Memory Constellations: Urban Colour and Place Legibility from a Pedestrian View

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ABSTRACT

Colour constellations contribute to the process of acquiring place legibility through sequential views of the city from a pedestrian's point of view. Rome was used to analyze visual elements that contribute to visual unity. These were: 1) façade colour, 2) pattern, and 3) building envelope. Through repetitive experiences with these elements, one forms a cognitive map of imagery organized in groupings, or constellations, as memory. These are memory constellations, and are used as a template for comparing previous experiences with new perceptions. This cognitive process contributes to place legibility. To demonstrate this graphically, an experience map is designed to show the holistic city view in plan, with notations that represent colour, pattern, and building envelope from a street level view. Experience maps of Rome are compared to those of Seattle, Washington, where visual unity is not experienced, to demonstrate how colour constellations record this information.

1. INTRODUCTION

The focus of this study is to find a model for defining and understanding the role of colour in the complex spatial environments of cities from the viewpoint of a pedestrian experiencing the city from the street. Architectural form and detailing, materials and texture, landscaping, signage, and infrastructure complicate colours. As a pedestrian, colours are experienced in a continually changing visual field. Planners have succeeded in achieving visual order in cities by implementing repetitive architectural typologies, zoning to form hierarchy in patterns of blocks and public spaces, and similar building heights. Planners have also used colour in ways, which Bente Lange[1] describes as the fastest and simplest means for creating harmony in the total urban picture. The examples of Rome, Turin, Paris, and Stockholm, as well as the Indian cites of Jodhpur, Jaipur, and Udaipur attest to this fact. Colour, however, is only one of several visual elements that contribute to harmony in the urban environment.

Many of the cities that have controlled the visual order of their urban environments are *historic compact* cities where there is a clear hierarchy between different spatial elements. Many new cities in the world, however, follow the model of the *contemporary city*, which is more dispersed, and where architectural elements are fragmented and autonomous. Hierarchy is less clear, and, although many are planned on the street grid pattern, order and harmony is difficult to experience from a pedestrian's point of view. Development in the contemporary city leads to greater diversity and complexity where architecture is less of a connective tissue and more of an array of individual figural objects striving for visibility. Their character is indefinable. Colour phenomena is not experienced solely as a defining or unifying element, but more as a visual characteristic within the complexity, and often chaos, of the visual field.

In both the historic city and the contemporary city there is, nevertheless, a tendency from the point of view of one that experiences the city as a pedestrian, to orient oneself by what Kevin Lynch[2] describes as *place legibility*. As a pedestrian one sees and experiences pieces and fragments of the city within sequential visual fields. As these experiences become repetitive, familiarity with the city provides a basis for orientation. In memory of these experiences, one forms a mental template to which new perceptions are compared. This is the process by which place legibility is formed, and this, in turn, enables one to form a comprehensive view of the city as a whole.

The historic city is less adaptable to change, but it does contain the lessons for achieving place legibility in the contemporary city. Colour is one of the repetitive visual elements that define the formal, spatial, and material phenomena in the city. One experiences colour in a city through its

combination with, and definition of, architectural elements in the visual field. The vocabulary of place legibility is the collective imagery stored in memory compared to visual experiences one perceives in a given moment. From the pedestrian point of view a cognitive structure of the whole is imagined through this collective imagery of repetitive, remembered visual elements. This is a *memory constellation.* Disparate and unfamiliar visual elements may be partially included, or rejected, from these cognitive groupings, or those elements that are familiar can be associated with other structures in other cities. This may account for the disorientation and confusion one experiences in many contemporary cities.

Finding a means for increasing place legibility in the contemporary city is the ultimate goal of this study. The first task is to analyze the components of the visual environment in cities that have visual order and place legibility, as well as identifying the contrasts that negate visual order and prevent place legibility. The second task is finding a means to record these components in a manner that represents the holistic nature of an urban environment, and includes notations of the visual elements one experiences from a street level pedestrian view. This representation will demonstrate how these graphic notations form colour constellations in a two-dimensional diagram. The hypothesis is that this graphic organization represents the cognitive map established in memory.

2. METHODS

The primary focus of this study is upon architecture, which comprises the majority of elements in the urban visual field, and can be the most controllable variable in managing change in the visual environment. The central question for this study is, "how is place legibility formed if one experiences the city in pieces?' The answer to these questions can probably be found in what Amos Rapoport[3] calls *environmental cognition*, or the ways which people understand, structure, and learn the environment as well as forming mental maps to negotiate it. Environmental cognition is based upon the multiple experiences one has with repetitive pieces of the city that are logged in a memory bank, and are then compared to new visual experiences.

In this study, Rome has been used as a model of the historic city, and Seattle as an example of the contemporary city. Two goals were established: 1) to identify the visual characteristics of urban architecture which contribute to visual unity and place legibility, and those characteristics which create visual disharmony; and 2) to develop a mapping technique that can record these visual pieces of the city in a manner that represents the whole city as a spatial organization, and the visual elements as perceived from a street level pedestrian view of the city. The graphic symbols would form groupings or constellations where similar repetitive structure occurs. Likewise, structure that is figural would read as contrasting and autonomous. Digital images were made of individual building elevations from a street level perspective in several parts of Rome, and Seattle. These images were organized sequentially, as one would traverse the city, and comparisons were made. Selection of the visual components of these building elevations that contributed most to visual unity and harmony was made. The elements that could achieve unity, through repetition, were recorded. These elements, experienced as a group, would form in clusters or constellations, and could be identified as such. The visual elements that became autonomous and did not form similar or repetitive groupings, would be identified by their lack of conformity, and not appear as constellations.

