



# COLOUR CULTURE SCIENCE

**Edited by:**

Maria Godyń

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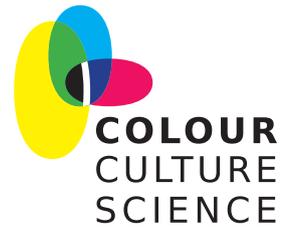
Kwiatkowska-Lubańska

**Faculty  
of Industrial Design**

Colour and Space

Department





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CULTURE  
SCIENCE**

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**Faculty of  
Industrial  
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and Space

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Jan Matejko Academy  
of Fine Arts in Krakow

**200 years**

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## **COLOUR CULTURE SCIENCE**

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# **Editorial**

We proudly present Colour–Culture–Science, a monograph containing an interdisciplinary review of research and project works focusing around the concept of colour. The articles compiled in this work cover a very broad range of topics related to colour, its place in culture, both in the context of current phenomena, as well as from the perspective of multifaceted historical research. The monograph is published more than a year after the international conference of the same name – Colour–Culture–Science, organised by the Department of Space and Colour at the Faculty of Industrial Forms of the Jan Matejko Academy of Fine Arts in Kraków between 23rd and 24th April 2016.

The event attracted both Polish and international specialists to Kraków who, even though usually engaged in completely different fields of academia or art, thought colour to be a fascinating subject of research, as well as artistic projects and undertakings. Contributions to this book come from art historians, culture scholars, architects, painters, designers, film makers, landscape architects and interior designers. Considering the wide range of issues presented, often falling within the confines of very different science disciplines, the perception of the analysed phenomena in the context of different methodologies has revealed the multidimensional complexity of the concept of colour. The authors focused on an analysis of symbolic aspects of colour, its aesthetics, significance in the cultural space, its function in architecture and design, as well as its role in the process of communication (from the point of view of linguistics and visual communication). The phenomenon of colour, investigated at the Academy mainly from the perspective of colour theory and art history, is a much broader concept that should not be appropriated by talented artists concentrating their activities in the fields of fine arts and design. For this reason, the main purpose of the Colour Culture Science monograph was an attempt to confront the intuitive “artistic” approach to colour with scientific methods used by specialists from other disciplines.

The book is divided into three parts covering the following areas: Colour & Culture, Colour & Design, Colour & Environment. The first part offers reflections on the presence and impact of colour in the con-

text of wider culture, including the visual sphere and linguistic representation of the world. The analysis concentrates both on the differences stemming from the various traditions of specific nations and social groups, as well as on the search for historical sources on the modern significance of colour. The opening article tackles the issue of linguistic differences in the naming of colour which, compiled by scholars from University College London as part of the Colour Naming Experiment project, were made available through a multiple-language website in the years 2009-2017. Next, the two authors direct their attention to two distinct colours – green and red, discussing their history and place in European and Polish culture in terms of the pigments used and the symbolism attributed to them. These topics are further developed in an article focusing on the role of colour in heraldry, presented from a historical perspective and from the point of view of a designer preoccupied with production of modern-day versions of coats of arms. The use of the latest research methods in archaeology and restoration makes it possible to recreate authentic colours used by historical artists with growing accuracy. This is the topic of the next article, where the author used the example of Greek art in museum collections. Reflections on the colour range of the modern metropolis in daytime and at night within the context of the development of IT technologies and globalisation of the world’s economy provides a sort of summary for the first chapter.

The second chapter is devoted to projects in which colour constitutes a significant or even leading element in the concept behind a work of art. The field of colour design is especially close to the hearts of the conference organisers and this part of the book is a very important part of the monograph from the perspective of the Faculty of Industrial Forms. The author of the Colour for children’s spaces chapter analyses the topic of colour perception among children aged 0 to 36 months and presents the principles for designing colour schemes for this age group. Using the works of American designer Hazel Adler, e.g. prepared for Ford Motor Company or Du Pont in the first half of the 20th century, the origins and the development of the profession of colour designer in the United States is presented. The 100 Silesian patterns and colours project provided a basis for

presenting how folk art has inspired colour design. The role of colour in landscape planning is tackled in the next two articles concerning German gardening shows, BUGA 2015 and IGA 2013, and playgrounds built in Kraków over the last decade. The use of colour for display and exhibition purposes was presented using the example of the Roundabout Baltic design exhibition and the Colour Coordinates by naN project inspired by Johann Wolfgang Goethe's *Farbenlehre*. A distinct and important part of the second chapter of the monograph is the presentation of methods used in colour teaching at such schools as Designskolen Kolding in Denmark, Savannah College of Art and Design and Slovak University of Technology in Bratislava.

The third chapter of the work, *Colour and environment*, is dedicated to reflections on the relationship between colour and architectural form and the role and significance of colour in the design of built-up areas. The first overview article emphasizes the so-called colour geography as a factor which makes a difference in the appearance of the modern city. The comprehensive process of colour plan development for larger built-up areas was presented using the example of the French city of Nimes, whose colour scheme was prepared by the design team Nancarrat. Tradition often serves as the source of inspiration for colours used in regional architecture, which is discussed in the following articles, where the examples of Scotland, Volhynia and the German cities of Lubeck and Zerbst were used. The techniques used by modern architects in the context of colour design were, in turn, presented in the section *On the role of colour in context-concept relations*. The relations between image and architecture are the focus of the articles *Colour Image Space* and *Mural versus painting in the space*. The role of colour in the urban space is not limited to providing aesthetic value, it also serves as a means for creating local identity and as an element shaping social reality, as shown in *The new aspects of the walls of the blocks of flats and Obedience to unwritten urban colour norms*.

The articles compiled in *Colour Culture Science* hint at the plethora of topics related to colour and its place in culture but, for obvious reasons, offer only a modest overview of selected issues. The editors of this book hope that the future will bring further opportunities for a more in-depth examination of the disciplines that take interest in investigating colour and that this book will be the first one in a long-lasting series of publications devoted to the study of significance of colour in modern culture.

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Last, but not least, we would like to thank all the authors in this book for their valuable contributions.

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I.

## **Colour & Culture**





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## Colour Naming – Linking Vision and Speech

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### Abstract

Colour naming links vision and speech. In a cognitive model the colour in an external stimulus is encoded as a visual percept, which is matched against a store of colour percepts in long-term memory. The result is an index enabling a word or phrase to be retrieved from a colour lexicon. The colour name is a category label for a region of colour space, and has an inherent uncertainty because of differing perceptions of the locations of the centres of regions and of the boundaries dividing them. The dataset gathered from an online experiment supports a probabilistic colour naming algorithm.

### What's in a Name?

*"Tis but thy name that is my enemy;  
Thou art thyself, though not a Montague...  
What's in a name? That which we call a rose  
By any other name would smell as sweet."*

William Shakespeare (1595),  
*Romeo and Juliet* (Act 2, Scene 2)

In her speech in the famous balcony scene, Juliet carefully separates the object of her affection from his name. Although Romeo is a member of the enemy Capulet clan, she understands that his name is only a label and that he would, she supposes, have the same personal qualities whatever he were called. She goes on to assert that the qualities of the rose (the referent) would persist, whatever its name (the reference). But, as with all metaphors, this argument is not entirely convincing because it overlooks other less desirable characteristics of the rose, such as its thorns and its wilting.

If she had not had other things on her mind, Juliet might have reflected upon metonymy. Literally meaning 'a change of name', metonymy is defined as "The substitution of a word denoting an attribute

of a thing for the word denoting the thing itself".<sup>1</sup> Thus the word *rose* can be substituted for any of the attributes of the plant of that name, in particular the scent and the colour (Fig. 1).

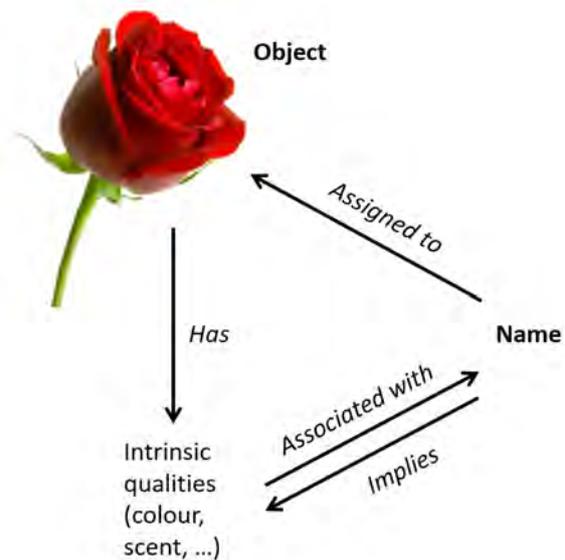


Figure 1. Rose as metonym

Casson observed that the metonym is based on contiguity relationships, whereas metaphor is based on similarity relationships.<sup>2</sup> The Old English word *rose*, derived from Latin *rosa*, had already taken on its metonymic sense by 1530, when English colour vocabulary had evolved from brightness concepts to predominantly hue concepts. This development coincided with the 'explosion of colour' that occurred in the late medieval period, particularly in the 14<sup>th</sup> Century Italian renaissance<sup>3</sup>, precisely the period about which Shakespeare was writing. As an aside, perhaps Juliet was also acknowledging that her relationship with Romeo would have to be *sub rosa* (literally 'under the rose', hence in secret), from the rose that in ancient times was hung over the council table as a token of secrecy. One can encapsulate colour metonymy as "Entity stands for entity's colour." The entity names that became colour names were drawn from five object domains: plants, animals, minerals, foods, and artefacts. These semantic domains served as resources for the innovation of secondary colour terms, by providing familiar words that could be easily and widely understood throughout the cultural group.

### Uncertainty in Colour Concept

The concept associated with a colour name is personal, something learned in childhood. It depends on individual learning experiences, from contact with parents, books, school and the world around.<sup>4</sup> Yet for communication within a community there has to be some shared implicit agreement on the meaning of each colour name. What is the probability that my mental prototype for a particular colour name is the same as yours? How can I know whether when I say *rose* or *róža* that you will envision the same colour? In practice, there is always a variance across the population. By way of demonstration, take a page of a colour atlas and ask a number of people to select the patch corresponding to a given colour name, for example pink in Fig. 2.



Figure 2. Which is the pinkest pink?

