WHAT IS A DESIGN LANGUAGE 
IN THE SERVICE OF 
THE EXPERIENCE OF LIGHT?

Figure 1. R. Key 2010

EXEGESIS

Submitted in fulfilment 
of the requirements for the degree of: 
Master of Design by Project

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DECEMBER 2012
The intent of this project is to explore the perception of light through a set of experiments, creating opportunities for narratives driven by light. These experiments define a process that becomes more and more reductive in order to get close to the light. This is not a manual on light, it is a record of a personal investigation into a language of light. In order to get closer to what a language is, the experiments have gone from the everyday world of light effects in context, to an intimate engagement with the qualities of light using minimal contextual interference. If we choose to observe it, there are resonant narratives in everyday visual experiences of light.

What is a design language in the service of the experience of light? On the surface, this question points towards a technical lexicon of effects and phenomena to do with a designedly appropriation or manipulation of light. The focus here is not so much what a design language of light is composed of, it is more about what is a language of light, where can a design language begin to be formulated?

This project explores experiential qualities of sunlight, the primary causal and capricious substance of our world. Beginning with light’s role in the perception of reflection, refraction and colour, then delving further into concepts of space (thresholds/depth) and time (motion/duration). While looking at the physical side of light perception in simple experiments, there is also exploration of psychological concepts, reflexivity (seeing our seeing) and embodiment (our body as the primary site of knowing).

There is a contrast of context: the pared-back experimental arena of this masters project, in relation to a professional role as a set designer/art director producing television content. My professional work environment involves interaction with directors, producers, agencies, clients and crew. This environment is a multi-layered setting, managing: design, budget, crew and construction. In juxtaposition to this work environment is the Masters project, which opens up potential for a design-aptitude to use light as a building material in a more explorative, yet structured environment.

Observing light’s narrative qualities is like contemplating the dynamics of an empty vessel, looking at the space between things, not focusing on just the objects themselves. This is a technique used in the work of Light and Space artists like James Turrell and Olafur Eliasson whose installations highlight the process of perception, light becomes the object to see and perception is the medium to see the light with.

It is a challenge to achieve a separation between the process of seeing (instinctive) and seeing the process of that perception (apperception). Maurice Merleau-Ponty’s writes in Eye and Mind about reflexivity as being the paradox of human vision. The body that sees, and sees itself, leads to an ambiguity of vision. Connected to this is the idea of being-in-the-world; that representational minds and represented objects are not separate, vision and movement are united in a body that moves and sees as part of one complete process; embodiment.

The way we experience light’s authorship with our eyes and minds in a reflexive and embodied way is an impelling subject. There is so much instinctual processing through the senses of the world around us. American architect and photographer Henry Plummer argues for deepening an appreciation of light through simple observations of light’s phenomena, “Discerning elusive and subtle aspects we often fail to consciously notice”. This describes a conscious gaze, lingering on sunlight’s phenomena that is never static, observing subtle shifts in the complex interaction of light and other matter, including ourselves.

Light is the ethereal fabric that holds everything together. It is the one seemingly constant phenomena that we experience – from the cosmic, to the everyday. This project is not about understanding what light ‘is’. The project is about ‘painting’ with light, exploring the perception of light, observing how its narratives can be manipulated in various settings, contributing towards a design language of light’s poetic vocabulary.

Figure 2. R. Key 2009. Morning sunlight emerging from behind curtains, bouncing onto ceiling surface.

Figure 3. R. Key 2011. Evening sunlight through trees, glass and mesh blind.

Figure 4. R. Key 2010. Refracted sunlight through blue lighting gel projected onto wall surface.
I would like to gratefully acknowledge the following people and organisations for their generous support during this project.

Principal Supervisor: Dr. Cris de Groot

Associate Supervisor: Dr. Susan Hedges

UNITEC Faculty of Product Design + Workshop

UNITEC Faculty of Interior Design

Encouragement: Nikki Walker

Final installation: Anton Parsons

Document layout: Kurt Ensor
I confirm that:

• This Thesis/Research Project represents my own work.

• The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.

• Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

Robert Key  
December 2012
ABSTRACT

ACKNOWLEDGEMENTS

DECLARATION

TABLE OF CONTENTS

INTRODUCTION

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>METHODOLOGY</th>
<th>Experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SURFACE LIGHT</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>FILMIC LIGHT</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>VOLUME LIGHT</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>FINAL INSTALLATION</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSION

TABLE OF ILLUSTRATIONS

BIBLIOGRAPHY
The initial concept for this project began with a curiosity about the nature of light. It appears as such a complex phenomenon to the naked eye (from childhood to the present), and to the trained eye (working in the film and television industry). From mundane occurrences to the sublime effects of light, is it possible to apprehend more than one senses of light’s qualities? There is that moment when you first gaze into a kaleidoscope as a child, nothing wonderful happens until you lift it towards the sunlight.

The primary phenomenon of change in our world is sunlight, as Professor Henry Plummer describes it, “Daylight is forever in the making... the luminous realm is revived through a poetics of alchemy, where things turn protean and lose their objective certainty in time and space.... fluid light keeps reconstructing the latent readings and interpretations of places”3. Plummer lyrically conveys sunlight’s diurnal narrative across all aspects of everyday life. This project aims to explore a sense of these conditions and the narratives of site that light’s phenomena supplies, creating the conditions for the apperception of light through the design of specific spaces, capturing moments of this all-encompassing, yet ethereal substance.

The subject of studying light could be mistaken for assuming that sight has primacy over the other senses (physical or cultural), this is not the intention here. Other powerful narrative devices have been stripped away in order to explore the narrative potential of light’s phenomena. Site has been a discussion point as this project attempts to focus on light’s experiential qualities, separated from intervening contextual objects. This project describes a perception of light in controlled environments from a subjective viewpoint.

**METHODOLOGICAL APPROACHES:**

1/. A professional and practical approach based on my background as an art director/set-designer in the television industry.

Figure 5. R. Key 2010. Sunlight through skylight and fluorescent lightbox, the light sources used in my workshop.

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2/. An aesthetic approach based on the ideas of the American light and space artist James Turrell as a praxiological influence.

Figure 6. James Turrell. Dividing the Light. A Ganzfeld affects our ability to determine depth.

3/. An intellectual approach using French philosopher Maurice Merleau-Ponty’s existential concepts of reflexivity and embodiment in relation to perception.

Figure 7. R. Key 2012. Reflexivity: seeing one’s seeing.

These three approaches also indicate the progression in this project’s descriptive language from moderately scientific explanations of light, through to more phenomenological descriptions of light, shadow and colour and then finally shifting into psychological and philosophical thoughts on light, shadow, colour, self and site.

PRACTICE:
Light is a sublime substance, a primary causal agent, yet it is subsumed by nearly all it reveals. This project explores perceptions of everyday light, designing and building controlled installations from scale models to room-size, exploring light’s illusive qualities as a narrative device. This will be guided by research-through-design practice, testing through making, reflecting, and then developing ideas further in the re-design of new models. This action-research method will be combined with relevant theory, enabling critical examination at each stage of practice.
DESCRIPTION OF WORK:

The three main chapter outlines of the project’s work are taken from an article by Japanese experiential psychologist and author Shinsuke Shimojo. Shimojo describes a terminology used when attempts are made to describe Turrell’s work with light from a phenomenological viewpoint. The first is ‘surface colour’ [surface light], the second is ‘film colour’ [filmic light], and the third is ‘volume colour’ [volume light]. As indicated in brackets, this project reinterprets Shimojo’s descriptive focus on colour to include the light that ‘delivers’ the colour. These three chapter headings describe the project’s evolvement; Surface Light, a re-sensitising to seeing light’s interaction with surfaces. Filmic Light, modulating light through transparent and turbid mediums. Volume Light, towards a conscious perception (apperception) of seeing light as an object itself.

Chapter Two Surface Light (Experiment #1). This begins a process of exploration as a Gedanken experiment, clarifying some of light’s physical characteristics, re-sensitising an approach to the initial (or final) qualities of light. The intent is to begin formulating the language that describes qualities of light. There is a discussion around the contingency of site/context in which light is viewed and around simplifying the contents of seeing.

Chapter Three Filmic Light (Experiment #2). This chapter explores the interruption of light’s trajectory, modulating light through various transparent materials, such as film gels. This adds a layer of light manipulation through what Goethe called ‘turbid mediums’ such as the earth’s atmosphere, fog, water or glass. Combined with this is the exploration of less light (more darkness) and the simplification of space. Time-lapse photography is used to capture composite images of these moments in time, exploring the perceptual flow of light, darkness, colour, space and duration. A tracing of light’s diurnal narrative.

Chapter Four Volume Light (Experiment #3). This chapter’s intent is to create a coloured volume of light, using directional and colour saturated light, through a distinct threshold slot between interior and exterior, into a turbid (atmospheric haze) interior space. There is an exploration of low-light environments, attempting to create a tactile negotiation with light, observing subtle shifts in light’s gestures in a simplified space, exploring the juxtaposition between ambiguities of vision and what Merleau-Ponty called embodiment.

The ulterior purpose behind this investigation is to inform the use of light within my professional practice of film set design. Using a gently empirical methodology of trial and error, designing models and abstract interiors in which to define light’s more subtle experiential qualities. Combining this with a filmic approach in terms of manipulating states, attempting to heighten an awareness of light’s presence and its lucid narratives. Miller notes the use of descriptive metaphors of light in the design of spaces, “that light reveals the genius loci of a place, creating a distinctive and aesthetic atmosphere. And if designers use their experience of the world, our cultural and sensory associations, we can extend the value and meaning of places... beyond mere functional use”. The point here is about creating a quality of atmosphere, or mood, through a designer’s mindful approach to the attributes of light and place.

