

## Aarhus School of Architecture // Design School Kolding // Royal Danish Academy

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*Publication date:*  
2013

*Document Version:*  
Early version, also known as pre-print

[Link to publication](#)

*Citation for published version (APA):*

Bülow, K. (2013). *Light Rhythms in Architecture: Integration of Rhythmic Urban Lighting into Architectural Concepts*. Paper presented at CIE CENTENARY CONFERENCE "TOWARDS A NEW CENTURY OF LIGHT", 15-16 APRIL 2013, PARIS, FRANCE, Paris, France.  
[http://files.cie.co.at/681\\_CIE2013\\_Call%20for%20Abstracts\\_published.pdf](http://files.cie.co.at/681_CIE2013_Call%20for%20Abstracts_published.pdf)

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# Light Rhythms in Architecture

## Integration of Rhythmic Urban Lighting into Architectural Concepts

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### Abstract

On one hand, urban lighting expresses itself in a complex visual environment made by the interplay by between many separate lighting schemes, as street lighting, shop lighting, luminous commercials etc. On the other, a noticeable order of patterns occurs, when lighting is observed as luminous formation and rhythm. When integrated into an architectural concept, electrical lighting non-intended for poetic composition has the ability to contribute to place, time, and function-telling aspects of places in urban contexts. Urban environments are information wise challenging to pre-historic human instincts, but they can be met by careful selection and adjustment of existing light situations.

*Keywords:* light sources, rhythm, human instincts, urban environment, territory

### 1 The experience of rhythmic urban lighting phenomena

Already at the beginning at the electrical era, Erich Mendelsohn presented in the book "AMERIKA. Bilderbuch eines Architekten" photos of American cities, and among these nocturnal situations with lights from cars, bill-boards and houses (Mendelsohn, 1928). From the additional text, following the photos, it is clear that the surroundings of the American cities acted somewhat different to the city environment that he knew from home. The photos of Erich Mendelsohn are fascinating, especially because the view of people moving across the cityscape, vehicles driving along the streets, shadows being present from tall buildings and the presence of different kinds of electrical light sources are recognizable from the urban environments of today. The photos of Mendelsohn are of such late date though, that by a closer look a horse and its carriage appear in one photo, the car models are really back to the 1920ies, the spatial structure is much less complex than in many urban environments today - and the amount of moving and dynamic elements are noticeable few compared to the complex and heavy loaded urban topographies of today.



Illustration 1 – (Mendelsohn, 1928) Amerika. Bildesbuch eines Architekten

What Erich Mendelsohn introduces with his pictures is nonetheless of use to architectural practice with light in urban environment today, namely the curious observing view of the urban cityscape and the questioning attitude towards the built environment, on what it means and how it makes sense. And with this, the attitude towards structure itself and how the discipline of lighting design acts as a structuring partner.

Mendelsohn comments to a photo shot done in New York (Ill. 1): *“During the day the city gets loaded with energy, in the night it spreads everything alive. With the crisscross of car lights, with the luminous shout from business commercials, with the vertical light from high-rise buildings. A light circus, and very seldom, like here, in the rhythm of architecture”*<sup>1</sup>. What Mendelsohn means about 'Rhythmus der Architektur', the content of this paper is not going more deep into. But presumed is, that Mendelsohn means the same kind of rhythm of architecture that Steen Eiler Rasmussen write about, when explaining how the structure of a façade make an architectural rhythmic element, based on syntax order (Rasmussen, 1962). Going down the line of Mendelsohn's note to the photo mentioned, the change between day and night and different types of electrical light sources make luminous structures and sequences – but they are not architectural – more like natural forces based on both nature and man-made artefacts.

Is it possible, though, to integrate the 'natural' rhythmic phenomena of urban lighting into architecture and make them into an aesthetic contribution to the experience of urban environment? And what qualities do such integrations provide to the experience of urban environment?

