

Light revealing Architecture

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THEORETICAL DISCOURSE

MAN AND ARCHITECTURE

“Being”

‘Beings’, as Heidegger (1962) states, are the key ingredient to why the built exist. But what is our relationship to that which is built? His opinion is that as humans, our instinctive purpose on this four-fold middle ground; captured between heaven and earth; is to dwell. Thus today, throughout the world billions of people are unconsciously exercising this action of dwelling and inhabiting. This dwelling is a habitual occurrence; we do it intuitively on an everyday basis. To understand Heidegger’s position on our relationship to the built, we must recognize where the word ‘building’, which describes an action, originates from. The word stems from the Old English and High German word, ‘buan’, which means ‘to dwell’. Thus, the relationship between building and dwelling becomes very evident. Heidegger states that to build, is not merely a way and means to dwelling, but dwelling itself (Leach, 1997). Architecture therefore provides a means of understanding and confronting our existential condition (Pallasmaa, 2005:11). Juhani Pallasmaa (2005:40) states that architecture (the built) is encountered, approached, confronted and related to being, moved through and utilized as a condition for other things. Architecture gives conceptual and material structure to the conditions of daily life. Therefore the built has fundamental responsibility in defining and expressing the notion of dwelling.

cal that facilitates the spiritual, and defines our perception of reality. The house nurtures our memories and dreams, and provides a sensation of spatial security and refuge. He explains that the house consists of a series of images that presents verification, or an illusion of stability (Leach, 1997:94). It also makes a petition for our perception of reality, by forming the hub of our spatial understanding in this world. In other words, everything we do, and everywhere we go is done in relation to points of reference. Therefore the concept of the house performs a pivotal role in the individual’s organizational modus operandi. This supposition could apply to the built in general. Our whole experience of the everyday is played out continuously in relation to the built. Heidegger claims that the nature of the built is to let dwell (Leach, 1997:109). The person that performs the dwelling consequently needs the manifestation of the built to facilitate dwelling. This illustrates the indispensable symbiotic relationship between the dweller and the built. Architecture directs us back to the world, and own self, and being (Pallasmaa, 2005:11). We build as a result of dwelling, but if we do not build, then how are we to dwell? How will man define, validate and orientate our dwelling?

MAN AND LIGHT

The concept of light relative to humans can be approached via a physical and a metaphysical perspective. Light in the physical realm relates to man and his activities in light, together with the characteristics of light and biological requirements of existence through light. In the metaphysical realm light has certain spiritual qualities, and has always existed in duality to darkness. In the beginning, God separated the light from darkness, therefore darkness is the absence of light, yet it is part of what defines light. Just as black is necessary to define white, so darkness is necessary to complete the experience of light (Millet, 1996: 136). Therefore in man’s relationship to light, there has always been a discourse between light and darkness.

The house

In Bachellard’s essay on the Poetics of space, he describes space as something active which performs a function. This function is to contain compressed time (Leach, 1997:89). Architecture (the built) enables us to inhabit this continuum of time, and it is the projection of being (the body) as it moves through space (Pallasmaa, 2005:45).

Bachellard draws from the illustration of the house as a spatial enigma. It is something physi-

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introduction

The calamity of Architecture is a continuum. Throughout architectural history man has been grappling with the concept of architecture. Why is it needed, what role does it play, and what is our relationship to it? For us to understand the purpose of architecture, architecture needs to be revealed to us, and I believe that this revelation occurs through light.

This theoretical discourse briefly investigate architecture’s relationship to man, man’s relationship to light, and ultimately light’s relationship to architecture, with the intention to disclose the importance of light, and the pivotal role it plays in revealing architecture.

Metaphysical

In Genesis 1:3 God spoke light into existence: "Let there be light: and there was light". This light was the precondition for man and all other creation. The Scriptures further reveals man's relationship to light. In the gospel of John 12:35b it is written: "...walk while ye have the light, lest darkness come upon you: for he that walketh in darkness knoweth not whither he goeth" In the spiritual context, man orientates himself in this world by way of light/God (1John 1:5 - God is light, and in him is no darkness). This is where he finds his identity (Ephesians 5:8 – children of light) and how he understands his existence. If light (nature and character of God) is not present, he cannot understand living, nor find meaningful discourse in it.

