

ARCHITECTURA SINE LUCE NULLA ARCHITECTURA EST

On light in Architecture

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La Idea Construida, Madrid, 1996

RT. Rivista Tecnica 3 – 98, Lugano, 1998

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"God said: `Let there be light`. And there was light. And God saw that light was good. And he divided light from darkness. He called light day and darkness night; and there was afternoon and morning. Day came first
"Genesis".

The first written word of God.

"I traced the form of my transit, not with ideas nor stones, but with air and light."

Octavio Paz: "Sons of the Air"

LIGHT IS MATTER AND MATERIAL

(On the material nature of light)

When at last an architect discovers that light is the central theme of architecture, it is then when he begins to understand something, starts to be a real architect.

Light is not something vague, diffused, which is taken for granted because it is always there. The sun does not rise every day in vain.

Yes, light with or without corpuscular theory, is something specific, precise, continuous, a matter of fact; measurable and quantifiable matter, wherever it might be, as physicists well know and architects seem to ignore.

Light as well as gravity is something unavoidable. Fortunately unavoidable by architects since architecture definitively moves through history thanks to those two primitive realities, light and gravity. Architects must always take a compass and photometer (quality and quantity of light) with them, just as they carry a metre, level and plumb line.

If the fight to overcome and convince gravity continues as a dialogue with it, giving rise to the best of architecture; the search for light and the dialogue with it is what makes common dialogue reach the most sublime heights. One then discovers the necessary coincidence that light is the only one which can truly overcome gravity.

Thus, when the architect traps the sun and the light, having it pierce the space formed by more or less weighty structures, that need to be joined to the floor to transmit the primitive strength of gravity; light breaks the spell and

makes that space to float, to levitate, to fly. Hagia Sophia, the Pantheon or Ronchamp are tangible proofs of this portentous reality.

Light in architecture has as much materiality as stone. We think and write that the Gothics accomplished marvellous sorcery with it making it work to its utmost possibilities to reach light, more light. Properly speaking, we might think and write that what the Gothics did was to work with light as matter. Since they knew the sun shine in diagonally, they stretched their windows, they raised them to be able to trap those diagonal, nearly vertical rays knowing already what would be possible nowadays. More than organizing stone to trap light we might see gothic as a desire to organize light, material light to provide spatial tension.

We know that matter cannot be created, or destroyed, it is transformed. That is why, instead of modern materials, we should rigorously speak of materials used in the modern sense, it brings centuries of reflection which we enjoy decanting. As always, when all is said and done, it is a question of thought, of reason.

Thus stone, that old rock was transformed into the most modern of materials in the hands of Ludwig Mies van der Rohe. Steel and sheet glass were not born out of nothing. These two materials which have revolutionized architecture have always been latently there. Nowadays, conception of new ideas makes them able to produce this spatial miracles.

Could we then consider that the clue is found in a profound understanding of what light is as matter, as material, as modern material? Could we not understand that the moment has arrived in the history of architecture, this tremendously exciting moment when we must confront light? To grasp light; to dominate light; let there be light! and there was light. The most eternal, the most universal of materials is thus erected as the central material to build with, to create space. Thus the architect again recognizes himself as the creator, as the master of the world of light.

"The splendor and brilliance of the stone that apparently seems to shine only thanks to the SUN are the first in bringing the silence of the sky and the darkness of the night to the light of day. THE SOLID SPROUTING OF THE TEMPLE MAKES THE INVISIBLE SPACE OF AIR VISIBLE"
Martin Heidegger. "The Origin of Artistic Forms"

SINE LUCE NULLA!
(On Light being the central theme of Architecture)

When I propose this axiom "Architectura sine luce nulla architectura est" I am saying that nothing, no architecture is possible without light. An indispensable material would be missing.

If I were asked for three recipes to destroy architecture I would suggest covering over the central opening in the Pantheon dome, to wall up the glass block façade on the Maison de Verre or to close the coloured openings which illuminate La Tourette chapel.

If, to keep rain and cold from entering the Pantheon in Rome the nearly nine meter diameter central opening that crowns it were to be covered over, a lot of things might or might not happen; its skilful construction would not change; nor would its perfect composition; nor would its universal function cease to exist; nor its context; Ancient Rome would not know it (at least on the first night). The only thing is that the most wonderful trap that human beings have ever laid out for sun light every day, to which that regal heavenly body would joyously return day after day would be eliminated. The sun would break into tears and with it architecture, since they are some what more than just friends.

Many things would happen if the grandson of Doctor D' Alsace had walled up the façade of the La Maison de Verre for security reasons. Or they might not happen. Its construction would remain untouched. It would continue to function with good electric lighting, without a problem. Paris, its context, would not know about it, even after the first night as La Maison de Verre is a private scarcely accessible place. All that would happen is, that it would destroy the most wonderful container of clear and diffused light, which achieved its splendour thanks to that subtle and precious glass block mechanism, without allowing to see or being seen, allowed light to pass through after transforming it into pure glory. Darkness would overcome it, and Architecture would plunge into utter sadness.