## 2 The lefebvrian approach to rhythm – a way to get attentive

To get to the point, to work with rhythmic lighting phenomena as part of an architectural structure, attentive observation to rhythm is required – and an understanding of, what rhythmic phenomena of lighting eventually is. The French philosopher and sociologist, Henri Lefebvre did an extensive study on rhythm in his writings on and practice of the 'rhythmanalysis' (Lefebvre, 1992). The practice of rhythmanalysis provides a structuring view also on rhythmic lighting phenomena.

### 2.1 Lefebvre's rhythmanalysis

As a Marxist thinker Henri Lefebvre was concerned about the everyday life of people in connection to the powers of politics, capitalism and other abstract concepts which result in certain conditions to the individual person. Henri Lefebvre is well-known for his analysis of space and the way it is produced on the basis of ongoing paradigms (Lefebvre, 1974). In the texts of the rhythmanalysis he goes into the very observation of rhythmic patterns and what they tell seen from the perspective of the observer. Reading Lefebvre's texts on rhythm and rhythmanalysis there is no precise guidance or 'receipt' to do an analysis on rhythm. If the reader want to define rhythm like a concept, the conception of it slips from the reader by a multitude of concepts, themes and questions with which Lefebvre fold out the activity of rhythm and how we relate to rhythm in our lives. To do a rhythmanalysis, there is no other way than to go ahead, with the help from Lefebvre's explanations on rhythm and examples of how to carry out a rhythmanalysis, which seems basically to observe carefully – in a listening way. It takes time to discover and distinguish between observed rhythms. Lefebvre writes in the chapter *“Seen from the window: “When rhythm are lived and blend into another, they are difficult to make out. Noise, when chaotic, has no rhythm. Yet, the alert ear begins to separate, to identify sources, bringing them together, perceiving interactions.”* (Lefebvre, 2004)

How is rhythmanalysis on lighting in the city done? And what does such an analysis tell about human condition in relation to the powers, which create the lighting of the city? To start with, Lefebvre's writings on the production of space point at the situation also present in today's lighting situation of urban environments. According to Lefebvre the city is a fragmented world - a catastrophic space - mainly created by capitalist interests. Henri Lefebvre describes the

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<sup>1</sup> *“Tagüber füllt sich die Stadt mit Energie, nachts sprüht sie alles Leben von sich. Im webrnetz der Autolichter, im Lichtruf der Geschäftsreklame, in Vertikalen der Hochshauslichter. Lichtzirkus, nur ganz zelten, wie hier, im Rhythmus der Architektur.”*

capitalist space as phallic, optical, visual, homogeneous, global and fragmented – a space of differences. (Lefebvre, 1974) Perceiving the luminous urban environment as Henri Lefebvre's catastrophic space, one observes a scenario of settings in which light sources work independently according to each other. Each café, each bill-board, each building, even the street lighting has their own lighting scheme. Being many singular elements, with each their own motivation and way to act, a powerful environment of chaotic luminous forces is created. Doing rhythmanalysis, Lefebvre puts a very simple example of the polyrhythmic interaction, which takes place between individual growths in a garden. Each growth have a certain sequence of time in which they bloom and whither. The lawn grows in a different pace than the leaves on a tree, and the leaves have another sequence to bloom and whither than the flowers and the fruits growing in the garden. Each growing plant has a different rhythm of developing and expressing themselves – and together they make the 'growing-pattern' of a particular garden. (Lefebvre, 2004)

## 2.2 The notion of light rhythm

When observing light from light sources, as if they were plants growing in each their individual pace, also light sources have each their own rhythm, expressed as different sequences of rhythmic qualities; when light comes from a light source, whose luminous output is always the same and which is never switched off it has a sequence of non-dynamic quality. When light comes from a source with changing levels, colours or distribution like the changing light from a bill-board or from the simple on and off function in traffic lights, there is a sequence of dynamic quality. What makes the rhythm of light sources even more complex than the rhythm from growing plants is that light sources also have either movable or situated qualities, like the lights from a bicycle or car in motion in contradiction to the stationary street lamp. Even daylight sources have rhythmic qualities, the sky changing colour and intensity, the clouds moving and changing size, intensity and colour, the sun moving slowly through its course over the sky. The really interesting polyrhythmic interplay begin, when the rhythms from daylight sources and electrical sources is observed, each having their very different pace and inevitable doing interaction as the different natural and human controllable light sources they are.



