

Chromatic Harmony in Architecture and the Work of Artacho Jurado in São Paul

João Carlos de Oliveira Cesar

School of Architecture, Urban Planning and Design, University of São Paulo, Brazil

Email: jcocesar@gmail.com

Published online: 16 July 2010

Summary

This paper aims at presenting the partial results of research still in progress at the University of São Paulo, focusing on the use of colour in the development of architectural design. It discusses chromatic harmony in architecture by means of the study of Artacho Jurado's work. The work of this builder and entrepreneur inspires us to reflect on the understanding of the relationships between nature, the observer's expectations and aspirations, and with architecture. Chromatic diversity – which characterises nature – is relevant to the controversial process of chromatic combination in Jurado's work. This paper summarises a number of theoretical concepts as well as defining some methodology aspects of the research.

Introduction

The purpose of this paper is to discuss the use of chromatic harmony in architecture on the basis of the controversial work produced by Artacho Jurado, a builder who made history in São Paulo, in the period specifically from the 1940s through to the 1960s. The intention is to report on the findings of research being carried out at the School of Architecture of the University of São Paulo.

Born João Artacho Jurado in São Paulo, Brazil in 1903 to parents who were Spanish immigrants, he lived with his family in an anarchist community where he was unable to attend school – a circumstance that resulted in him being a self-taught individual. Jurado began his professional career dealing with signs and lettering. In practically no time at all he began to organise exhibits and trade events and shortly afterwards, together with his brother, he engaged in the construction of small buildings in São Paulo, thus taking advantage of the favourable economic period the city was going through, as pointed out by Franco [1]. Within a short time, the brothers became involved in projects of a larger size and assumed the responsibility for real estate developments that later would give rise to new urban districts; however, the most controversial aspect of Jurado's work resides in the large buildings that were yet to be constructed.

The use of colours in Jurado's work, particularly in large buildings, was fundamentally important (Figure 1). The degree of refinement with which he mixed colours was such that



Figure 1 Building 'Louvre', portraying the importance of colour in Jurado's constructions

a phase of considerable architectural activity under the remarkable influence of the Modern Movement in Architecture, which highlighted the work of certain professionals such as Vilanova Artigas, Lúcio Costa, Rino Levi, Afonso Reidy and

it is possible to perceive in his buildings, particularly in the Bretagne building (Figure 2), a certain composition when looking from the ground level, and a different composition when viewed from one of the apartments on the upper levels (Figure 3).

For decades, Jurado's work was rejected by the majority of the architects of his time; his buildings were considered of lesser importance and in 'bad taste' and were ignored by scholars who studied the so-called 'good architecture'. The fact that he had not had any academic education was accountable for his work being strongly rejected by professionals and entities engaged in the regulation of professions.

At the time, Brazil was going through



Figure 2 Building 'Bretagne', observed from a ground floor perspective



Figure 3 Building 'Bretagne', observed from an upper floor perspective

Oscar Niemeyer, among others, and which represented one of the richest, most productive periods of Brazilian architecture [2]. In São Paulo, one should also emphasise the work of the architects Gregori Warchavchik, born in Odessa, and Jacques Pilon, of French origin.

The architectural movement, which reached its highest point with the construction of Brasília, inaugurated

in the 60s, was based on the same ideas that were defended by the Modern Movement in Architecture in its beginnings with regard to the use of colour. The movement was in favour of a predominantly achromatic style, except for of some volumetric features highlighted in primary and saturated hues. Some architects defended what they understood to be the traditional

colours used in Brazilian architecture, such as pink, blue and yellow, all of them saturated and perceived in the details of some projects as hues rather than as the predominant colours used in the past. In fact, mainly on account of technological limitations, the use of lime applied to masonry surfaces prevailed in Brazilian architecture, for the most part because it fulfilled a need for protection against some typically urban diseases. White lime or, whenever possible, slightly pigmented lime (which could result in pinkish lime, for example) would be normally applied to masonry surfaces, whereas colours, mainly blue and yellow, would be applied to doors, windows, frames and other ornamental details.

