LIGHT: from TOOL to LANGUAGE
Building a new language in architectural lighting

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Abstract. Throughout the twentieth century there has been a constant evolution of factors associated with artificial lighting, which have contributed to the evolution of the architecture to the current situation, where it is necessary to establish a new methodology to incorporate lighting in the teaching of architecture itself.

The architecture, in its constant search for new forms of representation and transmission of ideas and proposals, finds that artificial lighting provides a language capable of creating new images and new spaces with a totally innovative expression.

The transformation of artificial light, functional tool formal language is the result of a long process of technological development and constant exchange of experiences between different technical disciplines, art and culture.

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Key words.

Introdution.

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1. The definition of project lighting ideas

It is necessary to have a specific vocabulary of architectural lighting, which allows us to relate the spatial concepts, perceptual, atmospheres etc. ... with the characteristics of artificial illumination, which are commonly used to explain the luminous qualities that map the lighting project.

Ultimately, it is the expression in words of an idea that should materialize and that shall be expressed in a specific language, proper to the artificial lighting and associated with the conceptual expression from spaces of architecture.

Finally, the allocated lighting ideas, previously, a certain role or category to the lighting used in architectural design**. It can be stated that the main categories are:**

Light as a complement and substitute for natural light

Artificial light designed to complement the natural daylight and strictly quantitative overnight, followed by quantitative trend and seeks to ensure minimum levels to use the space.

If the building is designed formally based on natural light, artificial conditions must follow specific behavior patterns to achieve similar to natural light, both for its complement as for replacement.
Are predominant aspects of efficiency, economy and profitability over aesthetic or artistic concepts, It is especially important to take into account the chromatic properties of natural and artificial light, to avoid perceptual effects "not comfortable" in moments of coexistence of both.

Light as a symbol

From the Primitive symbol of fire, considered as a first artificial light, and through religious symbolism, until the symbol of 11-S Memorial in New York. Throughout human existence, the light has been used to represent deities, myths, fears and desires of man.

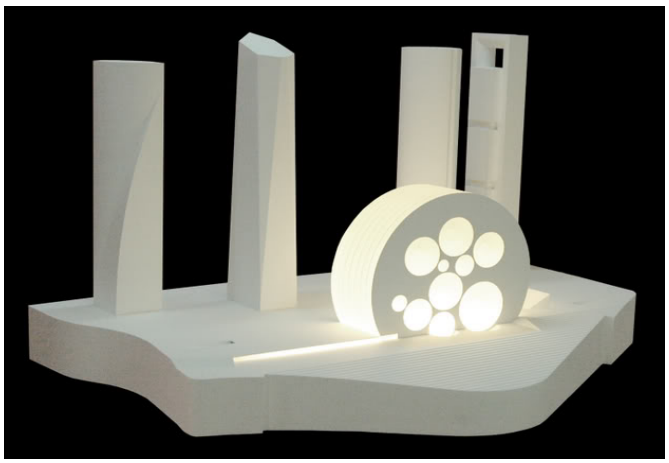
When this light is related to architecture and space that is perceived by the man turns into lighting, composition and qualifying in space, which allows endow the symbolism attributed to a Roman triumphal arch or a Gothic cathedral.

Is an element potent emotionally which has been used for a many symbologies indiscriminately, sometimes even contradictory.

Light as a single element opposed to the darkness of the night will be a continual symbolic reference. The monument called "Lighthouse for peace", held in 2007, on the island Videy Icelandic, is a light sculpture designed by the artist Yoko Ono.
A symbol vertical and infinite, it's visible from the capital, Reyjavik, and symbolizing the concept of "Peace in the world".

The same lighting concept is on the commemoration of the attack on the twin towers in New York, 11-S, 2001, where light symbolizes the two fallen towers.

Also the light is the only existing element in the constructed space of the monument to the victims of 11-M, performed at the Atocha station in Madrid.
The monument is composed of two distinct elements: a large empty glass sculpture inside, placed on the outside and an underground room, placed under the sculpture. Two different elements: one to be seen from outside and the other to be seen from within.
The main ideas of the symbolism of the project are: **lightness, transparency**, and **permeability**, which apply to the construction of cylindrical glass sculpture. While in the lower room are the concepts of **empty space**, **quiet**, **friendly** and **discreet**.