**Illustration 2 – (Bülow, K. 2007) Rhythmic qualities**

Lefebvre discusses the rhythmanalytic connection to phenomenology in his own peculiar way; he suggests that phenomenology is connected to the notion of observed rhythm, and yet no, he seems to think that phenomenology is a philosophical approach to observed matters, while rhythmanalysis create the possibility to describe and question the action of 'real energies': *"A philosopher could ask here: "Are you not simply embarking on a description of horizons, phenomenology from your window, from the standpoint of an all-too-conscious ego, a phenomenology stretching up to the ends of the road, as far as the Intelligibles: the Bank, the Forum, the Hotel de Ville, the embankments, Paris, etc.? Yes, and yet no! This vaguely existential (a slightly heavy technical term) phenomenology (ditto) of which you speak, and of which you accuses these pages, passes over that which quite rightly connects space, time and the energies that unfold here and there, namely rhythms. It would be no more than a more or less well-used tool. In other words, a discourse that ordains these horizons as existence, as being."* (Lefebvre, 2004)

Analysing the light from light sources as visual beings, as a plurality of energies taking place in a certain place, there is a possibility to discuss the matter of light on the basis of the actual

light sources present. Not only the planned ones, but all which are happening – and the ones that potentially could give some meaning as structured presence.

### 3 The need for observing rhythm, and what rhythm can tell...

The environmental psychologist Judith Heerwagen presents human need for light as the visual mediator of important information about the environment (Heerwagen, 2011). The perceptual ability to 'read' environment in a certain way connects to instinctive needs, such as being able to perceive the passage of time, the change of weather, how to get to overview or protection, how to get to safety, warmth and comfort, information on adjoining environment not to be overviewed and the synchronization of biological and social rhythms. In many ways, people use the same visual system and perceive environment unconsciously with the same basic instincts as prehistoric human, also in today's built environment. In her article "The experience of daylight", Judith Heerwagen argues that daylight holds important healthy and energy-saving qualities and also the capacity to be biophilic, which means "life-like" (Heerwagen, 2011). The changes created by the moving sun, the changing sky and the following changes of colour and intensity simply create a sense of well-being and a sense of being a living creature in a living environment.

Judith Heerwagen doubts that electrically lit and mimicked ways to light up indoor or nocturnal environments can create the same biophilic feeling as daylight does (Heerwagen 2011). But does the lacking ability to imitate daylight mean that electrical lighting do not contribute to biophilia in urban environments? The following examples present the results of rhythm analysis done in two different urban environments and reflection on how these cases of light rhythms in actions contribute to biophilia and human prehistoric instincts.

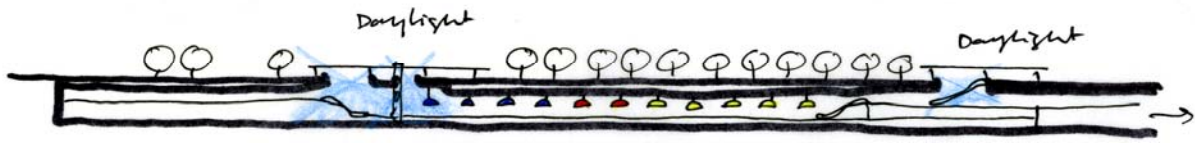
#### 3.1 In the case of an underground station in München



Illustration 3 – (Bülow, 2007) Westfriedhof U-bahnstation

Westfriedhof U-bahnstation in München is one of 100 stations in the München underground system. The system has been extended gradually since 1971 containing many different station designs. Westfriedhof U-bahnstation is characterized by 11 lampshades with a diameter of 3,80 meter coloured on the inside going from blue in one end of the about 100 meter long platform, to red in the middle and yellow in the other end of the platform. The light directed from the lampshades towards the platform creates soft "light-zones" (Madsen, 2005) along the platform through which one moves, moving along the platform. One light rhythm sequence is created as the observer moves through the light-zones of the lamps, which are emphasized by the position under the different colours inside the row of lampshades.