3. RESULTS

Three visual characteristics of buildings studied were recorded as *visual elements*, and a mapping strategy was developed which recorded these elements holistically in a plan view of the city. This will be referred to as an *experience map.*

Visual Elements

Façade color. Colours that achieve unity in the urban environment were analogous hues within an 80-degree arc on the NCS colour wheel. For example: Y to Y80R, Y80R to R60B, etc. In the Rome study area façade colours were in the Y20R to R range. The nuance range for colours in Rome that achieved unity were s=20 to s=50, and c=10 to c=40. Colours beyond these ranges of hue and nuance became figural in the Roman cityscape. In 'Figural Colour in the Seattle Cityscape',

Minah, G.[4], it was shown that hues of s=10 and below, and s=80 and above, and c=50 and above, would achieve figural status in the Seattle cityscape. This is true for Rome as well.

Pattern. Pattern was a combination of colours, usually in dark/light contrast that form the fenestration, trim, and regulating lines in a building façade. Rome has similar window types on most of its facades in the historic centre. The ratio of wall surface to window area is very similar, and this becomes a very strong and repetitive visual element in the city. Seattle, on the other hand, has few repetitive window patterns in the downtown, except for a portion of Seattle in the historic district of Pioneer Square. Windows are not only pattern, but also contribute to façade colour in light/dark contrast, trim colour and shadow patterns. Texture can be a factor as well, but for most of these observations from a pedestrian view, texture contributed to hue and nuance at distances observed.

Building envelope. Building height was the most critical element in the building envelope that affects unity in streetscapes, although the width of buildings was a factor when there were large contrasts in adjacent buildings. The range of heights that provided visual unity for adjacent buildings on a street were ratios of not more than 1 to 1.5 for taller buildings, and 1 to .75 for shorter buildings. Beyond these ranges visual unity was dependent upon other visual elements. These height comparisons and ratios were observed in Rome, with the exception of significant figural structures; i.e. cathedrals, palaces, and towers. In the Seattle downtown area, only the buildings in the historic core maintained the height ratios that provide visual unity.

Experience Map

A Garden Carpet from Kurdistan (18c) was designed to simulate paradise, recreate the garden environment, and offer a representation of a holistic experience. The carpet design incorporated both plan and elevation representations in combination, to give a sense of the whole garden and symbolic imagery from eye level experiences. Drawing upon these devices, a map was designed that represented buildings of a city in a plan view, and recorded, in their footprints, the colours and patterns from building elevations. Using different thicknesses of lines to represent the relative buildings heights indicated building elevation. Streets and open space were left as white. In these spaces a variety of graphic notations were used to indicate the type of visual character and experiences from the view of the pedestrian at street level. These notations are similar to those used by Lynch, K., and Rapoport, A.

The resulting map represents the spatial organization of the city, and the full palette of building colours showing harmonies and contrasts in groupings or constellations. Patterns reading as textures also group as constellations, and the streets contain notations of symbols that represent perceptual experiences from eye level. Colours and pattern form two-dimensional constellations that record the visual elements described above. The building outlines representing height, read spatially as figure or ground. The experience map can represent the cognitive map one carries in memory from sequential experiences. The purpose of the experience map is to provide a holistic structure that shows the spatial organization, and represents visual elements from the street level view of a pedestrian. Constellations in colour and pattern will indicate where visual harmony, or disharmony, occur.

4. RELATED RESEARCH

Constellations. Colour constellations observed in this study are similar to descriptions of perceived patterns that Allport, F.H[5], describes in his six principles of the Gestalt System. Most relevant are those relating to wholeness character and relationships. Colour constellations were observed in the three dimensional fabric of the Seattle cityscape, Minah, G.[6], where similar colours, particularly those in high chroma in a large urban field, appear to cluster and advance spatially to form a plane of colour fragments.

Color and Memory. In a study by Wichman, F.A. et al[7], participants remembered the coloured natural scenes significantly better than they remembered black and white images, regardless of how long they saw these images. Smilek, D. et al.[8] studied the memory ability of a student who experienced synesthetic colours in her ability to remember large displays of digits in either black and white, or congruent with the photism of the participant. Remus, B.G.[9] concluded that memory for colour exists when associated with an object. Environmental scenes are far easier to remember than independent colour.

Memory and Environment. Rossi, A.[10], describes architecture as having a long tradition of evoking memory. Individual memory collects experience about the meaning of typology of fragments within a city. Lynch, K.[2], established the concept of place legibility, which is the ease with which people understand the layout of a place. People create a mental map that are mental representations of what the city contains. Vivid areas have high image ability ranking. Rapoport, A.[3], discusses perception of the environment as being a clarification through three points of reference: 1) environmental evaluation or preference, 2) environmental cognition, and 3) environmental perception.

5. CONCLUSIONS

Colour in cities from the point of view of a pedestrian at street level is combined with architectonic elements referred to as visual elements. The memory of this colour is not autonomous, but combined with these architectonic elements. The memory of the repetitive visual elements in a city, combined with similar elements experienced over time, form a constellation of similar elements that provide the basis for both place legibility and imagining the holistic form of the city. The more repetitive the visual elements are, the more comprehensive the image of the whole. A means to represent this cognitive process is to create a two-dimensional diagram of the city, notate the visual elements that comprise the combined imagery of a pedestrian experiencing these visual elements sequentially, and reveal graphically how the repetition of these visual elements are organized as constellations. This notation would represent the parts of the city where visual order and harmony are experienced and those parts where disharmony and lack of unity exist. By comparing an experience map from the center of Rome to a similar map of Seattle, WA, one can predict where repetitive structure will create visual unity, and where lack of unity, or weak relationships occur. These maps provide a means for representing graphically a process that occurs experientially on the part of the pedestrian. One carries a cognitive version of the experience map (memory constellations) by remembering previous experiences, and forming expectations of what one will experience in the future. Place legibility develops from these experiences.

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