Jurado's great virtue resided in his ability to recognise and address the aspirations of an emerging middle class and to create differentials that would make his projects attractive to that particular public; for example, communal swimming pools, big party halls, car garages, children's playgrounds and solariums. In addition to the aesthetic visual quality of his projects, his designs represented features that ensured commercial success for his buildings and gained him a high reputation as a businessman in civil construction. His architecture paid homage to Oscar Niemeyer [3] but using a proposed, ornamental and chromatic approach rather different from that of Niemeyer's – to such an extent that his opponents were led to define one of his projects as 'Barbie's house projected by Oscar Niemeyer'. This very same project – the building



Figure 4 Building 'Planalto', an example of opulence in Jurado's work

named Bretagne (Figure 2) – was mentioned in the British magazine *Wallpaper* as 'one of the best in which to live in the world' [4].

Colour played such an important role in Jurado's buildings that on account of his innumerable real estate projects he came to deserve special attention from suppliers, in particular, from suppliers of glass tiles (a material he used frequently), who were willing to perform tests in the buildings under construction until they succeed in obtaining for the material to be used the exact colours Jurado desired (Figure 4).

Some architecture scholars are of the opinion that Jurado derived the inspiration for his projects from the glamour and splendour of the musicals produced in Hollywood, which were so successful at the time.

A number of Jurado's buildings indicate that their original colour schemes changed over time, particularly in segments to which paint was actually applied. The inexistence of

any chromatic references has made it difficult to recreate such colour schemes in places where repainting and/or maintenance work have been required.

Chromatic Harmony and Jurado's Work

'Harmony is a state recognised by great philosophers as the immediate prerequisite of beauty' [5].

Against all the architectural principles defended by the Brazilian elite of architects, mainly in relation to the 'correct' use of colour, Jurado's projects pleased and appealed to an emerging middle class that wished to display its opulence (Figure 5). Even nowadays Jurado's buildings are valued on the real estate market, and perhaps on account of their exotic character are coveted by intellectuals and artists. The fact is that, despite the criticism his work arouses, many of his projects and, especially, his colour schemes are deemed to be harmonious by a great number of individuals.



Figure 5 Focusing on the roof facade of building 'Viaduto'

According to the definition found in a dictionary, harmony is associated to the just arrangement of parts; the adjustment of things to other things, without excesses or deficits; the perfect fit; the accurateness in gathering elements together [6]. Graves states that a good chromatic combination should please its creator, be appropriate to its purpose, be variable or interesting, and have unity [7].

Many studies are based on the assumption that chromatic harmony is the result of a combination of colours that is 'pleasing', i.e. that creates a sense of balance, beauty and pleasure; they also seek to define the rules and mechanisms for the acquisition of such combinations even though such rules and mechanisms might not take into consideration the observer and the conditions involved in the perceptive process.

According to Westland three of the most important contributors to colour harmony in the early 20th century were Ostwald, Munsell and Itten, as cited by Westland *et al.*:

'A common factor in all three views of colour harmony was the use of colour solid or colour-order system to represent the relationships between colours' [8].

Such methods consist of systems based on the relations established among the attributes of certain colours in a given composition; they seek to achieve not only balance in such relations but also control over the generated contrasts. Balanced or non-accentuated contrasts tend to create either more or less pleasing sensations.

Wilhelm Ostwald developed some ideas about colour harmony based upon his colour solid which can be summarised as [8]:

- colours harmonise if they are located at equal white and equal black circle solid
- colours harmonise if they have equal white content
- colours harmonise if they have equal black content
- colours harmonise if they have equal hue content.

Albert Munsell's principles of colour harmony were based on the idea that colours can harmonise only when they are located on a specific path in the Munsell colour space. These paths include [8]:

- colours on the grey scale
- colours of the same Munsell hue and chroma

- complementary colours having the same value and chroma
- colours of ‘diminishing sequences’ in which each colour is dropped down one step in value and chroma
- colours on an elliptical path in the Munsell space.

Johannes Itten, in turn, goes deeper into the study of chromatic contrasts, and his contribution towards understanding the use of colours is quite important. Some other equally important studies might be mentioned such as those of Chevreul and, more recently, others that have been developed [8].