One of the reasons for uncertainty in colour vision arises from the genetic variation in spectral sensitivity of the retinal photoreceptors, leading to observer metamerism. Because no two people have exactly the same physiological responses to wavelengths across the visible spectrum, there can never be perfect agreement on the match between a metamer pair (two similar colours of different spectral composition). In fact there is no such person as the Standard Observer (CIE or otherwise), who represents a mean across the population of non-deficient observers; the

standard deviation from the mean is represented by the Standard Deviate Observer.<sup>5</sup> There is an inherent uncertainty whenever a selection is to be made from a continuous gradation of colour (Fig. 3).



Figure 3. Where is grey? Where are boundary lines between colours?

Where is the grey point, i.e. the least chromatic point on the colour plane? A series of observers will identify different locations, clustered somewhere around the centre of the image, from which the centroid gives the best estimate. This technique is being used in an experiment to investigate the effect of ambient light on chromatic adaptation, employing a tablet computer with a touch screen.<sup>6</sup> Where are the boundaries between the colour regions, for example between blue and green? The problem is that, although there is clearly an overall gradient from one principal colour to another, the change in colour from one point to the next is imperceptible. This is an example of the Sorites Paradox, originally stated as “When taking grains of sand from a heap, at what point does it cease to be a heap?” The logical argument is that, on a continuous scale, if a value cannot be distinguished from its neighbour then both must belong to the same category and therefore by induction all points in the scale must belong to a single category. One way to resolve the paradox is to note that the sum of many small differences may become large enough to exceed a specified threshold. Therefore one might specify that the colour region consists of all points within, say,  $10 \Delta E_{ab}^*$  colour difference units from the ‘focal’ colour centre. An alternative is to look beyond perceptual scales at cognitive categories, based on language. Davidoff even speculates that “human language might have evolved to solve the otherwise intractable problem of producing categories that cannot be established by judgments of perceptual similarity”.<sup>7</sup>

### Cognitive Model of Colour Naming

An analogous uncertainty occurs in the judgement of the accuracy of colours in the reproduction of images, for example in print or display media. According to Hunt, "the basis of judgement is usually a comparison between the colour perceptions aroused by the reproduction, and a mental recollection of the colour perceptions previously experienced when looking at similar objects".<sup>8</sup> The remembered colour may not be the actual colour of the original object or scene, but a modified or idealised version. Thus the grass may be remembered as greener and the sky bluer and the skin ruddier than they really were, and these memories influence the preferences for colours in the reproduction of photographs.<sup>9</sup> In the judgement of image quality, moreover, experimental subjects preferred images seen in isolation on a television screen with contrast and colour saturation enhanced by up to 10% over the original.<sup>10</sup>

Whereas approximately four million colours are discriminable by the human visual system,<sup>11</sup> in any language there are only a few thousand colour names (words and phrases). Therefore the mental process of

converting a colour stimulus into a colour name involves a many-to-one mapping, with a thousand-fold reduction in the number of elements. The function of the brain in colour naming is shown schematically in Fig. 4 as a kind of cognitive architecture.<sup>12</sup> The eye and retinal apparatus generate a neural stimulus of the colour in a region of the visual field. This is conveyed via the optic nerve to the visual cortex where it is registered in area V4 as a colour percept (a facet of perception), in this case *red*. Long-term memory contains the stored percepts of many different colours, and these are retrieved and compared with the incoming percept by a parallel processing network to find the best match, resulting in an identification of the colour. The response depends on the task and may be non-verbal, for example pointing to a target or typing on a keyboard or (if driving a car) applying the brake. For a verbal response, the cognitive match acts as an index to a lexicon of colour names, eliciting an item for articulation as the word "red". The lexical retrieval and speaking processes increase the overall time period between the first view of the object and the spoken response.

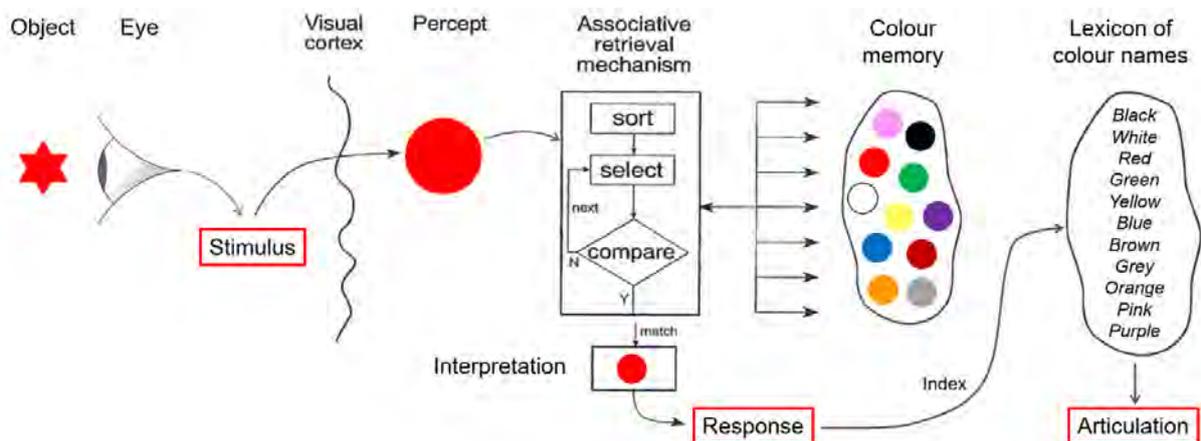


Figure 4. Model of mental processing of a colour from stimulus through perception and cognition to articulation

The colour percepts are kept in long-term memory in a categorical, or subordinate, kind of structure in which a list of instances is stored under a general concept or label.<sup>13</sup> Other percepts are stored for visual categories of shape, size, texture, brightness, orientation, etc. and for non-visual categories of sound, smell, touch and taste. Thus cognition of a specific colour involves a judgement of familiarity from the store of colour percepts, and in parallel the judgement of each of the other attributes of the stimulus, from the combination of which the recognition of the object can be achieved.<sup>14</sup>

**Linguistics and Colour Names**

Two opposing views have called into question whether colour categories are formed under the influence of human perceptual mechanisms, or whether language determines the structure of colour categories.<sup>15</sup> The Sapir-Whorf hypothesis proposes that linguistic and cultural concepts influence cognitive functions, such as memory, and hence the way that members of a culture think and behave.<sup>16</sup> Opposed to this idea, Berlin and Kay supported biological determinism as the basis of categorical colour perception. In their naming task, a 'stimulus palette' with 320 colours plus 10 achromatic tonal values (Fig. 5)

was presented in front of the speaker and for each colour term *t*, a piece of clear acetate was placed over the stimulus board and the person was asked to indicate, with a grease pencil on the acetate sheet, all the chips that he or she could call *t*. In the resulting theory, the authors proposed that a seven-stage evolutionary sequence in the development of colour vocabularies leads to eleven universal basic colour terms.<sup>17</sup> They further proposed that every language adds basic terms to its colour vocabulary in a specific sequence as the culture becomes more advanced. If a basic colour term (BCT) is found in a language, then the colours of all earlier stages should also be present. The English language was classified at the top of the scale, with the eleven basic colour terms of: *red, green, blue, yellow, orange, brown, pink, purple, white, black* and *grey*.

The World Color Survey (WCS) was initiated in the late 1970's to test the hypotheses advanced by Berlin and Kay regarding: (1) the existence of universal constraints on cross-language colour naming; and (2) the existence of a partially fixed evolutionary progression according to which languages gain colour terms over time. The study collected colour-naming data from speakers of 110 unwritten languages and concluded that the WCS languages largely partition

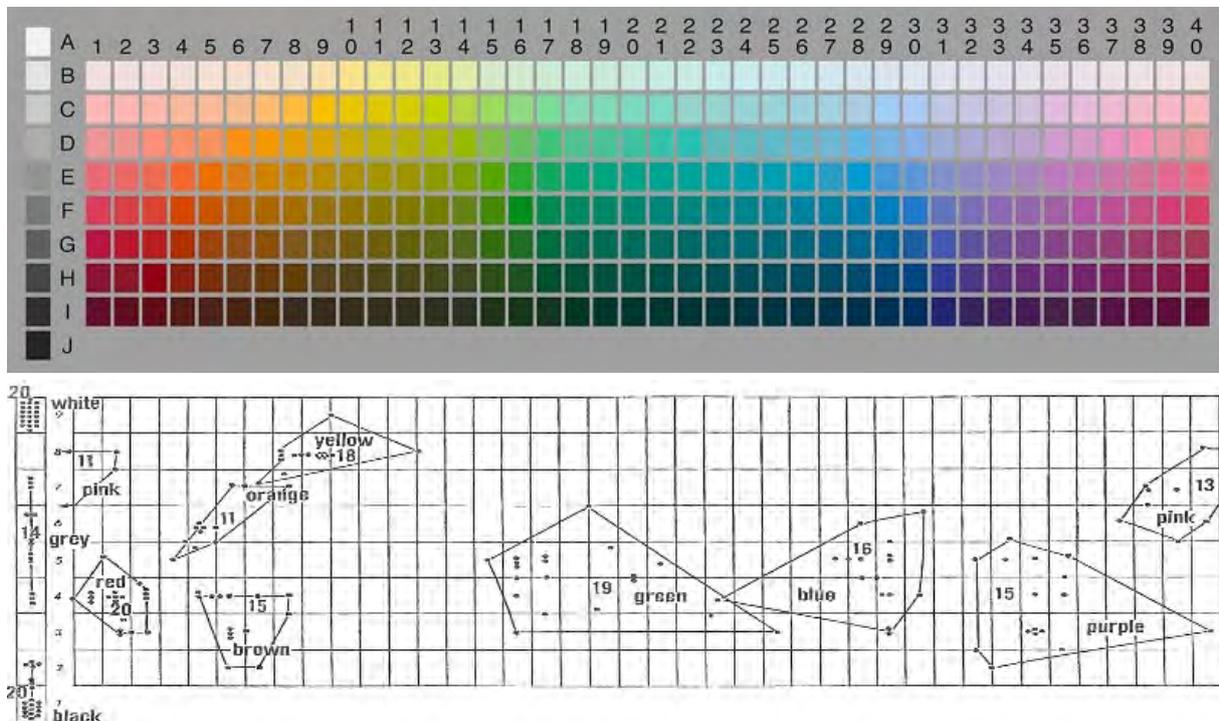


Figure 5. (top) Colour array of Munsell value vs hue; (bottom) normalised foci of basic colour terms in 20 languages (from B&K, 1969)

the whole of colour space in ways that, although often having fewer basic terms than English and hence fewer colour boundaries in their lexical ‘map’, tend strongly to place the boundaries in the same locations as do English and other familiar written languages.<sup>18</sup> When the WCS data was pruned to 38 languages that yield unequivocal results for the Hering fundamental hues (red, yellow, green, blue), it was found that the focal judgements of the participating speakers of unwritten languages agreed well with the unique hue judgements of 300 speakers of several written languages.<sup>19</sup>

