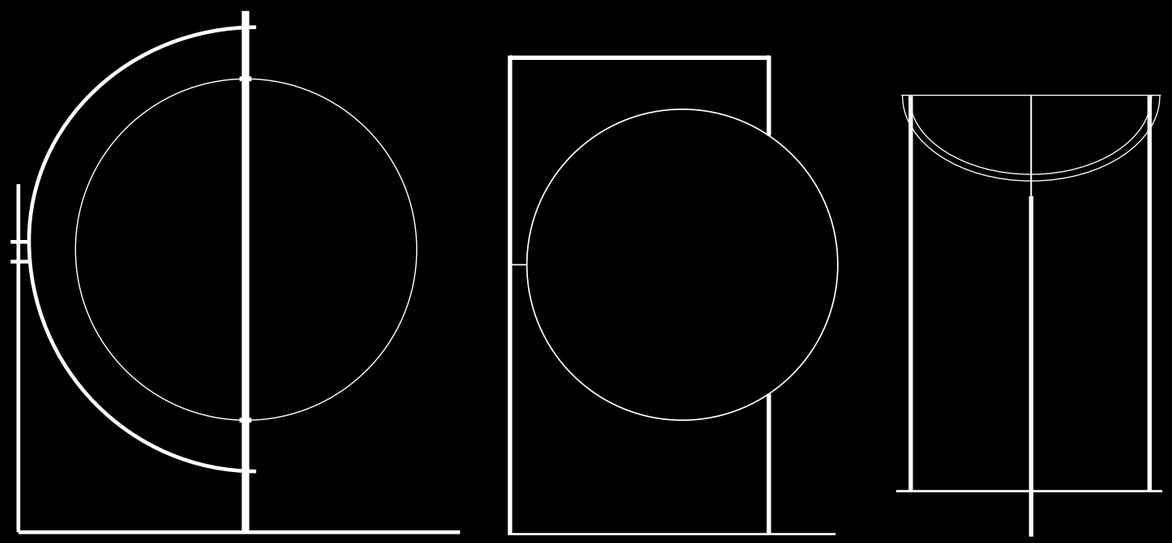

Reflections of Light

BA (Hons) 3D Design and Craft

By Ollie John

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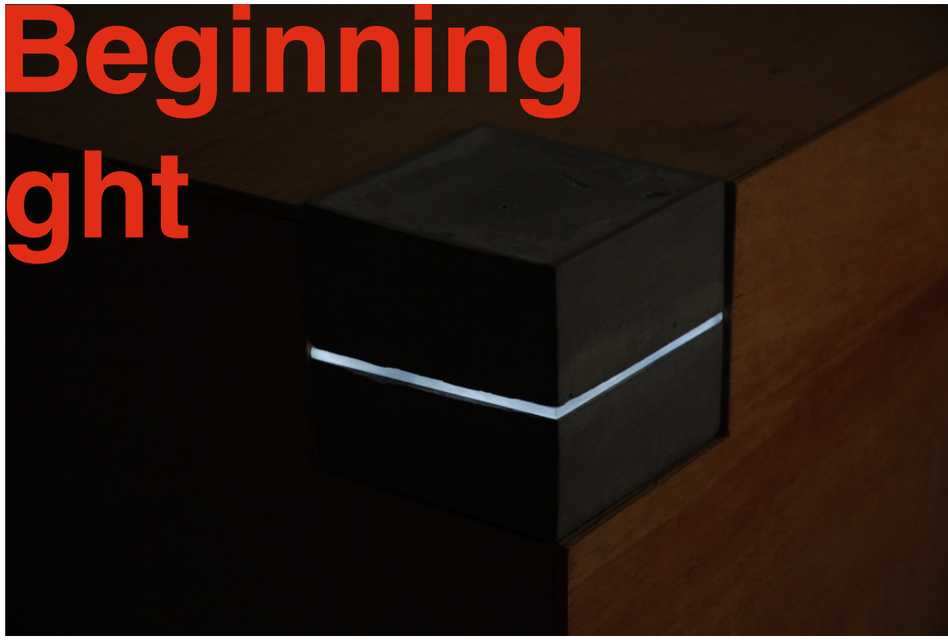
The Beginning of Light



Introduction

Light can affect us by generating feelings of warmth and comfort, it can change how we feel within a space. I am seeking out ways of shaping light through reflections, the very act of achieving this has pushed me to explore various components that need the ability to move within the structures. When has, natural light been static? The movable elements allow for engagement with the pieces. It looks to involve the user through intuitive moving parts, rather than using motors, which create an immediate divide between the user and the light. Orbital mirror, Exposed mirror and Arc mirror all share the idea of interaction and engagement with lighting. By shaping light in a way that we can associate with a thermal and visual warmth, we experience from natural light.

Experimenting with light goes as far back as A - level Art, using reflective mirrors on a rotating axis. Fast forward 2 years to foundation, my final major project explored the use of light to celebrate imperfections, much like the movement Wabi Sabi. Light has been an important focus for my work throughout university, it gives all my projects a sense of purpose and a formal function. It has taken on many forms from wearable reflectors made from recycled materials to product lighting that positions it’s self in homes. I have done extensive exploration into what light sources fit certain purposes, using strip lighting units, LED bulbs and casting my own casings for strip LEDs.

Relationship with 2nd year

Understanding my facination with light and persuing it.

My interest in light never started out from the actual source, it has always been the effect it has on a surface or where it's being cast onto. The series of lights I produced for 2nd year explored form and how the light sources could be intergrated into brutalist objects, but what I really did start to touch on was a reflective element. The light directly above, uses an LED unit set into the angled section, positioning a mirror above with the ability to rotate meant I could direct the light. 'Light bulb' moment, this was me realising I could push this into a project.

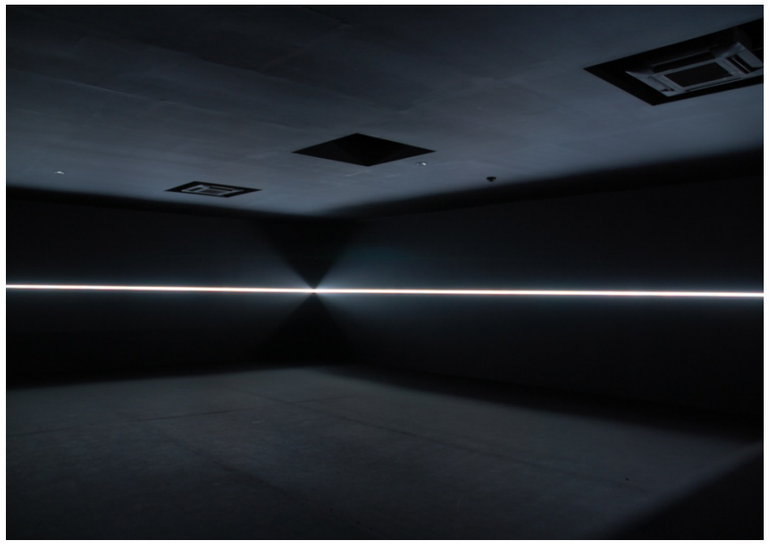
Deciding to focus on it for 3rd year project.

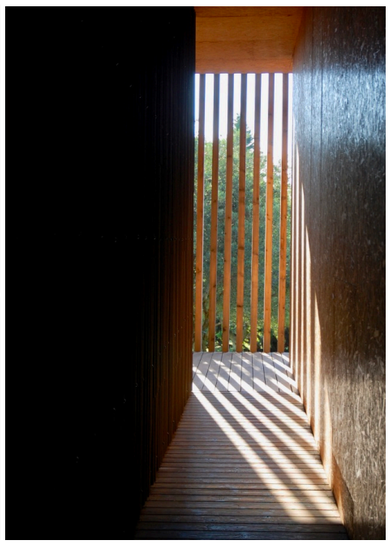
Persuing this route meant I had a perfect excuse for letting loose and exploring what effects I could create with endless possibilites of colours, tones, shapes, intensities and more. And at this stage I was over my brutalist stage and ready to explore my own language and aesthetic within design.

The following installation I visited was the Skyspace at Tremenheere sculpture park in Penzance, Cornwall. This space was part of his Skyspace series, as you walk through the entrance, which presents itself as a narrow doorway, it opens out into this circular room but it feels like an exterior space because of the air flow and then you look up. In the ceiling is this perfectly cut out circle, Turrell describes them as apertures, that show an undisturbed view of the sky. Perfectly framing the clouds rolling by, it's almost better if it's a slightly cloudy day so that you can tell it's real, otherwise it would either be this plan blue or white sky that has no definition of movement.

I have experienced a sky space before at the Yorkshire Sculpture Park (YSP), which was a square aperture changing the whole dynamic of the space, by showing the edges and tones of the parameters of the space. Whereas the one at Tremenheere, Penzance has an endless feeling of space, in photographs you can never capture the entirety of the space, although this technique I discovered allows you to use the panorama affect and by tilting the phone on it's side you can pan from down to up capturing from the floor to the ceiling.

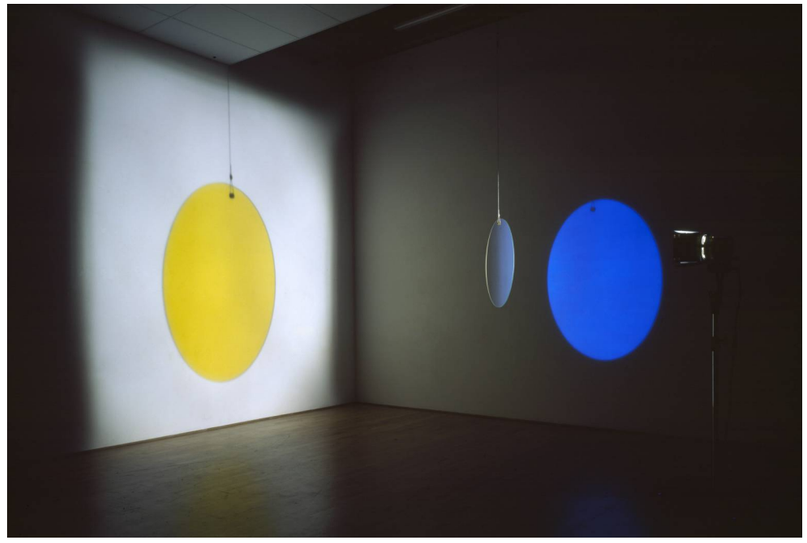
‘Your black horizon’
Olafur Eliasson





‘Your black horizon’, is a collaborative combination of architecture and immersive installation by David Adjaye and Olafur Eliasson. This was presented on the Island of Lopud, Croatia, a location that I had visited before. The nature of the space focuses directly on this strip of light, white light almost like midday when the sun is at its highest point, as you stare at it longer and longer it begins to change colour gradually. If you are not focusing on it, you wouldn’t notice it change, this change in colour rapidly influences the dynamic of the space. It plum-mets into a deep blue light making you more aware of the drop-in temperature within the space. The change in colour of the light strip is in direct corre-lation to the cyclic spectrum of light throughout the day, it shows the full spectrum in a condensed time of roughly an hour cycle.

‘Yellow vs purple’ 2003

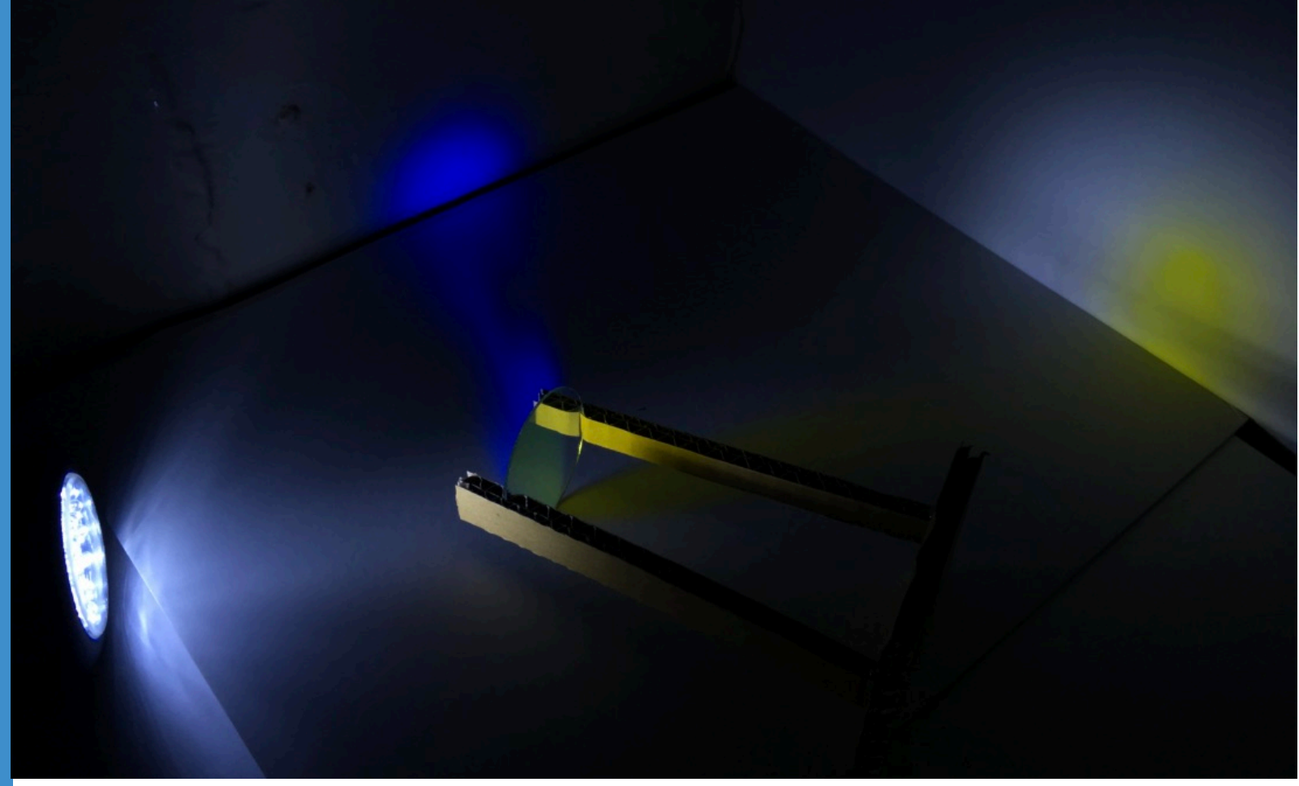


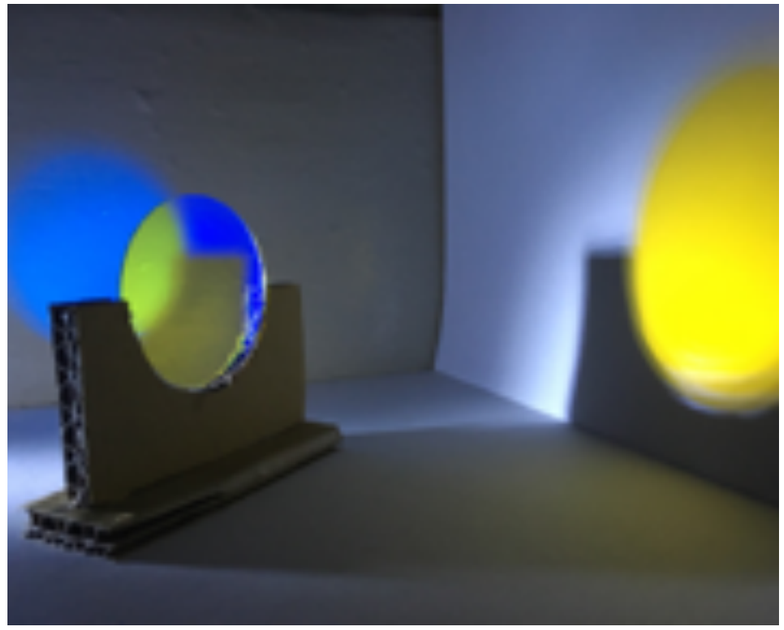
‘A sheet of colour-coated glass hangs down from the ceiling. An electric motor turns it at the rate of half-a-revolution per minute’. - Olafur