Another sequence is the slowly changing zones of light coming from the sky and the sun, as daylight of different levels and distributions enters into the platform and on to the walls in the one end of the station. The fall-off made by the form of the lampshades creates more rhythmic sequences; the directed non-dynamic light make the rhythmic formation of people coming, waiting and leaving very clear and also leave the rest of the station in a bluish light, coming from shielded light sources mounted above each lampshade. In the area, in which the light is non-directed, the luminous qualities of the flipping information signs are easily detected and also the electrical light in front, inside and on the back on the arriving and departing trains.



**Illustration 4 – (Bülow, 2007) section of Westfriedhof U-bahnstation**

In this case, rhythmic interplay is made by both electrical and daylight sources together with all sorts of movements in the station, which is typical to the function of the place; the individual movement along the platform, people's position and movement, the flipping information signs, and the coming and going trains. It is like, the rhythmic sequences make a theme, which 'tell' about the function of the place while the user/observer function in it. The rhythmic theme also 'tell' about the spatial situation of the underground station in a way, which is useful to the prehistoric ways to read information about the environment; the clear presence of daylight give indication about the way to get to exit, that the underground space is close to the ground level, what time of the day it is, and how the weather is outside. The long row of lit inner lampshades even emphasizes the presence of daylight and the fact, that you move deeper into the underground station, as the number of blue inner shades connect to the zone of cool daylight, and the warm light from two lamps with read inner shades mark the middle position of the platform, and a number of yellow inner shades mark the non-day lit part of the platform in the opposite end. Moving along the long platform, there is always a clear sense of position, thanks to the colour scheme of the inner shades and a feeling of security in spite of being underground.

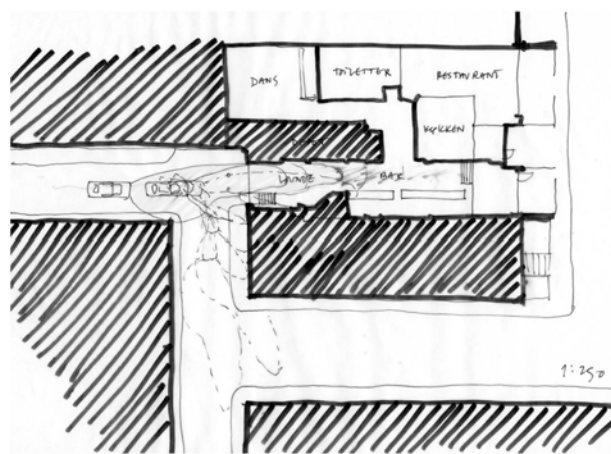
### 3.2 In the case of a bar in London



**Illustration 4 – (Glasson, 2006) Hoxton Square Bar and Kitchen**

In Hoxton Square, in the Shoreditch area of London, the light from car headlights sweeps through the premises of a bar. There are many bars for people to meet after work in, in this area, but this bar, Hoxton Square Bar and Kitchen, is distinguished by a noticeable light rhythm sequence of pauses and strokes made by the light from a car close to a window in the rear end of the premises of the bar, and the pauses in between them. The approaching car, coming directly towards the window, do a turn right in front of the window and leave the observer a bit scattered the first time the phenomena is experienced, especially if intoxicated, since it really seems that the car could go right through the window. When no cars drive down the one-way street towards the window of the bar, the view is a picturesque narrow street surrounded by buildings from the industrial era and lit by spartan pools of light coming from the lamp posts along the street. The electrical lighting in the bar, which seems to have no unnecessary interior decoration whatsoever, is at a low level, which make the experience of the light coming from the car close to the window to be at a very high level. The effect from the light, sweeping through the premises is made even stronger by the fact, that the body is stroke by light from head and down, since the street level is app. 150 cm above the level of the bar premises.