The concept of light connects us to something higher than ourselves, and this concept of light is directly related to the physical characteristics of light. Therefore throughout history the metaphysical understanding of light, has been intertwined with the manipulation of physical light. The expression of light that we can see, causes us to look inward to our centre, to search once more the connection, a personal connection with light, divine light (Millet, 1996:148)

"The sky provides the connection to divine light...Even before any religious values have been set upon the sky it reveals transcendence. The sky symbolizes transcendence, power and changelessness simply by being there. It exists because it is high, infinite, immovable, and powerful." - (Millet, 1996:148)

Physical

Humans are phototropic, we respond to light (Millet, 1996:132). Light reveals our passage in time and keeps us connected to our physical environment. All of our daily rituals are lived in accordance with the diurnal and seasonal rhythms of light. As our lives are lived out in light, there is continuous collaboration between the eyes, the body and other senses. Pallasmaa

describes this as the polyphony of senses (Pallasmaa, 2005:41). In 'The Hidden Dimension', professor Edward Hall (1969:66) states: "...as man moves through space, he depends on messages received from the body (polyphony of senses) to stabilize his visual world (man's perception). This visual world is constructed by the visual field (retinal image) which is made up of constantly shifting patterns of light, recorded by the retina. Our perception of our reality is therefore embedded in the body's interpretation of light.

Therefore the physiological effects of light are not only confined to mere radiation on the skin, nor is light entering the eye confined to the stimulation of vision (Mahnke & Mahnke, 1987:45), but it provides the substance for man to understand and interpret his environment. The physical characteristic of light also plays an indispensable role in our biological existence, and is the most important environmental input, after food, in controlling bodily functions (Mahnke & Mahnke, 1987:53).

"We also know that light received through the eyes stimulates the pineal gland and pituitary glands. These glands control the endocrine system that regulates the production and release of hormones controlling body chemistry. This would then seem to me to be a carry-over of the basic principles of photosynthesis in plants-sometimes referred to as a conversion of light energy into chemical energy- to animal life, a phenomenon not before recognized. Thus the wavelength that are missing in various types of artificial light or that are filtered from the spectrum of natural light by window glass, windshields, eyeglasses, smog and even suntan lotions, are causing a condition of malillumination, similar to the malnutrition that occurs when there is a lack of a proper nutritional diet" (Ott, 1981:25)

Scientist now believes that light plays an imperative role in sustaining positive human life. Not only are plants depended on exposure to light to sustain them, but all animals and man as

well. Sufficient exposure to these natural wavelength energies are pivotal, because it interacts directly at the molecular level with chemicals and minerals in the blood supply (Mahnke & Mahnke, 1987:45). Studies conducted on rats show serious distortions in behavioural patterns in those specimens that were deprived of daily exposure to natural light. Therefore depravity of balanced light causes ill health, increased stress, physiological problems, and sexual dysfunction (Mahnke & Mahnke, 1987:58) Daily exposure to balanced light revitalizes the body and is the necessary ingredient for health and a balanced human psyche.

Bioenergetics

As discussed earlier, light was spoken into existence as a precondition for life. Therefore man's relationship to light functions both on a spiritual and biological level. Bioenergetics relates to this supposition, but abbreviates in scientific terms.

All matter in space has an intrinsic energy, which essentially vibrates. Thus Bioenergy refers to all natural electric, magnetic, light, and other energies that together make up the cosmic background and earth radiations that are absorbed by and affect all life (Mahnke & Mahnke, 1987:58). The ancient Chinese belief of positive and negative energy (Ying & Yang) that coexist in harmony with nature, relates to these scientific observations of bioenergetics. As the body functions, there is a constant rhythm to it. The heart, breath and all other functions of life pulsate continually in polarized vibrating rhythms. Proper polarization (vital ability to absorb, assimilate and distribute energy), maintains an organism in health, and in harmony with his/her environment (Mahnke & Mahnke, 1987:58).