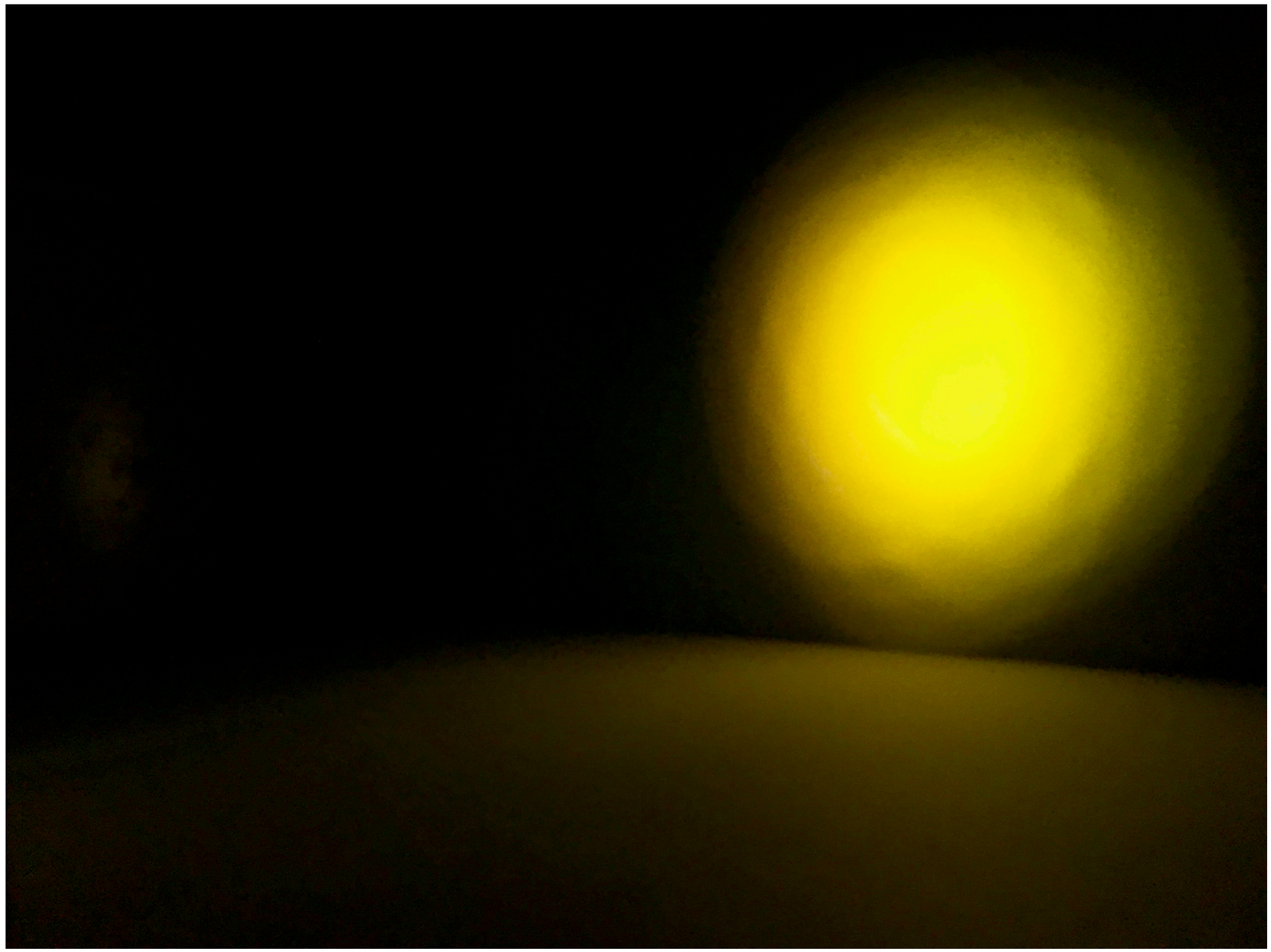
Dichroic Lens Exploration

Week 1 - 4 propositions

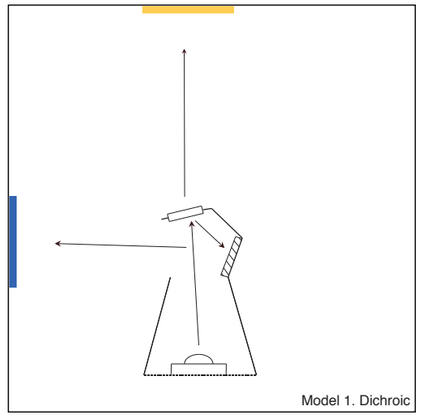
The first week or two back to university, I began exploring the use of the dichroic lens, following inspiration from Olafur Eliasson using similar lenses. The properties of the lens shown in the photos, is due to light being shone directly at the lens which refracts yellow, and reflects blue creating this vibrant show of colour. After playing with it for a while, it was clear what I could get from the lens but I wanted to work on how I could harness the colours and control the output of light, from the light to the lens and beyond. This required making a variety of quick cardboard models to hold the lens, and with a white backdrop I could show what the lens could do with a bit of patience.



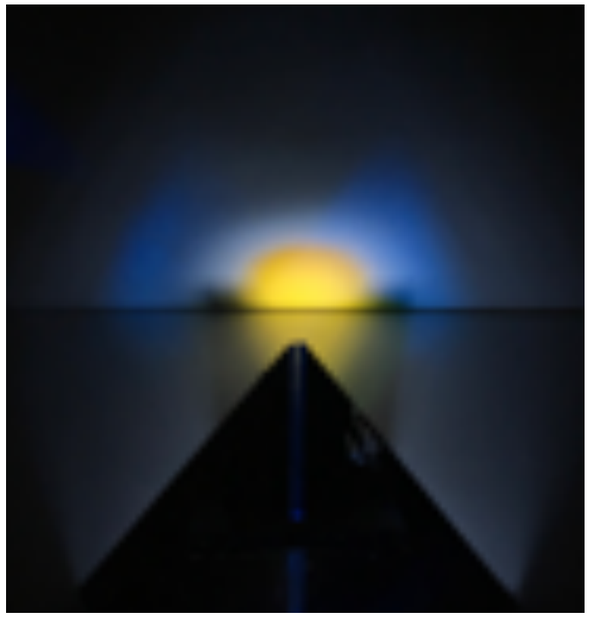




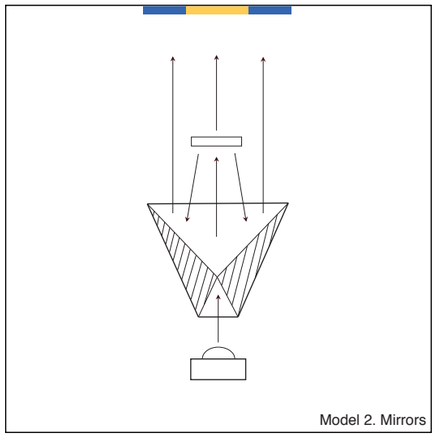
Here shows what the sheet steel housing does to the effect, the colours and light are more directed and any light being emitted is directed at the lens. This creates a crisp level of light, which you can get a real sense of warm and cold light effects from. The colours are soft and slightly diffused, there is almost a full spectrum of each colour, which makes it feel like less of a manufactured light effect and more natural.



Model 1. Dichroic

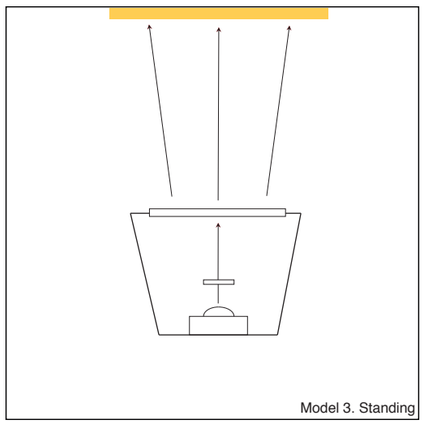


With this model, I was starting to draw inspiration from prisms and how light can be directed. This model used three sides of acrylic mirror stuck together with an open face and a circular hole at the back, this was primarily so that I could drop the lens into the slightly chamfered hole. This didn't work so I ended up setting the lens in the cardboard cradle and have it facing the open face of the triangular mirror model. I then shone the LED light through the hole which directed to the lens, the blue light was reflected back and forth from the mirrors creating this blue haze around the yellow semi-circle that's refracted on to the wall.



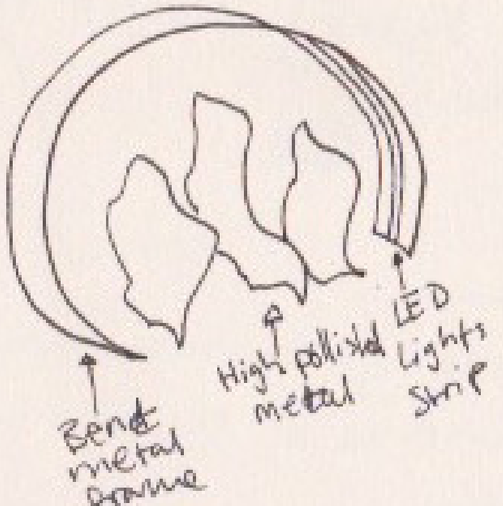
Model 2. Mirrors

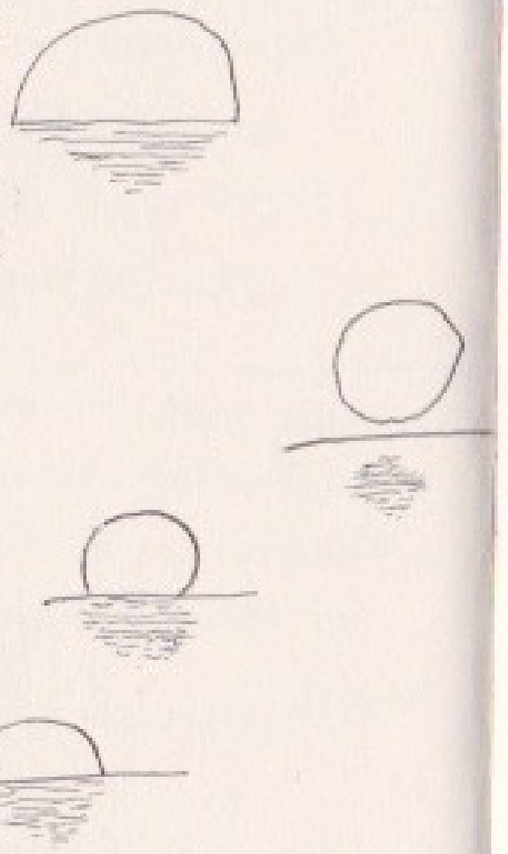
This piece although very toned back and simple, the idea was to harness the incredible warm yellow that the lens refracts forward. The circular disc at the front is tracing paper which diffuses the colour and spreads it further, with a simple steel framework to hold it all.



Model 3. Standing

Looking at the reflections



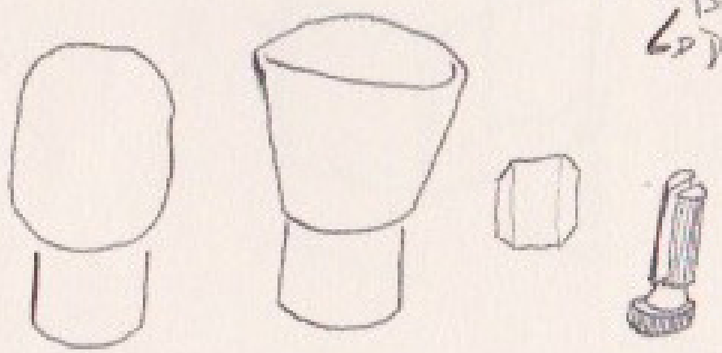


To do this week -

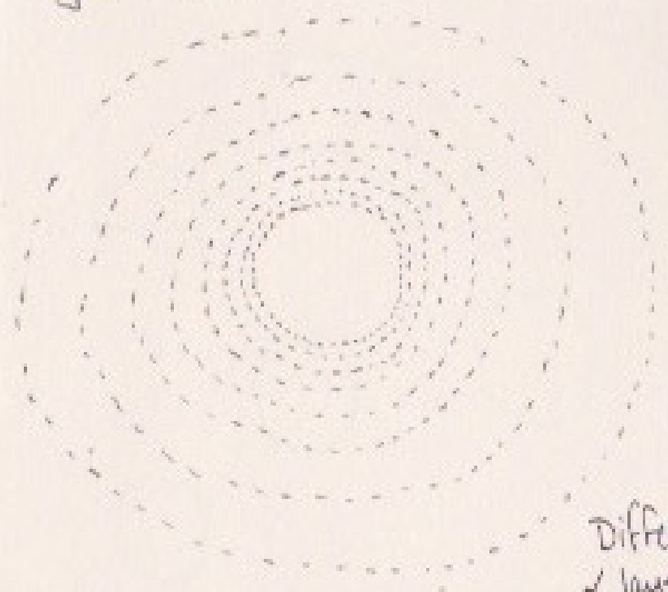
↳ make & Design a dimable light

↳ I want to play with different functioning lights -> The way they work - dimable
- colour changing

-> ways of powering - mains - simple switch
- Battery
↳ Different types.