Subsequent studies have found that colour terms translate too easily between languages for extreme linguistic relativity to be true, but these statistical, universal tendencies are not without differences, even for languages with the same number of BCTs. Hence the universalist hypothesis has been modified to accept that the biological explanation may be true only for the opponent colour primaries of red-green and blue-yellow, while for other colours composite categories may be formed under the influence of cognitive mechanisms.<sup>20</sup> This development opened the way for cultures to acquire more than eleven basic colour terms, and for secondary terms to be considered as a potential group of candidates, out of which new basic terms can arise.<sup>21</sup>

### An Online Colour Naming Experiment

A novel online colour naming experiment was designed by Mylonas to collect broad sets of multi-lingual colour names with their corresponding colour ranges in sRGB and Munsell specifications.<sup>22</sup> Over the past eight years (2009-2017), the server has gathered responses from over 7,000 participants, producing a dataset of over 140,000 colour names in twenty-two languages: English, Greek, Spanish, German, Catalan, Italian, Simplified and Traditional Chinese, French, Korean, Danish, Lithuanian, Thai, Portuguese, Swedish, Russian, Japanese, Turkish, Vietnamese, Dutch, Norwegian and Polish. More languages will be added soon (Hungarian and Kurdish). Associated metadata are gathered for the cultural background, colour deficiency, hardware/software components and viewing conditions.

In the experiment a series of 20 colour patches from a total of 600 samples is presented in random order against a neutral mid-grey background (Fig. 6).

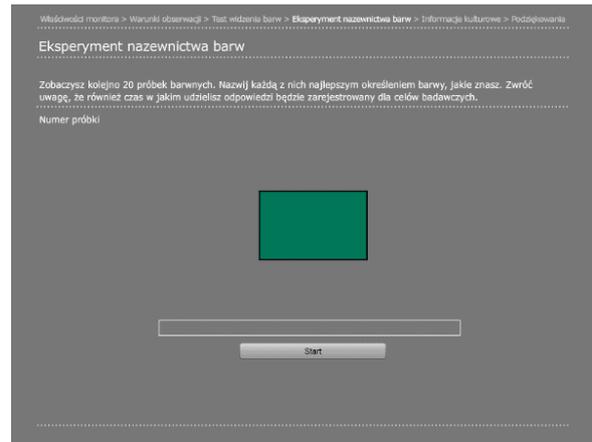


Figure 6. Experimental screen for entry of colour name

The observer’s task is to name each colour patch by typing any descriptive word or phrase on the keyboard. There are no constraints on what may be entered. To test consistency, one sample is repeated twice and both responses are recorded for further analysis. The observer’s response latency (delay before first keystroke) for each sample is also recorded. As with any technological innovation, the new method needed to be validated to ensure that it is sound, by: (a) comparing the results with those of conventional laboratory experiments; (b) comparing the results with those of other web-based experiments; and (c) examining the predicted trends. The dataset of English responses was analysed in terms of the number of words, frequency and response time. In English 52% of the responses involved a single word (i.e. monolexemic), 42% were two-word descriptions and 6% consisted of three or more words. The eleven BCTs proposed by Berlin & Kay occurred in 29% of responses, while non-basic terms were involved in 23%. The most frequent colour terms were *purple*, *pink*, *blue* and *green* while non-basic terms like *turquoise*, *lilac*, *violet* and *magenta* also occurred in the top ten. The most common use of multiple word descriptions involved *light blue*, *light green*, *dark green* and *dark blue*, revealing a preference for modifiers over secondary terms in the blue and green regions. In the top 20 list, three colour terms, *peach*, *flesh* and *tan* were given to segment the area of skin colours bounded by *pink*, *yellow*, *orange* and *red*. The BCTs elicited faster responses than non-basic terms, with *red*, *blue*, *white* and *green* the regions of colour space named fastest.

The top 27 most frequent chromatic colour names in English were validated against those of a comparable large-scale web-based experiment<sup>23</sup> in terms of the coordinates of their centroids. Comparison of the hue angles ( $h_{ab}$ ) in CIELAB resulted in a remarkable linear fit, with a coefficient of correlation  $R^2=0.99$  (Fig. 7).

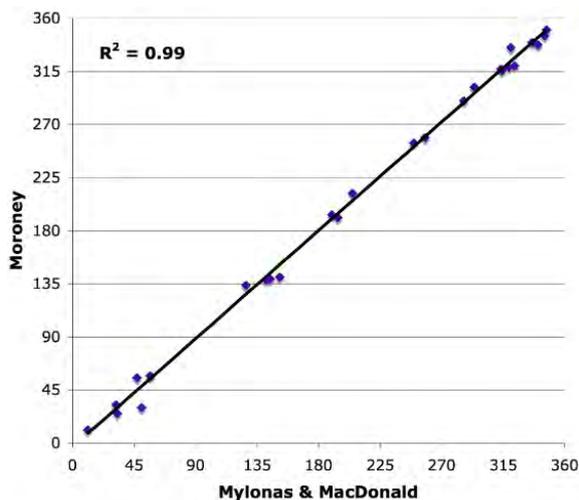


Figure 7. Correlation of results with Moroney experiment

This means that both basic and non-basic colour names are always used to describe the same specific regions of colour space, across a large population of observers from all backgrounds.

### Gender Differences in Colour Vocabulary

It is well known that the gender of the subject affects colour naming behaviour. Previous studies have shown that: (a) girls name colours better than boys at each age in early childhood<sup>24</sup>; and (b) women tend to use more elaborate vocabularies than men.<sup>25</sup> “Women’s colours” are complex, multi-varied, more abstract and expressive (raspberry sorbet, daffodil yellow, blush) while “Men’s colours” are simple, straightforward, conventional, real-world (blue, gold, grey). In general, men tend to use more modifiers, more compound terms and fewer elaborate names than women, as parodied by the graphic in Fig. 8. In a large study of colour naming in English and Chinese, it was found that female subjects used more names than male subjects in both cultures.<sup>26</sup> Advertisers take advantage of this behaviour in their choice of colour terms used in catalogues, with more variation in the terms for women’s clothing than for men’s.<sup>27</sup> In a study of colour harmony it was found, sur-

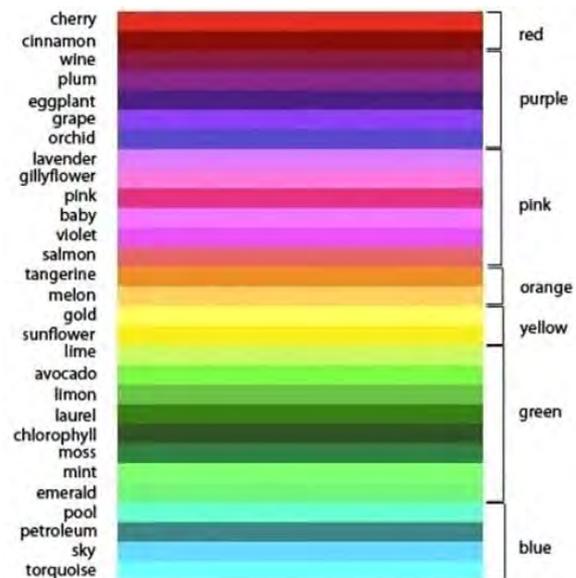


Figure 8. Exaggeration of the gender differences in colour naming between women (left) and men (right)

prisingly, that blue, pink, and purple (against all backgrounds) were perceived by the average female observer as being less harmonious than by the average male observer, but the reverse was true for brown.<sup>28</sup> Almost all earlier studies on gender differences in colour naming have employed only a few participants, with a small number (3–26) of standard reflectance chips. The online experiment has enabled us to study gender differences by using a significantly larger set of colour samples involving many participants in multiple languages. The analysis of gender differences in the dataset has confirmed the findings of previous off-line studies that women excel men in richness of colour terminology, in the variety of elaborate colour terms and in the speed of naming colours, and for both genders the percentage of occurrence of BCTs is comparable.<sup>29</sup> The novelty of the online study is that it has added to the understanding of gender differences, beyond use of the BCTs, in the pattern and variety of colour terms. Specifically, women offer more often hyponyms (e.g. pastel rose, vanilla, olive) whereas men tend to use a combination of the basic terms (e.g. blue-green, purplish blue) or with modifiers (e.g. dark purple, pale orange, vivid green). Also, women linguistically segment the colour space more densely, e.g. an area named orange and brown by men is differentiated by women into orange, salmon, peach, salmon, pink, beige and tan.

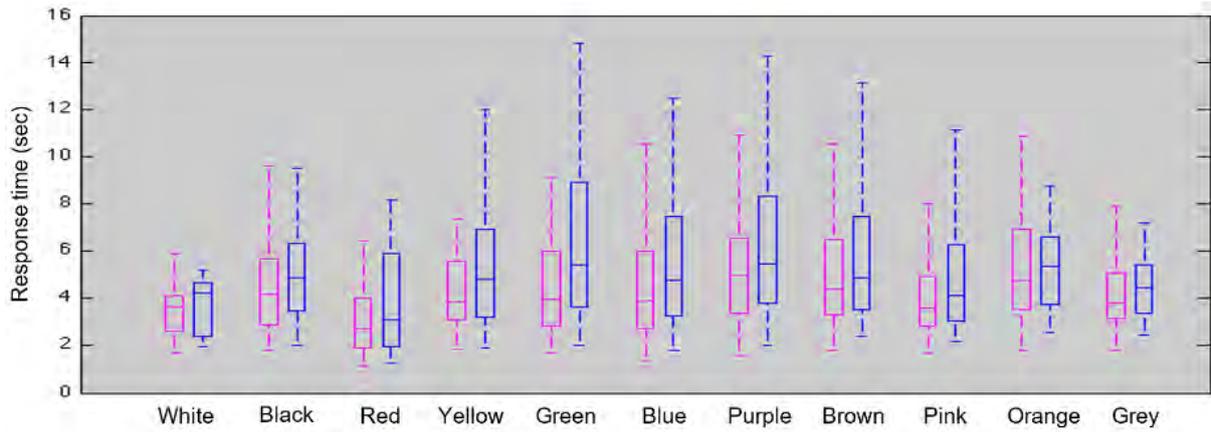


Figure 9. Distribution of response times for BCTs for females (pink) and males (blue)

The online response times recorded for the 11 BCTs for females and males are depicted in Fig. 9. The ‘box and whisker’ plot shows for each item the median, upper and lower quartiles, and the minimum and maximum value. The response times of female participants for BCTs were on average 17% faster than those of males, with the median time lower in all cases, although this advantage was less prominent for some commonly-used non-BCTs.