Light represent a major part of these vibrations. Illumination has dual properties; it is both in particle form (packets and photons) and wave form (electromagnetic radiation). Therefore, fundamentally, light is a vibration (Millet, 1996:2). Different spectrums of light, vibrates at different frequencies. Studies have shown that these frequencies can be blocked and distorted (Mahnke

& Mahnke, 1987:58), thus it is no small concern that in today's built environment we are substituting the use of natural light in favour of artificial light. As a result, these light-deprived environments wherein we conduct our lives have serious repercussions on our health and physiological well-being.

LIGHT AND ARCHITECTURE

Light has been an integral part of man since creation. Since light was the precondition for life; I believe that man has the capacity to understand light. Louis Kahn (Silence and light, 2005) stated that everything is spent light, even our bodies.

"In great architecture there is constant deep breathing of shadow and light, shadow inhales and illumination exhales light" – (Juhani Pallasmaa, 2005:47)

"Qualities of light have profound responses within us; they are the wellsprings of feeling... With light as the palette, architecture can be supreme in the arts. It is a source of expression that we tend to ignore and the one aspect of architecture that we cannot divorce from meaning in our determined nihilism as night and day and sun and moon work their pattern upon us. It is with light that we can bring a soul and spirit back into architecture, and perhaps find our souls in the process". - (Arthur Erickson, 1964)

In architectural experience, light is the catalyst, it designates engagement, and meaning, even confrontation. In 'Silence and Light' Louis Kahn proposed that for a building the religion is light, it is the giver of all presence; it gives room to the day and brings seasons into the room (Silence and Light, 2005). Architecture depends on light, and is vital in architectural experience (Rasmussen, 1959:187). As light reveals the form of architecture, and places made by it, it



Atelier le Corbusier (1974:8) - "Our eyes are constructed to enable us to see forms in light"

simultaneously reveals architectural meaning and intensions that are released through the process conceiving, designing and building (Millet, 1996:2).

Genius loci

Genius loci, sense of place, comprises of tangible and intangible characteristics that delegate the spirit of a place. Light is one of these intangible aspects that contribute to the character of a place. Each place has a specific light, which means that in order to capture this spirit of place; architecture ought to respond sensitively to this light. Junichiro Tanizaki (1977:18) explores this link in his book 'In praise of shadow': "And so it is has come to be that the beauty of a Japanese room depends on a variation of shadows, heavy shadows against dark shadows – it is nothing else". The response of traditional Japanese architecture is sensitive to the light of a place, and therefore it also reveals the culture of that place. The function of light is defining when it is revealed in the experience of a building. In order for this place defining light to be revealed, the formal strategy used in designing buildings must be flexible enough to be able to respond to the local light conditions (Millet, 1996:14).

In 'Genius loci: towards a phenomenology in architecture' Christian Norberg-Schultz states that the function of the window is much more than just providing an opening in the wall. The position and articulation, is intrinsically related to the spirit of that place and its light condition. In the window, the genius locus is focussed and explained (Norberg-Schultz, 1980: 179). As the window is related to the light of a place, it also reveals the character of the people, materials and the building methods specific that place (Millet, 1996:12).

The light of a place is also directly related to the climate and time. The interaction between light and climate is multi-dimensional, for it is related to the experience of thermal comfort, therefore the culture, habits and rituals of a place (Heschong, 1979: 55-72). Light and time operates

in coexistence, thus our daily in tune with the diurnal and seasonal changes of light through time. Louis Kahn (Wurman, 1968:175) said: "I have no colour applied on the walls in my home. I wouldn't want to disturb the wonder of natural light. The light really does make the room. The changing light according to the time of day and the seasons of the year gives colour".

In the residential work of Frank Loyed Wright we see a definite awareness of the need to make connections to the spirit of a place. He utilized light to create an image of nature inside a building, thus evoking associations through the type of light, the patterns of light, the direction of light, the colour of light, and the relationship of light to its environment (Millet, 1996:15). When architecture meaningfully interacts with light, it connects with that place by borrowing its spirit which is embodied in its light.

Arthur Erickson (1975:33) "I have been anxious to find, wherever I build, the right response to light"

Architectural form

Atelier le Corbusier (1974:8) - "Our eyes are constructed to enable us to see forms in light"

In Genesis 1:2, the earth was void and without form, and darkness was upon the face of the deep. In verse 3, God said: "Let there be light", and light was. This light gave shape onto form. Thus the light revealed form, and in turn the form defined light.