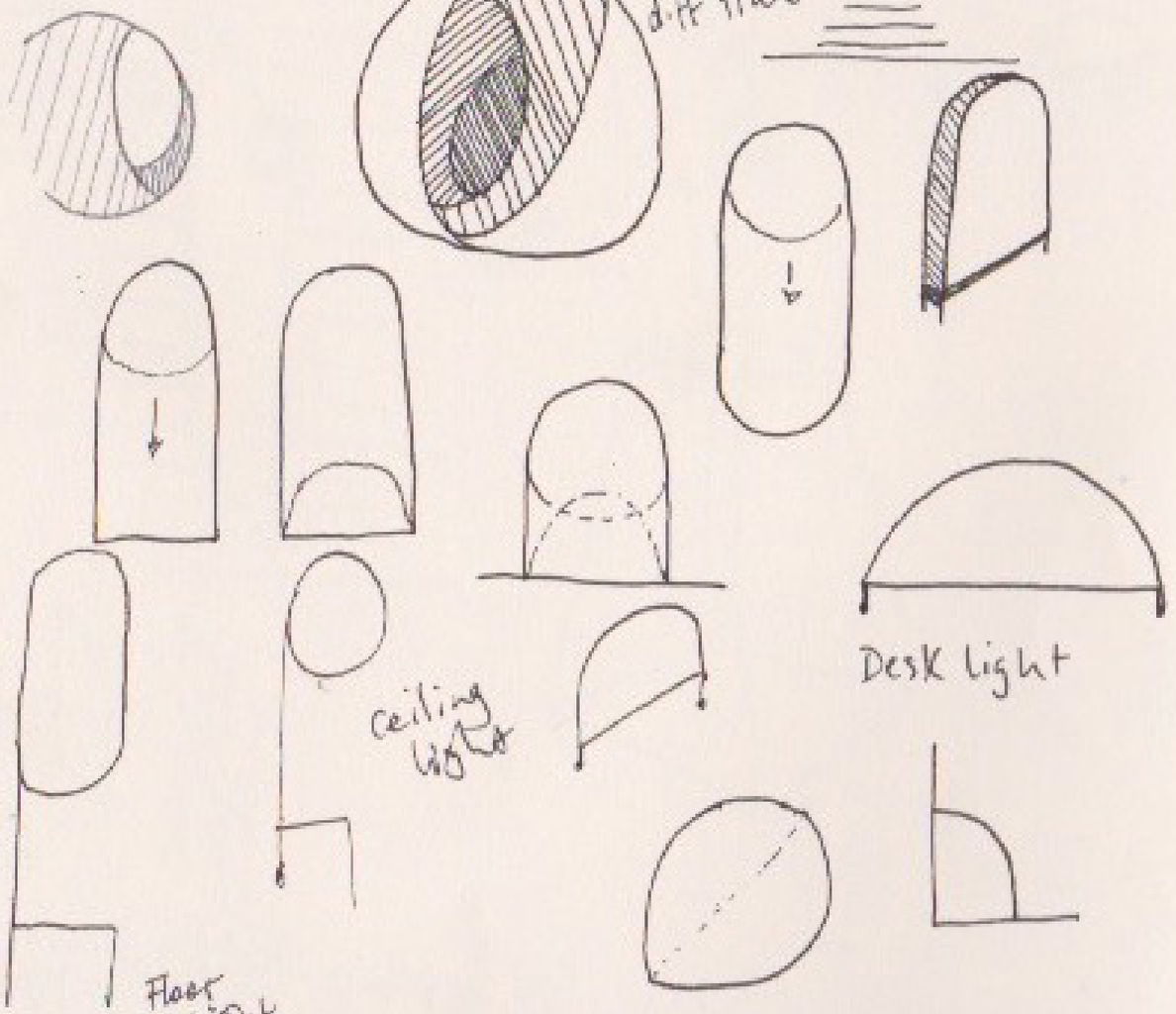


- The sun doesn't have an outline on first glance



Visual & Thermal warmth

Different layers sand blasted to diff times.

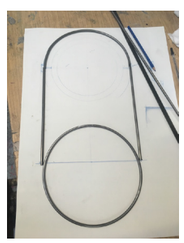
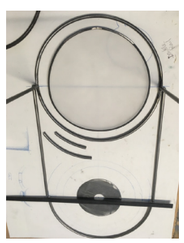


Establishing a language
Low to High light

This was the first bit of legitimate metal work that had a simple concept of diffusing light with the intension of being able to change the height of the light. It was a huge step for me, although being basic (I referred to it being at the IKEA end of the spectrum, rather than Turrell being at the other end, which was the end I was aiming to be at). This showed that I could make I functioning light with a simple purpose that did what it said on the tin. The welding side of it (all MIG welded) and cold forming of the steel rod, paved the way for me in terms of the frame work. It established an aesthetic I was very happy with, and on trend, supposedly seen as ‘industrial minimalism’.





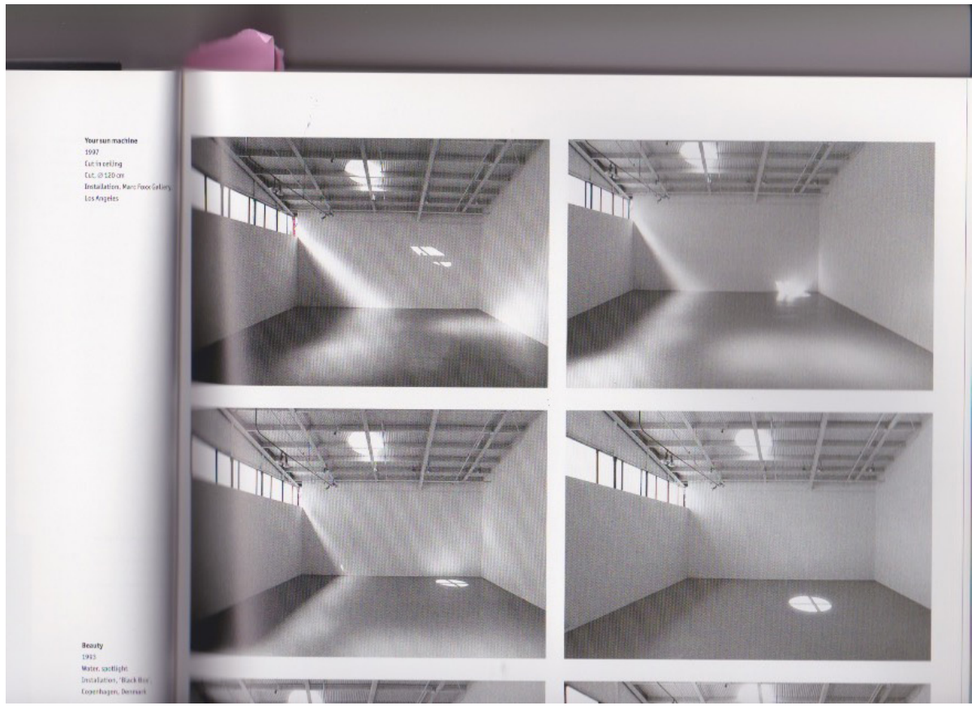


Daylight Entrance
Daniel Rybakken

Transitioning into the next segment of exploration, which delves into the idea of window light, and a warm comforting connection we have with the sun, creating these shapes on our walls. Something that I can relate to and I think everyone can. This was made apparent when a class mate showed me a designer (Daniel Ryybaken) that created the window light shape on the façade of a dark stairwell to make it feel like natural light was present in the space. This essence of light that he created, immediately had an interaction with the person entering the space. Changing their mood, which is something so simple but could make you choose to walk down the stairwell or take the lift.

Image from dezeen.com/2010/05/17/daylight-entrance-by-daniel-rybakken/

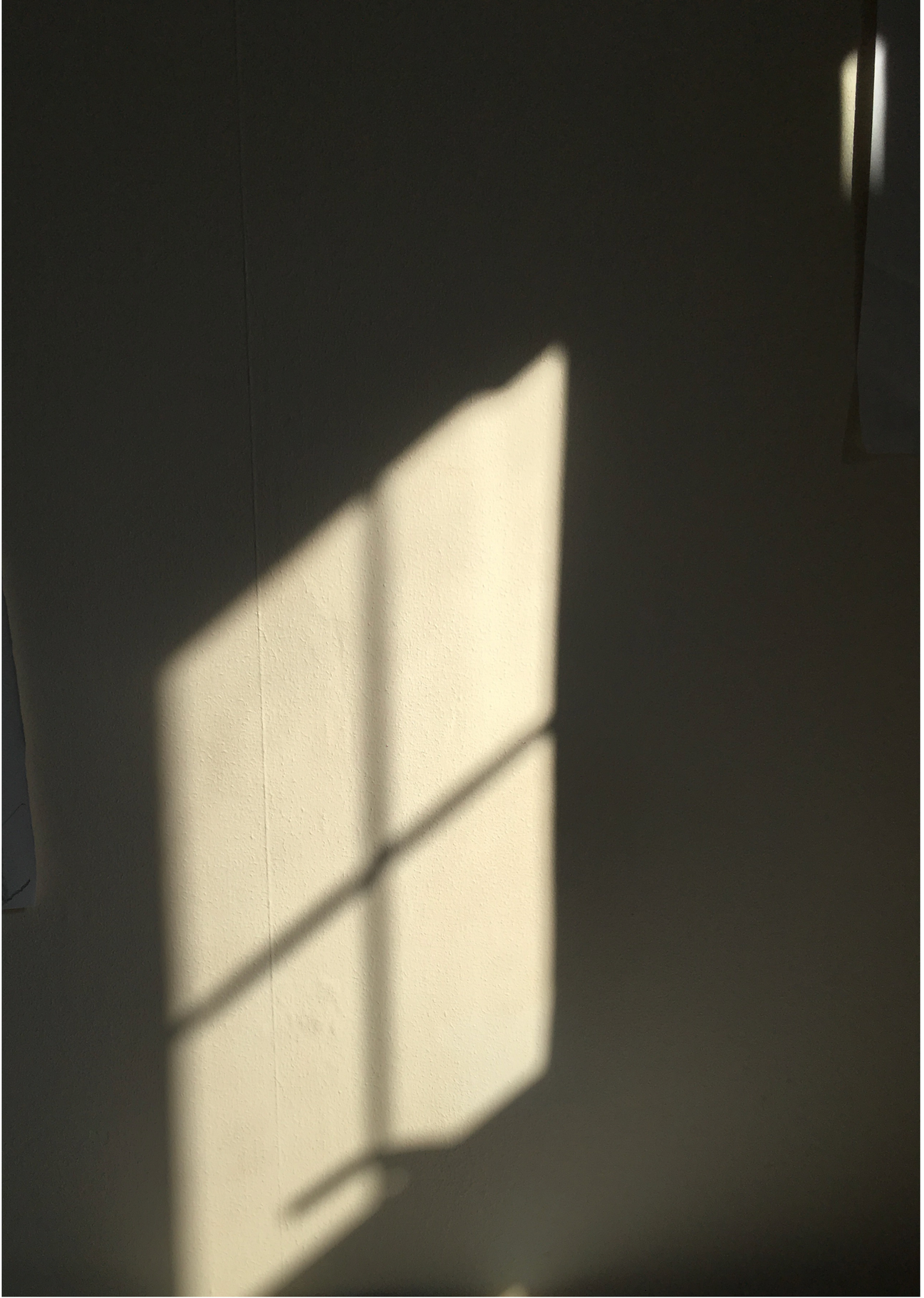
'Your sun machine'
Olafur Eliasson



'I cut a hole in the corrugated metal roof of the Marc Foxx Gallery in Los Angeles, and a round sunspot entered in the morning on the left side of the gallery. During the course of the day this spot would travel diagonally through the space and at the end of the day eventually disappear. People would come into the space and they would turn this sunspot int an object' - Olafur.

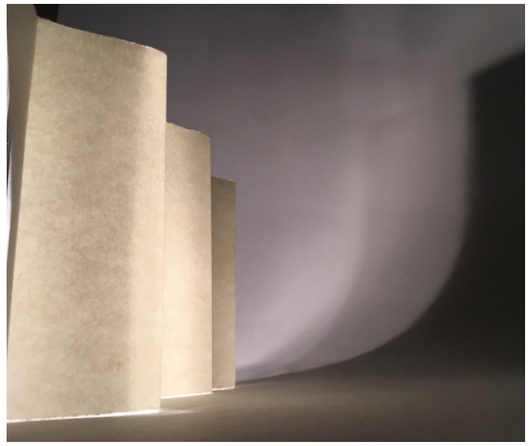
Scan from book, 'Olafur Eliasson', curated by Madeleine Grynsztejn.

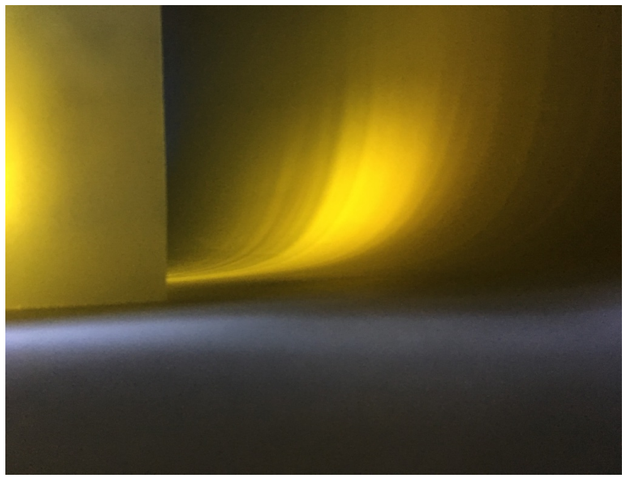
Window Shapes

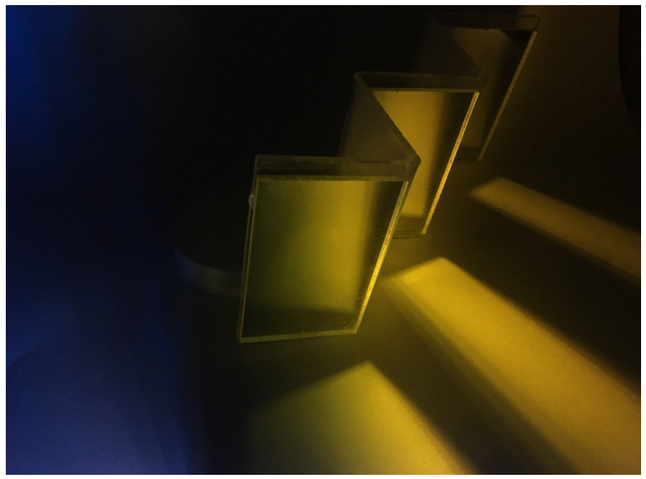


Abstracting Light

These tests following on from Low to high light, go back to this abstraction of light, which I love. Playing with mirrors, frosted acrylic, lens's and line bending acrylic, I managed to establish an interactive nature not too dissimilar to the previous light showing that human interaction is key with the process I take with my lights. Tilting, twisting, flexing and shifting are all actions that can immediately change the direction and type of light that's emitted.







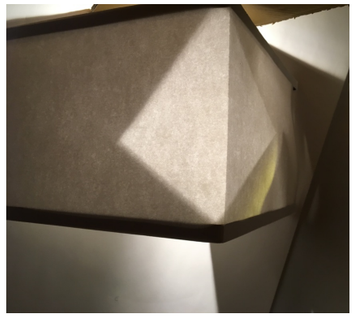
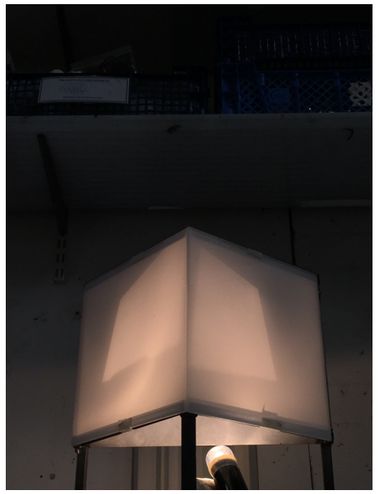
Paper

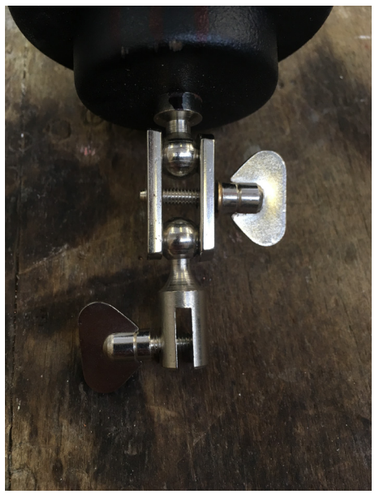
Reflecting light onto paper

Translating these into tangible models and effects, manifested as reflecting shapes of light onto paper, so that you can see the shapes from the outside. A quote taken from the book, In Praise of Shadows by Junichiro Tanizaki, describes paper, ‘From a new awareness of the softness and warmth of paper’, ‘Evidence of our recognition that this material is far better suited than glass’. This quote beautifully exemplifies the use of paper and the soft effect you can achieve. Which I started to explore in these models and beyond.

The first model started to explore the use of a curved piece of paper, which distorts the reflection of light on it. And the other looks at a corner which is where I ended up adding a second mirror that reflected on the other façade. Then angled them so they were both verging on the edge of the corner, almost making them as one shape.