**New Basic Colour Terms**

Why should there be only eleven basic colour terms? Is there something special about these colours that sets them apart from all others? Or could there be additional colour terms in particular languages that denote regions of colour space that are significant for those cultures? Paramei found that the Russian language has twelve BCTs, because in Russian there

is no single word for blue, but different words for light blue (голубой, goluboy) and dark blue (синий, siniy).<sup>30</sup> From the online experimental results, we calculated the means of the ranks for each colour term across six different measures, to obtain a combined ‘index of basicness’ for each colour term, shown in Fig. 10 by order of the mean rank. Low values indicate a high degree of basicness, where the colour term was near the top of the ranking list in the majority of measures. The 11 BCTs of B&K occurred first, with blue at the top of the list followed by pink and purple. The ranking shows that the two colours immediately following the BCTs are lilac and turquoise, and we believe that there is a strong case for these to be added to the set of BCTs in English.<sup>31</sup> Lilac partitions the large colour category of purple while turquoise appears at the borders between green and blue.

Figure 10. Index of basicness for the most frequent monolexemic colour terms

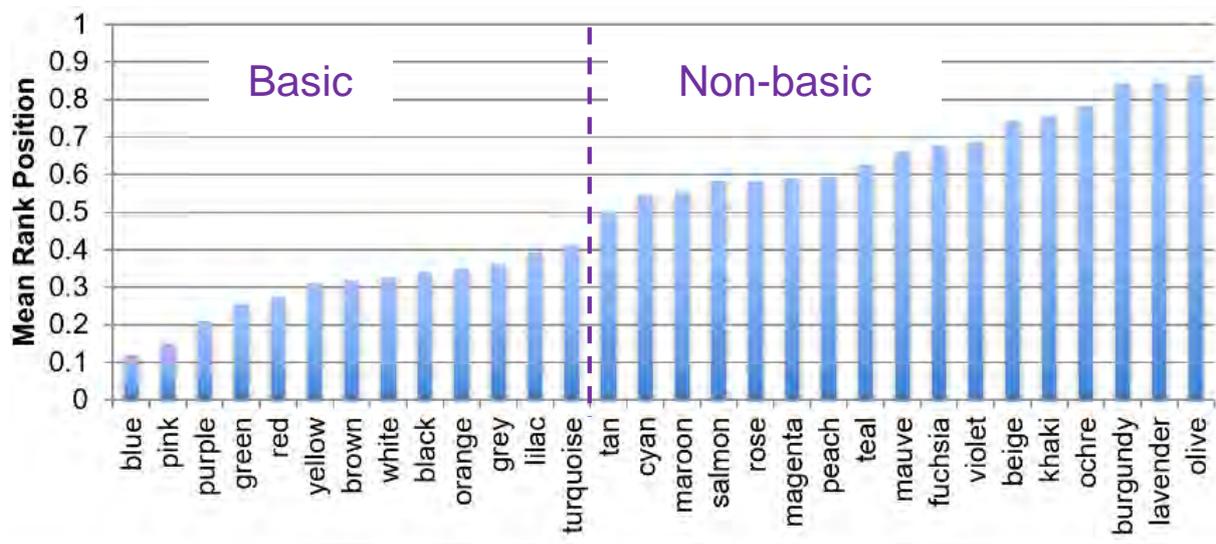




Figure 11. Classification of the CIELAB colour plane by most frequent names: (upper) Spanish; (lower) English; (left) female; (right) male

We have developed a ‘synthetic observer’, able to assign a colour name with the highest probability of agreement with judgements of observers in the online experiment, by applying a probabilistic algorithm based on Maximum a Posteriori (MAP). This method was used to estimate the boundaries of each name category in the CIELAB image plane in both English and Spanish.<sup>32</sup> Fig. 11 shows the segmentation of the colour plane for both genders in both languages, which can be regarded as a projection of the 3D segmentation of the CIELAB colour solid.

The process is analogous to the posterising of an image, by first generating a colour palette of the  $N$  most frequently occurring colours: the smaller the value of  $N$ , the coarser the quantisation of colour regions in the final poster. In Spanish, females have a separate category for azul-cielo and males for ocre. In English, females make a fine discrimination of the warm colours salmon, beige, tan, peach and salmon-pink, whereas males differentiate light-blue and cyan. Spanish fucsia is more chromatic and covers a larger area of the colour plane than English fuchsia. Spanish rosa is redder and more localised than English pink, and Spanish lila is darker than English lilac. All four groups have distinct categories for turquesa/turquoise and lila/lilac, which provides evidence in favour of the argument to add these colours to the set of BCTs. This demonstrates the value of the

dataset gathered by the online colour naming experiment to analyse variations across different languages, cultures and constituencies.

### Future Research Directions

Internet search engines offer a powerful means of locating images on the web that are linked with certain words or phrases. The indexing is based not on analysis of the content within the image, but on the conscious association that someone has made when naming or tagging the image or in nearby text. The results therefore provide a rich resource for research in colour naming. As an example, Fig. 12 shows the initial screens of images returned by Google Image in response to the search terms ‘turquoise’ and ‘lilac’.



Figure 12. Results of Google Image search for ‘turquoise’ and ‘lilac’

By analysing the distributions in colour space of the salient image colours it is possible to establish the probabilistic relationship between a colour stimulus and a colour name in many languages. Due to the limitations of Google Image, however, the harvested images may contain a substantial quantity of wrongly labelled data, so careful filtering and cross-checking of the dataset is needed. Previous studies have shown that for real-world applications colour names learned from real-world images can outperform colour names gathered from observer responses to coloured chips.<sup>33</sup>

Future plans for our online colour naming experiment include translation into additional languages, and investigation of the differences and similarities between responses according to language, age and gender. The experiment has been adopted by the Study Group on the Language of Colour, endorsed by the International Colour Association (AIC), which currently has 136 registered members from 39 countries. See: <http://language-of-color.aic-color.org/> Moreover a crowd-funded project, entitled Colours of Babel, will upgrade the experiment in 2017 to run on all new mobile devices, to minimise security threats and to maintain the online presence free without advertisements. This will enable users to perform the experiment at any time, and in any place, and will open the way to collect tens of thousands of datasets of colour names.

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## The Irresistible Rise of Green

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### Abstract

The colour green has had some kind of image problem since antiquity at least in Europe. This seems to have changed in the last decades. Some of the older causes for the low regard of green have disappeared. We now have brilliant and lightfast green pigments and dyes so that they do not have to be mixed with uncertain results out of poisonous components. But the main reason for the rise of green seems to be our changed attitude towards nature. For us, nature is no longer raw and ambivalent. We don't have to raise above it via culture. In our understanding, she is pure, beneficial and salutary. However, some of the older connotations of green like "monster green" are still subliminally operative.

Could you have imagined some years ago that nowadays fire trucks are painted in green or that Coke offers its drinks in green cans? We are already used to green eco-labels and recycling symbols and don't object when our icons of beauty like Scarlett Johansson or Angelina Jolie are dressed in green gowns. But what about green sports cars, in a hue which in my youth would have been called poisonous, houses and interiors painted in green, or the spread of green lipsticks, fingernails and hair? The purism of the Bauhaus and the Dutch de Stijl-Group where green was banned seems long gone.

Does this shift mean that any color can be used for any purpose? Is the irresistible rise of green we witness at present just a whim of fashion, or are there underlying profound causes? In what follows I will try to find some answers to these questions.

For many centuries, the color green had at least in the western Hemisphere a somewhat questionable reputation. It was seen as a secondary and subordinate color, even sometimes as dubious or treacherous. Shakespeare for example spoke of the „sickly green of indecision“<sup>1</sup> and described jealousy as a „green-eyed monster.“<sup>2</sup> Already Chaucer and Ovid

had related green to jealousy, an attribution which persists in popular color iconography. Goethe dismissed it as kind of bastard, i.e. a mere mechanic mixture of blue and yellow that fostered passivity: “The beholder has neither the wish nor the power to imagine a state beyond it.”<sup>3</sup> Wassily Kandinsky goes even further in his denigration of the color green. He compares it to the bourgeoisie, as well as to a fat, un-budging cow and associates green with grey.<sup>4</sup> Among the negative characteristics of green are: immature (think of greenhorn), poisonous, unstable, treacherous. Green belonged to the sinner Mary Magdalene and sometimes prostitutes had to wear green clothes (Fig. 1).



Again, the question is: why? Were there deeper reasons and if, what happened to them?

We have already via Goethe alluded to the fact that green was regarded as not a pure elementary color but an impure mixture. But also, various other reasons can be listed here. For one, there is the fact that for many centuries we were unable to find or manufacture a bright, stable green pigment or a dye for staining purposes. The only pigment available was green earth, which tended to be quite dull and not especially vibrant. The best of these earths was Veronese Green, based on the mineral celadonite, which had been used as a green pigment since ancient times. It was durable, but not particularly pure in terms of color (Fig. 2).



Similar things can be said about other minerals such as turquoise, which was hardly ever utilized as pigment, or the noxious malachite. Verdigris is also poisonous (and prone to react with other pigments), as is Paris (or Schweinfurt or Emerald) Green, (Fig. 3)



developed around 1805 and containing arsenic – the latter is said to have hastened Napoleon’s death on St. Helena where it was present as a wallpaper dye. Our tendency to term bright greens “bilious green” probably stems from this history. It was only from the mid-19<sup>th</sup> century onwards that the chemical industry was able to produce relatively non-toxic saturated, vibrant and lightfast green dyes and pigments.

For a long time, people therefore in actual fact made do by mixing green hues from yellow and blue pigments or dyes. But not only were these processes effortful, the results were often also unreliable on top of this, as small changes in the chemical composition could have a considerable impact on the outcomes. What’s more, the hues achieved through mixing proved to be neither lightfast nor long-lasting. To date, the (poisonous) chrome green, as well as viridian or cadmium green are still obtained by mixing yellow and blue components.

