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MATERIALIZING LIGHT

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Artificial Light, especially volumetric light can be materialized and transform the existing ruin. Specifically, I would choreograph the interaction between people and light to exaggerate, or dramatize the tragic feeling of Hiroshima Memorial Dome.
Revitalizing the Past

There are things that belong to the past. They contain treasurable memories but no longer fit in contemporary world. There are many ruin sites in major city centers as Tokyo, Rome or Beijing. They are isolated from contemporary urban life, and often being debated whether to preserve it as it is, or tear it down.

The thesis introduces light as a solution to revitalize the ruins while minimizing physical constructions. Artificial light, especially volumetric light can be materialized and transform the existing ruin. Since light is a material in between physical and virtual realm. It can be designed to revitalize the space, while minimizing physical constructions that might damage the historic site. Through revealing, hiding or introducing additional information, the designer can refurbish the past and present to the contemporary.

I Light as a mask of transformation

On the left is a piece of Mark Rothko’s mural painting, the color was faded 50 years after commission, and adjusted with projecting an additional layer

On the right is a 3d version of Rotheko’s mural. It’s the Tribute in Light Installation in remembrance of 911 attack.

Inspired by both approaches, the thesis aims to not only restore parts of Hiroshima Dome’s appearance, but also introduces experiences of laughter and playfulness to lessen the tragedy.
1. The experience of light can be categorized as perception, movement, and interaction.

2. Light can be used as materials to create forms. It can paint a composition on existing walls.

3. In terms of movement, artists UVA has created the installation called momentum, which is an array of pendulums swing back and forth and allows people experience the rhythm and time.

What I find the most interesting is the direct interaction between people and light, as this is what distinguishes light from other materials

1. Light at eye level dispels people from certain area, while the soft light can be inviting;

2. A wall made of light can be walked through, but it can channel the flow of people

3. Mirror effect: strong light projects the silhouettes of human shadows on the wall, creates a stage of people and provokes self-awareness
Dune

Dune is a public interactive landscape that interacts with human behaviour. The interplay of nature and technology is consummated in an array of three-dimensional forms that brighten according to the sounds and rhythms of passing visitors.

Evolved through various contexts, DUNE 4.1 enhances social interactions in the public pedestrian Massentuin, commissioned by Rotterdam City of Architecture. The 60-meter DUNE 4.1 situated on the Manh Truc street in Rotterdam-West uses less than 60 watts of energy. Within this setting, Rotterdammers citizens can enjoy their walk of light. DUNE is an interactive landscape of light placed in the dark. Dying tunnel on the occasion of the 100th anniversary of Sydney. With its hundreds of interactive lights and sounds, DUNE invites the visitor to a labyrinth, a relation to urban space.

Specifications:
2006-2012: Modular system of lights: 100 cm, width 50 cm, variable heights. Hundreds of lights, LEDs, sensory, auditive, interactive software and electronics, variable up to 400 modules.

Line

- A point extended becomes a line: With properties of length, direction and position.
- Associated light resources: light, line, laser

Spazio permeabile

Beppe Berti and Carlo Bernardini play with light and space to create his impressive installations.

"The site-specific installations are based on triangular forms where lines pass through voids, floors, gaps and even between buildings.

Each installation has its own unique viewpoint from which it can be seen as a two-dimensional form, following principles similar to aeronautical illusions.

Your making things explicit

“Normally I don’t think of the words as being about something finite or defined. I think about each as a sentence in a conversation. So I can both inhabit the actual sentence and the broader conversation. With the particular work, your making things explicit, [2009] I was interested in trying to show something we normally do not see. Normally inside the piece there is always the most precious, and the particular experiment was to reverse this: to take the precious from inside and put it outside, and have the glass box contain the spectator. So you are perfectly right when you say that you are becoming a part of this object when you stand in the light of the room. To some extent, I’ve worked with these kinds of experience for a long time now, but it still feels that I’ve only just started. Because there is as in art I can still improve. I can still make it more precise... this sentence.”

Materials: HPL, lamp, bimetal, glass, bay, machine, wood
**Waterlicht**

WATERLICHT is the dream landscape about the purity and poetry of water. As a virtual flood, it shows how high the water could reach without human intervention.