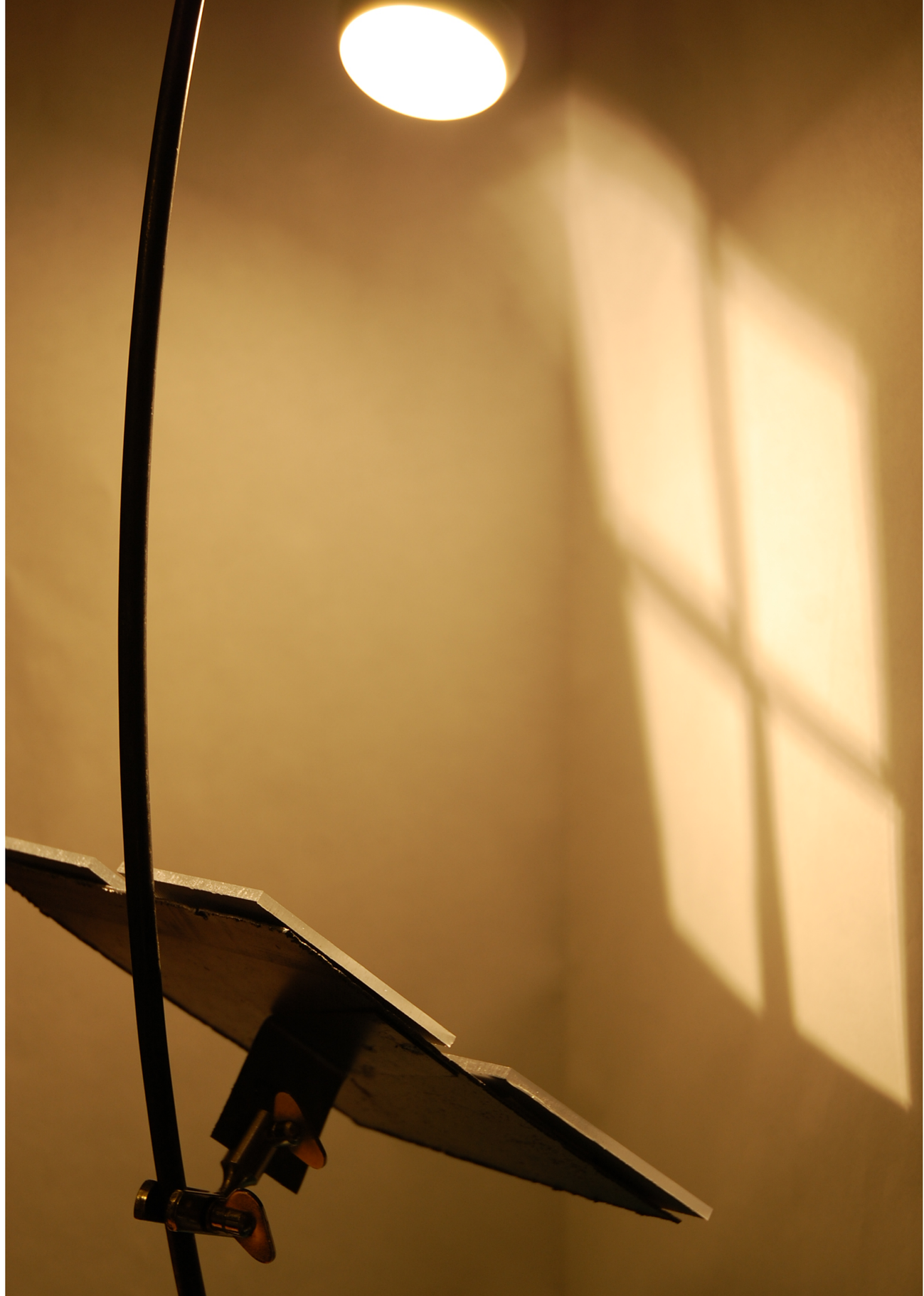
Paper Corner
Acrylic Mirror

The next step I took was to try transform this into a lighting piece that stood alone. But in a way, it took away the magic that I created with the previous models. The effect it gave was questioning the scale, with the shapes converged on the corner, and the use of frosted acrylic sheet didn't have the same effect as the softness that's achieved with paper.

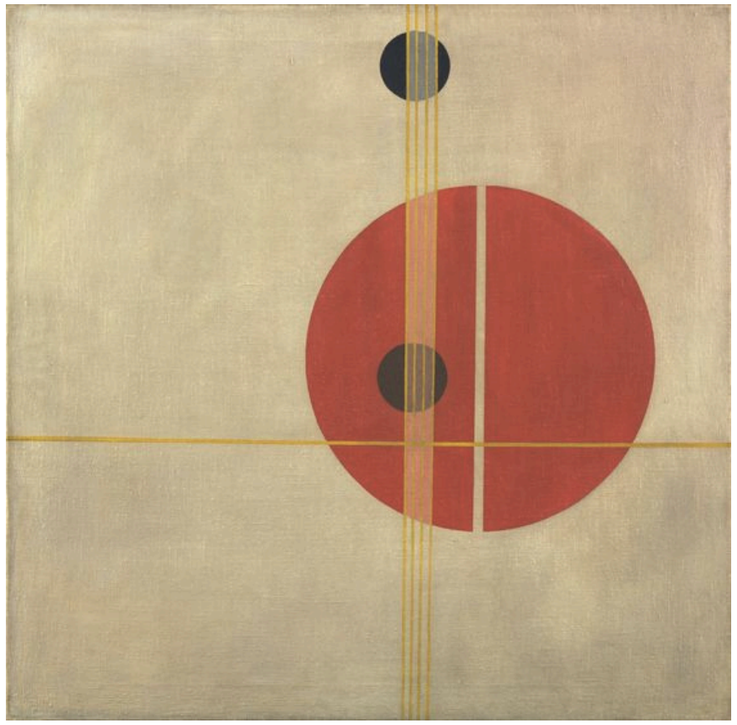
I decided to scale up, this was to do with the use of paper. After reading 'In praise of shadows', the author talks about the use of paper in Japanese architecture and the softness that light has on it. I immediately had the ease of scaling up as I had a pad of A2 paper that was thin enough for the light to clearly pass through it. The frame work for this piece was very simple, I wanted to elongate the corner shape much like a corner of a room, giving much more surface area for the light and a range of mirrors to be used.

Window reflection

LED bulb, paper, acrylic mirror, steel frame.
570mm x 350mm



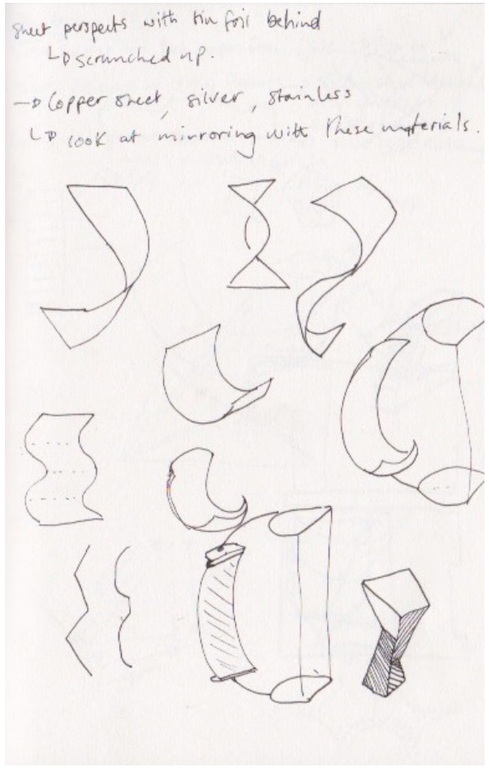
László Moholy-Nagy
Q 1 Suprematistic. 1923

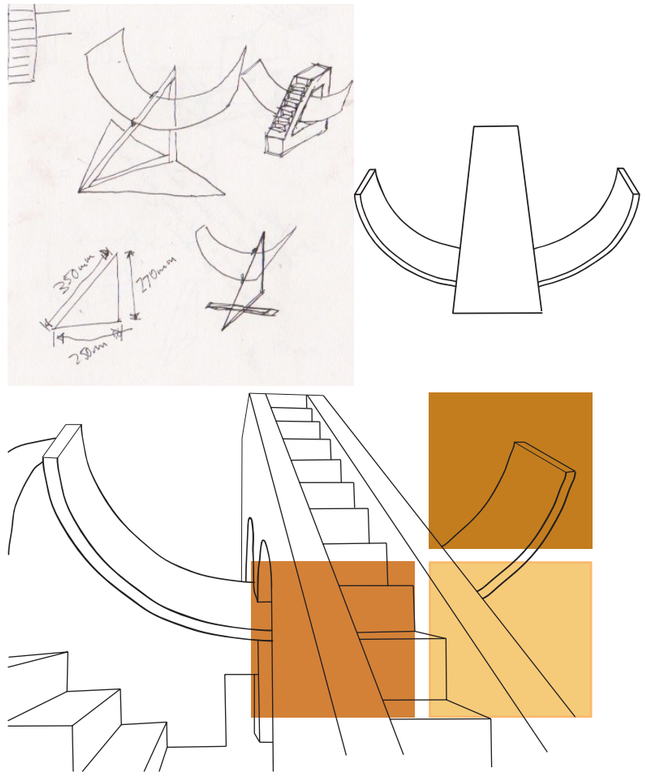


Moholy-Nagy positioned himself in the Bauhaus movement during the early 1920s, becoming part of the faculty in 1923. The style he pursued in painting involved confident use of shapes and bold colours, the subject matter encompassing colour, light and space all being human factors. I started studying his paintings due to realising a strong correlation to my own drawings when designing. Perspective is very important to my work but simplifying them down by drawing two dimensionally with three different perspectives rather than compiling all the information into one three-dimensional drawing over complicates the design. Looking at Moholy-Nagy's painting considers these factors, taking it right back to all the essential lines and shapes, something I constantly consider as I start to develop my style in design.

'Q 1 Suprematistic'.1923 by László Moholy-Nagy

Form inspiration
Jai Pur sundials



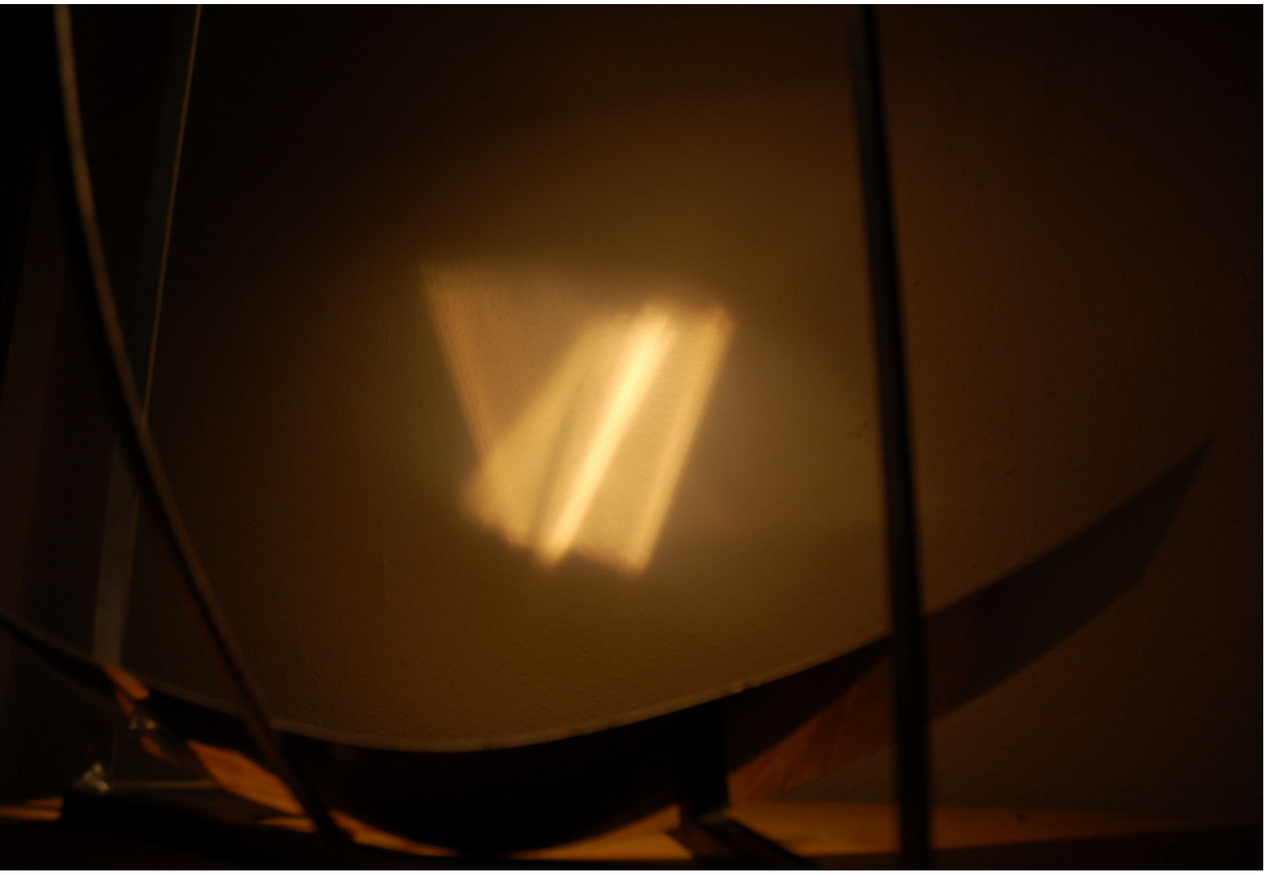


After having a productive group critique, I was suggested to look at the Jaipur Sundials in Rajasthan, due to their concaved shape and use of determining the time using the 'Sun'. This had a big effect on the next step I took, after exploring the use of acrylic mirrors with their reflective properties and flat uninterrupted reflection. I wanted more character and tone to these reflections, this is where the metal reflectors began.

Through trial and error, I used a long rectangular piece of stainless steel sheet with the concaved shape, this concentrated the light when reflecting from a bulb.

Stainless Steel

Metal Reflectors



Copper
Metal Reflectors

Natural light
Acrylic mirrors

Realising
Natural light
cannot be
controlled

‘The artist was the slave to this unstable element, since one cannot make a work of art with the sun itself’ - Francois Morellet.

Didcot
Power Station

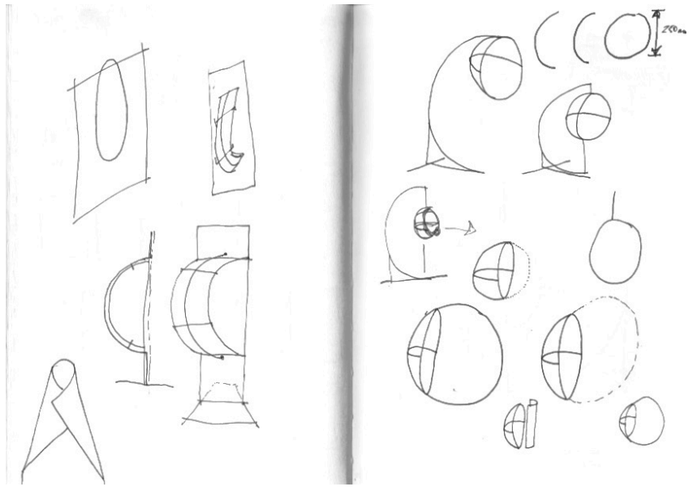
Why research this location?