The rhythmic sequence made by the observation and bodily exposure to the light from the car headlights in the bar appear like a very solitude one, compared to the multiplicity of rhythmic sequences in the previous example. Additional rhythmic sequences in this case are the situated and mainly non-dynamic light from 'normal' light sources, like the lamps over the serving place, the small candles at the tables and the lamp posts outside. The additional light sources work with other and much less noticeable rhythmic qualities and make room for the light coming from the movable vehicles step visually forward. Noticeable is the effect of the pauses in-between the strokes of light from the car headlights; in spite of loud music the premises seem almost silent as the expectation of the next stroke is growing. Unintentional, the different lengths of the pauses is noticed and in the meanwhile the low lighting level of the bar allow even glow from cigarettes to be observed. In contradiction to the feeling of security created at Westfriedhof U-bahnhof, the rhythmic theme at Hoxton Square Bar and Kitchen create a feeling of thrill and confrontation with a light element that normally signalizes danger. There is a chance to 'dare', as position in front of the light is taken and a possibility to take shelter by the wall under the window, from which an observing position to the indoor scenery is possible.



**Illustration 5 – (Bülow, 2007) Plan, Hoxton Square Bar and Kitchen**

### **3.4 The biophilic capacity of light rhythms**

Edward E. O. Wilson defines biophilia as “the urge to affiliate with other forms of life” (Wilson, 1984). There is a profound need among human to be connected with plants and animal in daily life and as Judith Heerwagen draws attention to, also the need of being connected to daylight. Even though technology in the form of electrical lighting and built constructions provide the possibility for visual tasks to function when no daylight available, and shelter to be taken whenever needed, human has an inborn urge to get information about the outdoor natural conditions and to be connected with them, when indoor. As urban landscape is a faceted landscape of indoor and outdoor places, connected to each other in different ways and visually informed by a multitude of light sources it make a very complex landscape for the pre-historic side of human to live in. On the other hand, as Erich Mendelsohn observed that urban electrical lighting also make a fascinating landscape full of beauty, which he imagined would someday be perfected (Mendelsohn, 1928).

Lefebvre related to the connection between rhythmic activity and the ability to ‘read’ the part in connection to the whole and coherence in complex contexts, when developing the rhythm analysis. He used observations of rhythmic actions to discuss a theme in relation to human conditions, on basis of observing and telling differences and similarities of the observed (Lefebvre, 1992). Doing analysis on light, the observing and organizing approach of the rhythm analysis is usable when analysing light and place in connection to visible flow of time and a spatial landscape context, which are exactly the issues of biophilia, when it comes to human instincts and information brought by light. The question is how the biophilic qualities of daylight manage to become visible in the visual complexity of urban environment?



In the cases of Westfriedhof underground station and Hoxton Square Bar and Kitchen electrical lighting emphasizes the presence of life-like elements like the change of daylight and human activity in different ways; in Westfriedhof underground station the row of situated lamps with coloured inner shades make a clear fixed sequence of luminous output in contradiction to the more or less slow dynamics of daylight, sporadic positions and movement of people and the time-table controlled coming and going of trains. The row of electrical lit lamps does not hold biophilic qualities itself, but it supports the expression of live-like elements, like the changes of daylight and human activity going on. In Hoxton Bar and Kitchen, the light from the car headlights and the pauses in between make a sequence depended on the traffic in the street in front of the bar. By first sight, no life-like elements, except from other people and animals in the street, is at work here. But if in the bar after work, as other people head for the bar after work, as well, it is observed how the lights from the cars grow at a more and more intense level and becomes a more and more dominant feature of the bar, in line with the decreasing level of daylight. Also in this case, an electrical light element supports the presence of daylight and the fact that it decreases at dusk and leaves us without it during the night.