Nevertheless, while attempting to transpose any of the mentioned methods into architecture, it is necessary to consider other variables, such as light dynamics, volumes, surrounding areas, scale, features of materials to be used, cultural and socio-economic aspects, and mainly the relation with the user who is going to actually live and experience the space created by the architectural design.

In Jurado’s work, colour and form constitute a set of inseparable elements. It is difficult to accept, as pointed out by Batchelor, that colours constitute a meagre ‘make-up’ of the resulting forms [9]. One can clearly perceive that in Jurado’s work there is an intention behind the use of chromatic and formal relations – an intention that transcends the concept of subjectivity, as stated by Minah:

‘These are: colour contrasts that create figure/ground juxtaposition, spatial effect of colour, and atmospheric colour effect. Of these, figure/ground holds a special interest because: (i) representations of form also depend upon figure/ground; (ii) through figure/ground contrast one may establish a hierarchical contrast to which value can be attached; and (ii) figure can be read as multiple elements in a visual field as groupings or constellations having degrees of figural status or importance’ [10].

Such an approach could be included in what Minah classifies as one of the three roles that colour can play in the design process, namely: colour dynamics; colour tectonics, i.e. a colour’s potential in defining and clarifying three-dimensional forms; and colour imagery, i.e. a colour that one experiences perceptually in architecture, which conveys materiality, physical context, cultural context, symbolism and emotional response [11].

The relation with the observer in the perceptive process, while attempting to understand the meaning of chromatic harmony applied to architecture, is present in many theories related to nature. Since Pythagoras, man has been trying to find formulas and mathematical relations in nature that can ensure harmonious combinations, associated either to music or to the planetary system, and it is Pythagoras that is credited with originating the idea of the harmony of the spheres [8]. Plato, as quoted by Socrates, describes the process of chromatic visual perception as the contact of the outer or external light with the inner or internal light of each individual, made through the individual’s sight. Light, in this context, is understood as information, knowledge; thus, the information with which the outer light is loaded makes contact with the knowledge that characterises the observer. In Plato’s view, human beings are constituted by knowledge or a set of ideas, which provides them with a vision of the world based on their experiments in living and on what actually constitutes them. The harmonious aspects in this process are those that bring the human being closer to nature. The chromatic perception process is seen as a stimulus to sensation:

‘Colours, flames that emanate from every sort of body, in which particles unite with the fire of the sight to form a sensation’ [12].

While trying to understand the perceptive process, one should also mention the studies carried out by Merleau-Ponti [13] and Gibson [14], to mention a few of the scholars who played an important role in this research.

Goethe [15], considering some aspects of his views on the matter under discussion, takes a stance similar to that of Plato when he defends the idea that man only recognises what he knows, i.e. what he has within himself, and considers chromatic diversity – which characterises nature – fundamental to the process of the harmonious chromatic combination:

'805: When the eye sees a colour it is immediately excited, and it is its nature, spontaneously and of necessity, at once to produce another, which with the original color comprehends the whole chromatic scale. A single colour excites, by a specific sensation, the tendency to universality.

806: To experience this completeness, to satisfy itself, the eye seeks for a colourless space next every hue in order to produce the complementary hue upon it.

807: In this resides the fundamental Law of all harmony of colours, of which every one may convince himself by making himself accurately acquainted with the experiments which we have described in the chapter on the physiological colours' [15].

The chromatic schemes found in Jurado's work are far from indicating unanimity among their aspects of harmony, even when they display chromatic diversity as their main feature (Figure 6). On the other hand, in principle, chromatic diversity comes up as one of the elements that would characterise a harmonious combination.



Figure 6 Focusing on the doorway of building 'Viaduto'

As regards nature, Arnkil states:

'The satisfaction of seeing a rainbow or deep blue shadows in a snowy landscape at sunset or the vibrancy of complementary colours in a painting or flower arrangement may be the result of a kind of resonance of our consciousness with the deeply ingrained biological constants of our visual system. It provides a joyous sense of being alive and dynamically 'in tune' with not just nature out there but the nature within us. Perhaps this is what colour harmony really is' [16].