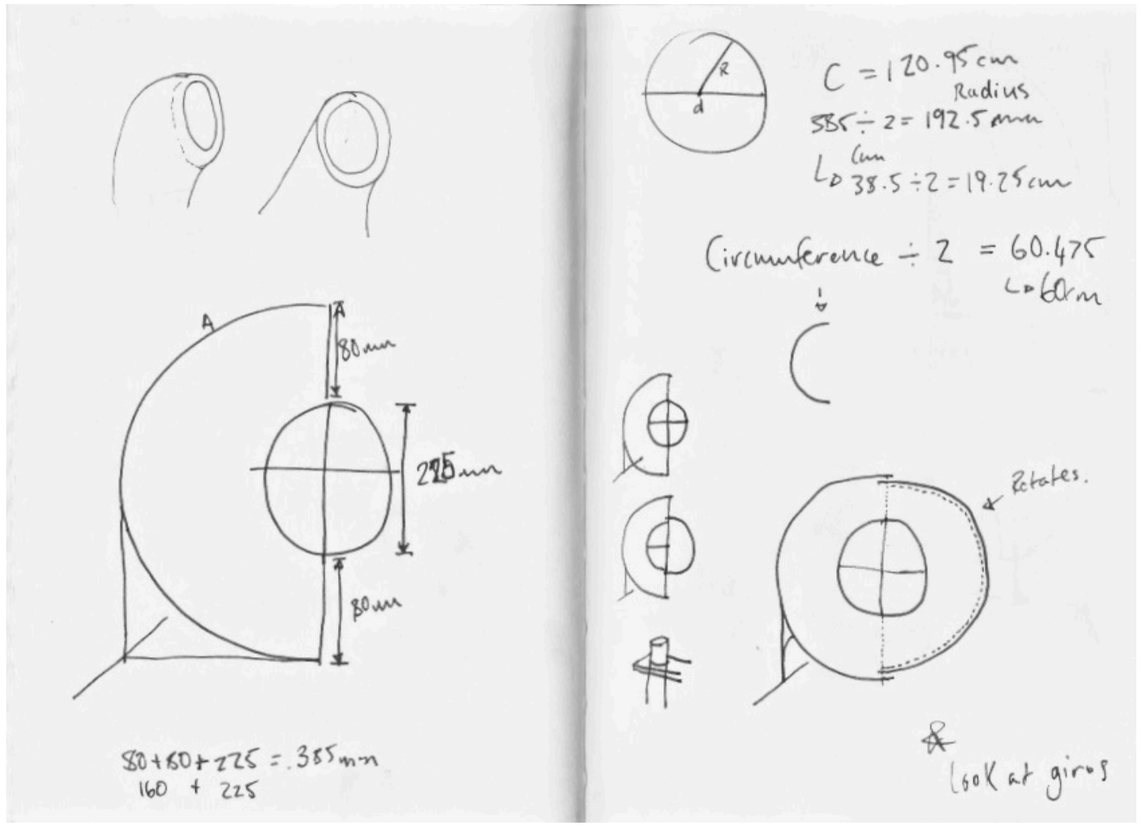
The Didcot power station is a high standing group of structures in a relatively low lying area, this means that light is caught by the cooling towers from sun rise to sun set. The brutal forms of the various structures cause obstruction to the sun when nearby, the shadows created by them are powerful. Using photography to document the obscure shapes and focus on sections where shadows are defined by the textures and structures. I set out looking for inspiration in unlikely places, but what I discovered was purely furthering my documentation methods and creative use of the camera. Which is very important when documenting my own lighting work in fresh new ways.

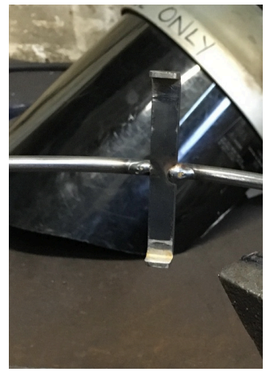
Orbital Light

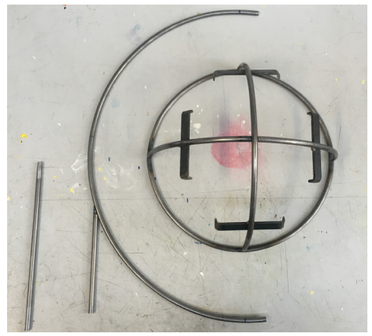
V1 small scale light

This piece manifested itself from constantly playing with mirrors and light effects, the design of the frame work follows the design principles from the Bauhaus movement. Form follows function, which I have followed throughout the project, I chose to achieve the affect I wanted and then proceeded to design the frame work around it. With a lot of consideration to the design, the scale was modelled around the scale of one's head. this makes the size of the piece approachable in a sense that it is ergonomically scaled in correlation to the human body.









The making process involved meticulous measuring and filing, followed by cold forming the full circular and semi-circular rings using metal rollers. Using TIG welding to fabricate the piece meant there was little to no clean up involved in any of the joins. Brackets were added for the stainless-steel mirrors to be pressed into, with the ability of removing them. The middle semi-circular flat bar rotates around the inner core, with the intention of mounting strip LED lights to it.

Designing with ‘You’ in mind

Measurements of man

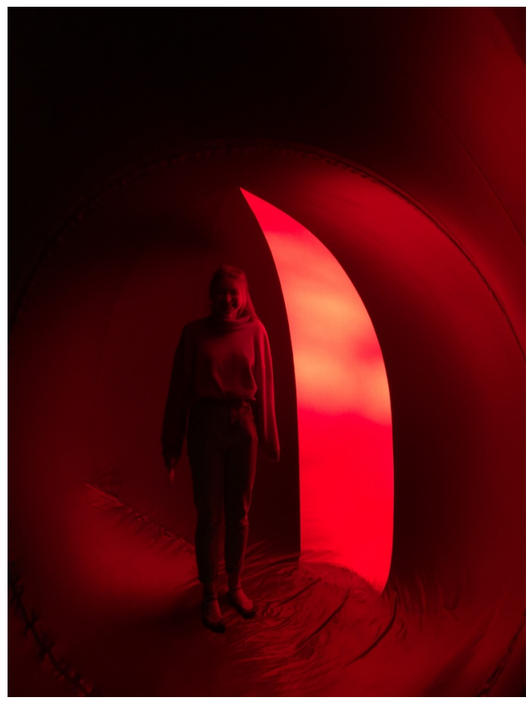
Space + Person = Object

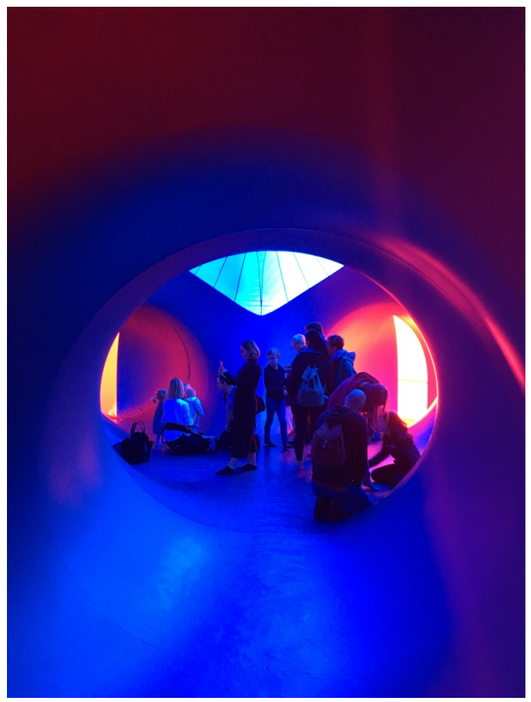
The importance of considering the space and person when designing my lighting pieces has been essential. By looking at my own personal proportions, such as arm span and ratio of head, I can scale the frame work to be a comfortable and approachable size. With each light, there will be an adjustable element, this is integral to the nature of them, in correlation to the way I work with light which involves elements that can change, whether that would be the gentle rotation of a mirror or the angle of the light source. With this fascination of interchangeable elements, the usability must be scaled to a person, because essentially the user will be changing the elements.

By visiting installations such as, James Turrell’s Skyspaces and Luminarium I have exposed myself to spaces that welcome people to inhabit and experience them. These spaces create a feeling of comfort that associate with how I want to portray the lights I create. By achieving this sensory experience in correlation to the scale, considering this is key in making scaled lighting pieces that allow this feeling to be obtainable.

Luminarium

Architects of Air





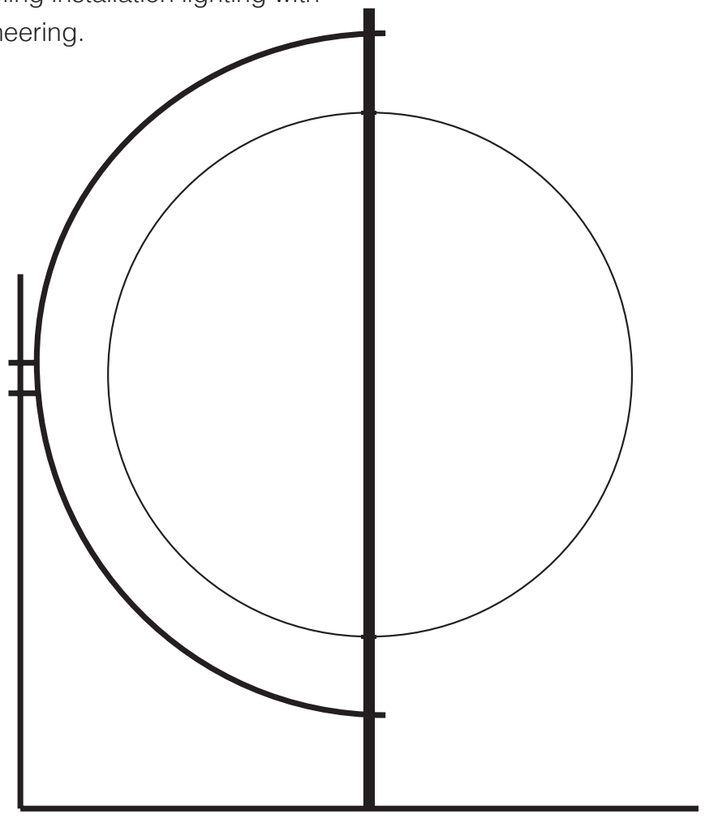
Luminarium is an experience, using natural light to illuminate the interior of the installation through coloured screens. The walkways within are perfectly circular to allow full movement as you walk through, different coloured screens produce ambient spaces for people to inhabit.

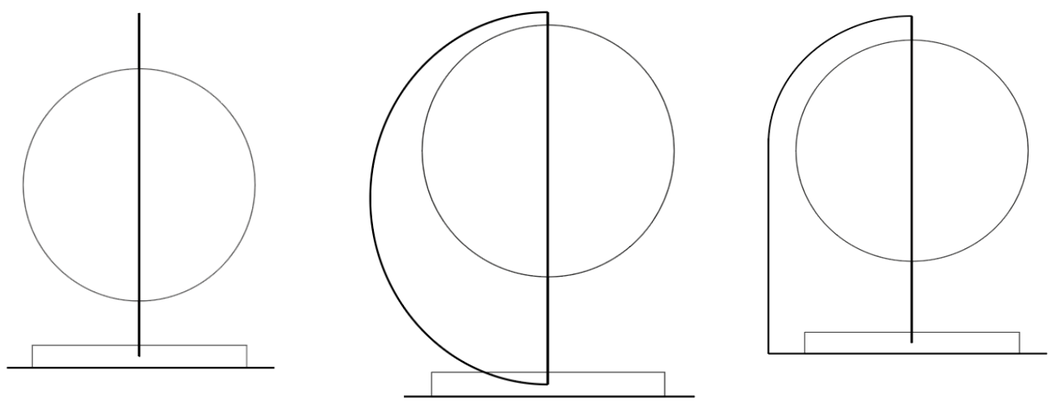
But how does this encompass the measurement of man?

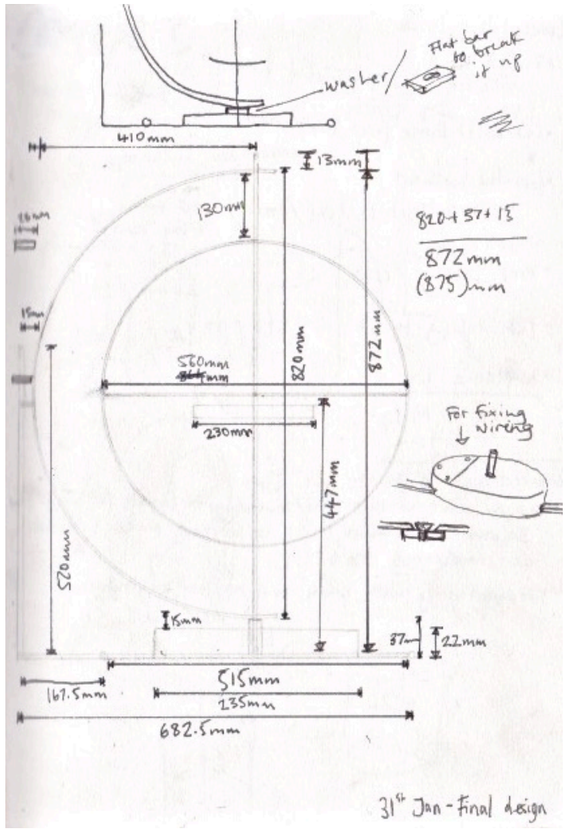
The feeling I got when I was in the spaces, was a sense of warming comfort, each walk-way and focal space was perfectly scaled to house a person. You could stretch and move in the spaces but with a comfortable amount of room, when looking at the simple equation I came up with by combining the two elements together it makes the object scaled to suit, not only the person but the space too.

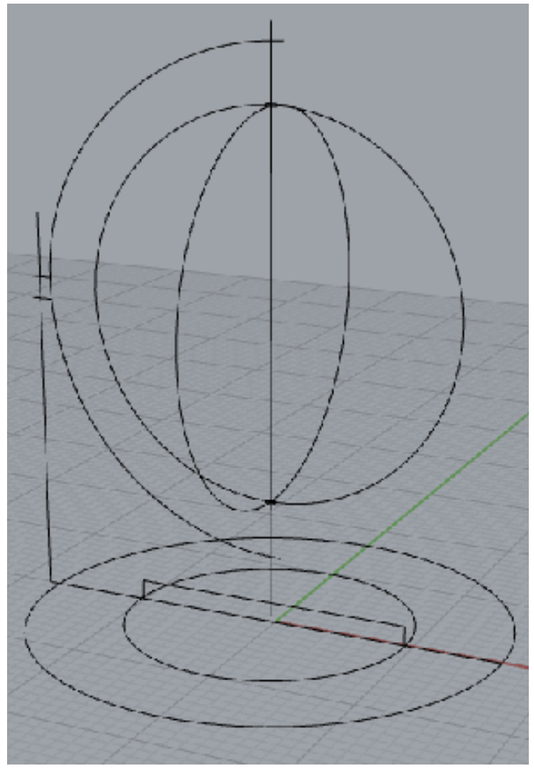
Orbital Mirror
V2 full scale final

With this light sculpture, I set out to create my biggest lighting piece in the series of three. Accumulating the techniques I had developed to make a piece that both produced a certain effect whilst having the ability to move the light around the room. Combining installation lighting with considered engineering.