Throughout history light has demanded a response from architectural. Supreme examples of this phenomenon is found in le Corbusier's brise soleil, or the cut-outs in the national assembly building designed by Louis Kahn. As light approaches the edge of a building, a discourse begins between the darkness of space in the interior and the illumination of light. Therefore the forms that we see in buildings, and the way that we see them, is a result of the manner in



James Turrel (Millet, 1982:18) - "I think **LIGHT** is
AS much as a **MATERIAL** as anything else"

which light is admitted by the form, as well as the way in which the form models the light that have been admitted (Millet, 1996:12). The light that reveals these forms are always changing due to diurnal and seasonal patterns, yet the form remains constant. However, the way in which a surface is rendered by shifting light alters our perception of that form. Light and form has a symbiotic relationship; light defines form, surface and texture, and in return, form gives expression to light.

Light also reveals the function in architectural form. For example, the surface of a staircase responds differently to approaching light. As light falls onto the alternating horizontal and vertical, the treads and the risers are modelled differently in light. These differentiating patterns of light instruct me in the purpose of the stair, thus how I can use it. Light further emphasizes the form of a room, by defining its bounding edges in light. When these surfaces therefore emphasize the shape of a room and organize its features, this light becomes organizing light (Schwartz, 1993:14-25).

Louis Kahn (Wurman, 1986:6) - "...structure is the maker of light. When you decide on the structure, you are deciding on light. In old buildings, the columns were an expression of light. Light, no light, light, no light, you see. The module is also light, no light."

Architectural structure, when designed in this way, is revealed by light. Structure in turn defines the entry of light. Where the structure is, there is no light, and where the structure is not, there is light (Millet, 1996:60). Light, by defining structural composition and bounding edges of space, reveals clues about the making of architecture, how it was assembled, and how it functions.

In 'The eyes of the skin' Juani Pallasmaa (2005:11) states that superficial architecture is devoid of any tectonic logic or a sense of materiality. He speaks about a 'seeing-touch', the ability to feel a material through my eyes by means of a stored experience of a previous en-

counter. As the light falls on a surface, it reveals its texture, materiality and light reflecting and absorbing qualities. This arouses the experience stored in my haptic memory, thus enabling me to touch it by seeing. Light not only gives a material the ability to express its surface and texture, but also composition and materiality. The same material can express itself differently depending on the type of light, its intensity, and the direction of light. The experience of materials is therefore grounded in the interaction with light (Millet, 1996:68). Light gives materials the ability to speak.

James Turrel (Millet, 1982:18) - "I think light is as much as a material as anything else"

Space and Light

Space is always present. It is self-existent and continues. Defined space is instituted through the built, and experienced through the being. As mentioned earlier, the action of dwelling is exercised in relation to the built in space. Space could therefore be seen as an extension of the being, space where the dwellers life is lived out. Space operates as a mediator between the action of dwelling and the context (the built, the objects and the people that we dwell amongst) in light. Stephen Holl (1989:11) stated that space remains in oblivion without light. Light's shadow and shade, its different sources, its opacity, transparency, translucency, and conditions of reflection and refraction intertwine to define or redefine space. Defined space was first created by fire, and therefore space is still dependent on the presence and arrangement of light (Millet, 1996:106). This relationship between light and architectural space remains inseparable, for it is rooted in the human experience.

Juhani Pallasmaa (2005:51) wrote that architecture presents the drama of construction silenced into matter, space and light. In architecture, light defines the relationship between inside and outside space. In 'Complexity and contradiction in architecture' Robert Venturi

