculpture and painting have been united. *Blurring* in this series suggests a *rhizomatic* trans-temporal/spatial condition, where painting is neither dependant on its former materiality and meanings, but lives between and across the two, where other forms of materiality, meaning or meaningfulness can – and do – occur.[2]

I paint. I paint without colour (or at least without the usual sense of colour). I paint with my *mind*. I paint with my *body*. In these sensuous paintings I recognise my own world. I construct and reconstruct my own Grey world. *Grey as a colour of freedom* and openness. *Grey* as a colour of rhizome, as the state of becoming. *Grey* out of tension between black and white… as a platform that generates ideas and possibility, open to imagination and interpretation. This *"unending" series* emphasizes the fluidity of life in opposition to any fixed and systematized world. My paintings are not about the act of seeing or about the world, but about their interaction and the tension formed by such between self and ones world.

In the beginning, this painting is a rather a combination of materiality and the aesthetic complexities of painter's mind. But as time goes on, they started living a life of its own, while the thick and heavy traces of the painter became thinner and lighter, while the painter became fainter.

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2. See Deleuze and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia,* translated by Brian Massumi, (London: Athlone Press, 1987/88), pp. 22–25. For Deleuze and Guattari Rhizome has no beginning or end; it is always "becoming;" always an "inter being." As anti-genealogy and underdevelopment, instead of continuously progressing toward development. It is a mapping instead of a tracing. The rhizome has multiple entryways and exits; it creates maps that are a-centred, non-hierarchical, without an organizing memory or central automaton. Rhizome is uniquely alliance, where the becoming is all about where things pick up speed, gain intensity.

Samira Shafiei Nejad (Artist), *the unending series*.
Acrylic, oil, and polyurethane on canvas, 2012. Size 205 × 320 × 30 cm.
Courtesy of the Artist.

Estelle Barrett is Adjunct Research Professor at Charles Sturt University and Professor/HDR Coordinator at the Koorie Institute of Education, Deakin University. Her research includes material thinking, affect and embodiment in aesthetic experience, creative writing and practice as research. Best known for her *Kristeva Reframed: Interpreting Key Thinkers for the Arts* (2011), her two co-edited books (with B. Bolt), *Carnal Knowledge: Towards a "New Materialism"* (2012) and *Practice as Research: Approaches to Creative Arts Enquiry* (2007). Forthcoming: *Material Inventions: Applying Creative Research* (2014) co-edited with Barbara Bolt.

Sheena Calvert is an artist, philosopher, typographer and book designer whose research investigates the moment where material language and philosophy interact, situating this enactment an immanent, "performative" philosophy at the level of the material text. Dr Calvert's most recent publications include: "The Moral Economies of Language in Digital Space," *Leonardo Electronic Almanac* (MIT, 2013); *Materia Prima* (Intellect, 2012) and *Materia Secunda,* (Book 2.0, Intellect: 2013). She teaches across theory and practice within the areas of design and interaction, illustration, and comunication design at the University of Westminster and the University of the Arts, London. She maintains a fully equipped letterpress studio, the .918 press (E8) for the production of experimental printed works which explore what she terms within her research as 'materialanguge'. She is the art director and series designer (with Joseph Bisat Marshall) of the Zētēsis journal, which aims to explore the intersection of art, philosophy and the sciences, through the material form of "the book".

Ole Hagen is a Norwegian born artist educated at the National Academy of Fine Art, (Oslo), the Chelsea College of Art and Design (MA), and Goldsmiths College (PhD). His London-based studio practice includes video, sculpture, drawings and performance. Major curatorial exhibitions include: *Multiverse Expanded* (Akershus Kunstsenter: Lillestrøm, Norway, 2011) and *Multiverse* (Danielle Arnaud Gallery: London, 2009). Dr Hagen's latest book, *Nowhere Less Now* (2012), was part of an international collaborative exhibition on time, duration, materiality, and image commissioned by Artangel, Museum of Old and New Art, Hobart, Australia and the Sharjah Art Foundation, Sharjah, UAE. Previously published catalogue essays and research papers in the field of consciousness studies and comparative philosophy. Currently Dr Hagen is a lecturer in Fine Art at the Birmingham Institute for Art & Design (BCU).