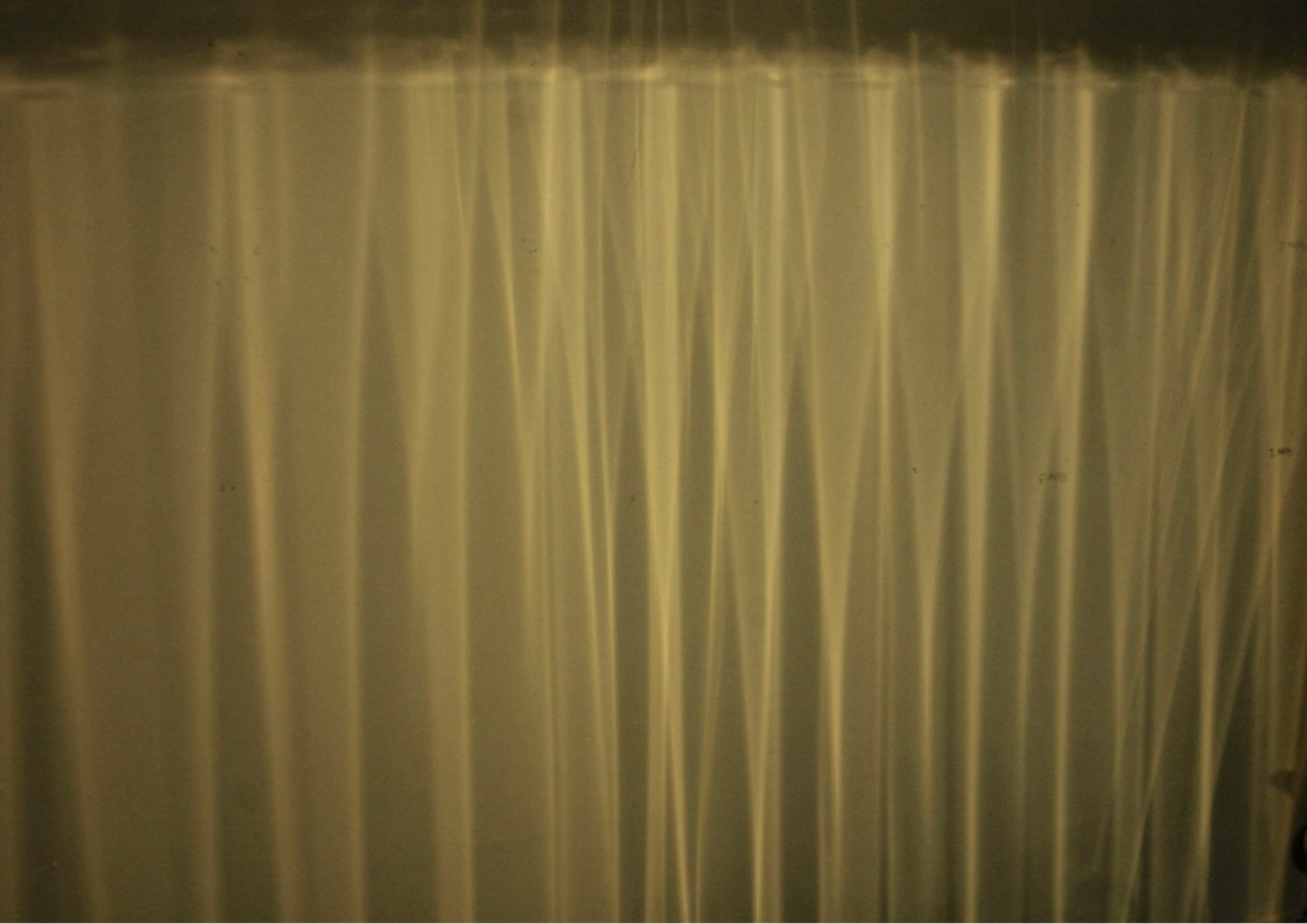
The mathematical equation pie, was thoroughly used to get the measurements for each circular and semi-circular ring. During the process of measuring and cutting the steel components out, the design gradually evolved, taking into consideration variables such as the internal cabling that was needed for the LED panel. The base had to have a removable panel, in the case of any technical problems with the wiring. This meant taping and dyeing lugs to then be welded into the base plate allowing screws to secure the removable panel down.

The mounts for the mirror are removable and resizable, to ensure that the mirror is secured into place due to the rotation of this element. Threading into the flat bar was necessary by taping and dyeing it, with two different sets of holes, for different widths of mirror. Strength was key when having this central rotating element, TIG welding meant I could ensure the strength, whilst having delicately clean joins, using 1.6mm copper coated filler rod.

Orbital Mirror

Mild steel, stainless steel, LED,
acrylic.
870mm x 682mm

Shown at the exhibition, ‘The Matter of Making’, in the ONCA Gallery, Brighton. A collaborative exhibition celebrating the combination of 3D Design and Painting from University of Brighton undergraduates.



Research

Shape of light

Tate Modern exhibition
100 Years of Photography
and Abstract Art

Abstraction c.1924
Jaromir Funke

Documenting light, photography is obviously the main source of documentation method when capturing a certain lighting effect. I heavily use photography to show the specific effects the lighting I create emits, but what if there was a way of documenting light using light?
Going to the exhibition, 'Shape of Light', opened my eyes in regards to ways I could document and capture these delicate and subtle effects. The concept of not only making these light sculptures that create light, but making art works from them and seeing the light effect as a permanent composition. This presented another layer to the project that I hadn't appreciated till visiting this exhibition.

Photogram c.1925
Laszlo Moholy-Nagy

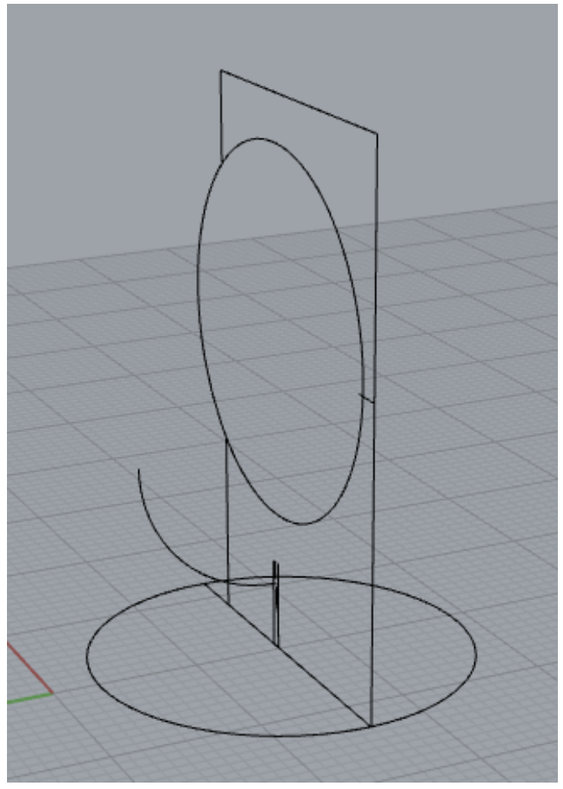
Exposed mirror
Concept

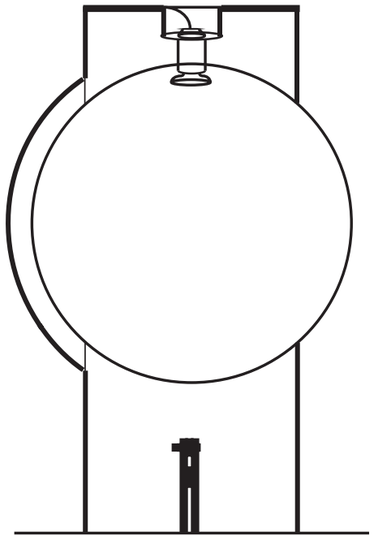
Using paper as a way of capturing the light effect, and making a platform for the exploration of textured metals with mirror finishes.

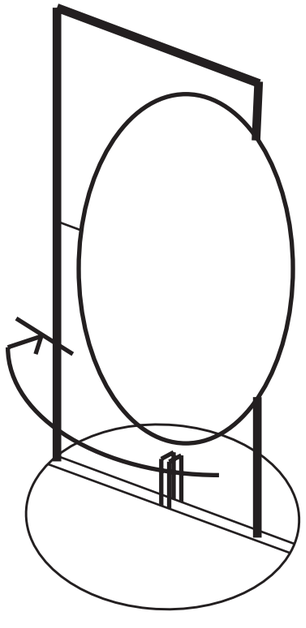
Exposed Mirror designs

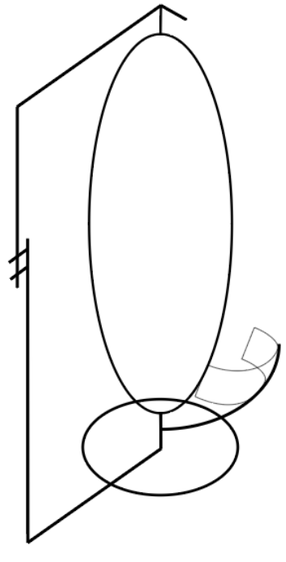
Designing an instrument to catch reflected light and its beautiful shapes.

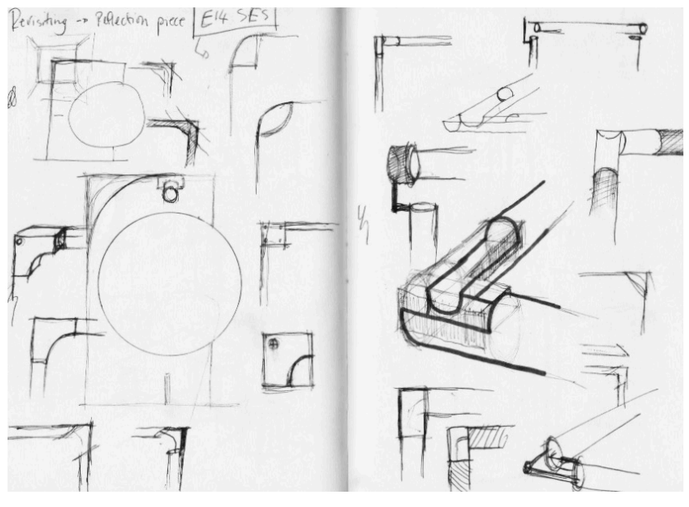
From a series of previous models, I made earlier on in the project, I achieved a certain effect. Where the shapes of light produced from the sections of metal were perfectly crisp, I wanted to reproduce the effect combined with a well-considered frame design that enables the effects to be fully appreciated. Presenting a blank canvas of paper allows for a completely uninterrupted reflection of light produced by the light source and mirror metal.

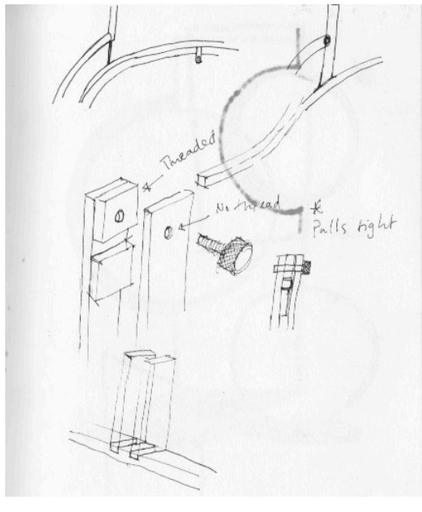




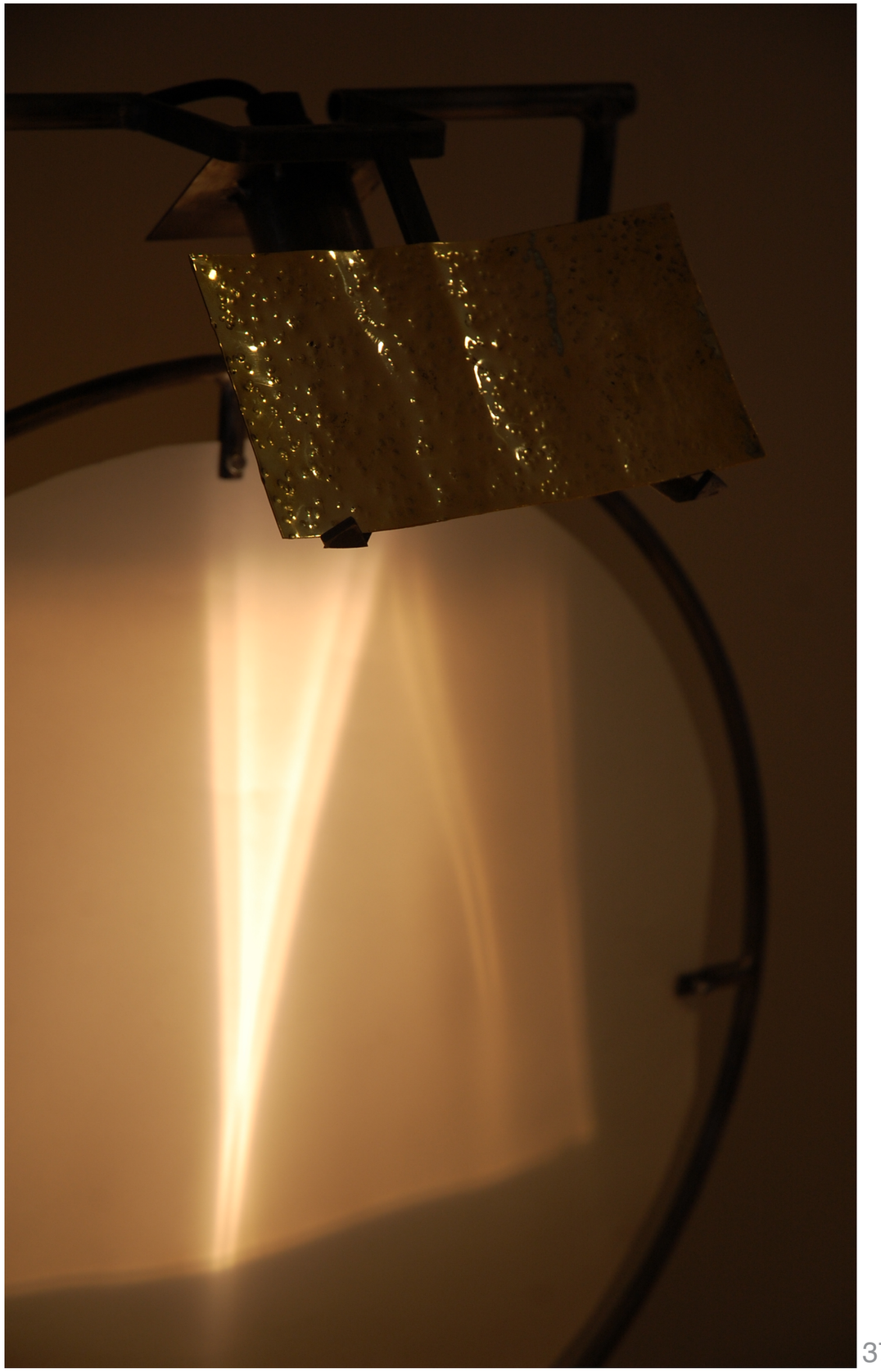








With this second light sculpture in the series, it looks to contain the light effect by using paper to capture it. Working with the mirrored reflectors further, by texturing, bending and warping each surface. To make each surface as reflective as possible finishing them by using the polisher to a mirrored finished.
The metals that have produced the most interesting reflections are copper, stainless steel and gilding metal. Stainless steel seems to reflect the strongest amount of light, the smallest bends and kinks in the sheet metal make massive effects to what is reflected onto the paper. From looking at the Jaipur sundials, the concaved rectangular strip works well as the general shape of the reflectors. The light reflects off and creates the most interesting shapes using this form.