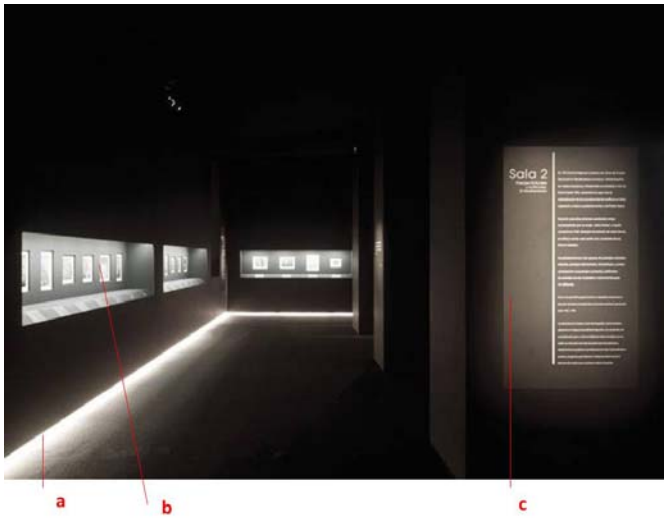
The literalness of the symbolism is on the proposed Mansilla and Tuñón. to realize the setting sun in a building, almost touching the innocence of children, by proposing a round building with large round holes, crystallized into a permanent sunset time, when begins to hide in the horizon, in this case the horizontal basement of the building.

Toyo Ito's idea is that "space becomes metamorphosis of light", born from observing how the hues, intensities and textures that brings the lights transforming the space.
In another example, Toyo Ito explains how the Tower of the Winds, in front of Yokohama Station, use artificial light as a tool (device) to represent the symbol of the "noise present in the air of the city"

Light as information

Light also can be used as an element of visual communication, including aspects of understanding and orientation in space, as introduced by Lam.

An example is lighting Allianz Arena football stadium in Munich. The external structure of stadium consists of 2874 rhomboid metal panels, which can be independently illuminated in white, red or blue.
The resulting illumination information is according to the different colors with the team that is playing: Red FC Bayern, TSV 1880 Blue and white when playing the German selection.



The next Figure shows a photograph of the installation of the exhibition on Escher in Barcelona, where we observed that artificial light gives us different types of information:

A. Information to meet the need of guidance and understanding of the exhibition spaces, consisting of a low light (a), linear and continues situated at the junction between floor and wall.
. A second light (c) which allows visual focus on the sign that gives access to the room and informs us of the content thereof.
. And the third light (b) which allows the collection of drawings without changing its content understanding by introducing aspects of comfort and color quality,

Light as Architecture

The Artificial light, used as a language of architectural space qualifier, is able to convey the ideas of the architecture, according to a high formal and conceptual consistency with the architectural design.

Consider light as an element of the architecture take us to relate the architectural and the lighting qualities and recognize what are the best lighting characteristics associated with a different architectural styles.

Finally I wonder if it is possible to define how should be the lighting rationalist, expressionist, neoplasticist, minimalist, organic, etc ..., that is, if you can review all the adjectives attributed to the light as an architectural style attributes.

I will put some examples to exemplify the previous concepts.

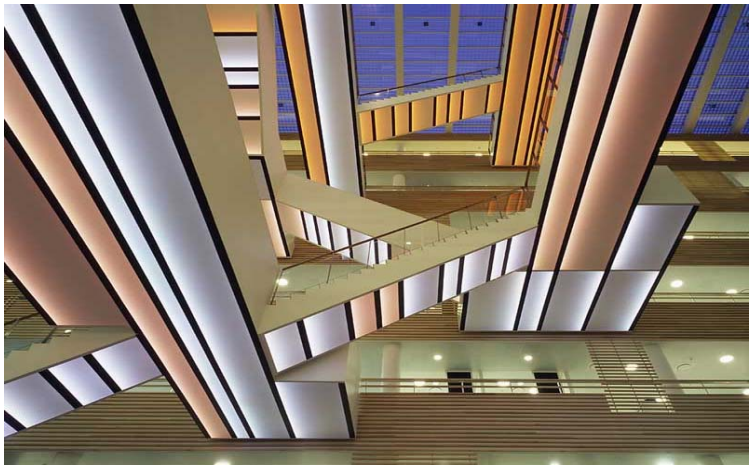
Expressionist lighting

Expressionist lighting is characterized by the visual occultation of the luminaires, the appearance of light is always associated at the surface elements of the space. Where walls, floors, walls, etc ... and space, are illuminated by the configurator elements themselves. The light appears as a reinforcement of the rhythms and geometric modulations.