Pallasmaa writes of, “understanding our sensory relation with the world as a fully integrated existential condition... the hands want to see, the eyes want to caress”. The idea of eyes touching what they see is a strong metaphor and informs this project’s exploration; that light can be apperceived as a connecting ‘vessel’ between us and our world.

Pallasmaa also describes, “a distinction between manipulative images closing down imagination, and poetic images liberating and opening up impact”. This resonates with the contrast between the constraints of my design work in television advertising and the explorative mode of this Masters by Project.

* * *

5 Gedanken experiment; A thought experiment, exploring theoretical consequences of an idea.
6 Goethe’s ‘turbid mediums’ are other material objects, ‘lenses’ that light interacts with, creating reflections, refractions and diffractions before it reaches into our eyes.
7 Millet, Marietta. S. Light Revealing Architecture New Jersey: John Wiley & Sons. 1996 p6
9 Ibid. p6
Figure 8. R. Key 2012. Sunlight through a crystal glass prism projected onto wall surface. Separating cool blues and warm reds on the contrasting boundaries of light and dark. These are the dominant colours at the opposed leading edges of the contrast between light and darkness.
METHODOLOGY

This project is led by a research-through-design process. Ideas are tested through a process of designing and building scale models, reflecting on these and developing ideas further in new models. This process is concepitive and cyclic, using experience-based techniques of immersion, action, and reflection. The practical aspect involves creating spaces that manipulate sunlight and artificial light. The installation is then filmed using time-lapsed photography and the still images rendered together into short video narratives.

The iterative process of the work involves a description of the experiments, followed by an evaluation in terms of what worked, what didn’t, and what might be done in the next experiment, shifting beyond the present constraints. The brief is then rewritten for the next experiment in terms of what can be achieved as the experiments evolve.

METHOD APPROACHES:

1/. Professional. My background as a set-designer in the television industry. The process of designing, building and photographing this project’s light-models uses my existing skill base. The intent of the theoretical research and practical outcomes is to feed these back into my work. I had thought for years we were manipulating objects to suit the lense’s frame, in a more essential way what we are doing is manipulating light (with atmospheres and surfaces) to suit the lense’s frame.

2/. Aesthetic. Using the ideas of Turrell as the primary theoretical framework. Turrell is interested in the observation of light in space and time. Turrell explores the boundaries of perception around the experience of light, “the way we assemble our reality... our lack of separation between us and that we behold”\(^\text{10}\). Turrell’s controlled installations shift the context in which we view the light, site is simplified, light becomes the experience in-of-itself, light is the content.

3/. Intellectual. The existential and holistic ideas of Merleau-Ponty contribute to the project’s theoretical framework with concepts such as reflexivity and embodiment. Reflexivity describes the act of seeing oneself seeing, this is explored here in terms of apprehending a fuller awareness of sensations or ideas about light, a conscious perception of light, the process of apperception. Merleau-Ponty writes, “perception is a [in-determinate] way of being involved with the world, not an objective, determinate way of recording it”\(^\text{11}\). This is an embodied perspective from which all space is experienced, a lived space, “I live in it from the inside; I am immersed in it. After all, the world is all around me, not in front of me”\(^\text{12}\). This juxtaposition of the reflexive ‘self’ and the immersed ‘body’ is relevant to exploring an experiential awareness of light’s qualities.

Sensing our seeing is a tricky proposition, how we make sense of our environment visually is (in part) a subconscious or habitual event\(^\text{13}\). A way to lead into this proposition is using rarefaction; making something less dense, stripping out the image’s frame (the site) to its most basic elements. Another way is by observing subtle shifts in the light for longer than we might under normal instinctual everyday conditions. Using a camera’s gaze conditions this observation, it holds the observer to a particular mise-en-scene.

The mechanical lens of photography becomes the primary method used for recording light in these experiments. This process began by thinking about the eye as a lens within an optical chamber. Simon Schaffer describes how lenses in general, “reach into every aspect of light”\(^\text{14}\). This concept led to an exploration of basic camera techniques, beginning with building camera obscura (the lens is simply a very small hole), and digitally capturing the images created by them.

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13 Pallasmaa points out that, “the Italian philosopher Gianni Vattimo introduced notions of ‘weak ontology’ and ‘fragile thought’... Vattimo’s idea... parallel to Goethe’s method of ‘delicate empiricism’... is an effort to understand a thing’s meaning through prolonged empathetic looking and under standing grounded in direct experience”. Pallasmaa, Juhani. “Hapticity and Time” *Gale.Cengage Learning*. Web. As cited 6 April. 2012. p5
The camera obscura, which literally means *darkened chamber* has been capturing light since the 17th Century\(^{15}\). This is the origin of the camera’s mechanical eye, another way to perceive the world. This sublime device, pictured in Figure 9, is not only a practical means of light capture technique in this project, it is also a lyrical analogy for the threshold between interior and exterior, between light and dark. This aperture (as a threshold) divides and connects these contrasting elements as recurring themes throughout this project.

Documenting light in this project moved from still photographs into time-lapse sequences, creating narratives of light with composites of still images. Pallasmaa comments on film editing: “Collage and assemblage are favoured techniques of artistic representation in our time; these media enable an archaeological density and a non-linear narrative through the juxtaposition of fragmented images deriving from irreconcilable origins... collage invigorates the experience of tactility and time”\(^{16}\). This project used these notions of assemblage and durational density. Speeding up sunlight’s diurnal flow and observing its narration of built-space’s internal condition. This notion of density was explored using time-lapse photos that were then rendered into video clips.

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Manipulating the frame rate (twelve hours compressed into three minutes) in this project’s video clips is a way of capturing an unconstrained sense of light’s narrative effects. The intermittent shots in Figure 12 record the sun’s languid path across the sky, time is then re-assembled for an alternate perspective. The camera frees the project’s work from the boundaries of real time and space in order to alter or enhance perception of light’s expression.

Turrell regards, “seeing the act of seeing... as realising the process of perception itself”17. We observe the light evolve, sensing gentle shifts in its phenomena, reading things we might otherwise miss in the process of experiencing light. To an extent, using time-lapse technique cheats this process of intense observation by ‘dropping’ frames in the real-time flow, but it still feels relevant in terms of heightening the experience of light as an object. This project is drawn to Turrell’s concept of light as an experience in-of-itself, as a space-maker, or material artefact. Turrell describes his work as experiencing, “no object [perception is the object], no image within it [avoid associative symbolic thought] and no point of focus [no particular place to look]... my interest is in plumbing the space”18. There is a sense here of a search for light’s volume, experiencing its thinginess, its depth.

Turrell uses minimal environments for installations. In Afrum I, Figure 13, “Turrell utilises the sparest formal means to perpetuate the consciousness of perception. As demonstrated by the projected geometric ‘cube’ of Afrum I”19. As a way of studying light, this project has been drawn to the methods used by Turrell and Eliasson. These installation spaces create simplified and more abstract environments in which light itself can be felt to sway perception.

One of the ironies in the search for light’s narrative qualities is that this project’s work has headed into the darkness to find it. The installations have used less quantity of light and focused more on the quality of light. The initial studies drew discussion around the everyday and convenience aspects of the context being used in the project’s work. More thought needed to go into the form of the spaces being created. This began a process of viewing space itself as the ‘empty vessel’, it is the site, but not an end in itself. The installation space is a means to allow observation of light in a vessel. The process of creating an image with narrative per se is not that difficult. Almost anything that moves gets imbued at some level with meaning. Things that don’t move have narrative potential20.

To see anything however, light needs an interruption, a surface or object to reflect off or refract through, otherwise there is no chance of seeing anything. Light is not visible until something interrupts its trajectory. Having said that, light is not something that is easily isolated from context. What this project is attempting to do is respond to a context with an awareness of light’s part in the process of creating the context’s form.

Figure 12. R. Key 2012. ‘Assemblage’ of test shots tracing sunlight’s diurnal path in a symmetrical scale model. All five surfaces have the same finish, there is no floor (as in figure 13) to give the space a feeling of gravity, the sunlight’s source direction does that. Camera aperture and exposure time is locked, the sunlight is bringing the narrative to the form of this contrived space.

Figure 13. James Turrell. Afrum I, 1967. The dark floor gives the installation a gravity, the projected light-cube illusion hovers above it as if tethered with a magnetic tension.
SURFACE LIGHT

This Gedanken experiment was initiated as a way to begin describing light’s qualities. Re-sensitising an approach to, and clarifying self-evident aspects of, light’s physical characteristics. An example is how we assemble our visual reality based on things like: the direction of the light source, its interaction with objects (reflection, refraction) and the shadows that are cast. This chapter looks at the context in which light is viewed and explores minimising visual cues to simplify the contents of ‘seeing’. Camera obscura and time-lapse photography are introduced and explored as methods used to capture sequences of sunlight’s diurnal narrative within space and over time.

Is shadow a gap in the light, or is light a gap in the shadow? British artist John Chilver suggests in Displacements of Shadow, the era in which Italian artist Michelangelo Merisi da Caravaggio painted, “shadow is the environment... and light erupts from within”\(^{21}\). Light emerging from within a dark space describes something primordial, the creation of a universe, or the dawn sun\(^{22}\). Whichever way the relationship of light and dark is viewed, it is the threshold where the two elements meet that gives form, colour and texture to things.