Innovation is a natural part of the DNA of the Dutch landscape through its vision and creative thinking, yet we almost seem to have forgotten it. WATERLICHT is a powerful and poetic experience to remember.

WATERLICHT consists of seven lines of light made with the latest LED technology, software and lenses. Originally created for the Dutch Delta Water Board Rijkswaterstaat, the artwork has now travelled to the Museumplein in Amsterdam, first Echino in Paris, France and MEXCO (Chicago) for Netherlands. WATERLICHT will continue its journey to create more water awareness.

**Line Describing a Cone**

Line Describing a Cone is made from a beam of white light emitted from a thin projector positioned at one end of a darkened room. Passing through the projector is an unframed film of a line, asking line that, when it hits, gradually rises up to become a complete circle. Over the course of thirty minutes the line of light forms the circumference of the circle as a projection on the ceiling while the beam takes the form of a two-dimensional hollow cone. It is transformed into smoke machinery once the beam of light is greater density, making it appear almost tangible.

**Corridor**

Two parallel columns of water are in a completely dark, long room. They are made of squares of water, which fall from the ground floor in a perpendicular shape. The columns of water form a corridor whose ceiling is made of real tiles. The viewer can walk through the corridor across the metal walkway. Smoke lights make the falling shapes of water seem in air. They are formed, through smell, Nona, Feb nominees and even between buildings.

Materials: Metal, water, racecar, hose, pumps, 24 strobe lamps

**Beauty**

A spiral hose sprays a curtain of fine mist from the ceiling of a darkened space through the beams projected by a spotlight. From certain perspectives, a ceiling can be seen in the falling water. It shifts in intensity or disappears as the viewer approaches or moves away.

Materials: Spotlight, water, glass, wood, hose, pump
Plane (illuminated from center)

- A line extended becomes a plane, with properties of length and width, shape, surface and position.
- Associated light sources: LED light, often achieved through casting on real, diverse, smoke, etc.

Volume

- A plane extended becomes a volume, with properties of length, width and depth, form and space, surface orientation and position.

Mirror threshold

For Silke Wolf, photography is a way to explore abstraction and the physical limits of image-making. Her conceptually driven photographic work is defined by ideas of visual perception and metaphor, as in the "horizon" series, where she used the un-expected ends of film rolls as negatives, creating visual bands of color with a dark division between dark and light, or in other pieces utilizing mirrored surfaces to reflect light. Recently, she has begun exploring the human figure, in a series of black and white images that highlight negative spaces as besides pass through corridors, in addition to photography. Wolf works in installation, creating abstract patterns in black and white: maps, dust, printed canvases, and projections on urban environments.

Atmosphere

- The light operating in the space - Stimulates tone or mood of a place.

Feelings are facts

In this project, Silke Wolf introduces condensed banks of artificially produced fog into the gallery, stimulating with an artificial light spectrum, creating a unique experience. The illusion of light and fog creates a new sense of presence, changing, as one walks through the space, the light and sound experience become real.

Corner

- The space in the angle between converging lines or walls which meet in a point.

Corner Shallow Space

A Tunel Corner Shallow Space is created in a corner, where the light creates an illusion of a three-dimensional object. Working out of a small studio in the area of Venice, California in the early 1970s, Tunel began his exploration with projected light, as seen in the documented works below. Setting up a slide projector mounted on the ceiling of the corner via a platform, Tunel gradually experimented with alternative, 35mm slides. Taped off with blackout light in various shapes registered to the geometry of the corner of the studio into its generator. What appears to be a three-dimensional volume of brilliant light.
Corner
- The space in the angle between converging lines or walls which meet in a point.

Corners, Barriers and Corridors
In terms of corner installations, a sequence of four related constructions - entitled by Barnett Newman was solo, 1967 - are on view for the first time since. Rabin's 1967 solo exhibition at the Green Gallery, New York, as an angora of climbing, wall-mounted discs that are converted into a triangle shape in the corner of the room. The work is an example of Rabin's lesser known, circular light utopia - entitled to a man, George Miller's 2 - born 1973.

Mirror
- A reflective surface creates visual illusion of space.