Yvonne Hindle is a painter. Her most recent series of paintings, *Somewhere Adrift,* sit between representation and matter. With an MA in Painting (Royal College of Art,1987), Hindle's publications include: *About Painting* (2011); *The Art of Birmingham1860 – 2008* (2008), *The Nature of Things* (co-edited and co-curated, 2005); *Base & Awesome: Conversations on Contemporary Painting* (IKON/ ARTicle Press, 2003); and *Paint Theory Paint Practice* (2001). Hindle's recent exhibitions include: *Somewhere in the Distance*, exhibited at H Project Space Bangkok; *Lost Horizons* (ARTicle Gallery, Birmingham); and *Working Against the System* (Gallery North, Newcastle Upon Tyne and Transitiongallery.co.uk London). A regular Fine Art visiting lecturer at Nottingham Trent, Gloucester and Cheltenham College of Arts and Technologies, University of Newcastle upon Tyne and, for two years, (Acting) Head of Painting at the University of Northumbria. Yvonne Hindle is currently Senior Lecturer in Fine Art at The School of Art, The Birmingham Institute for Art & Design (BCU).

Andrea Jespersen is an artist who embraces interdisciplinary adventures exploring the way in which conceptual considerations and the handmade can coexist to mutual benefit. In 2013 Jespersen's solo exhibition at Medical Museion in Copenhagen examined and questioned the cultural value structures surrounding the notion of healing. A graduate of the Royal College of Art, Jespersen has exhibited widely in Europe and the USA. Presently she is researching *Mind Circles: On Conceptual Deliberation and the Trace of the Artist's Hand* as part of her practice-led PhD (Northumbria University) with a studio-based practice in London.

Jo Longhurst is an artist who has gained worldwide recognition for her explorations of ideas of perfection and traditions of photographic practice through photogr̄āphy, video, performance and installation. The images which act as both front and inside back covers for Zētēsis, come from a wider body of work, *The Refusal,* 2001– ongoing.This study of the British Whippet, explores the competitive world of the show dog. The shaping of the domestic dog has a history in 19c Eugenics, a movement closely linked, not uninterestingly, with the invention of photography. The eugenic obsession of the breeders seeking to create the perfect dog, taps into contemporary concerns about genetic modification and cloning. Exhibitions and events include *Other Spaces,* Mostyn, Llandudno; *The Worldly House,* Documenta (13), Kassel; *On Perfection: an Artists' Symposium,* Whitechapel Gallery, London; *UpdateUK: Photography in Britain since 2000,* Krakow; *Cocker Spaniel and Other Tools for International Understanding,* Kunsthalle zu Kiel; *Becoming Animal, Becoming Human,* Neue Gesellschaft fur Bildende Kunst, Berlin; *New Works: Pavilion Commissions,* National Media Museum, Bradford; and *The Refusal,* Museum Folkwang, Essen. Holding a PhD from the Royal College of Art, London, Jo Longhurst was awarded the prestigious Art Gallery of Ontario's international *Grange Prize* (recently

renamed the *AIMIA/AGO Photography Prize*) in 2012. Jo Longhurst is a Research Fellow at the Centre for Fine Art Research (CFAR), Birmingham Institute of Art & Design.

Samira Shafiei Nejad is an artist interested in the process of blurring and the question of becoming: becoming of presence, mind, body and I/eye. Shafiei Nejad holds a BA in architecture, and an MA in Fine Art from Birmingham City University. In 2012 she received two Mike Holland prizes for excellence in painting and for excellence in drawing. Samira was recently appointed Artist-in-Residence at the Centre for Fine Art Research (CFAR), Birmingham Institute for Art and Design.