The qualities of light are participants in the qualities of the materials in which it is reflected. The use of light and color is secundária and has the color value through reflection of light on the surfaces of the space. The material hierarchy imposes their color at the light.

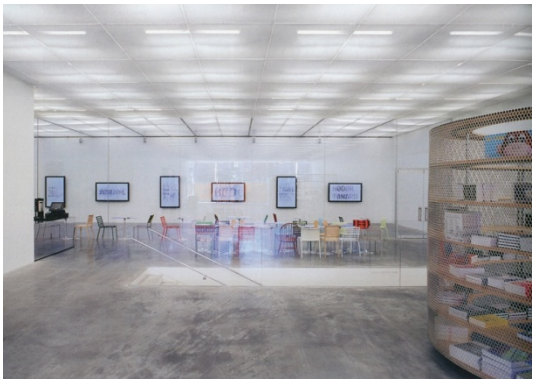
Neoplasticist lighting

The neoplasticist light is fragmented, subject to a geometric configuration which defines its provenance. The lights colors use and the geometric games, for example in painters like Mondrian, becomes one of the main elements setters.

Functionalist lighting

When the lighting distribution is based on criteria that cater solely to meeting the quantitative requirements, without considering aspects of formal reinforcement definition or space on the areas known as "Working areas", we can say its "functionalist".




The functionalist architecture arises as a basic parameter of the architectural configuration. Similarly functionalist lighting serves to fulfill the main lighting needs.

Art Deco lighting

The art deco Lighting could be characterized by using filtered light through translucent surfaces, with the presence of color. General lighting is diffuse and global, without the presence of light headed or accent lighting. It's homogeny and a bit directional and the chromatic surfaces acquires prominence.


Impressionist lighting

Lighting with an apparent visual expression of the light sources, with a bright lights and an accents, where the lighting system is integrated into the formal design of the space. The luminaries are visible and they have an important visual presence.
We could continue with the definition of Deconstructivist lighting features, Rationalist, Organic, Conceptual, Hig-Tech, etc...

As a result of lighting proposal the observer has a perception of space, subject to different levels that allow analysis the lighting with formal and aesthetic component, as the following table:

. Structural or Relationship
- .Structural Reinforcement
- .Space reinforcement
- .Architecturel reinforcement

. Expression or aesthetic
- .Stylistic consistency
- .Color consistency
- .Own perceptual effects

. Emotional or psychological
- .Feeling emotion

They are tree different levels, and everyone has different parts.

RELATIONSHIP OR STRUCTURAL LEVEL

At this level are put in relation the characteristics of space and lighting, according to their structural and organizational aspects. Thus we find that this reinforcement may involve three different concepts such as: the structural, the architectural and the space.

Reinforcement structural

Often supported physical and formal structures, that coordinate space, have a very important role in the perception of space and its own definition. A task lighting to accentuate, consistent, will emphasize in these aspects of the space (centrality, rhythm, inclusiveness, diversity, etc. ...).

Space reinforcement

The spaces have a hierarchy, Khan organized the spaces served and servers for example. They are unique Spaces, dynamic spaces, vertical spaces, extensive, circulation spaces, work spaces, open spaces, fractional spaces, etc., ... the Space reinforcement lighting could be according to the above criteria, and reinforcing them

Architectonic reinforcement

The lighting contribute to understanding the global language of the architecture of the space, how it is organized, formal hierarchy, functional etc ...

ESPRESSION OR AESTHETIC LEVEL

At this stage assesses the degree of relationship between the chromatic color space and light, considering aspects of perceptual coherence.

Stylistic coherence

The lighting in the Seagram Building by Mies, emblem of his concept of "less is more", requires a unique lighting, simple and categorical, using the ceiling light as a metaphor of a theoretical uniform sky (just as it does in the glass house prototype).
Mendelsohn expressionist architecture in Universe cinema, or the Schöffler in Tatiana Palace, need lighting that express the material bathed in light on surfaces.

HOTEL SILKEN PUERTA AMERICA (MADRID) © FOTO RAFAEL VARGAS

The rationalist architecture by Le Corbusier needs a directional component lighting, which emphasizes the volumes with light contrast and cause the presence of harsh shadows.