This lack of a pure green which could serve as a dye or pigment probably contributed to the consideration of this color as being treacherous, unreliably changeable or common. Apparently, this perception holds true even for China, where the idiom of “wearing a green hat” signifies a “cuckolded husband”.

Another reason for the bad reputation of green: Mammals cannot produce a green pigment on their bodies. With humans, a greenish complexion looks

sickly. As an aside: that's why the green screen technique is possible. Animals which sport green scales or feathers are therefore regarded as unrelated to us and somewhat dangerous. Humanlike creatures like the little green men from Mars or the greenish devil are seen as uncanny (Fig. 4).



Green befits monsters.

The etymology of the words *green*, *grün* or *groen* and so on points to verbs meaning "growing" or "sprouting", while words such as *vert* or *verde*, stemming from the Latin *viridis* (related to *vis*, *vir* and so on), can thereby also be traced back to the meaning of "greening" or "flourishing". The same pertains for terms in Slavic languages related to Polish *zielony*. In countries where the winter periods are pronounced, green vegetation is greeted as harbinger of spring and the promise of nourishing food, which might explain its connotations with hope but also immaturity. As green is, so to say, omnipresent in nature it provides little information. Biologically important signals must contrast clearly with green in order to be easily perceptible. Those flowers and fruits that need to be frequented by creatures capable of seeing colors, such as insects, birds or primates, are therefore not green. A co-evolution of color vision occurred in many animals alongside the color signals produced by plants. Of the chromatic colors,

red, blue, green and yellow, green is (at least for us humans) the least striking and most redundant. In terms of fruits, green tends to mean that these are not ripe yet. Green is still a background against which important signals must stand out e.g. when it comes to our traffic signals. If something is green, it may be overlooked. When gardeners talk of colors they never mention green, which for them is the given backdrop. Green signals the normal state. It is average, mundane and banal. Goethe and Kandinsky's scolding of green therefore seems understandable. In catholic liturgy, green stands for the ordinary days. Giving someone or something the green light means to give something the go ahead.

During long periods people had to create human settlements within forests and green lands. Green was something ubiquitous which didn't need to be protected and fostered. This has changed when more and more people live in big cities. Long gone are the times when conquering nature was regarded as meritorious. Now we are eager to introduce vegetation into our manmade environments wherever we can. If you take Hongkong, one of the most densely populated cities in the world, you can see how much people crave for some green.<sup>5</sup> Guerilla gardening became a rage for city dwellers. Small wonder that green nowadays stands for mother nature, health, freshness, protection of the environment, peace, vacations and so on.

To sum up: green paint is no longer instable or poisonous. Also, due to modern technology, the argument that green is a secondary color has lost its conviction. Green vegetation is anything but ubiquitous or self-evident. Green stands no longer for an ambivalent and sometimes dangerous nature, but for a nature which has assumed only positive connotations.

However, this cannot be the whole story. It does not explain the attention-grabbing use of brilliant greens in our times which even contradicts the comforting eco-friendly associations. In our man-made environments, green can attract attention as easily as red, blue or yellow. For example, the "green screen" outfit of the Queen ensured according to the tabloid *Guardian* that she stands out of the crowd.<sup>6</sup> Our intense greens are especially when fluorescent much stronger than the chlorophyll-based green of

vegetation. We have already mentioned green lipsticks and finger nails. Even sneakers can look unsettling. If we remember the fact that mammals cannot produce a green hue, this counterintuitive use forces us to take note. Green is still somewhat disquieting when as is the case in man-made environments first and foremost it is not related to vegetation and not treated as kind of irrelevant noise but instead claims attention for itself and enters the stage as a decidedly visible signal. Somewhat ambivalent between eco and monster, it appears unexpected, arresting and even disturbing.

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  4. Cf. Wassily Kandinsky, *Über das Geistige in der Kunst*, 10<sup>th</sup> edition, Bern 1973, p. 94.
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  6. Cf. <https://www.theguardian.com/uk-news/2016/jun/12/queens-green-screen-outfit-ensures-she-stands-out-from-the-crowd>, accessed on: 12 Dec 2016.
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## History of Red Colours in Poland. Polish Cochineal *Porphyrophora polonica* L. and Others Natural Dyes

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### Abstract

The paper presents a study of red colours and shades obtained from natural sources in Polish textiles. The presentation concerns research carried out as part of the research project on the scientific basis of the cultivation of the natural dyeing plants and creation of the collection of data on existing natural dyes and production process.

The presentation will demonstrate applications of red dyes on linen, wool and silk fabrics. The results of our study present large variations in hue and the influence of the mordant type on colour. The examples used in illustrating this paper show the range of colour variations to be achieved from: Madder *Rubia tinctorum*., Safflower *Carthamus tinctorius* L. and insects dyes: Cochineal *Coccus cacti* and Polish cochineal *Porphyrophora polonica* in the conjunction with a broad spectrum of alternative mordants. In the Middle Ages **Polish cochineal *Porphyrophora polonica*** was the most famous Polish red dyestuff, which was exported, both to the West and to the East, giving Poland huge profits. Magnates and noblemen wore robes dyed with *Porphyrophora polonica* L., which gave very bright and fast red colour. The work presents the results obtained by using analytical methods in dye analysis on several tapestries from Polish museum collections dated 17<sup>th</sup>–20<sup>th</sup> century. Colour research was based also on archival materials of the Kraków Workshops, which was an artistic group working between 1913 and 1926 in Kraków.

### Introduction

#### History of Polish cochineal

“*W czerwcu pod czerwcem siedzi czerwiec*” (“*In June a Polish carmine scale sits under a Polish carmine scale plant*”).

This known for ages Polish proverb reflects the huge role in Polish culture played by the tiny scale worm,

which fed on also most unimpressive useless plant. The **Polish cochineal** (aka Polish carmine scale) is an insect of *Porphyrophora polonica* L., which larvae produce especially important red dye in carmine hue. The insect gave name to the sixth month of the year in Polish language – the month of harvesting miniature as seeds larvae. To explain completely the meaning of the proverb it must be said that the plant (*Scleranthus perennis* L.) on which roots the worm used to sponge on was called with the same name. The traces of occurrence of the dye in Wielkopolska region date back to ancient times. The archaeological sources mention the dye while describing the artifacts of the Przeworska Culture in the late La Tene culture (circa 125 B.C. – 35 AD) and the Pomeranian Culture within the iron age (7<sup>th</sup> – 3<sup>rd</sup> century B.C.) that spread over most of the Polish territory and which left much more of the archeological artifacts.

Thus it was very likely that Polish cochineal larvae were used then for dyeing clothes of richer inhabitants of ancient Wielkopolska.

In the Middle Ages Polish cochineal was already the most famous Polish red dyestuff, which was exported bringing Poland huge profits. *Porphyrophora polonica* was one of few sources of crimson dye in Europe and became the major exported commodity of Poland and Lithuania – beside grains, wood, iron ore, tar and salt. It could have been the abundance of red colour that led to choosing Polish national colours of white and red – a white eagle on the crimson background, which constitute Polish national emblem. The source of the dye, often more valuable than gold, was found in high volumes in Poland. Beside Poland, the Polish cochineal was harvested also in Ukraine, Byelorussia, Russia, Lithuania, Germany, Czech regions and Slovakia. It was also known in France, Hungary, Switzerland, Kazakhstan, Kirghistan, Mongolia and China.

Until the end of the 16<sup>th</sup> century the larvae were excellent and very much sought-after commodity. From Mazovia, Wielkopolska, and especially Red Russia, the dye material was sent to Kraków, Wrocław and Gdańsk, from where it was shipped to the most important textile centres in Upper Germany, Tuscany, Venice, the Netherlands, France, England, Turkey and Armenia. The oldest quote about exporting the cochineal comes from 1412. The trade started soon bringing

huge profits and thus was heavily taxed. The archives hold proofs of that and now the tax registers serve as an excellent historical sources. Poznań gained the status of one of the biggest trade centres for cochineal in Poland. In the late 15<sup>th</sup> century the most eminent Poznań merchants traded with dried and prepared for dyeing cochineal. They acted as middlemen between the Jewish suppliers and buyers in Nurnberg or Italy or local townspeople.

Near Poznań, cochineal plantations were run by nuns from Order of Cysterians in Owińska monastery. Since 1242 Owińska, Dziewicza Góra with neighboring villages were the property of the monastery and also the place of breeding **Polish cochineal**. The sisters run the breeding until the order was closed in the 18<sup>th</sup> century and made Owińska a reputed center of dyeing, sewing and embroidering canonical dresses. The relic of the time when cochineal plantations were run in Owińska is the name „Czerwonak” – of a big settlement once located in the forests near Dziewicza Góra.<sup>1</sup>

The organization of the cochineal trade is difficult to comprehend without the knowledge of links between the peasants who harvested larvae and the merchants who bought the worms. Harvesting was strenuous and time-consuming. Even though the whole villages were engaged in the work, they obtained little material. At one plant there were about ten “grains” i.e. larvae of the Polish cochineal. To col-

lect one kg it was necessary to harvest from at least 260 thousand plants. It is hard to understand how it was possible to achieve. Yet these numbers indicate the value of the material in that times. However hard times hit the trade. Soon after the discovery of the New World, when cochineal became the exported good, the Polish industry was in decline. American red dye, obtained from an insect feeding on cacti, was ten times cheaper than its European equivalent. Polish cochineal remained a mystery for biologists and economists for a long time. This resulted from difficulties in finding the insect in its natural habitat and typical for that age gap between scientific theory and practice. Moreover revealing the secrets of the trade might not have been in the best interest of the merchants, who might have been afraid of losing the monopoly.<sup>2,3</sup>

The first scientist that observed and described Polish cochineal was Martin of Urzedow, a professor of Cracow Academy, the author of a comprehensive botanical compendium titled “Polish herbs, it is about origin of herbs and various trees” (*Herbarz polski, to jest o przyrodzeniu ziół i drzew rozmaitych*) written between 1543 and 1557, published in 1595. However, on the base of his description it was impossible to reconstruct the process of harvesting and production of the dye. Only the Dutch living in Gdańsk, Johann Philipp Breynius (1680–1764), a doctor and biologist, studied the physiology of this insect and in three pieces of work proved scientifically the specifics of its development. Two of the studies were translated to English in 18<sup>th</sup> century and thus were often quot-



Figures 1. 2. Chasuble, 18<sup>th</sup> century, detail of altar tapestry in Owińska closter. Photo by K. Schmidt-Przewoźna, 2009



Figures 3.4. Detail of canonical dresses from Poznan Fara Church XV-XVI century. Photo by K. Schmidt-Przewoźna, 2009

ed, usually when disputing with the author's opinions that were regarded as very unlikely BREYNIUS J. Ph. 1731: *Historia naturalis Cocci Tinctorii Radicum quod polonicum vulgo audit.*<sup>4</sup>



Organization named Cracow Workshops – Warsztaty Krakowskie. That splendid group concentrated around the artists of Polish Applied Art. In years 1913-1925 followed the motions of e.g. William Morris and the English Arts and Craft Movement. Nevertheless those were only attempts and the red insect as an important element of economy disappeared almost completely. Gradual reduction in the area of fallow lands, which were the natural habitat of the Polish cochineal, as well as its extensive exploitation led to the slow extinction of the species in Poland and abroad. The studies on fauna conducted in years 1970-1995, *P. polonica* allow to regard it as the species on the verge of absolute extinction. Despite all this cochineal is held in Polish memory and proverb (language).