Franziska Schenk is an exhibiting and published artist-researcher at the Centre for Fine Art Research (CFAR). Initiator of, and Principal Investigator on, several funded Art and Science projects investigating the relationships between fine art painting and the natural sciences – in particular evolutionary developmental biology and optical physics, Schenk also lectures in Fine Art at the Birmingham Institute for Art & Design (BCU). In an attempt to explore artistically the principles governing the evolution of texture, pattern, colour and perception in nature and art, Franziska Schenk has developed/adapted innovative bio-inspired methodologies, techniques and materials, including latest colour-shifting iridescent nanoparticles.

Pip Seymour is an artist working in watercolour, oil and acrylic. Author of several critical handbooks for painters, including *The Artist's Handbook*, (London: Arcturus Publishing, 2003, 2010); *Making Soft Pastels Using Dry Pigments* (1999), *Watercolour Painting: A Handbook for Artists* (1997); *A Short Book about Oil* Painting (1995). He is currently one of the leading paint manufacturers for oil, watercolour and acrylic art-based paints in the UK.

Doekele Stavenga is Professor Emeritus in Biophysics at the University of Groningen. Following his official retirement he joined the university's Department of Computational Physics. Most of his research concerns insect vision, with a particular focus on the optics of fly and butterfly eyes, the waveguides containing the visual pigments, together with the phototransduction process converting incident light into an electrical signal and the light control processes of insect eyes. In the last decade his research has broadened to animal coloration, including the physical properties of butterfly wing scales and the cuticle of beetles and bird feathers. How the colours of animals are tuned to the spectral sensitivity of the visual photoreceptors is currently a central topic of investigation.

Grace Williams is an artist and Gertrude A Bowater award holder for practice-led PhD research based at the Centre for Fine Art Research (CFAR), Birmingham Institute of Art & Design (BIAD). Her work traverses photography, film and installation, exploring the performance and sexual politics of female psychics as channelling conduits, with a specific focus on the materialising mediums within the Thomas Glendenning Hamilton photographic archive

Bodo Wilts was awarded his PhD under the supervision of Doekele Stavenga and Hans De Raedt at the University of Groningen. Dr Wilts' research interests focus on the interplay of light with structured matter. More specifically, his research investigates photonic structures found in nature, particularly, for example on the wing scales of butterflies and beetles and in the feathers of birds. He currently is a postdoctoral research associate at the University of Cambridge investigating the optics of floral surfaces and metamaterials.

Dane Worrallo is a researcher and practising artist based at the Centre for Fine Art Research (CFAR), Birmingham Institute for Art and Design (BIAD), where he is currently studying for his PhD. His research focuses on the undecidable nature of systems and investigating the role digital art has in developing a methodology for engaging with real-time systems in networked environments and assemblages.

Jennifer Wright has been a practicing artist for over 25 years. Her work uses diverse materials and methods of production, shifting between the "hand crafted" (paint, plastics and embroidery) to the "technologically accelerated" (mediated photographic imagery, textiles and wall and floor graphics). Reflecting upon the speculative possibilities and implications of interacting with information through the technologies of the virtual, her work engages its audience by analogy and reference to the "everyday" experience of those interactions, particularly in terms of the domestic interior, through "affect" and the phenomenal qualities of colour, light and haptic perception of different materiality. Collections of her work are held at the Victoria & Albert Museum (London) and the Whitworth Gallery (Manchester).

Sian Everitt Vaughan is an art historian whose research focuses on the interpretation and mediation of engagement with contemporary art, both as archive and as public art. Dr Vaughan is currently Senior Research Fellow & Keeper of Archives with Birmingham Institute of Art and Design (BIAD) and has previously worked teaching art and design history in Further and Higher Education.

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Front cover and inside back cover, details from The Refusal (Part II),
Jo Longhurst, 2008. C-prints on aluminium, each 68.5 cm × 101 cm.
Courtesy of the artist.

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