When we talk about "style" refers to both the language of light as energy as light system treated as a formal element in the composition of space.

Colour coherence

We Talk about color coherence when there is a match between the chromaticism of the environment and of the light produced by the lighting **system**.

Own perceptual effects

When the artificial lighting with lighting systems presents a formal independence, aesthetic and even functional on the space.

EMOTIONAL OR PSYCOLOGICAL LEVEL

At this stage we evaluate the psychological and emotional feeling predominantly produced as a result of space joint interaction between it and the light.
This would be referred to the sensations related to biological needs studied by Lam, but also the emotions and pleasure related to cultural understanding, architectural, emotion, provocation architectural and color, etc…

The Professor John Flynn, in 1973, he did a study of how lighting affects printing space of the user, evaluating five categories of analysis: evaluative, perceptual clarity, spatial complexity, breadth of space and formality.
Subjective Sensations Space Flynn study results were grouped into 6 groups:

SENSATION	LIGHTING SYSTEM
Spacious	uniform distribution with some perimeter lighting
Intimate	lighting Low levels of active spaces with light areas on the periphery and darker between the two
Tense	top Direct illumination uneven
Relaxed	non-uniform distribution with some lighting perimeter lighting and less overhead des
Placer	uneven lighting with a combination of perimeter lighting from a
Featured	intense and uniform illumination on the working plane with lower horitzontal perimeter lighting

In this line we explain briefly a work by students of the ETSAB, in different spaces of the School of Architecture of Barcelona, in which students had previously defined the emotions or feelings that the lighting proposed by them , should convey.

The emotions that were proposed as basic in opposite pairs were related and were the NEXTS:

. Calma - Excitation, Introversion - Extraversion, Privacy - Public, Dinàmic - static voltage-Serenity, Limited-Unlimited, Chaos-Order

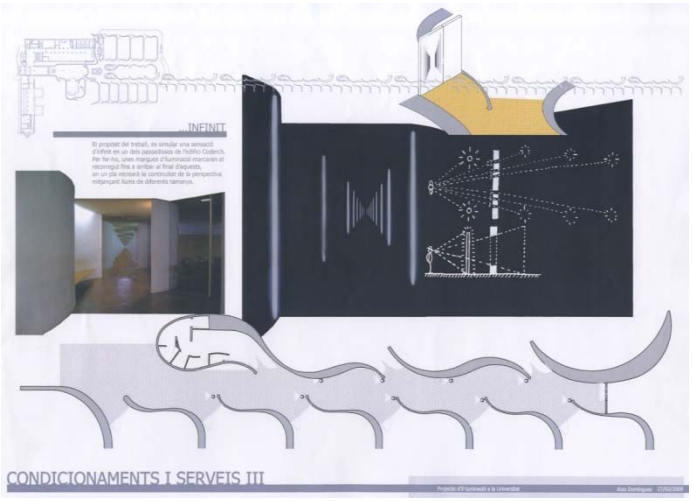
This work arose in the beginning of the course, without which have made lighting lectures and had intended to see what will preconceived relations (accepted without specific training and architectural lighting) between lighting and emotions, resulting in the following jobs, which can be obtained some interesting conclusions.

Lighting proposals that intends to achieve sensation-RELAX SERENITY

Proposed lighting to give the feeling of EXCITEMENT

Proposed lighting to give the feeling of CAOS-DISORIENTATION

Proposed lighting to give the feeling-UNLIMITED LIMITED



Of the various proposals and analyzing their approach lighting could be able to define common parameters for each of the sensations, so as to facilitate the association of emotional and spatial sensations with specific lighting proposals, to serve as a guide to approaches previous projective .

MAIN CONCLUSIONS

Lighting proposals

RELAX-SERENITY

. Soft lights and homogeneous
. Not exciting colors (blue, green), one color
. Lighting reinforces the space
. Illuminated surfaces

EXCITEMENT

. Localized lighting
. Variable directional, intensity,
. Lighting contradicts space
. Hot colors
. Important presence of lighting

CAOS-DISORIENTATION

. Lighting breaks the space
. Lighting looking opposite effects
. Opposite colors can be used

UNLIMITED

. Lighting cannot perceive all space
. Very low levels
. Color is not important
. Lighting refuses visual continuity of space