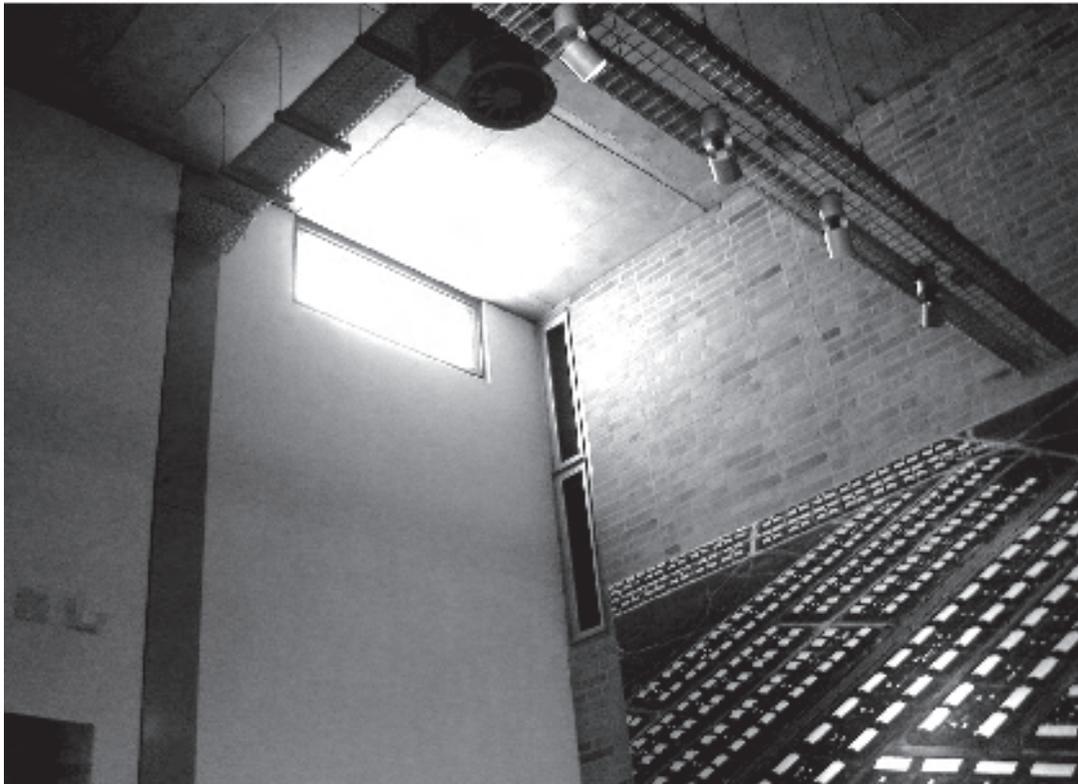
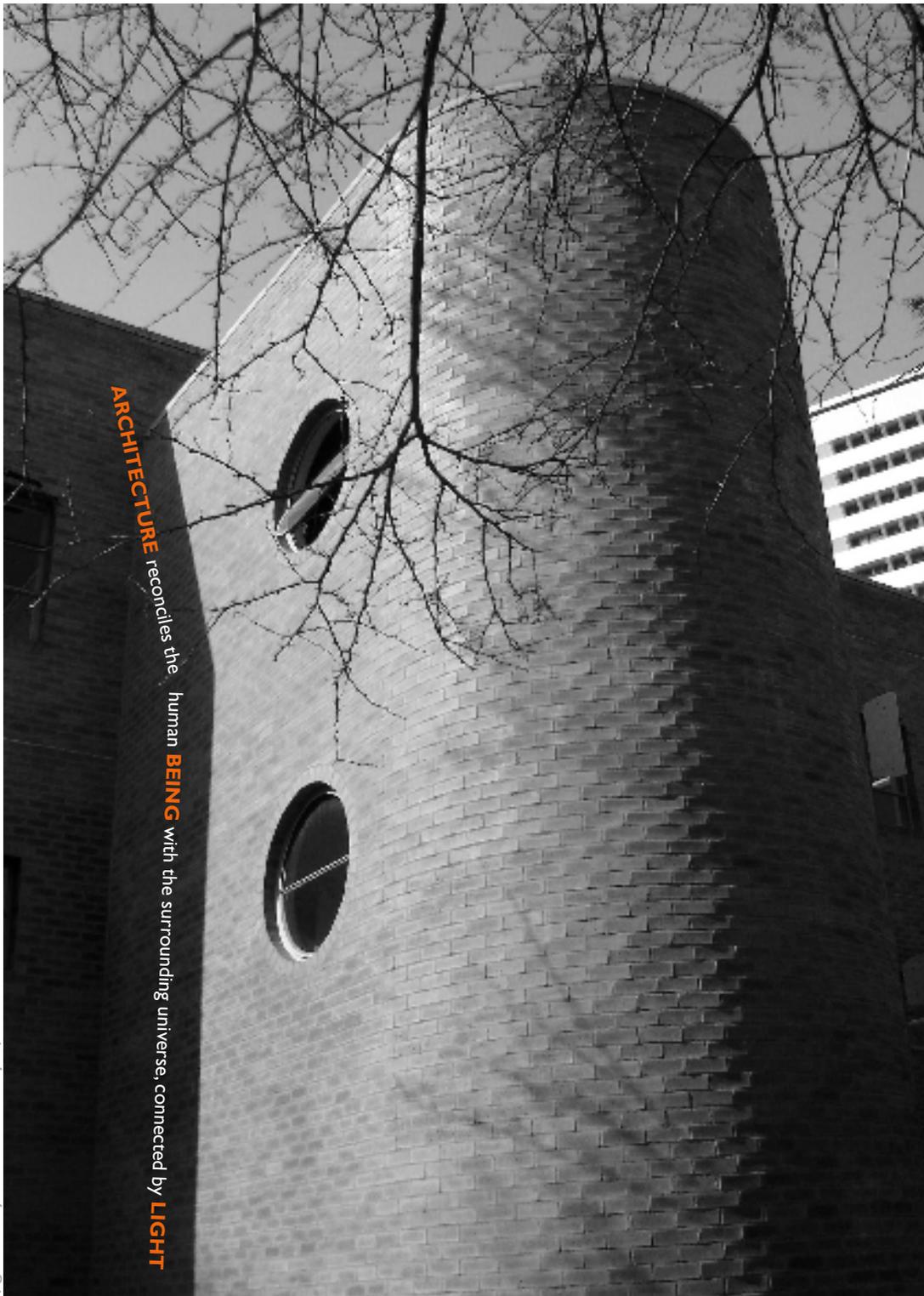