Weather
In this installation, The Weather Project, representations of the sun and sky dominate the sequence of the Turbine Hall. A tree wall penetrates the space, an image in from the environment outside. Throughout the day, the mist accumulates into thick, cloud-like formations, before dissipating across the space. A glance overhead to see where the mist might escape, reveals that the ceiling of the Turbine Hall has disappeared, replaced by a reflection of the space below. At the far end of the hall is a giant semi-circular form made up of hundreds of mirror frequency lamps. The arc, repeated in the mirror overhead produces a spheres of dazzling radius dripping the real space with its reflection. Generally used to shoot lighting, these unique lamps emit light at such a farce frequency that colours other than white and black are invisible, thus transforming the visual field around the sun into a vast aurora landscape.

Materials: Mirrofrequency lights, projector foil, laser machines, mirror foil, aluminium, and acid-fading
There are four different types of light. The ambient light is considered as the most basic form of light. The second tier is projection, or surface treatment, including digital projections, shadow plays, silhouette shows, as well as gobos, which is a dark plate or screen used to shield the lens from light. Essentially projection enlarges designated information, but sometimes diminishes the presence of light itself. The third kind of light is volumetric light, which is also the primary focus of the thesis. Beginning with primitive shapes such as cone and extrusion, designers are able to create more complex geometries.

The last kind of light is animated light, which adds a fourth dimension to space and allows one form to morph into another. I attempt to animate the light through controlling the track of light sources, or controlling the size of cone shape through using oculus. When combining animated light with planar projections and volumetric light, unexpected coherences between mass and rays can be produced.
SHADES IN HIROSHIMA

Genbaku Dome was built in 1915 as an industrial promotion hall, and is the only building survived from atomic bomb. It locates at the northeast side of Hiroshima memorial park. It faces Ota river on its west. It locates in a commercial district and currently surrounded by tourism spots accompanied by restaurants.

The main entrance of the original building is from the west, but now it is protected by fence preventing damage from people.

The remaining structure includes one story wall on its west and east side, free-standing walls contains two cylinder spaces and rectangular volumes. The only part above head is the steel frame dome, and there’s no floor slabs remain. Reinforcing steel frames are inserted to support the structure from a typhoon or an earthquake.

The opportunities I see from the site includes:
1. To reconstruct the front façade with light
2. The building is entered through underground channel to control circulation of people and reduce damages.
3. The open courtyard can be doing ground interventions and covered with mesh to receive light.
4. The path can be inserted through the window openings without touching it.

Shades of Hiroshima are not real shadows, but carbon imprint of human bodies that permanently etched on stones or concrete, caused by the heat of explosion.
SUN STUDY

PLAN BEFORE AND AFTER EXPLOSION
The final design will be tested through

1. Models of both small scale and mock-ups to describe the experiences
2. Pepper's ghost device to collage the physical site model with phantom images.
LIGHT ROOFING

MIRROR ON TOP

INVERSION
I’ve chosen to use screenplay as a tool to describe the sequence of interaction with light. Then the spatial experience can be combined in a sectional view. Design is developed through moving back and forth between the screenplay and the holistic section.
However, you couldn’t find the entrance, it is surrounded with the mirror and you can find only the reflection of yourself in the mirror. When you about to give up, you found an illuminated line on the ground.

The Hiroshima Memorial Dome in the daytime is a ruin representing the tragedy of Hiroshima. After the sunset, there’s something different going on. The broken building seems to be recovered and you can see a new face made of light. The ground is surrounded by mirrors reflecting the city skyline. You are attracted by it and decided to visit.
Walking down the stairs, you reach the reception room. The room is filled with haze. There’s a light source buried in the floor projecting a cone to the mirror on the ceiling. The light reflects and form a mushroom-shape canopy. People all gather under the canopy waiting. You can roughly figure out the size of the room but you decide to get in the canopy as well because it makes you feel safe in space you can see.

After walking along the river for 3 minutes, you see stairs going down very bright.
Suddenly the canopy goes away, leaving everybody in complete darkness. And you feel the room is slightly shaking. Is it an earthquake? You are afraid. As you are complaining how unreliable light is, you hear a voice. Someone calls himself a guide and you are told this is a fallout shelter. What just happened was a bomb attack. "How absurd." You think.