Combinations of colours and forms create sensations that can be considered harmonious inasmuch as they find echo in the nature that is inherent to the observer. Nature by itself is

sufficiently capable of embracing the majority of the individuals, but in Plato's view, individual interpretations and their transpositions to architecture are relative and partial, thus reaching only a few groups that identify themselves with them through the created emotions and sensations.

It is evident that such sensations are not limited to colours; in fact, they are involved in every aspect of an architectural design and spatial organisation. In Jurado's work, however, what draws our attention is that colours play a predominant role. As stated by Arnkil:

'Nature is often considered the paragon of colour harmony. Indeed, has anyone ever looked at a nature landscape and said: This scene would be perfect if those trees over there were slightly more yellowish?' [16].

For the sake of providing just an idea, the following are the colours mostly used by Jurado in his work (NCS notation was adopted as the standard for colour readings during the research) [17]: pink, NCS: S 0520-R20B and NCS: S 3020-Y90R; yellow, NCS: S 105-Y; and blue, NCS S1040-B10G.

Conclusion

Upon reviewing Jurado's buildings, one can say that it is impossible to talk about colour harmony without taking into account the relations of colour schemes with other architectural elements that define the resulting spaces, and also, by consequence, without establishing some sort of dialogue with the users, especially if one considers the important role that such elements play in the perceptive process. Expectations and aspirations of such observers should be taken into account, and aspects of colour harmony as represented by balance, beauty and pleasure are related to them, since there is no denying the fact that the perceptive process is dynamic and interactive. Perhaps, while creating a sensation of harmony, architecture somehow represents the way in which the observer feels and understands nature at a certain moment in time.

At some moments in history, many scholars, while attempting to understand the meaning of chromatic harmony, related it to music. Although the concepts of harmony, melody and rhythm are applied to architecture and, in some ways, establish certain dynamic relations with the observer, the studies so far carried out in regard to such relations and that could contribute to the understanding and application of the concepts in question to architectural design have not been very significant.

Occasionally, while the observer is looking at an architectural project, perhaps it may occur to him the same idea expressed by Goethe, i.e. that 'architecture is crystallised music.'

References

1. R E D Franco, *Artacho Jurado Arquitetura Proibida* (São Paulo: SENAC, 2008).
2. L Cavalcanti, *When Brazil Was Modern: Guide to Architecture 1928–1960* (Princeton: Princeton Architectural Press, 2003).
3. Oscar Niemeyer website (online: www.niemeyer.org.br; last accessed, 14 June 2010).
4. *Wallpaper* (issue 92) (2006) (online: www.wallpaper.com/gallery/architecture/ten-best-residential-builds/1043; last accessed: 14 June 2010).
5. M P Hall, *The Secret Teachings of all Age* (Los Angeles: Philosophical Research Society, 2000).
6. M F W Salles, *Dentro do dentro: o nome das coisas* (São Paulo: Editora Mercuryo, 2002).
7. M Graves, *Color Fundamentals* (New York: McGraw-Hill, 1952).

8. S Westland, K Laycock, V Cheung, P Henry and F Mahyar, *Colour: Design & Creativity*, (1) (2007) 1: 1–15 (online: www.colour-journal.org/2007/1/1/; last accessed, 19 May 2010).
9. D Batchelor, *Chromophobia* (London: Reaktion Books, 2005).
10. G Minah, *Proc. AIC Interim Meeting*, Stockholm, Sweden (2008).
11. G Minah, *Proc. AIC Interim Meeting*, Misty Hills, South Africa (2006) 66.
12. Plato, *Thimeu e Crítias ou A Atlântida* (São Paulo: Hemus Livraria e Editora, 1981).
13. M Merleau-Ponti, *Primacy of Perception and Others Essays on Phenomenological Psychology, the Philosophy of Art, History and Politics* (Evanston: Northwestern University Press, 1964).
14. E Reed, *James J. Gibson and the Psychology of Perception* (New Haven: Yale University Press, 1988).
15. J W von Goethe, *Theory of Colours*, 4th Edn (Cambridge: MIT Press, 1978).
16. H Arnkil, *Proc. AIC Interim Meeting*, Stockholm, Sweden (2008).
17. NCS – Natural Color System (online: www.ncscolour.com/; last accessed, 19 May 2010).