fig 2-4- Apartheid museum



ARCHITECTURE reconciles the human BEING with the surrounding universe, connected by LIGHT

fig5 - study halls, University of Pretoria

(1966:88-89) stated that since the inside is different from the outside, the wall – the point of change – becomes an architectural event. Architecture therefore occurs at the meeting of interior and exterior space in light. As light approaches the boundary, architecture dictates why, how and where it should enter, and this directly relates to the occurrence of internal space. The light that enters has function, first to illuminate, then to facilitate, instruct, unify, differentiate, connect and separate space. Thus it is at the boundary where light is modified to suit the internal conditions of light. Therefore today's extensive use of artificial light is negating this intrinsic need for the resolution of natural light at the boundary.

The drama that occurs at the boundary of space not only pertains to light, but also coincides with thermal aspects, air movement and noise propagation. As mentioned these aspects directly relate to the character of a place, therefore to the perception and experience of architectural space. In 'Intensions in architecture' Christian Norberg-Schultz introduced the concept of filter, connector, barrier, and switch to describe the physical controls of energies that determine regional character. The application of this could be seen in Le Corbusier's development of architectural forms with the intention to modify the progression of natural light into internal space. This vocabulary comprised of 'pans-de-verre' (panes of glass stretching from floor to ceiling), 'ondulatoires' (vertical mullions placed at varying intervals between strips of glass), 'brise-soleil' (large cross-baffles placed in front of fenestration to obstruct direct sun), and 'aérateurs' (solid pivoting doors for ventilation) (Griffin & Millet, 1984:43-60). The 'pans-de-verre' simultaneously acts as a barrier and connector, connecting the inside and outside space with light, but acting as a barrier to heat, air and sound. The 'ondulatoires' and 'brise-soleil' acts as filters for light, thus allowing it into space, modifying it in different ways. Lastly, the 'aérateurs' functions as switches relative to all environmental forces of light, thermal aspects, air movement and sound. Marietta Millet (1996:105) wrote that the dynamism of these forms emerges from their use in

response to climatic factors and their manipulation of the spatial tension at the building's edge .