"Follow me!" The guy opens a door at the back of the room. The strong light hit your eyes so bad and you think you will be blind.
You are still covering your eyes with hands. You realized the light is at your eye level. All you need to do is to bow and look down. You discover the stair is painted with mural of the dome.

Behind the door seems to be stairs going down. "You have to live underground in mineshaft until the radioactive elements go away. But don’t worry it won’t be long."
Finally, you now stand on the ground. You are facing a wall. Behind you are people playing the courtyard and there’re shadows projected on the wall. You discover the gravestone at the bottom of the wall, reminding you how thin the line is between life and death.

“People decide to build with light.” The guide explains. “After the attack, they don’t trust any physical materials. Light doesn’t fall on your head. They replace walls with light to define space.” Now you understand why there’s light always at your eye level. As the ceiling becomes lower, you must crawl.
You walk around the building and there're shades painted on the ground marking the corpses. You are terrified at first, until you discover the outline of a Pikachu. “I don’t like bombs at all. They killed my favorite cartoon character.”

Keeping walking and you are literally stand in the façade. There’s a path pierces through the building and you walk on the ramp.
The circulation ends at the scene of emergency staircase. It won’t be functional in a bomb attack, but it is certainly a good stage setting.

Now you are in the dome. The steel frames are coated with LED lighting. There’re core shape balloons floating in air look like a-bomb falling.
THE FRONT FACADE

The Hiroshima Dome along remains a tragic piece during the day; after the sunset, there’s something different going on. The front facade is revived with projection light. Through symmetrical patterns applied on two wings of the ruined façade, the triangular module system re-establishes the wholeness of building face.

YOUR CHANCE ENCOUNTER

Since light is such an ethereal substance that interact with the solids in a unique way, also because the movement of light adds the fourth dimension to the existing, animation appears to be the most appropriate tool that empowers the designers to investigate the complex behavior of light. The animation investigates the possibilities that light can be materialized and transform the physical ruin site.

URL for final video: https://youtu.be/l2sipQ14HAq
THE ENTRANCE

Walking down the stairs, you reach the reception room. The room is filled with haze. There's a spotlight buried in the floor. It projects a cone shape up to the mirror. The light rays reflect back to the floor and create a canopy. There are skylights at the side producing a secondary screen. You want to step inside the canopy, walk around it, and touch the light.

THE ENTRANCE

The ground intervention traces the contour of building shadow from Aug 06, 1945, 8:16 am, when the bombing took place. The openings turn into recessed light buried in the ground. The shadow is represented using black gravel in contrast with soil.
HIROSHIMA SHADES

You now stand on the ground. You are facing a wall. Behind you are people playing the courtyard and there’re shadows projected on the wall. You discover the gravestone at the bottom of the wall, reminding you how thin the line is between life and death.
THE COURTYARD

The courtyard also covered with fog. Volumetric light creates various shapes and spaces. Coincidentally people gather under soft canopies while avoiding stronger light beams. There are trusses hanging spotlights above the head, creating light pavilions for people to rest and talk. There’s a light corridor against the wall formed by an array of light beams.

THE FIREWALL

At the north end of courtyard is the fire stair constructed against the concrete wall. Another layer of fin shape light is added outside of the stair. The fins gently move inward and outward as the concrete wall is breathing.
SHADES ON THE GROUND

Going up on the ramp, here again is a literal reference to Hiroshima shades. Each spot light is a tribute to a life. The transformation of light spots has the same pace of human breathing.

LIGHT FOREST

Walking toward the south of courtyard, there’s a balcony sticks out from the ruin and cone lights project from below. You can lie among the forest of light watching light spots changing their cone sizes.
In the dome are sky lanterns floating in the air, being dragged by strings on the ground. As the lanterns float against gravity, they strengthen the verticality of space. They also lighten the heaviness of the ruin and gives a sense of hope.
Instead of having the bracings cast dark shadows on the wall. They are dematerialized through replacing the shadows with white illuminated crosses.
THE BIRD-EYE VIEW

The ground intervention traces the contour of building shadow from Aug 06, 1945, 8:16 am, when the bombing took place. The openings turns into recessed light buried in the ground. The shadow is represented using black gravel in contrast with soil.