Dutch photobiologist Marcel Minnaert describes in his book Light and Color in the Outdoors a deeper perception of light’s phenomena that can be seen with the naked eye. “Partly things you can observe in everyday life, and partly things as yet unfamiliar to you, though they may be seen at any moment, if only you will touch your eyes with that magic wand called ‘knowing what to look for’...[Minnaert] avoids any instruments... and theoretical considerations not directly concerned with what we see with our eyes”\(^{23}\). There is the notion here of looking for the sublime qualities in everyday observances of light without any apparatus between the eye and the world. Minnaert looks intently at how light is modified when interacting with the material world.

Plummer describes Minnaert as offering a basis for understanding how a number of phenomena are concretely produced in the ordinary world. Minnaert blends careful observations of luminous effects with analysis of physical modulations of light. His work not only helps to throw attention on light’s beauty and mystery in the daily environment, but also treats those phenomena as palpable qualities to be consciously perceived and described\(^{24}\). This considered method describes a process of apperception. An example is the more time you spend in contemplation of the darkness in a cave, the more the cave is visible as your eyes dilate, adjusting over time to the low light levels.

The intent of this first experiment was to explore light in a simple environment, describing some of light’s basic characteristics, the image’s language of light and narrative potential. These painted egg studies are referential of American assemblage artist and sculptor Joseph Cornell’s light boxes. When a constructed image is kept elemental, the contrast of light and shadow’s narrative emerges, from subtle hues to hard lines, the two elements intertwine, giving things form. When describing this image it became apparent that the shadow’s language grew in significance as a narrative device, it was not all about the light.

The matte finish on the eggs in Figure 14 spreads reflected light diffusely in all directions. This allows the light to ‘interlace’ with the object, giving the camera lens more texture to reveal than a shiny reflective object would give. The light can grasp or imbue the surface texture when it is not being bounced off by a reflective surface. It is a technique used when shooting film in order to reduce glare, allowing the lens (and therefore the eye) to delve into the image.

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22 British artist David Hockney points out in his controversial documentary Secret Knowledge this method of contrast was perhaps due to the use of a camera obscura (a darkened room with lenses or mirrors) as a technique of capturing the reflected image that was then traced and painted. ”Secret Knowledge” Director: Randall Wright. Featuring: David Hockney. BBC. 2003. As cited 31 July. 2012.
This first set of photos became predominantly a description about contrast – the effect of the light being ‘blocked’ by the caster and the resulting shadows. The shadow also indicated the shape of the caster that was hidden from the viewer, and yet, was silent about the internal structure of the object. The shadow is clearly an image - perhaps even an independent representation - of the caster, defining the caster’s relationship to the surrounding surfaces.

This project’s process of image construction and description is in stark contrast as to how an image is constructed in television advertising. This project’s method of enquiry juxtaposes my everyday work as a television art director/set designer. Every detail within an commercial’s frame is imbued with narrative meaning; little is left to chance. We prescribe an audience’s interpretation of an image. Reversing this process is a refreshing way of seeing.

Figure 14. R. Key 2009.

Two hollow eggs, matte sprayed black and white on a matte white styrene plastic surface, photographed under direct sunlight. This experiment examines Cartesian single point perspective revealing spatial parameters informed by light and shadow, building a vocabulary describing the phenomena of light source, artifact and shadow.

Figure 15. R. Key 2009.

Single hollow egg, matte sprayed white, on a textured timber surface, photographed under direct sunlight. Defines the basic language used in describing light’s interaction with surfaces. Light source, caster and shadow define elements of the ‘play of light’. Shadows spatially define objects in relation to other surfaces, light source and viewer.
CAMERA OBSCURA

The Camera obscura image in Figure 16 explores a more abstract contrast of light with shadow. Continuing the Cartesian theme, the camera obscura was used as a mechanism for capturing light. The difference between this image and the image in figure 14 is the reversal of contrast, the lack of light. Aesthetically, this retrograde technique felt like a more lyrical form of light capture, it has a plasticity; form appears subtly diluted.

Pallasmaa points out, “The spatial, formal and colour integration of a painting is often appreciated by dimming the sharpness of vision... in deep thought, focused vision is blocked, and thoughts travel with an absent-minded gaze”\textsuperscript{25}. A simple experience of this is to ‘de-focus’ your eyes (glazed eye staring) as you look at a scene. This technique is sometimes used in the film industry to shift perception, it homogenises the image tonally, hinting at the two-dimensional view the lens will capture.

Figure 16 has a mood that is dominated by darkness. Plummer describes the narrative power of contrasts, “…darkness stoked with tiny fragments of light has enormous poetic power, in part because it defies reduction to any one true and single meaning”\textsuperscript{26}. In a narrative sense, low levels of light are more intriguing than ‘normal’ light levels. Imagine a small fire in a dark cave, the fire’s light dancing across the uneven walls, creating contrasting and moving patterns of warm light and darkness. Then flick a switch, and the cave is suddenly full of fluorescent light, this democratic and cold light source has stifled the ambience of contrasting light and dark, the firelight’s warm ambulations cease.

Another quality of the camera obscura is that it operates as a situation, as much as a device. Rays of light are squeezed through a very small hole and projected into an interior space which is darker than the exterior in order to see the projection. The dark interior interacts with the light projections, light is in a constant state of fluidity, if the space were large enough our bodies could move through it, shifting this ethereal stream. By projecting sunlight through a controlled aperture, the slightest motion has aesthetic consequences.

Our perceptual process is revealed more clearly to us when we are confronted with situations outside our normal range of experience. Turrell uses low levels of illumination in installations such as Afrum to push our visual perceptual capabilities to the limit. How we represent reality through our sensing cues does not always match the reality of the physical form\textsuperscript{27}. Reality is not just seen (or felt, or smelt), we imbue sensory input with content.

David Levin motivates the philosophical critique of visual bias; “I think it is appropriate to challenge the hegemony of vision in the ocular centrism of our culture. And I think we need to examine very critically the character of vision that predominates today in our world. We urgently need a diagnosis of the psychosocial pathology of everyday seeing - and a critical understanding of ourselves, as visionary beings”\textsuperscript{28}. The concept of ocular centrum challenges this project’s pursuit of light’s narrative qualities, and its call for a diagnosis of everyday seeing could be a direction for further studies.

\textsuperscript{26} Plummer, Henry. Poetics of Light Japan: a+u Publishing. 1987. p75
\textsuperscript{27} Millet, Marietta. S. Light Revealing Architecture New Jersey: John Wiley & Sons. 1996. p94
The site of this image: internal garage, concrete floor, light source is sunlight through an overhead skylight, a wooden broom.

The images were created by using a hand made camera obscura lens, attached to a digital camera body. The lens consisted of a piece of plastic with a 0.3mm hole drilled in the centre. There is no aperture control (it is determined by hole size) and no focus control (no series of adjustable glass lenses refracting the light), there is only light exposure time (duration) of the shutter. This is a combination of 15th Century Renaissance technology (home-made pin-hole lens) with 21st Century technology (digital SLR camera). The image emerged as the amount of light exposure increased over time. As the shutter speed slowed down, the darkness becomes a vessel, like a black velvet painting, revealing form.

There is something lyrical about how light is recorded in this simple method, as it emulates the basic function of the eye. The eye has a malleable lens, this camera obscura does not, the threshold between exterior and interior is simply a very small hole in the wall of a darkened room (i.e. a camera body). This method of image capture has no sharp focal plane, but a democratic depth of focus where everything appears softly in focus.
TIME LAPSE

This experiment introduces time-lapse photography, painting with light to create a sequence of structured images in time. The intent was to explore variations in light exposure as a narrative device. The context is a pile of cut firewood that fills the frame, and the sunlight that falls on this is from a window above and behind the camera.

Figure 20 shows architect Steven Holl’s scale model to study sunlight’s transit when designing the St Ignatius Chapel in Seattle. Holl, “visually scored these cinematic motions in a cluster of photographs, similar to a cinematic storyboard, producing composite images of moments in time”29. Holl’s method captures a sense of light’s play on the surfaces, no two images are the same, the sunlight carves a geometry of its own in communion with built space.

In relation to architecture and light Plummer describes the core of phenomenology, “as description...when one is filled with wonder... offers a method of examining phenomena through intensified seeing and sensing. By suspending judgement and grasping things in a kind of primal encounter, it becomes possible to discern the most elusive and subtle aspects of buildings, including aspects of light we often fail to consciously notice”30. This simple act of open yet intense observation allows for the possibility of reading the more subtle aspects of light’s everyday phenomena.

In terms of reading this everyday phenomena, Turrell writes, “We are made for twilight... under low levels of light our eyes dilate and we actually begin to feel light, almost like touch”31. There is something emotive about low light levels, often referred to as ‘magic hour’. This describes sunlight just after dawn and just before dusk when the sun becomes an architect. The light from the sun rakes low through the earth’s atmosphere, filling it with sunlight’s burnt orange glow, casting long and sculptural shadows. The earth does not appear flatly lit as in the midday sun when the light has uniform illumination of the earth’s surface and there is little or no shadow. The atmosphere has rendered the sun’s light vermilion, warmly embellishing our world for a brief moment.