If a new dominican monk from La Tourette in search of greater concentration were to cover up the few cracks and holes in the convent chapel many things would happen or cease to happen. Its strong construction would not change. Its composition would remain untouched. Its sublime functions would continue although more "concentrated" perhaps by candle light. No one in the surrounding area would know, or they would take a long time to do so. Only the alarming stillness of the pigeons alighting there after their flight would eventually inform the peasants of the sacrilege perpetrated there. The more than concentrated space would have darkened and the monks would see with surprise how that luminous Gregorian chant would refuse to leave their throats. The monastery and architecture with it would have penetrated dark night.

Covering the central opening in the Pantheon dome, walling up the Maison de Verre glass block façade and patching up the cracks on La Tourette Chapel would mean we had put an end to architecture and history with it. And the sun would not want to come out again; whatever would it want to for? The fact is that architecture without light is nothing and less than nothing.

*"More light!" Goethe said, laying on his death-bed. He sent his daughter-in-law Otilia to open the windows before closing his eyes forever.
Johann Wolfgang Goethe. The last words of Goethe before his death.*

LIGHT TABLE

(On accurate control of light)

Lorenzo Bernini, a light magician among all those there are, made his own tables to measure light accurately, which were very similar to those now used to calculate structures: meticulous and precise. That master knew that light may be measured and classified, as all matter that is evaluated, and may be scientifically controlled.

It was a pity that on his return from that tiring and unfruitful trip to Paris to try to make the Louvre, his young and absent-minded son Paolo should have lost them. On the 20th of October 1665, Bernini was quite relieved to leave the City of Light which had treated him so badly, and to his horror, he realized he did not have his tables, which were more valuable to him than the Law itself. Searching gave no results. Chantelou, the punctual and punctilious chronicler of that French trip left everything related to that unfortunate accident out of his detailed narration.

It is known that, many years later, Le Corbusier was able to obtain some of the key pages of that valuable manuscript in a second hand bookshop in Paris, and that he knew how to use it cleverly. Thus he was also able to control light with such precise precision.

However, light is more than a feeling, although it is capable of moving men's feelings and making us tremble in our innermost being.

To change the small diameter of the skylights in the bathrooms of the Alhambra making them smaller or to change the height of the horizontal superior plane of that "continuum" which is the Farnsworth House making it larger would be sure formulas to destroy two brilliant pieces of our Culture. This is because continuous space, and the Farnsworth House as its paradigm, is also a matter of light. The break in tension produced by doubling its interior height would not be so much an error of dimension or proportion but a break with the clear and exact amount of light, of transparency which makes that space has something that speaks with certainty of continuity of space, achieved with such great effort by the Modern Movement. It took Ludwig Mies van der Rohe many long years to build such a valuable piece. To achieve that difficult continuity of continuous space, it must be controlled, its dimensions and proportions dominated so they can be efficiently swept by light.

"The temple, (the Pantheon), open, secret, was conceived as a solar sundial quadrant. The hours would turn in the middle of the floor which carefully polished by Greek artisans. The disk of day would lie there like a golden shield."

Marguerite Yourcenar. "Hadrian 's Memories"

THE FIRE TEST

(On different types of light)

We have already talked about the seduction of the Maison de Verre due to light, and how dark it would be with everything else intact: construction, composition, function, and context but without light it is nothing and less than nothing but, can you imagine that Doctor D' Alsace's grandson, tired of so many visits and thinking little of the amount of divine light, decided to change the great glass block wall for a technological and transparent curtain wall with the biggest and flattest sheet glass existing on the market? Many things

would happen this time, perhaps too many. They would go inside, they would go into that already distended space into all the ugliness of the Parisian courtyard in which it is immersed.

To avoid this, looking at the disastrous results, it might occur to him to use the Gothic windows taken out of the demolition of St. Denis church, things would take on another tint, or rather, other colours. The invasion of angels with trumpets and biblical characters on newly painted fabrics would keep out the view of the bare courtyard and would change the well known space into pure celestial glory of a thousand colours.

Thus this identically dimensioned space, with the same construction, use and context have paraded in our imagination dark at first, very clear later and finally gloriously coloured; three different spaces and one true space, the original.

Changing only one material, light; changing only its quantity and its quality.

The architect of the Maison de Verre, Pierre Chareau, used light as a material, knowing that it had to be given a physical definition. To say light as well as stone is to say almost nothing, that is only the beginning. Of course most architects never leave this first period of definition, which explains the results they achieve.

There are many kinds of light and we shall speak about some of them now.

In olden days, when people needed to take light from above, they could not do it because if they made openings in the roof, water and wind and cold and snow would come in. It was not a case of dying to obtain that light. Only the gods in the Pantheon dared to do it. In their honour, Hadrian had that lofty architecture raised. Premonition of the achievement of vertical light.

Thus, throughout the length of Architecture's History light has always been horizontal, taken horizontally, piercing the vertical plane, the wall, as it is logical. Since the sun's rays fall diagonally upon us, a great part of the history of architecture may be read as an attempt to transform horizontal or diagonal light into light that might appear vertical. This is what was achieved in the gothic, which may not be understood as just the desire to obtain the greatest quantities of light but, fundamentally, how to obtain the most vertical light in this diagonal matter.