#### **4 Light rhythms in architecture – a matter of architectural manner**

The two cases analyzed are examples of carefully constructed rhythmic concepts, which changes visually over time and in a certain spatial context. Westfriedhof underground station is made by the architects Auer + Weber in collaboration with industrial lighting designer Ingo Maurer and the interior design of Hoxton Square Bar in Kitchen is made by the tenant of the premises himself. The conditions for planning were the same in both projects; the spatial layout was already there as a condition for the planning. What make the results of the planning into rhythmic concepts are the things done, which allow integration of rhythmic light sources to become visible part of the concept. In both cases it is as simple as leaving an opening for the lighting phenomena to get inside, and next step is then to make it into a visible feature of the concept.

In Westfriedhof underground station extremely rough surfaces of the walls create a visible shadow play from the entering daylight and the shielded lamps direct the electrical light in a way, which leave not only the changing intensities and shadow play from daylight on the surfaces visible, but also the other rhythmic elements mentioned. In Hoxton Square Bar and Kitchen the one-way street going towards the window, and the fact that the window is there, make way for the car headlights to enter. This rhythmic concept gets more or less visible with the non-presence or presence of daylight and is depended on the low lighting level of the other electrical light sources of the bar.

Places like these cases work in a different architectural manner than the hierarchic master plan or the finished architectural work; they make a place in an infinite context by the visibility of the rhythmic concept, telling about the place in connection to the context indicated. Often light comes in second, working as the visual contributor to the works of architecture. Working with lighting in an integrated rhythmic manner, light acts as an essential component holding together an architectural concept – a territorial assemblage – as Deleuze and Guattari would say, hold together – or created by selected forces of environment. Architectural lighting thus goes environmental instead of only architectural, drawing attention to the expressive functions of light.

##### **4.1 The territorial construction of rhythm**

The cases analyzed show that it is possible to integrate rhythmic phenomena into architectural concepts by simple ecological approach to visual perception, like James J. Gibson put forward in his theory on the conditions needed for the action of visual perception (Gibson, 1979). By relating to a certain physical lay-out and balancing between perceived intensities, it is possible to make rhythmic lighting phenomena appear visible in a certain context. Such ecological balances are well-known within architectural lighting, but what is nonetheless important are the choices made of what to make visible and how. In the cases of Hoxton Square Bar and Kitchen and Westfriedhof U-bahnstation the visibility of luminous rhythmic phenomena contribute to the identity of these urban places, based on the activity of



rhythms functioning in a certain place – rhythm thus contribute to both place-telling, time-telling and function-telling aspects.

The French philosophers Gilles Deleuze and Felix Guattari compare a structure expressed by rhythm with pieces of music, art and also animal-made territories. In the chapter “1837: Of the Refrain” in the magnificent work “A Thousand Plateaus: Capitalism and Schizophrenia” they explain the concept of the territory as a time-space based concept and demonstrate it among others with the territory of the bird. The singing and moving around of the bird is done in order to maintain the territory especially among competitors, and is used for such functional doings as to breed and to maintain affiliation to a certain place. The singing and even visual actions of birds creates noticeable ‘notes’ to members of the species alike and in contexts of complexity; “*The brown stagemaker (Scenepoeetes dentirostris) lays down landmarks each morning by dropping leaves it picks from its tree, and then turning them upside down so the paler underside stands out against the dirt: inversion produces a matter of expression*”. (Deleuze, Guattari, 1980)

The marking of a place in the deleuzian territorial way is done in a pleasant, and non-aggressive way, which is useful working with light in urban environments of today. It is not necessary to create attention by ‘loudness’, but instead it is useful to create sensuous visual environments, which help human confront the powers of urbanism and stimulate the pre-historic instincts in a skilled way. As the lighting of urban environment make even more now than in Mendelsohn's time, a ‘light circus’, there is aesthetic potential in regarding the rhythm of urban lighting phenomena as potential actors in architectural concepts. It is a way to connect the powers of urban environment to the people in it, and give them the possibility to discover different powers at work as a place- and time establishing mechanism. The light circus is there - why not make use of it?

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