The narrative of the Woodpile in figure 19 bookends the sequence with low-light levels, using subtle increments in the amount of camera light exposure. When the sequence of images passes through optimum exposure and heads towards over-exposure, it appears as though the woodpile has caught fire and the image itself is about to ignite. Rendering the sequence’s varying light exposures as a video clip creates the narrative in Woodpile. The narrative permutates from a low-glow magic-hour effect, to a bright white-out burnt-out effect, then back again. The low-glow effect has more subjective impact as a quality of light, the burn-out effect feels like the quantity of light is too much to bare, there is a sharp emotive response to the blinding glare. While the use of light quantity creates the narrative intensity, it is the qualities from less-light that brings relief, the eyes relax and are granted the ability to absorb the image.

When there is less visual information, it feels like our cognitive process has more opportunity to apprehend the event. Shimojo discusses Turrell’s work: “…critical cues are minimised to define the contents of ‘seeing’ at a lower level of visual information processing, whereby cognitive and emotional systems at a higher level are left with more processing or required to process more”32. This describes a state of sensing more (cognitively/emotionally) when there is less to see (visually). In terms of light’s narratives, Shimojo’s comment is insightful of the simple structure of the Woodpile piece in Figure 18, and informs the intent of further design experiments.

* * *

30 Ibid. p12
Figure 18. R. Key 2010 *Woodpile Light Narrative.*

Time-lapsed sequence shot manually on a digital SLR camera. Shot over 30 minutes using aperture and exposure increments. Site: interior surface texture of firewood, camera locked on tripod. Sunlight source is above and behind camera from a small window.

Figure 19. R. Key 2010 *Woodpile Light Narrative.* Montage sequence of stills taken from video clip.

Figure 20. Steven Holl. Model 'light score' for St Ignatius Chapel. 1997.
FILMIC LIGHT

This chapter explores veiled light sources, casting light through coloured transparent surfaces and bouncing it off solid surfaces. Light’s trajectory is modulated through various transparent materials, such as film gels. This adds a layer of light manipulation through what Goethe called ‘turbid mediums’ such as the earth’s atmosphere, a dense fog, water and glass. Combined with this phenomenon is the exploration of less-light (more darkness) and the simplification of space. Time-lapse photography is used to capture composite images of these moments in time, exploring the perception of modulated light, darkness, colour and duration.

Modulating the source light in these experiments became a more aesthetically productive technique for creating narratives than any direct light source has been so far. Despite this, its not easy to capture a sense of light as a material element, it is a chimerical entity to paint with. Turrell states that, “light is a powerful material... but the conditions for showing its power are strangely fragile”.

Plummer might describe the model in Figure 21 and its stationary light source as, “not living time... but the morbid optical permanence of artificial light”. Turrell, on the other hand, argues that, “There isn’t any unnatural light... light is characteristic of what you burn and the structure in which you burn it”. Both comments have relevance to the image in Figure 21 which has ‘burn’ characteristics of both artificial and natural light sources. These differing opinions about light’s animated qualities point out the subjective complexities held within the experience of light.

One of the discussions about earlier experiments was ‘site’. The contextual narrative of this work became an unanticipated focus. The intent of the project is towards the capturing and perceiving of light, content was a secondary concern – more of a means to an end. Site is something light is reflected from, or held within. The discussion around context began a process of stripping the site of visually distracting cues, becoming an abstracted and more neutral site of ‘white cube space’ in which to experience light’s narratives.

White cube space is abstract, and especially suited to exhibiting ‘light’, but it is not neutral. Irish artist and author Brian O’Doherty describes gallery space as “not a neutral container, but a historical construct”. Eliasson argues that, “the colour white is deeply rooted in our [Western] culture as the only truly purifying colour”. White cube space, “conditions and overpowers the artworks in its shift from placing content within a context, to making the context itself the content”. While attempting to create a space free of context, attempted disappearance of context has created a content of its own. Having stripped space of as many contextual narrative distractions as possible, the white box still carries an unavoidable story.

Figure 22 shows the reflecting mechanisms for an indirect light source in the model, there was a move away from sunlight in order to experiment with the control of all inputs in a simplified white cube space. It uses an artificial and indirect light source. In Figure 21 the photograph juxtaposes the light-model with the space in which it was built, some of the mechanisms used to create the effects are visible. The model itself plays with visual indeterminacy, sometimes it appears to be a two-dimensional surface and at other times to have depth. These illusions were enhanced by framing the model within the workshop, exposing the mechanisms that support it.

The manipulation of light generates outcomes not always predicted in the set-up process. Indirect light (reflected, refracted or diffracted) has more subtle visual narrative fabric than direct light. The light is softened by each surface it hits, and a gentle veiled ambience emerges as the light is diffused within the space or upon the objects it inhabits.

This white foam-core model uses reflected light, projecting into and illuminating the model’s interior, without seeing the light source directly. The model is based on the Cornell Box, which is a test used to determine the accuracy of a software rendered lighting scene compared with a photograph of the same scene. This model also references architect Steven Holl’s work, where light is bounced off (obscured) coloured surfaces into interior space with no direct view of the sun’s exterior light source. All surfaces facing the camera (inside the model) are white.

Figure 22. R. Key 2010. Close-up details of model in Figure 21. Reflected light bouncing off high gloss red-coloured vinyl creates the background. Refracted light bouncing off a curved laminated paua shell surface creates the organic blue foreground effect.
CORNER #1

Corner #1 in Figure 23 was a move back to direct sunlight’s diurnal qualities, using time-lapse photography within a simplified interior space, creating a series of short narratives exploring the sun’s intonations. The intent was to look at ways of isolating and controlling light, processing and editing batches of still photos taken over a twelve hour period into three minute video clips. Holl suggests that, “time or duration is a central theme of the interior” \(^{39}\). While architecture has narratives that are built around diurnal light flows (the duration of a day), clusters of photos can order and frame architecture in a particular way, creating a visual focus for the viewer’s gaze. This series of time lapse still frames rendered into a video clip format becomes a composite of light moments in time and space.

Pallasmaa describes architecture as existing, “like cinema, in the dimension of time and movement” \(^{40}\). The way Pallasmaa compares cinema and architecture resonates with this project’s approach to exploring the perception of sunlight as the signifier of motion and time within interior space, a space determined by a filmic frame, a time-lapse gaze. Capturing the duration of sunlight within interior space becomes thematic for all installations from this point on in the project. Time-lapse photographs that are rendered into short video clips becomes the primary method of documenting the installations. The playback speed of the video clips are manipulated, compressing time, emphasising light’s presence and motion as an object in the scene.

There is something captivating about increasing a video clip’s playback speed over time. This is already a familiar narrative technique used in film (eg: action sequences) and allows for another reading of what is seen, the perception of time is not as steady and linear as we might think. Compressing ‘real’ time in the video clip creates a perceptual phenomenon, a Gestalt-type shift, where a familiar visual space is perceived in another way, as if time travelling. This process highlights our mediation of visual surroundings over time.

The still-photo excerpt from the video clip Corner #1 in Figure 24 shows a surface contrast shifting constantly in relation to direct, reflected and refracted sunlight. These images of light have been sped-up, revealing another commentary on visual reality. It is not something observed in ‘real time’, except for fleeting moments, such as when the sun bursts out from behind fast moving clouds.

As the light level drops the scene takes on a mood of intensity or tension, semi-darkness feels more evocative, the image ‘breathes’. A sense of the day’s passing emerges as the sun arcs the sky and changes in contrast elicit duration within the stationary framed image. There is a simple narrative from a set of basic elements; abstract site, light and time. This simple observation of light in an everyday space reveals the complex phenomena of sunlight’s qualities that are in constant state of flux, all the time, everywhere.

There are moments in Figure 23 when the bars of light pulse-out a wave of fluid light that washes over the floor for an instant, then recedes or vapourises. The last thirty seconds are the most graceful of the video clip as the light comes down the wall in waves like a waterfall from both sides, directional paths crossing as they move out of frame towards and below the camera’s frame.

This series of images has a light exposure balance that reveals-all, approximating our eyes. This kind of exposure level leaves little space for the imagination, there are no particularly dark corners, the even light levels stifle narrative potential. Our perception’s gaze has nowhere particularly to be lead, everywhere has a democratic light hue. Exploring lower light levels has more potential for a visual sense that can touch the depths of a space.


This series of images is created in a north facing room, lowering the blinds against the window, reducing and directing the sunlight as it enters the space. The camera is locked-off and the camera shutter is set to time-lapse a series of shots over twelve hours at approximately one frame every thirty seconds. This series of images was then edited together using Final Cut Pro software and a Quicktime video file was rendered, playing back at 25 frames (images) per second. Twelve hours of ‘real-time’ is played-back in approximately three minutes.
CORNER #2

This variation uses the same space, exploring less-light and less-colour in surfaces to increase contrast and to reduce recognisable distractions, making the space monochromatic. The site becomes more abstract and allows the focus to fall into light’s phenomena, in contrast with darkness.

Turrell describes the three ways he “opens up time”: eyes adapting to low levels of light, glazed-eyes-staring and change\textsuperscript{41}. These phenomena are modes of visual perception. Glazed-eye-staring (mentioned on page 18) gives a homogeneous or two-dimensional view of the overall picture. Low levels of light are more expressive, in a narrative sense, than functional over-lit interiors (fluorescent office lights) or over-lit exteriors (mid-day sunlight). Kent Bloomer argues in *Shadows in Ruskin’s Lamp of Power*, “darkness is more productive of sublime ideas than light”\textsuperscript{42}. Darkness however, needs a flicker of light to give the sublime some form. For the human eye, light can inform space even at the lowest levels of illumination. From the subtle to the most stark, contrast between light and dark is essential to the reading of anything visual.