In this way during the baroque period they tried to twist light with ingenious mechanisms to convert horizontally taken light into a light that would appear, and could upon reflection sometimes be vertical light. With one more step

more verticality than that obtained by the gothic. The magnificent transparent baroque by Narciso Tomé in the beautiful Toledo cathedral is a masterful lesson of what I have expounded.

I do not know if the architects of the Alhambra's Baths were aware of the incredible wonder they were causing when they made openings in their domes. Those openings were used not only to illuminate an area which might be private but also it was basically a natural opening to let out steam from the baths. However, above all they were, perhaps without knowing, producing the opening for the arrival of solid light which would filter through like a knife. It is fascinating to remain in those rooms for some time, seeing the sun light move and change, touching them. It would be even more exciting to bathe there (we shall continue trying). Even nowadays, it is still possible to see, in some Turkish baths in Istanbul with spaces of that sort, where steam in its intersection with solid light makes the material nature of this white light more palpable.

I also do not know although I imagine that Le Corbusier, who later used so much of that solid light, was conscious when he constructed the unequalled Ozenfant studio that what he was really constructing was a theorem about diffused light. The ingenious construction solution of a covered small toothed saw, produced a material plane of diffused light, across a continuous translucent roof. Then, converging the angle of various panes of glass, after the necessary meeting of lines created that amazing trihedral of diffused light about which contemporary Architecture has not yet reflected enough. That diffused light which reaches maximum state in the so often mentioned Maison de Verre.

It is obvious to point out that solid light can only be taken in when the architecture is oriented towards the south to be able to receive spilled light which is later apportioned at just the right measure. It is this southern solid, dramatic, spilled light, which produces those spectacular effects capable of taking your breath away.

In this way diffused light will normally be taken in by orienting architecture towards the north to obtain that serene and peaceful reflected, diffused light. Light that produces effects of calming tranquil rest.

With these facts in mind, we understand we can search for and utilize the various qualities offered by light depending upon its orientation in space and time. We can, therefore, tell the difference between clear and blue morning light, when we look towards the east and between the warm golden light of dusk when we orient ourselves towards the west, knowing that both types of light are basically horizontal.

We could in depth study concepts and nuances related to light in architecture such as transparency, back lighting, shade, darkness or luminosity and colour.

"And one morning, rising with the dawn, he stepped before the SUN and spoke to it thus: Oh great star! What would your happiness be if you did not have those for whom you shine?"
Friedrich Nietzsche. "Thus Spoke Zarathustra"

WITH MANY LIGHTS AT THE SAME TIME
(On the combination of different types of light within one single space)

Just as Edison would later invent electric light Gian Lorenzo Bernini, greatest master of light invented something so simple and full of genius such as "Luce alla Bernina".

Using various sources of visible light he first created a homogeneous environment with diffused light, generally from the north, with which he illuminated and gave light to a space. Then, after centring it geometrically with the forms, - bang! - he would break in at a concrete point, hiding the source from the eyes of the spectator, producing a cannon of solid light -Luce gettata - establishing it as the star of that space.

The contrast, counterpoint between both types of light, furiously tensing that space, produced a first rate architectonic effect. Solid light in visible movement dancing over an invisible diffused light in calm stillness.

The same thing was done by the orientals Anthemius of Tralles and Isidorus de Miletus without need for the Neapolitan universal tables. Hagia Sophia, that great miracle, more of light than of dimension is in its fabulous dome. The sun throws its rays in diverging directions and due to their distance from the earth, they arrive as if they were parallel. What then happens within the interior of Hagia Sophia which receives light from all its high windows as if many suns were illuminating it? What happens when the light rays converge inside, producing incredible effects? The simple secret is found in the exact dimension and thickness of those windows, which make reflected light have nearly as much strength as direct solid light, and the effect is what we have described. The wise combination of both sources, of direct and indirect light is the secret formula of the miracle.

The appropriate combination of different types of light has, knowing them, infinite possibilities in architecture. Well knew it Gian Lorenzo Bernini and Le Corbusier even before Anthemius of Tralles and Alvar Aalto. Hadrian or even Tadao Ando.

FINALE

(On how light is the theme)

Finally is light not the substance of architecture? Is the history of architecture not the search for understanding, and dominion over light?

Is not the romanesque a dialogue between the shade of the walls and the solid light which penetrates like a knife in its interior?

Is not the gothic, light's elation inflaming those unbelievable spaces into rising flames?

Is not the baroque an alchemy of light where the wise mixture of diffused lights brakes through light, sure, capable of producing in its spaces in describable vibrations?

Finally, is not the modern movement, after throwing down the walls, such a flooding of light we are still trying to control? Is our time not a time when we have all means available to finally dominate light?

Depth reflection about light and its infinite ways must be the central point in the architecture of the future. If Paxton 's intuitions and the successes of Soane were a prelude to the discoveries of Le Corbusier and of the investigations of Tadao Ando, there is still a long and rich road to follow. Light is the theme.

When in my work I am able to make men feel the rhythm marked by nature, harmonizing spaces with light, mitigating them with the passing of the sun, then I believe it is worthwhile.