#### Others red dyes in Poland:

##### **Cochineal**

Regrettably, that profitable for Poland trade started its decline after introduction of American cochineal *Dactylopius coccus* in Europe. The American cochi-

Figure 5. *Historia naturalis Cocci Tinctorii Radicum*, Breynius

neal was cheaper and more efficient dyestuff, even twenty times more efficient. In connection with falling trade with cochineal, the priest J. K. Kluk in his *Vegetable dictionary* written in 1811 appeals for the maintenance of the breeding and the collecting of Polish cochineal. Unfortunately, slowly the trade fell and a proverb: „When cochineal reddens, there will be enough in the pocket” became no longer true. The scarlet and purple colours, so far associated with Polish most known dye, was replaced in the late 16<sup>th</sup> with the American cochineal. It remained in use in folk dyeing longer, until the end of 18<sup>th</sup> century, mostly in east regions of Poland. This traditional dye was slowly replaced with imported in bulk *Dactylopius coccus* from Mexico. It is the larva of the insect feeding on desert opuntias with extremely high concentrations of red dyestuff.

#### **Madder *Rubia tinctorum* L.**

For many ages in the European culture the basic source of the red colour was the **dyer's madder *Rubia tinctorum* L.** Its roots contain the red dye – the alizarin. The highest concentration of the dyestuff is obtained only after three years of the cultivation. When breaking the root of the plant one can see red-orange colour. Madder roots were dug out in spring and autumn, then washed with water to remove earth and dirt. After drying the root parts were cut into small pieces and stored in paper-bags in a dry place. Preparation of the red dye involved threshing roots with flails to rid of the outer skin, and then breaking the material to dust and finally the dyestuff was ready for sale in barrels.<sup>6</sup>

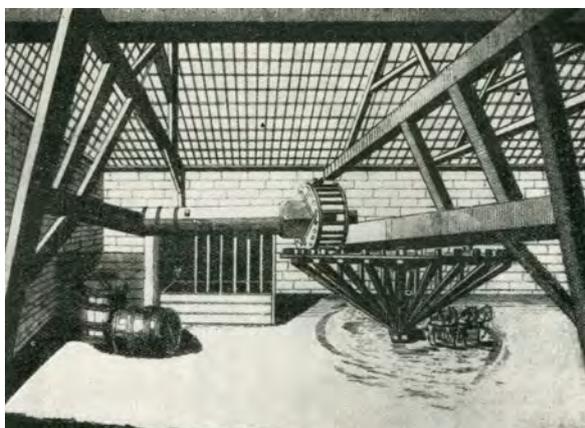


Figure 6. Madder production (P. Miller, 1788, *Dictionnaire des jardiniers*, table VI)

#### **Safflower**

The safflower *Carthamus tinctorius* L. is a source of the most beautiful, most saturated and sophisticated colours: cherry, poppy red, carmine and yellow. The production of red dye from the safflower was a very complicated process. In 18<sup>th</sup> century villages children were employed to harvest the petals of the plant in July and August. The safflower contains yellow and red dye. However, the plantations were established to produce the more difficult to obtain red dye. The technology of the production of this dye material involved the drying of small petals in bread ovens and subsequent rinsing in salted water to get rid of the “bad” yellow dye. Another method relied on spreading petals on fabrics and sprinkling them with water. The obtaining of the red colour required ensuring of the suitable water environment. Not only the knowledge but magical practices were certainly necessary.<sup>5</sup>



Figure 7. Safflower *Carthamus tinctorius* L, plantation of Institute of Natural Fibres, Petkowo, 2015

Another source of red colour was obtained from oregano *Origanum vulgare*. In the dyeing process mixed oregano, and dried flowers with apple leaves were used to a ratio of 1: 1 or 2: 1. After this they added some smalt and added the yeast and left it until the ingredients were fermented. Pale crimson was the colour obtained in this folk dyeing process. In Slavic countries the dyer's woodruff *Asperula tinctoria* was used for dyeing red sometimes.

### Tapestry

Magnates and noblemen wore robes dyed with *Porphyrophora polonica* L., which gave very bright and fast red colour. The poorer classes had to satisfy themselves with red from madder, although it was not equally bright. The 17<sup>th</sup> and 18<sup>th</sup> centuries was a period of very rapid development in a textile industry, especially in weaving and dyeing technologies and also in design.

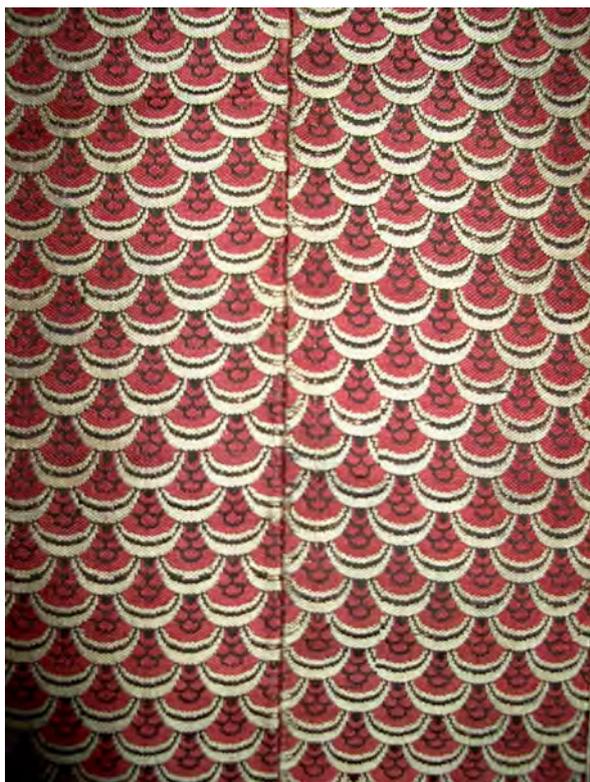


Figure 8.9. Polish kontusch sash, Kobyłki, details, Archdiocesan Museum, Poznań, 2006

The search for colors in that times were not restrained by any regulations, like in past centuries when particular colors were reserved for particular classes of society, for instance red for noblemen. Since then, the color of clothes was determined by often-changing fashion. The fashion was highly influenced by West Europe – mainly France and by orient cultures – Persian and Turkish. Be the eighteenth century, the national costume fore Polish noblemen was established. The first manufactures, called “persjarnie”, were founded around 1740 under the patronage of rich Polish magnates. The most important in workshop were established in: Sluck, Kobyłki, Grodno, Gdańsk, Lipków and Kraków. Comparing Polish waist-sashes with the ones from Istanbul one can notice an evolution of color. The Istanbul waist-sashes were characterized by three colors of gentle shades. In the belts of Madzarski much more highly contrast colors can be found. Natural dye-stuffs applied in manufacture workshops in XVII-XVIII century: dyeing trees, cultivated plants and animal dyestuffs. Vincent Dupiney from France established in Grodno botanic garden. He cultivated madder (*Rubia tinctorum* L.), woad (*Isatis tinctoria* L.) and weld (*Reseda luteola* L.). The red color in the Polish kontusz sashes obtained from: madder *Rubia tinctorum* L., cochineal and probably Kermes. The Polish cochineal was used in dyeing fabrics till the end of XVI century, so it is difficult to say the red colour come from this sources in this sashes.



Figure 10. Pashalis Jakubowicz kontusch sash dyed – cochineal, Archdiocesan Museum, Poznań, 2006



Figure 11. Dyeing yarn – cochineal, experiments in Institute of Natural Fibres & Medicinal Plants, Poznań, 2015

The natural red color obtained from madder root and larvae of cochineal we can find in the collection of Wawel tapestries, kilims and double thread tapestries from Podlasie region.

### Method

Over time, dyeing technologies developed and the techniques were passed down from generation to generation. The knowledge of the dye materials was not sufficient without expertise in using mordants. Dyeing workshops were often founded near rivers, as it was widely believed that river water was richer in mineral elements that played a crucial role in the dyeing process. All these operations it was thought would lead to obtaining the most durable and beautiful colours. Mordants played an important role in the dyeing process. Folk culture dyeing techniques employed various metal salts as mordants e.g. alum, copper sulphate (“Vitriol”) and iron sulphate. For the mordanting of plant fibres substances of the plants origin rich in tannin were applied such as e.g.: leaves of the sumac, rhubarb root, oak bark and gall oak. In the 18<sup>th</sup> century Polish dyeing technology reached advanced levels. Earlier regulations that limited the use of specific colours in clothes for a specific social class were no longer in force so it was fashion that dictated the choice of colours. In that period the clothes for noblemen were very colourful. Obviously red in various shades was the basic colour. This gave Polish Noblemen the nickname of ‘the crimson’s’. Spectrophotometric colour measurements of wool dyed yarns.