In Corner #2, Figure 26, simplifying the space to a monochromatic hue highlights the image’s contrast by lowering exposure, focusing on the sunlight itself as it projects into the space. By removing the timber floor’s golden hue, the image now appears to have no colour. In Turrell’s work the spaces are quite spartan, free of extraneous things or other narrative cues. Turrell presents a simple and seamless space, even if behind the scenes there are complex mechanisms to create the desired effect.

Turrell describes a “discontinuous sensing”, how we combine information from the senses to form reality. An example is believing we see colour out at the edges of our vision - we don’t - its memory\textsuperscript{43}. What we see on the periphery is monochromatic, the colour bleeds away towards the periphery\textsuperscript{44}. Another example of combining received visual information is our perception of time, watching the results of the time lapse still photos (edited together forming a video clip), there is a sense of both fluid and staccato motion.

As the image in Figure 25 darkens there is a distinct shift in perception, an, “indeterminate vision”\textsuperscript{45}, the kind of visual experience we have of the hidden side of an object. The mind completes things from incomplete information. As the light recedes it offers a sense of the space described by it, but is no longer discernable. As the visual cues are simplified, the inner-chattering-mind increases.

The sunlight entering the space is squeezed by the lowered blinds into graphic geometric shapes\textsuperscript{46}. The light’s form in Figure 26 is refracted through the window’s glass pane, solid light reaches in, surging in intensity and clarity as the sun is obscured by clouds. Waves of veiled light appear as a smoky vapour, dispelled from the strips of solid light. There is a mechanical feeling, an industrial manufacturing process purposefully embedding light-information into the surroundings. Towards the end of the sequence a softer ambient light is cast over the rear walls, spilling onto the floor in waves, a waterfall of light.

The difference between this sequence in Figure 25 and in the previous one in figure 23 is the removal of the warm coloured floor from the frame with a layer of white. The floor’s colour and subsequent gravity was more of a conditional element in the perception of this space than anticipated. The white cube space is becoming the preferred site of these experiments due to the uncluttered qualities it brings to the images. There is an ongoing dialectic between light and darkness that is rendered in this series of photos, the phenomena of contrast becomes the locus.

\textsuperscript{41} Turrell, James. *Into the Light* Pittsburgh: Mattress factory. 2002. p48
\textsuperscript{43} Turrell, James. *Into the Light* Pittsburgh: Mattress factory. 2002. p48
\textsuperscript{44} This is similar to what deep sea divers see as they go deeper, away from the water’s surface, the colour is sucked out of the light, revealing only a grey world.
\textsuperscript{46} Referential of Light and Space artist Robert Irwin’s fluorescent light tube installations.
Figure 25. R. Key 2011. *Corner #2*. Monochromatic time lapse sequence.

Figure 26. R. Key 2011. *Corner #2*. Monochromatic full frame shot from video clip sequence.

Timber floor covered with a matte-white surface. Despite being photographed in colour the image becomes monochromatic by losing the warm hues reflected off the floorboards. These time-lapse photos are rendered into a video clip of 25 frames per second. 12 hours of ‘real time’ is played in approximately 3 minutes.
CORNER #3

This intent of Corner #3 in Figure 27 is to re-introduce colour in a more designedly way, attached to the light source. The idea of multistability (shifting viewpoint) is introduced through a controlled camera movement on a ‘dolly’ track, which subtly displaces the framing 1mm per-shot as we track with the sunlight’s movement. The intent of displacement is to highlight the visual experience, unsettling the perception of light’s movement in this abstract space by slowly moving the viewpoint.

The animation of sunlight in this sequence is something Plummer describes as, “living time... not the morbid optical permanence of artificial light”\textsuperscript{47}. Corner #3 creates a colour-sense of “magic hour”\textsuperscript{48}. This is when day and night blend momentarily, a threshold of approximately an hour we call dusk and dawn. The sun is low and its light has a golden hue as it threads its way through the earth’s atmosphere. The shadows are long, our eyes are dilated, there is more depth to what we can see. It is on this diurnal threshold that light and darkness become their most expressive. Bachelard points out that, “perhaps the deepest felt encounter with light known to people is... the loss and then recovery of light in darkness”\textsuperscript{49}. The more that light is occluded, the more atmosphere is created, site becomes imbued with subtle character, allowing our vision to plumb its depths.

Plummer writes of Turrell’s Skyspaces, “Turrell has consciously exploited for expressive purposes the perception of light’s speed and time span, suspending normal time and replacing it with time traced by the sun and weather... the outer world is obscured... encouraging an intense contemplation of faint shifts of ethereal colour”\textsuperscript{50}. The Corner series of experiments is influenced by Turrell’s notion of suspending normal time, and focusing contemplation on light’s ‘thingness’ in simple spaces.

In Corner #3 the light is modulated through the transparent window glass and then the coloured transparent film gels. These objects narrate the light’s indirect access to the interior space. The corner of the room is an anchor, a place for the image to settle, it is a geometric shape that gives depth to the surfaces the light will engage. The two bars of light appear as the illuminating body, the arcing refractions and veils of soft light in the video clip appear to be caused or subsumed by these two vermilion light bars as they track across the space. The light bars hover above and within the softer coloured vaporous atmosphere, vanishing and re-appearing, tidal clouds envelope them, briefly cloaking their form. The light bars give the floor’s surface a three-dimensional appearance, as if there is space between the light bars and floor. The bars appear as blistering ingots sliced from the sun.

Eliasson writes that, “The experience of colour is closely related to the experience of light... despite our associative relation to colour being closely derived from our cultural habitat... subjective colour experience varies widely between individuals”\textsuperscript{51}. Habitual examples are: California’s golden-light, the Inuit’s white-light, and New Zealand’s clear-light. The two primary colours explored in this project are the warmth of vermilion reds and the coolness of azureous blues, these are the dominant colours at the opposed thresholds of the contrast between light and darkness as seen through a prism (as in Figure 8).

This chapter began by exploring indirect light as a narrative device, moving from still models using artificial light to room-sized spaces using sunlight with its inherent motion and duration. The models get simpler, the light gets reduced, and interior duration and camera motion is explored. This simplified and darkened space affords an indeterminate view. Less visual information appears to create more cognitive and emotional input into what is experienced.

\* \* \*

\textsuperscript{48} Twilight... the time of day when, as French anthropologist Claude Levi-Strauss describes it, "the sun becomes an architect". Levi-Strauss. Claude, As quoted in Plummer, Henry. \textit{The Architecture of Natural Light}. New York: The Monacelli Press. 2009. p147
\textsuperscript{51} Eliasson, Olafur. “Some Ideas About Colour” olafureliasson.net Web. As cited May 2011. p1
The light is refracted through a semi-occluded exterior window’s glass. The colour and texture of the light strips is three dimensionally shaped vermilion coloured film. There is a subtle camera-tracking move which gently follows the sunlight as it traces a path across the matte white surfaces. There is more control in this experiment than the last iteration, the illusion of hovering-blistering-strips of light, a stronger sense of an interior-light-event as we follow the arc of the sun’s light across the abstract interior space.

One of the points of difference in this work is the addition of camera-tracking movement. The camera tracks 1mm between each shot, so that over the 1200 shots used to compose this work, the camera moves 1200mm. The architecture of the frame shifts very subtly over the duration of the work, the subjective viewpoint shifts, creating an almost indiscernible multistability. This camera move was used to highlight the animation within the strips of light’s motion, unsettling the viewer’s seeing.
VOLUME LIGHT

The intent of this experiment is approaching a more palpable experience of light. Added to the use of contrast and colour is; threshold (aperture), and a material atmosphere (haze). The aim is a feeling of immersion in an interior space where, in Turrell’s language, “light as the material and perception as the medium”52.

COLOUR AND ATMOSPHERE

A fundamental part of light’s thingness is colour. Goethe poetically describes light’s colour qualities that we experience in everyday situations, “Colours are the deeds and sufferings of light with darkness”53. Where light meets darkness in a turbid medium, colour is created. Goethe’s ‘turbid medium’ describes the atmosphere that we live under and within, it clings to the planet and envelopes every other material thing that light interacts with54. Despite the narrow band of light’s spectrum that humans can see, colour is an evocative outcome of light’s causal nature. For the human eye and perceptions, colour is the narrative of light.

Eliasson explores light’s colour and the observer’s physical involvement in some of his light installations through the use of colour saturation, an example is Your Atmospheric Colour in Figure 31. Eliasson also investigates afterimages and the temporal relationship with their source. If the room is red, our eyes (as a reaction) produce so much green. If the room is blue, our eyes begin to produce an orange afterimage55. It is not the phenomenon of ‘afterimage’ that is pertinent here, so much as what the process reveals about perception. Perception has a physical connection to the material world outside the eye, light projects images into our eye’s retina and we see/project afterimages, as a response, back out onto surfaces. The spectator becomes a proactive subject/object; a projector.

Eliasson describes three colour-curves at work, one mediated through the work itself, one in our retina and one in our brain56. There is an ongoing loop between the outside world, our seeing eye (on the threshold) and the internal perception. Eliasson is interested in the, “self-reflexive potential in this experiment, limiting the number of disturbances, keeping it to basics, so that the viewers would be able to begin adding narrative aspects to it themselves”57. There is the possibility implied here of seeing oneself seeing, of experiencing an aspect of our bodies, not only in the process of perceiving the work, but as part of the work itself58.