Exposed Mirror

Mild steel, stainless steel, LED bulb, paper.
700mm x 450mm

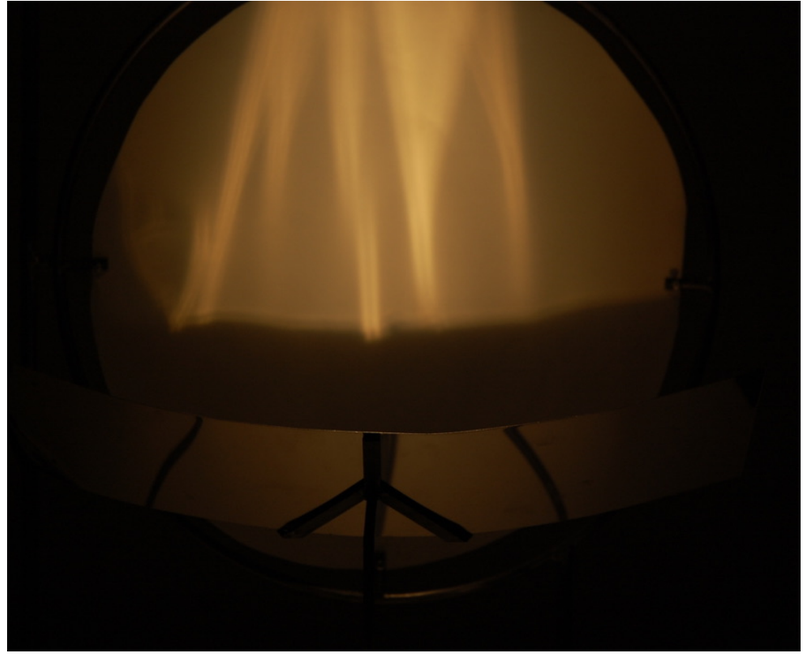
Documenting light using the Sun

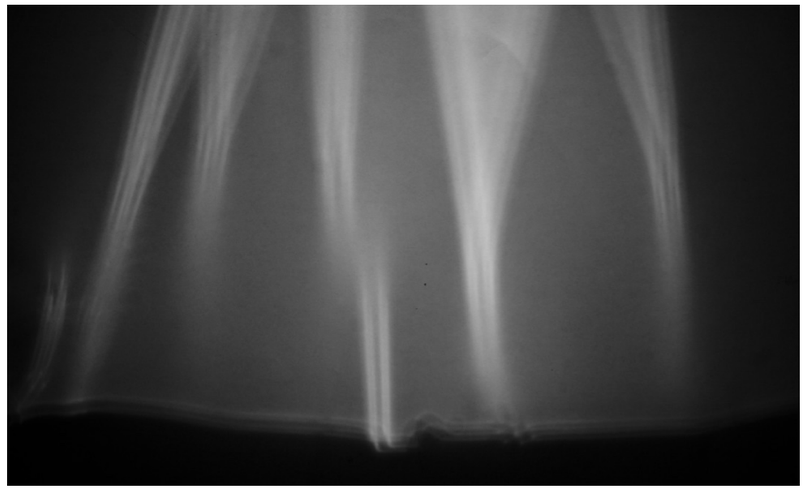
Cyanotype experiments

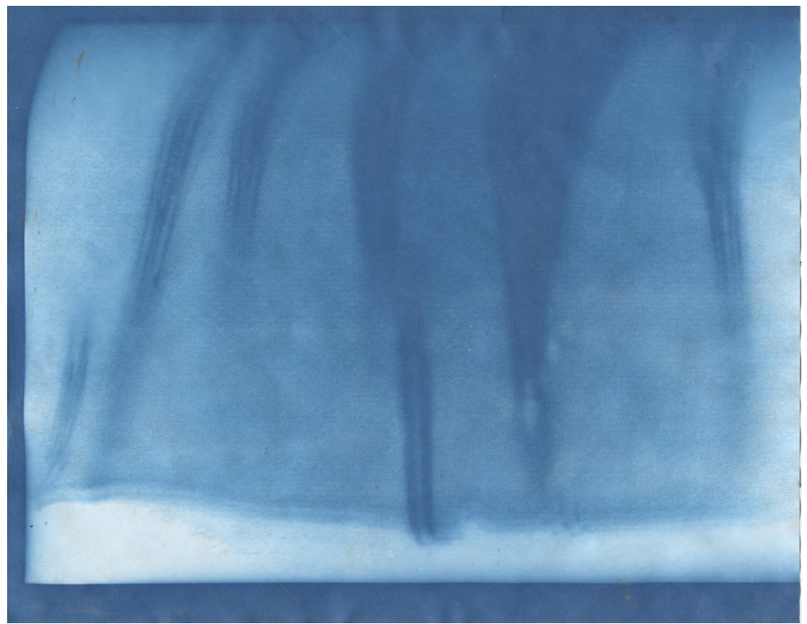
Following on from seeing, ‘Shape of Light’, exhibition, I wanted to transfer these light shapes I was getting on the paper, from my second lighting sculpture, Exposed mirror.

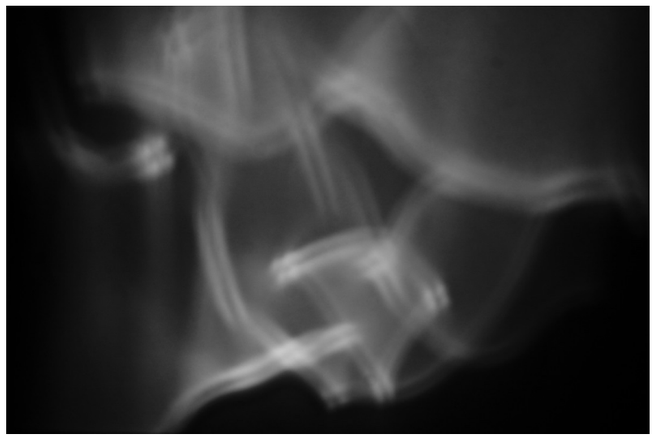
From photographs, I took of the reflections onto the paper, I cropped them and printed each effect onto acetate. Using cyanotype paper, which has a light sensitive chemical coating, I secured the prints to the paper and left in direct sunlight for 4-5 minutes. As soon as I took them inside and removed the acetate I could see the imprint, the next step was to soak them in cold water for 10-15 minutes.

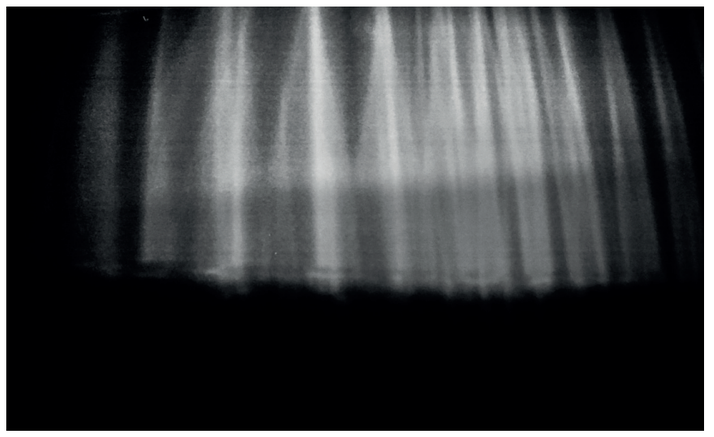
The prints that I have achieved using this simple process are perfectly representative of the lighting effects, that reflect onto the paper. They also form a series of artefacts that sit with the light sculpture.