**Table 1 CIE L\*a\*b\*C\* and h° values of woollen madder dyeing fabrics**

No.	Fabrics	Mordant	Colour	Spectrophotometer result				
				L*	a*	b*	C*	h°
1.	wool	alum	red	26,9	18,4	11,7	21,8	32,5
2.	wool	citric acid	light red	36,6	28,1	26,2	38,9	38,2
3.	wool	soda	orange	39,7	30,7	30,8	43,5	39,3
4.	wool	copper sulphate	violet brown	31,8	23,5	17,4	29,2	34,3
5.	wool	ferrous sulphate	brown	27,1	15,3	7,3	17,0	34,9

**Table 2. CIE L\*a\*b\*C\* and h° values of woollen dyeing fabrics by cochineal**

No.	Fabrics	Mordant	Colour	Spectrophotometer result				
				L*	a*	b*	C*	h°
1.	wool	alum	Violet	34,7	33,2	15,4	37,6	24,3
2.	wool	citric acid	light pink	33	32,1	10,9	34	27,7
3.	wool	soda	red	36,2	29,0	8,0	30,2	29,3
4.	wool	copper sulphate	brown	27,8	23,8	2,0	23,9	34,4
5.	wool	ferrous sulphate	brown violet	23,5	12,2	0,5	12,3	32,4

**Table 1 CIE L\*a\*b\*C\* and h° values of woollen Sambucus nigra L dyeing fabrics - fruit of Sambucus nigra L**

No.	Fabrics	Mordant	Colour	Spectrophotometer result				
				L*	a*	b*	C*	h°
1.	wool	alum	pink	40,0	15,5	6,4	16,8	21,6
2.	wool	citric acid	beige	59,6	4,7	22,3	22,8	78,1
3.	wool	soda	red	42,4	24,1	6,2	24,9	14,5
4.	wool	copper sulphate	light brown	42,3	7,6	18,4	20,0	67,5
5.	wool	ferrous sulphate	brown	26,0	0,7	1,7	1,8	67,2

The Krakow Workshops (1913–1926) played a significant role in natural dyeing process in art. That workshop gathered numerous designers who restored traditional techniques of natural dyeing and developed about 100 formulas for dyeing. As a result of their efforts, they were presented with 205 awards

at the World's Fair in Paris (1925) for tapestries, batiks and furniture. The Krakow Workshops played a significant role in the history of Polish tapestries, as the artists associated with the group strived for higher artistic value of craft and folk artefacts. Natural Dyeing Studio of INF&MP Poznań reconstructed

the natural colors used by the Krakow Workshops. Publications by Okołowicz explained some sources of plant origin and mordants used by them.<sup>6</sup>

### 1. Red colour

#### Cochineal

5-8g cochineal for 1 l H<sub>2</sub>O

- Cochineal + alum = red
- Orange = yellow silk + cochineal
- Scarlet = silk dyed yellow two times longer than orange
- Amaranth = cochineal + alum (white silk)

#### Madder

20-30g madder root + tin.

### 2. Violet

- Cochineal + indigo
- Logwood

### 3. Brown

#### Catechu

20g catechu + 1 l H<sub>2</sub>O

### 4. Blue

- Indigo *Indigofera tinctoria* L
- Woad *Isatis tinctoria* L

### 5. Green

- Blue silk + yellow dye bath (Old Fustic, Quercitron, weld and others)

#### Mordants used in Kraków Workshops:

- Cream of tartare C<sub>4</sub>H<sub>5</sub>O<sub>6</sub>K
- Sulfuric acid H<sub>2</sub>SO<sub>4</sub>
- Potassium dichromate K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>
- Ferrous sulphate Fe SO<sub>4</sub> 7H<sub>2</sub>O
- Copper(II) sulfate Cu SO<sub>4</sub> 5H<sub>2</sub>O

### Results

The Polish artists of the Krakow Workshops paid much respect to the centuries – old experience of Javanese artists. Their systematic studies of Javanese textile decoration and technology of dyeing resulted in numerous features of Javanese aesthetics and technique to Polish fabrics.<sup>7</sup>

### Conclusions

In Polish Culture red was the most important color. It could have been the abundance of red colour that led to choosing Polish national colours of white and red – a white eagle on the crimson background, which constitute Polish national emblem.

Despite all this cochineal is held in Polish memory and proverb (language). The studies on fauna conducted in years 1970-1995, *P. polonica* allow to regard it as the species on the verge of absolute extinction. Despite all this cochineal is held in Polish memory and proverb (language).

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## Tincture in Heraldry: The Past and the Present

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### Abstract

The study addresses the issue of tincture (colours, metals and furs) in heraldry, placing it in historical perspective. The introductory section offers a brief look at the origins and development of coats of arms, and provides a short description of the basic elements of various types of arms. The main section focuses on the specificity of Polish arms, and presents some contemporary examples of the coats of arms designed for Polish administrative units of various levels, such as towns, districts (*gminas*) and counties (*poviats*). The author of the study, in collaboration with academic historians and heraldists, has developed a comprehensive and coherent system of coats of arms for a number of towns, districts and counties located mostly in the Małopolskie Voivodeship (southern Poland). The present paper describes the design concepts and the problems encountered in the design work, with special emphasis being put on colour-related issues. Considering the fact that the coats of arms created in Poland in our times lack stylistic and colouristic uniformity, it is suggested that the colours should be codified, and strict guidelines for specific colour parameters should be drawn up.

### Introduction

A coat of arms is a unique graphic symbol constructed according to strict formal rules, used by individual persons, families, secular and ecclesiastical corporations, towns, lands and countries. The applications of coats of arms range from personal, through institutional, to territorial. The design comprising a coat of arms on a shield (*escutcheon*), together with accompanying elements (a crest, supporters, a motto, etc.), forms a so-called full heraldic achievement of armorial bearings. Coats of arms are described using a specialised, very precise, heraldic language. Such a formal description is known as a *blazon*, and the creation of this description is named *blazoning*.

Coats of arms were produced by medieval culture, but the custom of using them had its roots in the ancient tradition of marking objects for identification purposes. Primitive peoples knew the art of body-painting that enabled them to take on a special appearance required in ritual situations, such as e.g. war. At first, war colours were supposed to scare the enemies; later on their use was motivated by the necessity to distinguish one's own troops from those of an opponent. Early three-dimensional military symbols (e.g. the Roman *signum militare* was originally a bundle of grass fastened to the tip of a staff pole) were gradually replaced with two-dimensional ones: banners and pennons. It was the time at which colour acquired communication value, with the colour of a charge being the most important, and that of its background, i.e. cloth, playing a minor role. This was probably due to the insufficient development of cloth-dyeing art. With time, however, the colour of the background grew in importance, to become equal in these terms to the colour of the charge in the 13th century.

The development of coats of arms was in large measure connected with the evolution of military equipment (especially the introduction of an enclosed helmet which covered the entire face of a knight), taking place in the 11th and 12th centuries. A practice of painting geometric, animal or floral patterns on the shields of knights (as a means of their identification during a battle or tournament) started in the years 1089–1120 (Fig. 1).

While in Western Europe coats of arms fully developed in the 12th century, in Poland this process began in the first decades of the 13th century. Initially, coats of arms were adopted by the members of the feudal elite of that time: kings, princes and magnates, who later found followers in wider social circles. The design of a coat of arms was not subject to change, and in the case of families it was inherited. Gradually, coats of arms became omnipresent: they were placed on the flags of military units, on the shields and clothes of knights and the objects crowning their helmets (so-called crests), on the caparisons of horses, as well as on furniture, tapestries, clothes, works of art, and monuments. Apart from being identity marks and ownership symbols, they often played also a role of an ornament. One

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Figure 1. Segment of the Bayeux Tapestry (2nd half of the 11th century), a unique piece of Romanesque art. This hand-embroidered cloth, ca. 70 m long, gives a story of the Norman conquest of England with the Battle of Hastings. The knights are shown in their armours, carrying arms and shields. The latter have various patterns on them, which may be considered as the beginning of heraldic art.<sup>1</sup>

can find them in medieval churches: in such places as the floor, walls, ceiling, stained-glass windows, liturgical objects and vestments. Such relics constitute a valuable source of knowledge not only of the symbolism of coats of arms, but also of the colours appearing therein. However, while the colours used in a stained-glass window, mosaic or enamel-coated object can be determined without a doubt, those in which tombstone coats of arms were painted have often lost their original appearance. Nevertheless, laboratory tests can provide evidence of the presence of pigments and dyes even if the colours have not survived.

Also the recognition of metals used in the past sometimes causes trouble: gold peels off easily, leaving a red ground, and silver oxidises in the presence of cinnabar (mercury sulphide; red pigment for the production of paints), assuming a bluish or black colour, which may mislead those trying to determine the true colours of old coats of arms.

Although each branch of heraldry had its distinctive features (being related to people, institutions or places), there were also some common general rules governing the creation and functioning of coats of arms. First of all, a coat of arms appeared on an escutcheon (a shield), and its main element was a charge placed in the field of the escutcheon (Fig. 2).

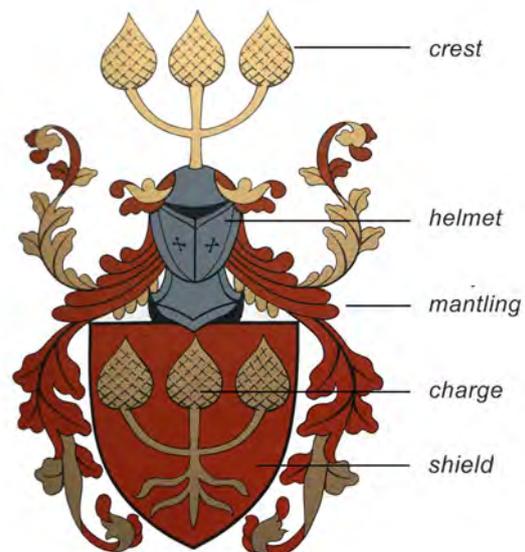


Figure 2. Elements of a coat of arms: (a)<sup>2</sup> Godziemba, the coat of arms of a Polish noble family; (b) the coat of arms of Bishop Józef Guzek; (c) the coat of arms of the Kraków Archdiocese; (b) and (c) design by Barbara Widłak

The shields of royal coats of arms used to be topped with a helmet (often crowned) adorned with a crest with mantling. In the case of monarchs, a king's crown or prince's coronet was used, whereas ecclesiastical heraldry employed the insignia of an appropriate office: cardinal or rank hats, mitres, crosses and crosiers.

Crest was the oldest and most important device among the elements situated outside the shield. Its origins go back to prehistoric times when various communities used masks or totems. With time, it became inseparable from a coat of arms, constituting additional identification. Compared to Poland, West-European countries attached a greater significance to this element: its change amounted to the creation of a new coat of arms.

A crest appeared in the following forms:

As a repetition of the charge placed on the shield;

As a motif not connected thematically with the charge on the shield; or

As a plume made of ostrich or peacock feathers (popular in Polish armorial bearings).