Light and space is inseparable. The work of architectural masters like Louis Kahn, Alvar Aalto and Le Corbusier speak of a consciousness towards the importance of light in defining spatial relationships, hierarchy, focus and movement. Light defines spatial enclosure and establishes connections to place, and advocates the relationship between inside and outside space. Light facilitates movement through space, function in space, and experience of space. Therefore when light is used purposefully to reveal the intensions of architectural space, then form, space and light are joined together to create an architectural experience rich in light (Millet, 1996:120).

Louis Kahn (Wurman, 1986:257) – "A space can never reach its place in architecture without natural light"

Conclusion

Light is the precondition for life. Man is dependant on light for very survival and well-being. The daily ritual of life is exercised in tune with the shifting patterns of light; it gives structure to our lives. This ritual is exercised within a context, and the composition of this context contains the built. Therefore man daily enters into a discourse with the built, sustained through light, ordered by light, and submerged in light. As man needs light, architecture needs light. In "Experiencing Architecture" Steen Rasmussen states that architecture needs to be experienced (Rasmussen; 1959:9), however, architectural experience is dependent on light. Form is defined by light, space is articulated in light, and architectural meaning is expressed through light. Illumination gives architecture the ability to live. Arthur Erickson (1964) stated that with light, we can bring the spirit and soul back into architecture. Therefore I believe that architecture that is sustained by light can be understood, for it has the same foundation as our existence. Architecture that responds to light, is revealed by light, a light that uncovers and

continuously reveals the very function, composition and meaning of its architecture.

This viewpoint on light is nothing new, for architects have been dealing with light since man started to build. What is important is how this mindset informs and influences an architect's design decisions. Usually when we think of architecture that is generated by a sensitivity to light, we conjure up images of le Corbusier's Notre Dame du Haut at Ronchamp, or the Monastery of Sainte Marie de La Tourette with their contrasting shadows and dramatic internal light conditions. But these buildings are mere products of a discourse with light in relation to their context (site, program, culture, genius loci, location, meaning etc), but it is definitely not the norm. Architecture that is revealed by light is purely architecture that desires light. When the architect has a mindset towards light, then there is a right response towards light, structure starts to be revealed by light, architectural form appears in light, and textures are brought alive through light.

Bibliography

- Buttiker, U. 1994. Louis Kahn : Light and space. New York : Whitney Library of Design
- Erickson, A. 1975. The architecture of Arthur Erickson. Montreal: Tundra books.
- Erickson, A. 1964. 'The weight of heaven', The Canadian architect 9(3).
- Hall, E.T. 1969. The Hidden dimension. New York : Garden City, Anchor Books, Doubleday & Company, Inc.
- Heidegger, M. (1962). Being and Time. New York: Harper & Row
- Heschong, L. 1979. Thermal delight in architecture. Cambridge, Massachusetts: The M.I.T. Press.
- Leach, N. 1997. Rethinking Architecture. USA & Canada: Routledge.
- Lefebvre, H. 2000. Everyday life in the modern world. United Kingdom: The Athlone Press.
- Lefebvre, H. 2003. Key writings. Great Britain: MPG Books Ltd, Bodmin, Cornwall.
- Mahnke, F. H & Mahnke R. H. 1987. Colour and light in manmade environments. New York : Van Nostrand Reinhold Company
- Michael Blackwood Productions, Inc. 2005. Louis Kahn: Silence and Light. (DVD). New York : Post Perfect
- Millet, M. S. 1996. Light revealing Architecture. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Norberg-Schultz, C. 1980. Genius Loci: Towards a phenomenology in architecture. New York: Rizzoli.
- Ott, J. N. 1976. Health and Light: The effects of natural and artificial light on man and other living things. New York: pocket books.
- Pallasmaa, J. 2005. The eyes of the skin: architecture and the senses. Great Britain: Wiley-Academy.
- Rasmussen, S, E. 1959. Experiencing Architecture. Cambridge: Massachusetts: The M.I.T Press.
- Tafuri, M. Architecture dans le Boudoir. In Op positions, number 3,
- Tanazaki, J. 1977. In praise of shadows. New Haven: Leete's island books. GmbH.

fig6 - D.K Primary school - Ghana