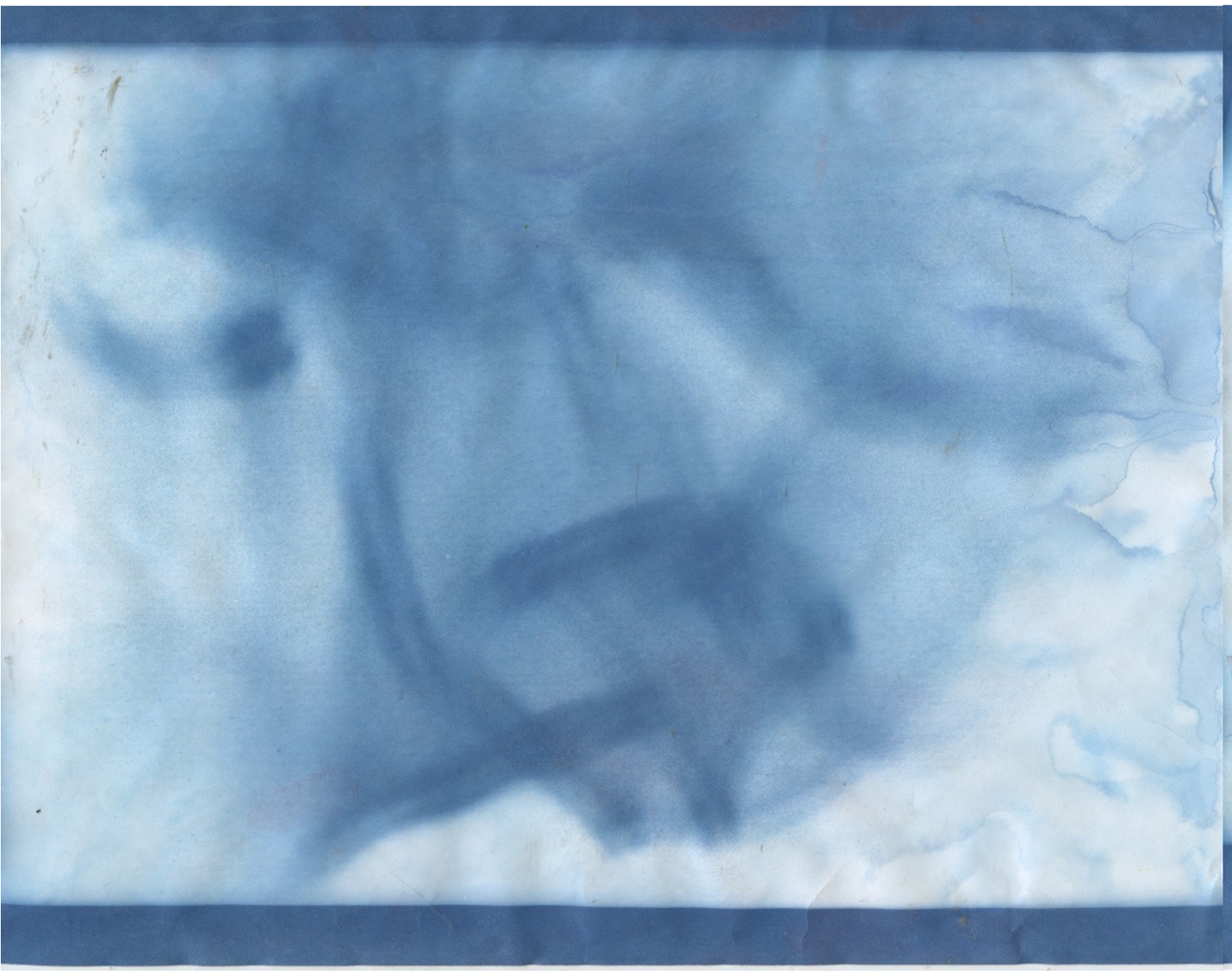


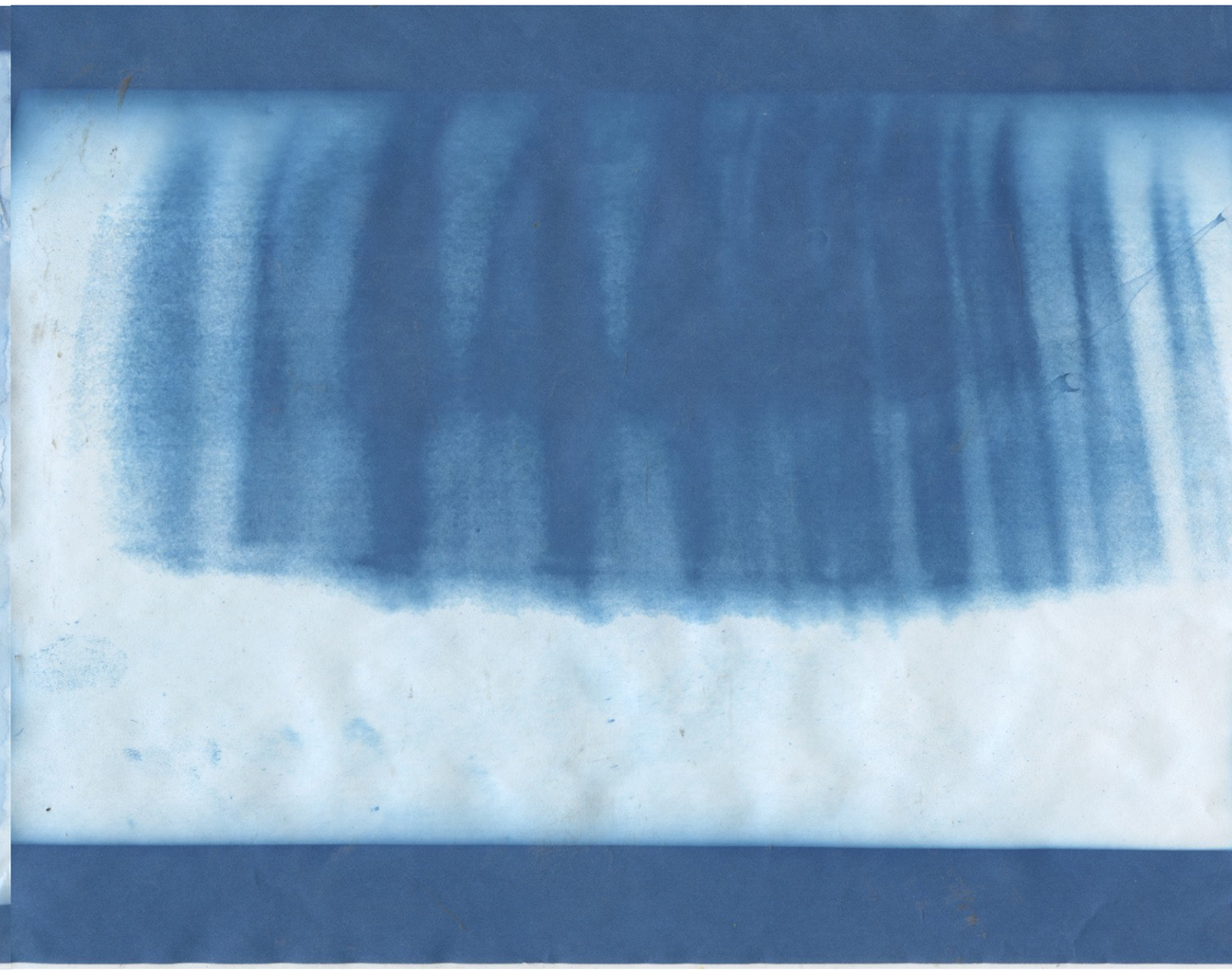




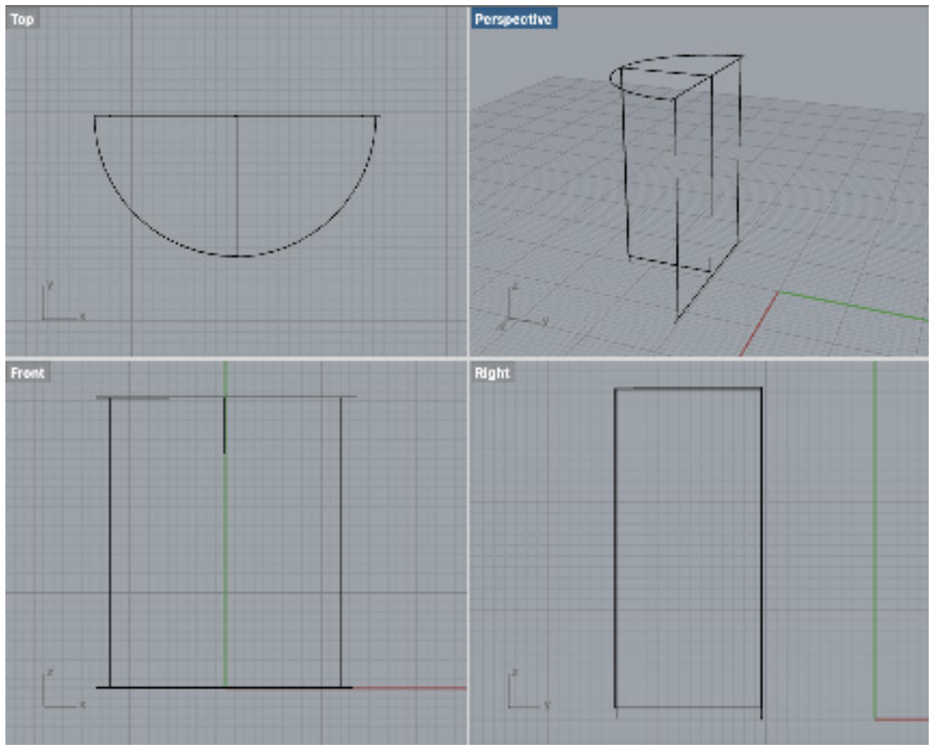


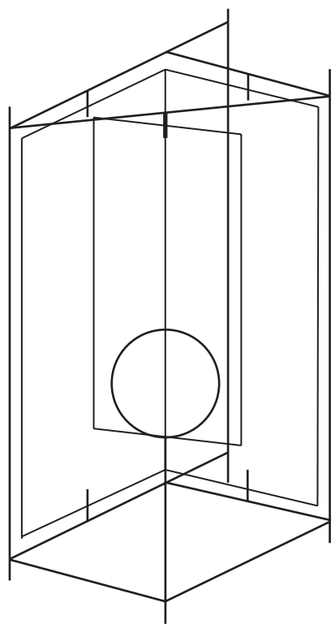


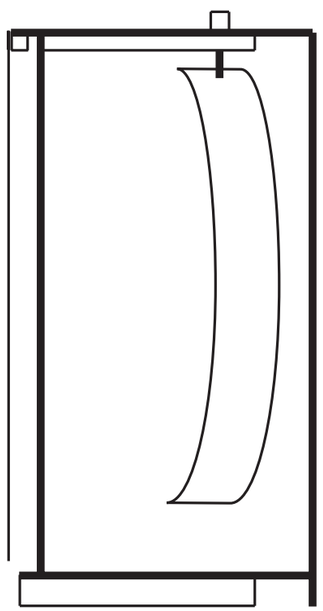


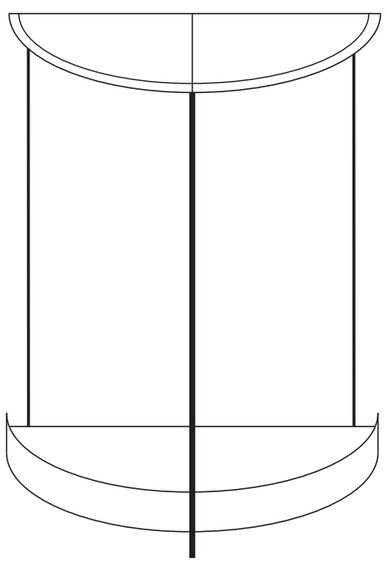


Arc Mirror
Development





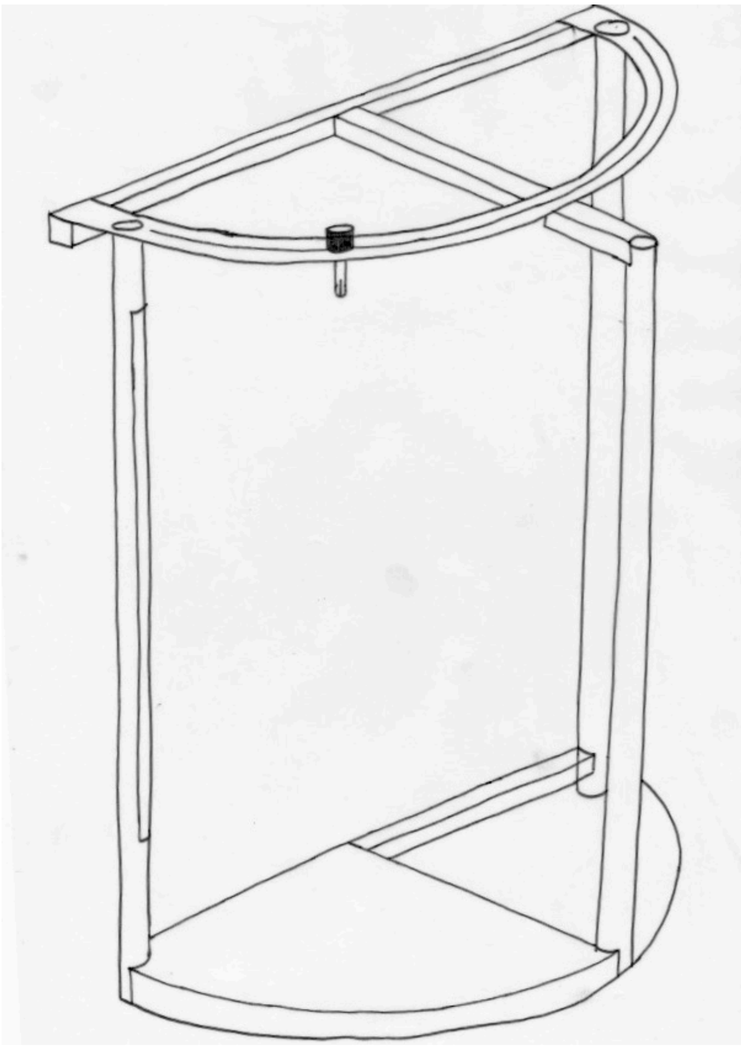


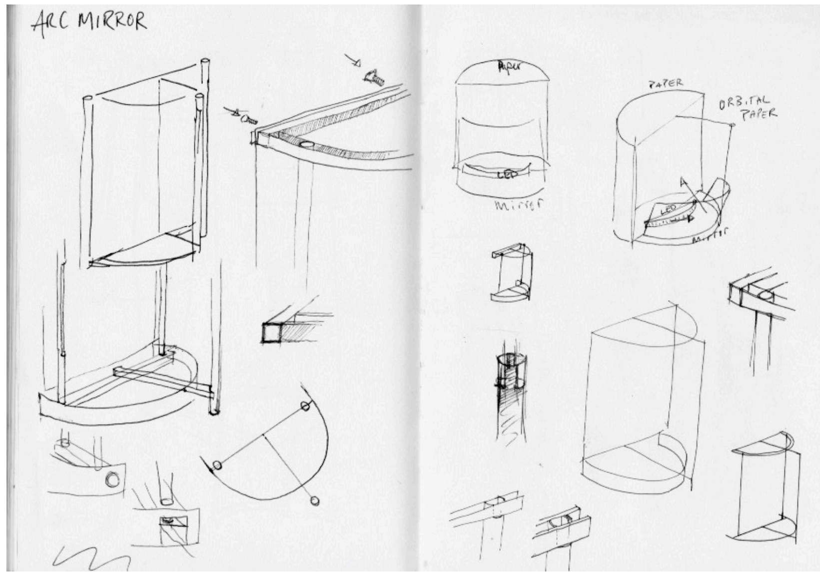


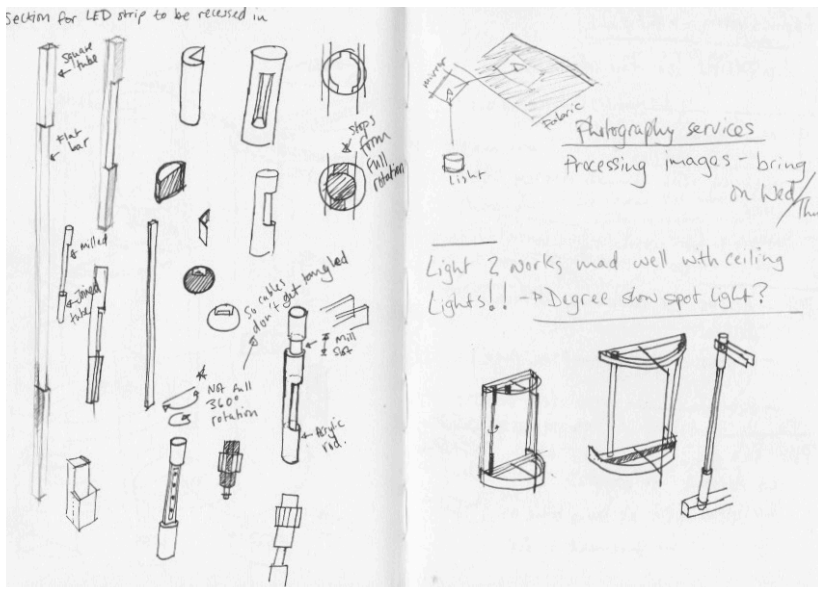
Still Playing

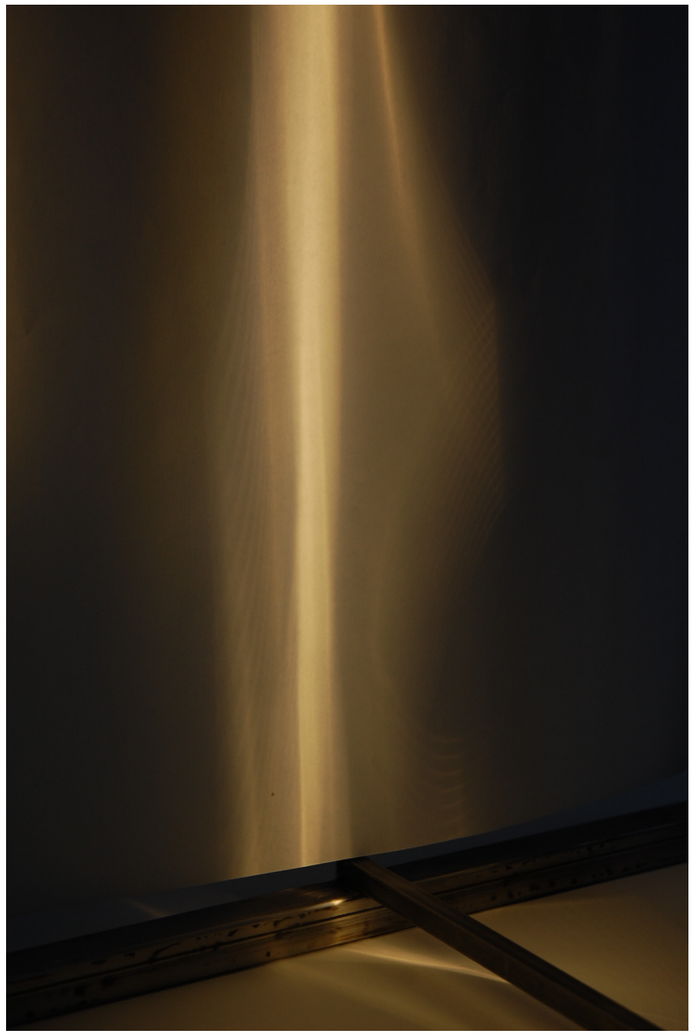
The playful nature of light and how I explore it.

In these tests I was exploring the use of paper to create shadows, I quickly realised it is far more interesting, much like my other lights, that the use of mirrored stainless steel can create amazing reflections as well as shadows.




ARC MIRROR
PAPER
ORBITAL PAPER


Section for LED strip to be recessed in
Photography services
Processing images - bring on Wed
Light 2 works mad well with ceiling Lights!! -> Degree show spot light?

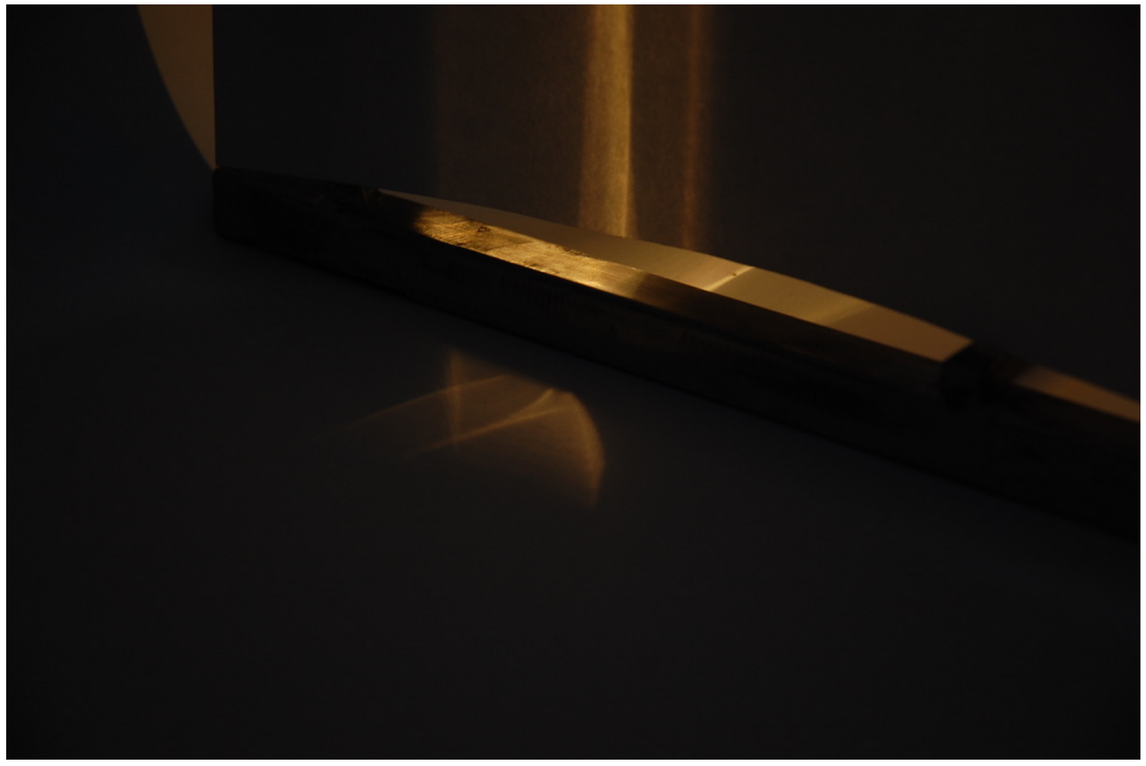


Arc Mirror

The final effect, light is ‘impossible’ to control especially when your bouncing it off mirrors with imperfections, such as bends and scratches. But you know what, that’s what I love about this whole project, creating lighting ‘sculptures’ with a certain level of mystery, I don’t always know what the reflections are going to look like, but I know it’s going to be beautiful in one way or another. Having heavily explored light reflections throughout this project, this final piece within the series perfectly exemplifies this, by curving a 300mm by 450mm sheet of stainless steel the LEDs bounce around hitting every little inch of the mirror creating this delicate strip of light on the paper. Having the ability to rotate and move the mirror around the arc allows for interaction.

Arc Mirror

Mild steel, stainless steel, LED, acrylic.
650mm x 350mm



Reflecting on my project and the evolution it has taken, I feel I have established my own language within the vast sea of lighting design. Along with the making side, I decided early on to focus on fabrication and the joining of metal which has become a true passion of mine. In regards to the reflections of light, pushing the use of textured mirror surfaces has only been touched on and is something I plan on taking much further. I am excited at the prospect of carrying on with this project beyond university.

Photograph (left) by Sofia Christoforou

Orbital Mirror, short film showing the movement of light. Filmed and edited by myself, with sound by Sonny Bacon.
https://youtu.be/lDdMfVfPvYA