Eliasson writes, “Scientific research shows that our experience of the colours of specific objects often is constant despite significant changes in ambient light”59. Observing these shifts in ambient light levels more acutely in a simplified space (without distractions) may, as Eliasson argues, “enable us to understand the world as a much more open, negotiable space than we usually think it is”60. The empathetic observation of light in simplified spaces contributes to apperception of the world’s temporal and richly textured visual flux. The notion of visual negotiation, of a palpable interaction with the naked eye and our surroundings is described by Pallasmaa and Turrell as, ‘touching with our eyes’.

54 The atmosphere is 79% nitrogen, 20% oxygen and is a material itself. Add phenomena like moisture, dust motes or glass to the sunlight’s arcing motion and there is a plethora of ways light’s colours are modulated before they reach our eyes.
56 Ibid. p2
57 Ibid. p3
58 This phenomenon could be interpreted as a physical translation of Merleau-Ponty’s concepts of reflexivity and embodiment.
60 Ibid. p2. This process of visual negotiation with the material world resonates with Merleau-Ponty’s idea of embodiment, emphasising the role that the body plays in shaping the mind.
Figure 29. R. Key 2011. Close-up of backlit coloured lighting gels. The coloured gels are placed on a white translucent perspex cyclorama, backlit with fluorescent light. This is exploring light through colour hues and colour overlapping, painting with light.

Figure 30. R. Key 2011. Wide shot of backlit cyclorama with coloured lighting gels suspended in foreground and placed on cyclorama.

Figure 31. Olafur Eliasson. Your Atmospheric Colour. Saturating a space with coloured light.
CONTRAST AND THRESHOLD

Turrell suggests, “we are made for twilight... it is not until very low levels of light that our pupils dilate... we begin to feel light, almost like touch”\(^\text{61}\). Low light levels generate a palpable interaction, entwining our eyes with the material world that surrounds our body, revealing a deeper narrative potential of light’s phenomenon. Low-light levels are not always enough on their own to create mood, there is a vast array of almost imperceptible aesthetic nuances between low-light levels and uniform bright illumination.

Plummer argues that, “Light’s value is diminished by uniform illumination, and enhanced by directional light”\(^\text{62}\). Pallasmaa talks about architects Tadao Ando and Peter Zumthor’s roof slits as, “forcing light into thin directional sheets, contrasting with the relatively dark spaces around”\(^\text{63}\). Figures 32 and 33 illustrate a dramatic flooding of the interior with limited light. They are stark post-modern interventions, yet also feel primal and cave-like. These designs play with the contrasting boundaries of light and dark, the constricted light appears to open up again once it has passed through the threshold, achieving its own independent presence in the space.

Goethe’s experiments described boundaries (the threshold of where light meets dark) and turbidity (particles in the air) are required factors between the eye and the object in order for the mind to mix light to produce colour, and how the mind creates illusion in this process. Goethe’s descriptions of boundaries and turbidity are guides for this project’s experimental process. By the end of this project the notion of threshold has been reduced down to a discreet slot, or, a series of tiny pinholes. The threshold acts as an elongated aperture through which a ‘sheet’ of coloured sun-light is cast into a turbid and dark interior atmosphere, as if projecting a liquid light.

The final installation’s intent is for the sheet of light to give the experience of ‘coloured light volume’, also to create an internal optical experience that translates the outside world into drifting fields of coloured light, expressing sunlight’s authorship. It is a site-specific space in which there is a subject-object interrelation between viewer’s gaze and light’s substance. The internal (and external) architecture of the installation is built around a moving and coloured body of sunlight, focusing perception on light’s thingness. The installations to date have been private, the experience is viewed through a third party (video clips), it is not the, “audience’s active and entire bodily participation when perceiving... the installation”\(^\text{64}\), there is no sense of the embodiment or reflexive experiences that Merleau-Ponty describes. The scaled-up installation intends to explore the notions of embodied and reflexive experience, of seeing one’s seeing.

Shimojo points out that realising the reflexive process of perception [seeing one’s seeing] is not easy to demonstrate, “…mainly because the major part of visual perception [a mental event] is automatic and subconscious... although introspection allows us to describe the quality of perception phenomenally”\(^\text{65}\). The final installation’s intent is to create the conditions for a more conscious perception (apperception) of light as palpable material, of experiencing light’s iterative nuances. This wants to be an immersive optical environment, translating the ‘outside’ into moving fields of light and liquid colour. The installation’s interior is designed to respond to an exterior environment in flux, as the earth rolls towards, then away, from the sun’s light.

\* \* \* 


A way of looking; these spaces close off the light, opening up the senses, the eyes dilate and there is a feeling of connectivity of body and surroundings.
There is a heightened awareness within the exploration of perception, what Merleau-Ponty describes as mindfulness. This is the intention of Turrell and Eliasson’s designs, giving their audience the possibility of a subtly objective (reflexive) experience of their own subjective perception. According to Merleau-Ponty, reflexivity is the paradox of human vision; the body that sees, and sees itself, leads to an ambiguity of vision.

While our lived experience of the world may be an illusion of appearances, Merleau-Ponty argues that our sense perception still enables us to access the nature of things. Science is not able to give a definitive view of reality, only an approximation of what happens in nature, “absolute and final objectivity is a dream... this returns simple justice to all the elements of human experience and particularly to our sensible perception.”

**REFLEXIVITY AND EMBODIMENT**

Merleau-Ponty’s holistic concept of embodiment could be interpreted in a literal sense, the seer and the seen are connected, “made of the same fabric – the same flesh.” Our bodies, perceptions and the world that surrounds us are intimately intertwined. Pallasmaa supports Merleau-Ponty’s concept of embodiment, “Regardless of totally fragmentary nature of our observations... Merleau-Ponty argues for the integration of the senses... the true wonder of our perception of the world is its very completeness, continuity and constancy.”

Merleau-Ponty argues that things of the world and our bodies are, “made of the same stuff... that vision occurs within and amongst things... While the elements of visibility (light, colour, depth) are not things, i.e. they are not tangible concrete objects, they do exist... We feel the presence of the thing in us in a visceral way by means of a carnal formula.” Merleau-Ponty is saying that there is no distinction between the subject who sees and the object that is seen, our world and our existence is a blend of materials and experiences. Merleau-Ponty is also saying that light is not a tangible thing, it exists because through it we instinctually feel an entwining of body and world.

Turrell explores light beyond instinct, finding something more tangible, describing, “the thingness of light... making spaces that capture light and hold it for your physical sensing... when we allow for this feeling, the eyes touch, the eyes feel.” Turrell creates experiences of light that heighten everyday perceptions - similar to Minnaert’s observational techniques - the only requirements to experience these physical phenomena are time and eyes.

**THRESHOLD**

Time and eyes determined the intent of the model Aperture #1 in Figure 34. Duration is required to see anything in this cave-like environment, time for the eyes to adjust and time for the sunlight to move. In this space the light levels drop dramatically, it will take time for the viewer’s eyes to dilate, adjusting to the low-light levels. The model emphasises light’s projection through a prescribed threshold, or, ‘aperture’ in Figure 35. The model will be scaled up to room-size and installed in a north facing site with a clear view of the sun’s diurnal path. The movement of objects, people or clouds (between the sunlight and the threshold) will animate the light’s projection from the exterior to the interior.

This model explores light’s transition from one space to another. The light has been modulated through a discreet slotted opening. The threshold between interior and exterior becomes a narrator, translating light from one world to another. The interior vessel is informed by the motion of the light source and the exterior funnel that is designed to carry the light towards the interior.

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Figure 34. R. Key 2012. **Aperture #1.** Test model for room installation with slotted light. Table-top model using black and white foam-core to block/funnel the light through a slotted aperture/threshold. The incandescent light source is a 300 watt bulb mounted on a small stills-camera dolly track, allowing light source to approximate the sun’s motion. Camera is locked-off, and a haze atmosphere was pumped into model.

Figure 35. R. Key 2012. **Aperture #1.** Interior test shots with 2mm slot and vermilion gel light source. Experimenting with light source’s direction, colour temperature and intensity. Testing camera’s settings of exposure time and shutter speed to create the required intensity of light.
In an architectural sense, the installation’s point of focus is the threshold of exterior and interior.

"Without a threshold there would be no transitions between spaces, it would be a continuous space therefore the outside"72. The threshold has the dual function of separating as well as linking the two parts of this installation. It is the sharp point of ‘spaces-meeting’, the transitional moment as the light shifts from one context to the next, acting as a lens, modulating the light as it travels inwards. This threshold is the starting point of a new event, the boundary where different states of light occur.

The threshold slot in Figure 36 is narrow (1mm), the interior light-play becomes an abstract representation of the world outside carried on the light. These slots are not windows in the sense they can be seen through. They are designed to let a limited amount of light enter the darkened space, creating a narrative of light that can be felt with the eyes. Our perception of the space’s form is decomposed by this intense contrast of light and dark, allowing for another reading of the light and the space. The feeling of immersion with light is held within the darkness of the interior, this contrast highlights the connecting qualities on the threshold of interior and exterior, light and dark. The relation of these binaries contributes to the locating of ourselves within spaces, and in relation to what lies ‘outside’ the space we inhabit.

The final installation’s intent is to enable light to be an immersive experience, that light can be seen as an object of experience rather than its usual role of illuminating the material world that we see. This installation is architectural in the sense that it has been exploring multiple thresholds between interior and exterior, the room inhabited, and the body inhabited. There has been a process of reducing the light entering this space, playing with contrast and exploring ways of visually prescribing light’s physical presence. As a consequence, these installations have also been exploring a correlation between external control and interiority.

**VOLUME LIGHT**

_Aperture #2_ in Figure 37 is an interior shot of the second prototype model for the final installation. The design focus of this experiment is the discreet opening as an aperture, a lens. The intent was to play with a blend of window and camera obscura, drilling a series of very small holes to see if a mixed texture of exterior imagery and a sheet of interior volume-light can be created. There has been a process of refining this aperture, manipulating the quantity, but particularly, the quality of light getting through, exploring ways of prescribing light’s physical presence. The final model will incorporate: white cube interior space, the opening facing north towards the sunlight and a haze machine producing an unobtrusive and homogeneous cloud suspended in the air to make the coloured light beams more palpable.

The intent of the darkness in this model is that form dematerialises in favour of the light. Primacy is given to a shifting veil of light. With the help of a turbid medium (hazer smoke-machine), the air has a tactile quality as a unifying body. The intense contrast of light and dark around the slotted wall opening also creates a _sfumato_ effect, a subtle grading of tone and colour, blurring the contours of form. In the scaled-up version of this model the suspended haze within the space should give the light a volume, creating a vertical plane of light that gently shifts in intensity as the sunlight, clouds, and the world outside imbues its veil.

One issue with using this small-scale model is attempting to create the effect of _volume light_. Creating the turbid medium with hazer smoke has not worked photographically at this scale. This tabletop scale model will be scaled up to enable the hazer’s atmosphere to interact with the light, creating the intended effect of light’s volume. This next series of experiments looks at how and where to fabricate the scaled-up version of _Aperture #2_ model.

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Figure 36. R. Key 2012. Aperture #1. Interior test shots taken of tabletop model. The light source is a 300 watt incandescent bulb on a
dolly-track (to emulate the sun’s movement when time-lapsing). The camera is locked off and set to take a series of stills which match the
light source’s motion (2mm of movement = 2 seconds between shots). Aside from the quality of the light itself, the critical aspects of this
model are the colour and the aperture/threshold. Subtle variation in the aperture width and colour quality of the light transforms the
tactile intimacy within the space. The wall surface configuration in this test was determined by the shape and direction of the light.

Figure 37. R. Key 2012. Aperture #2. New test model for room installation with ‘perforated’ blue artificial light, with L.E.D. & incandes-
cent light from different angles. This model differs from Figure 36 in that the aperture is a ‘slotted’ series of 0.3mm holes in a thin metal
sheet, the light aperture becomes a series of pinhole ‘lenses’ in formation. This series of tiny holes lacerates the light source, creating a
similar look to the scientific single-slit experiment with light showing its ‘wave-like’ qualities. The ‘perforation’ effect brings texture to the
light’s interior narrative. The wall configuration has been changed (differing from Figure 36) to allow the light more ‘projection time’ on
the walls.
Figure 38. R Key 2012. Possible interior site.

Figures 39a + 39b. R Key 2012. Window light modulation test with series of 4mm holes/perforations. In 39a the curved piece of stainless steel is there to direct the light through the perforations. The outcomes of; concave, flat and convex are illustrated in Figure 40.

Figure 40. R Key 2012. Interior light effects (concave, flat and convex) of window modulation in Figure 39a.

Test of north-facing window modulation for interior installation. Using a series of 20 x 3mm holes in metal, scaled up from 0.3mm holes in test model. The holes where too big for the larger space, too much light came in. All that is needed per average sized room is a round hole approximately 15mm diameter, this lets enough light into to create a camera obscura representational image of what is outside. The intent was to get some narrative texture within the light entering the space using a multitude of small camera obscuras (as per the model test).
This test used a slot rather than holes. The vertical slot was 3mm wide and 500mm long, again, there was too much light entering the space. There was some shafting of light through a ‘turbid’ atmosphere of hazer smoke, but the slot needed reducing to a 1mm wide in order for light’s volume to emerge.

These tests have led to the development of building a free-standing installation, separate from interior spaces where the windows are too small and the roof eaves too large.
APERTURE #2. LIGHT SPACE MODEL'S EXTERIOR SETTING AND THE INTERIOR EFFECT

The vertical perforated light slot is perpendicular to a flat exterior reflector. The intent with this design is to create a sheet, a volume of light that can be seen in isolation within this space. The model will be movable (see Figure 46), the viewer can manipulate the shape of the light’s volume.

Light manifests within the counteracting potency of darkness. The form and value of the light entering the space traces hard and soft aspects, intensifying the experience of the interior volume. The experiential value of the space is increased through this play of contrasting volume and light. A uniform illuminance would homogenise and ‘flatten’ the experience, spatial tension would be lost to a democracy of light value, an illumination without shade and depth. There is almost a literal translation between the depth of physical vision and ‘depth’ of the experience of vision.
APERTURE #3. DRAFT DESIGNS FOR FREE STANDING EXTERIOR LIGHT SPACE INSTALLATION

Figure 45. R Key 2012. Aperture #3. First design option. This design’s intent was to scale-up Aperture #2. Being large and immovable, it would only get the desired effects at certain time of day.

Final installation.
Scaled for plywood sheet fabrication.
Needs frame to suspend it.
Angle determined by sunlight path at time of display.

Figure 46. R Key 2012. Aperture #3. Second design option. Mounted on a stand that can pivot so the viewer can manipulate light’s form within the ‘lightscope’.
We are surrounded by natural and constructed phenomena that act as lenses of light; the earth’s atmosphere, water and glass, all exquisitely cultivating the imperfect way we see. The most eloquent of all is the eye itself, suspended on the threshold between the surrounding world and our mobile perception of it. The ability of our physiological perception to make ongoing sense of the world we are immersed in is juxtaposed to the representations that project into our eye’s retina. Reality is not just sensed, it is imbued.

The intent of this project was to explore a deeper experience of light as a thing in-of-itself, observing light’s narratives, drawing out the language of light. The journey towards apprehending more of light’s qualities than one unconsciously senses has been sustained by a process of; reflexive observation of light within controlled abstract interiors. Other cues that distract the subjective eye have been removed, creating spaces which capture sunlight’s thingness. The design and construction of site in these experiments became a process of controlled abstraction towards white-cube-space, filled with darkness, allowing a discreet quality of light to project into the interior.

Chapters 2-3-4 prescribe the process of the main experimental outputs; Surface Light, a re-sensitising approach to seeing light’s interaction with surfaces. Filmic Light, manipulation of light through transparent, coloured and turbid mediums. Volume Light, moving towards a conscious perception (apperception) of light as the object in-of-itself, sensing one of light’s essential qualities, volume.

The physical outputs were a series of video clips depicting short narrative studies driven by light. These clips used time-lapsed still photos shot within scale models, creating simplified spaces in which to observe qualities of light’s narrative that might otherwise be missed. This project explored an abstract architecture of light, building composite-image-structures of durational experience using coloured light and shadow.

The final installation’s intent (still a work in progress) is to create an immersive optical environment that translates the outside world into subtly moving fields of coloured light and darkness. This space is about capturing a sense of (in Turrell’s language) light’s thingness, to experience a sense of touching light with our eyes, similar to the connected gaze into the vermilion glow of a fire in the darkness of night. To this end, the theoretical framework of this project was based on Turrell’s premise to present light in the simplest environment in order to heighten a perception of light as a more immersive experience.

Over the course of this exploration there were ‘pivot’ points in the process. As the design projects evolved, it became apparent that exploring light is not possible without exploring the process of perception itself. There was the distinction between the process of seeing, which is instinctual, and seeing the process (of seeing), which is apperception, a heightened experience of things. A way into this experience is to minimise critical cues; the less visual information, the more that cognitive processes can flourish. If we choose to see them, there are rich narrative seams in the everyday visual experiences.

One of the discussion points in the project was the distinction between the act of seeing, and what is seen. Contextualising the phenomena of light was not something anticipated, the project was attempting to see light’s qualities free from the constraints of other things. Context is unavoidable even in the most abstract, simplified or darkest settings.

Darkness is part of, and completes our experience of light. One quality of light that re-occurred throughout this exploration is how evocative the outcomes were the less light was introduced. Low-light phenomena is where Turrell would say that our eyes feel best, “we are made for twilight... when our eyes dilate... we actually begin to feel light, almost like touch”.

One early outcome was the discovery that less-light achieved more narrative content. Moving towards a darker aesthetic of the half-light was a strong pivot point in the project, light’s narrative potential lay in the shadows, in the contrasts between light and darkness. This contrast became the most important.

consideration in the process of designing and building the installations. As the scale model builds progressed, the spaces created were dark interiors with discreet openings, allowing very fine and directional amounts of expressive light in. There is an attempt to find the threshold between a camera obscura type image from the exterior with more abstract expressions of light created by very discreet ‘window’ openings. The less light, the less visual information was available which allowed more cognitive processing to occur. A self reflexive potential emerges, when visual disturbances are limited the viewer adds narrative.

Merleau-Ponty’s holistic approach through concepts of reflexivity and embodiment describes the inseparable nature of perception between our bodies and things. These phenomena have no explicit coda because they are an interaction of perception and body, its pre-cognitive. At the level of my individual mastery a personal design language has emerged out of this project’s discourse between the available theoretical frameworks that were investigated and the immediate engagement with and reflections on these experiments themselves.

The main instances that pointed toward an essence of light were; The camera obscura acting as a situation, an event. Through a discreet aperture the interior darkness interacts with, and is informed by the external light projections, this condition enables narratives of light in a constant state of fluidity. The use of colour was an evocative outcome of light’s causal nature, colour is a fundamental narrative phenomena of light. Time lapse light capture and durational editing has an, “archaeological density... through the juxtaposition of fragmented images”74, offering alternate perspectives on sunlight’s diurnal motion, the unconscious experience of light’s subtly transforms into a conscious perception, apperception. Reflexivity offers a way into this conscious perception, or, seeing our seeing. While reflexivity renders human vision ambiguous (the world as an illusion of appearances) our sense perception still enable us to access the nature of things. If visual disturbances are limited the viewer has the potential to add narrative, to sense oneself seeing. Juxtaposed to reflexivity is embodiment which pulls the disparate elements of our perceptions and everything else together. Embodiment is a holistic concept that integrates the senses and the world, there is no distinction between the subject who sees and the object that is seen, our world and our existence is a blend of materials and experiences. Manipulating qualities of light and not quantity allows deeper narratives of light to emerge. One of the primary outcomes from this investigation is an awareness, a mindfulness of light’s subtle and mutable narrative qualities, as being an informing contribution to design genius loci.

These explorative design-modifications create a language of seeing that feeds back into my work in film-set design, using the descriptive and experiential insights into light. While these experiments are influenced by the Light and Space artist’s aesthetic, they have focused on pursuing the concept of contextual modifications of interior light’s form rather than specifically as an art form75.

This project has been an ontological and idiosyncratic journey into a personal design language of light in action. The journey has informed my professional practise. I can access the core ingredients, redesign an experience from the basic building blocks before I start to entertain the way particular effects combine to generate an overall narrative.

This exploration into aspects of light’s phenomena has been driven by how light is perceived; bodily interaction with light as a volume and its narrative potentials. Through apperception, and over time, we acquire experiential knowledge of light’s complex interrelation between us and everyday inhabited moments. This project expresses a personal encounter with qualities of light, darkness and site, a cursory archaeology of the palpable.

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75 This exploration into perception of light’s narrative qualities has not been overtly artistic or scientific, more a gently empirical mix of the two.
This project points toward the need for individuals wishing to master the language of light, to, as Husserl noted, “a return to the things in themselves”\(^\text{76}\). In short, to apprehend, experience and master the qualities of light in its essence. To this end, what this project can suggest to such individuals is to begin this kind of journey where this project has ended. Start by studying light as a volume, this is where Turrell takes the spectator to in his works that use phenomena such as a Ganzfeld, experiencing the thingness of light. The language of light is there to be apprehended at first principles, at the level of the light’s volume.

This project has brought a designer to the point where they can begin to experience the language of light itself, to garner an essence begins with light’s raw volume (chunks of light, are like chunks of atmosphere, we tend to move through them without conscious thought of their thingness). From here, the process can be built upon with filmic qualities (phenomena that act as lenses of light) and then towards surface qualities (reflection, refraction and diffraction). It is like starting with a piece of clay in the hand and designing a single element, composition and complex manipulation comes later. A refined view of the initial question would be; Where can a design language of light begin to be formulated? The answer is; in the camera obscura (a darkened space), at the level of volume.

A design language is not a technical manual, it is a heterogeneous mix that differs for individual bodies in different contexts, inasmuch as light is an illusive and yet omnipresent property. For each individual wishing to develop their design language of light, the suggestion based on this project’s journey is that they start with the most ‘essential’ quality. This is what Turrell, Eliasson are attempting to connect us with; light as a substance with experiential value in-of-itself.

Has this project has fulfilled the research question? My conclusion may sound evasive, but there is an idiosyncratic quality to the observation and description of things. Husserl’s return to things themselves is a return to the world that precedes knowledge, the world that knowledge describes. Due to the reflexive and embodied nature of perceptual experience, written language does not serve it very well. This is pointing towards the inhabitation of a design language, the personal ownership and mastery of such a thing. The ontological quality of a design language of light is one that begins with ‘volume’, something to inhabit. This phenomena is pre-cognitive, the fact that light ‘is’ is something we don’t see, it takes an event of conscious perception to have a sense of one of light’s essential qualities, volume.

Despite the ethereal nature of light and subsequent descriptive knowledge of its qualities, Zajonc argues that there are still insights to be had, “the true artist, monk and scientist are not searching to grasp knowledge as object, but rather as event... The moment of critical importance is the moment of insight... we rush past the immediate offerings of the senses to what we suppose to be the hidden, enduring, primary objects of reality... The habits of our culture, the dogmas of our education constrain our sight”\(^\text{77}\). Zajonc is describing knowing as seeing, knowledge as an event (not an object), a shift from dogma to apperception. Even in the most commonplace occurrences the senses can offer epiphanous moments of insight into the nature of light. The sciences and the arts have an equivalence when it comes to describing essential qualities of light.

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\(^{76}\) This primordial notion of things in themselves is to, “enable people to see clearly something that is right before their eyes but obscured; things that are so taken for granted that they are muted by abstract observation”. Maxwell, Kenneth. *Phenomenology :: Deconstruction :: Obey!* 30 November 2010. Web. As cited 10 December 2012.

Figure 47. R Key 2009. Handmade Pinhole lens. The shadow of reflexivity.
Figure 1. R. Key 2010. Sunlight projected onto interior walls, refracted through window glass
Figure 2. R. Key 2009. Morning sunlight emerging from behind curtains, bouncing onto ceiling surface
Figure 3. R. Key 2011. Evening sunlight through trees, glass and mesh blind
Figure 4. R. Key 2010. Refracted sunlight through blue lighting gel projected onto wall surface
Figure 5. R. Key 2012. Sunlight and artificial light sources used in my workshop
Figure 6. James Turrell. Dividing the Light:  
Figure 7. R. Key 2012. Reflexivity: seeing one’s seeing
Figure 8. R. Key 2012. Sunlight through a crystal glass prism projected onto wall surface
Figure 9. Illustration of camera obscura:  
Figure 10. R. Key 2009. x2 Hand built camera obscura with 35mm negative developing lenses fitted
Figure 11. R. Key 2009. Digital photograph of image seen through hand built camera obscura
Figure 12. R. Key 2012. ‘Assemblage’ test shots of sunlight’s diurnal path in scale model
Figure 14. R. Key 2009. This experiment examines Cartesian single point perspective
Figure 15. R. Key 2009. Defines the language used in describing light’s interaction with surfaces
Figure 16. R. Key 2009. Camera Obscura
Figure 17. R. Key 2009. Camera Obscura Exposure sequence
Figure 18. R. Key 2010. Woodpile Light Narrative
Figure 19. R. Key 2010. Woodpile Light Narrative Montage sequence of stills taken from video clip
Figure 21. R. Key 2010. Model using indirect light source
Figure 22. R. Key 2010. Close-up details of Figure 21
Figure 23. R. Key 2011. Corner #1 Time lapse sequence
Figure 24. R. Key 2011. Corner #1 Full frame shot
Figure 25. R. Key 2011. Corner #2 Monochromatic time lapsed sequence
Figure 26. R. Key 2011. Corner #2 Monochromatic full frame shot
Figure 27. R. Key 2011. Corner #3 Introduced colour full frame shot
Figure 28. R. Key 2011. Corner #3 Introduced colour time lapsed sequence
Figure 29. R. Key 2011. Close-up of backlit Lighting gels
Figure 30. R. Key 2011. Backlit cyclorama with coloured lighting gels
Figure 31. Olafur Eliasson Your Atmospheric Colour : 
http://ilikethisart.net/?attachment_id=9491
Figure 32. Tadao Ando, Church of light, Osaka-fu, Japan:  
www.evermotion.org/vbulletin/showthread.php?t=48851
Figure 33. Peter Zumthor’s Thermal baths in Vals, Switzerland:  
http://picasaweb.google.com/lh/photo/-d1MHNW8xPyEZL9-lCwleW
Figure 34. R. Key 2012. Aperture #1 Test model for room installation with slotted light
Figure 35. R. Key 2012. **Aperture #1** Interior test shots with 2mm slot and vermilion gel light source

Figure 36. R. Key 2012. **Aperture #1** Interior test shots taken of tabletop model

Figure 37. R. Key 2012. **Aperture #2** New test model with ‘perforated’ blue light, LED & incandescent light

Figure 38. R. Key 2012. Test. Interior site considered for final installation

Figure 39a + 39b. R. Key 2012. Test. Window light modulation with series of 4mm holes/perforations

Figure 40. R. Key 2012. Test. Interior light effects of window modulation

Figure 41. R. Key 2012. Test. Laser-cut black perspex over north-facing window’s interior

Figure 42. R. Key 2012. Test. Subtle light volume effects with hazer atmosphere and aperture slot

Figure 43. R. Key 2012. **Aperture #2** Exterior site and set-up of model

Figure 44. R. Key 2012. Interior effect of **Aperture #2** model

Figure 45. R. Key 2012. **Aperture #3** option #1

Figure 46. R. Key 2012. **Aperture #3** option #2

Figure 47. R. Key 2009. Handmade pinhole lens (0.3mm), attached to digital camera-body, 1second exposure

Figure 48. R.Key 2010. Avondale Racecourse, early morning light through a ‘turbid medium’ of fog. iPhone3.


Figure 48. R-Key 2010. Avondale Racecourse, early morning light through fog.
Figure 44. (Repeat) R Key 2012. Interior effect of Aperture #2 model. A vessel of light.
Figure 44. (Repeat) R Key 2012. Interior effect of *Aperture #2* model. A vessel of light.