Crests often depicted some animals that people did not place on shields in fear of their negative traits. For example, a swan was associated with hypocrisy, while diabolical characteristics were attributed to such animals as cats, monkeys, foxes and cuckoos. Also monsters and hybrids (dragons, unicorns, sirens) – rarely displayed on shields – were frequently used for crests. The animals were presented in an aggressive position with strong expressiveness.

As mentioned before, armorial bearings are described using a laconic and very precise heraldic language, called *blazon*. The description starts from the farthest plane, considered the most important,



Figure 3. Gothic coats of arms (the Zurich Roll of Arms, 1335-1345)<sup>3</sup>

and ends in the one situated closest to the spectator. Thus, the colour of the shield (i.e. a background; called a *field*) is described first, followed by the figures (*charges, ordinaries*) displayed on the shield. When describing charges, it is assumed that one is standing behind the shield. Consequently, the right (*dexter*) half of the shield is the left-hand side to the spectator, and *vice versa*, the left (*sinister*) half is on his/her right.

The language used for blazoning (e.g. *Gules, a cinquefoil Argent*, which means "a five-petal silver

Figure 4. Late Gothic coats of arms with crests (Scheiblersches Wappenbuch, the oldest part 1450-1480)<sup>4</sup>



rose in a red field”) sounds a little archaic as it draws on medieval description based on French. The rules of heraldry became formalised and regulated by heralds (officers of arms), who supervised their observance as well. We owe them also armorials (called *rolls of arms*) containing the coloured drawings of arms with their blazons and names of the holders. The rolls of arms count among the most beautiful medieval illuminated manuscripts (Figs. 3 and 4).

The present study focuses on the issue of tincture (a phenomenon encompassing colours, metals and furs) in heraldry, placing it in historical perspective. First, a brief look at the origins and development of coats of arms is offered, and a short description of the basic elements of various types of arms is provided. Next, the specificity of Polish coats of arms is discussed, and some contemporary examples of the arms designed for Polish administrative units of various levels are demonstrated. Emphasis is put on the constancy, across ages, displayed by the medieval canon of heraldic colours.

### Heraldic art in the past: Tincture issues

The second half of the 12th century was an important time in the history of colour perception as it saw the beginning of transition from the former Indo-European triad of so-called primary colours (black, red and white) to neutral colours. Gradually, a new canon of six colours (black, red, white, blue, green and yellow) came into use. Heraldry, that took shape in roughly the same period, employed this canon from the very beginning. If heraldry came to being earlier, we would perhaps have now solely coats of arms in black, red and white.

The broader concept of ‘tincture’ was formulated at the end of the 13th century. Since then, the use of tinctures has been governed by strict rules, and the tinctures within a given coat of arms have remained constant.

The tinctures encompass metals, colours and furs. There are two metals: gold, called *or* (considered as an equivalent to a yellow colour), and silver, called *argent* (treated as an equivalent to white), and four colours: red (called *gules*), blue (*azure*), black (*sable*), and green (*vert*). Heraldry accepts also two additional, but rarely used, colours: purple (*purpure*) – for mantles and lining of king’s or prince’s crowns, coronets and hats, and flesh colour (natural, “prop-

er”) – for the natural colour of human skin. A steel blue (greyish blue) colour is used for helmets. Other colours appearing in coats of arms, such as dark brown or grey, are not considered as heraldic, and should not be used. The colours have the highest possible intensity (as is the case with medieval polychromy), but their shades are not formally defined. It is not allowed to combine an unlimited number of tinctures in the field because too many tinctures would weaken the message contained in the heraldic symbol (an ideal coat of arms contains no more than two of them), nor to put one colour on another colour or one metal on another metal; the rule of alternation should be obeyed. As coats of arms were to be visible from a long distance, it was necessary to sharply contrast the colour of the charge with that of the background, thus making the charge better legible and strengthening the message it conveyed. Since its beginnings, heraldry has used two furs: ermine and vair. Ermine fur, when depicted in a naturalistic manner (i.e. black tails on white) occurs as a lining of heraldic mantles and pavilions or a rim of princes’ coronets. Stylised ermine (black little lilies with three black spots) is used as a tincture on the shield. Vair fur is represented by a series of alternating silver and blue panes in the form of stylised “iron hats” or “clouds”. Furs can be placed on both metals and colours.

Large empty areas on the shield are filled by means of a damasking technique, i.e. using ornamental patterns similar to those found on Damascus steel swords. The Gothic style preferred geometric patterns, while the Renaissance and Baroque tended to favour arabesque. Damasking should correspond with the style of the whole coat of arms, but it does not have any heraldic meaning, so it does not need to be blazoned.

As a rule, the importance of colour (tincture) was so great that its change, even if the charge remained the same, produced a new coat of arms. By contrast, in Germany, Poland (Silesia) and Czechia such an alteration gave only a variety of a coat of arms, but not a new one. (In the latter countries, varieties within a family were obtained by changing the colour of either the shield or charge.) Evidence to support such a claim may be found, e.g., in the work *The life and death of Jan Twardowski*, written by S. Orzechowski around 1561. The author observed: “When recalling

somebody's coats of arms, neither the charge's colour nor the background are mentioned, which leads to the conclusion that they are not of a heraldic nature". One of the causes of colour change lay in one's descent from an illegitimate relationship, a morganatic marriage or misalliance. The alterations made to a coat of arms in such cases, to mark its degradation (to lessen its dignity), were called abatements. Nowadays, the term 'abatement' (or 'rebatement') means an alteration made to a coat of arms in order to differentiate a new variant from the basic, original, version, e.g. by removing some parts of the charge or multiplying them.

The change of colour may have also indicated an augmentation of a coat of arms (a phenomenon especially frequent in 15th-century Germany), i.e. an alteration made to the original version to distinguish its proper value and dignity. This consisted in adding motives derived from higher-rank coats of arms, such as a royal crown, monogram or charge, etc.

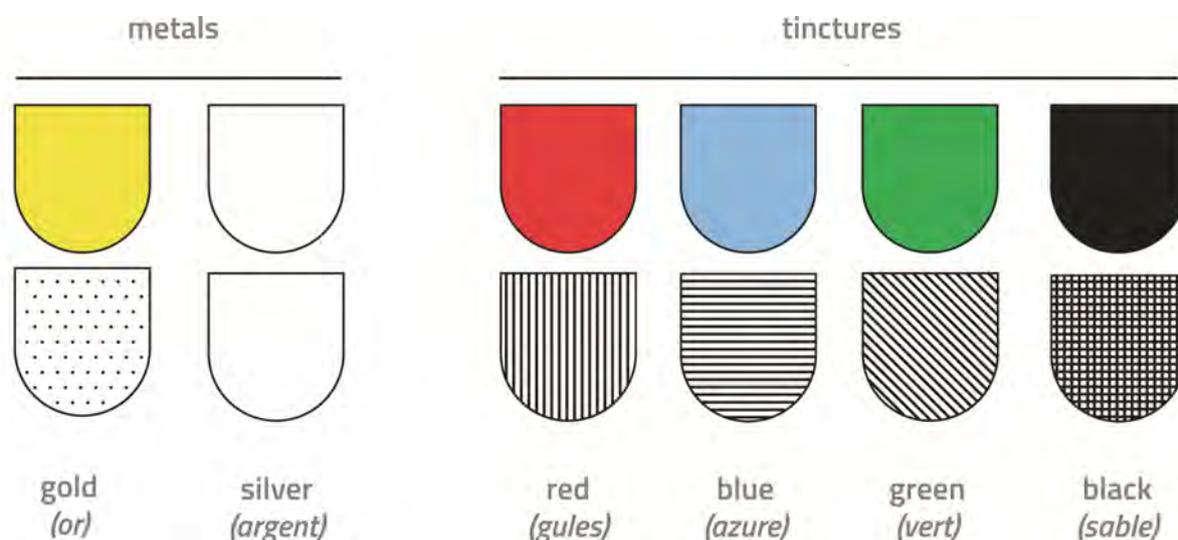
The abatement or augmentation through a change of colour did not affect the heraldic value of a coat of arms because heraldry had not established any hierarchy within colours. Hence, two coats of arms differing only in colour do not carry sufficient information to determine which one was the first (original). Since coats of arms were placed on a variety of objects, among them ones which were unable to render colours (e.g. wood engravings, copperplates, monochromatic prints, seal matrices), it became necessary to invent a technique making it possible to solve this difficulty, namely, hatching (Fig. 5).

Hatching is a system for identifying (encoding) tinctures in monochrome by dots and lines multiplied at various angles. The red colour (*gules*) is represented by parallel vertical lines; blue (*azure*), by horizontal lines; black (*sable*), by a combination of vertical and horizontal lines (a check); green (*vert*), by right-slanting lines; purple (*purpure*), by left-slanting lines; fleshy, by broken vertical lines; gold (*or*), by dense dots; silver (*argent*), by no pattern. Hatching lines are orientated in the relation to the axis of the shield. If the shield is tilted to one side (a so-called heraldic tilt, a kind of heraldic courtesy), right or left, the lines also change their positions and directions, as appropriate.

The first comprehensive hatching system for tinctures was presented by Silvestre de Petra-Sancta in his works *De symbolis heroicis* (1634) and *Tesseræ gentilitiæ* (1638). This system was popularised by Marc Vulson de la Colombière, who described it in 1639 in a theoretical treatise on heraldry.

According to A. Zausznica<sup>5</sup>, the most striking aspect of the development of colour symbolism is the gradual formalisation of the meaning of colour. It was in the Middle Ages that the symbolic meaning of colours became established: the perception of colour understood as a simple, natural emotion engendered by colour evolved into an elaborate system of symbols, each with a precisely specified content. With time, the colour symbolism became a kind of play, a convention. Here, heraldry may be taken as an example. At the beginning, using colours in her-

Figure 5. Hatching



aldry probably had a deeper meaning and reason, which, however, were forgotten as time went by, and the symbolism of heraldry assumed the fixed form of a strictly formal system in which individual colours or their combinations were conventionally assigned a specific sense. The catalogue *Le blason des couleurs en armes* (ca. 1450), written by Sicillus, a herald to Alphonsus King of Aragon, is known as a classical system of heraldic colour symbols.

Heraldry owes a lot to Bartolo da Sassoferrato (1313 or 1314-1357) from Umbria, a professor at universities in Bologna, Pisa and Perugia, the first heraldic theorist, who established the hierarchy of heraldic colours and described their symbolic meaning. He presented his scale of heraldic colours in the work *Tractatus de insigniis et armis*. Da Sassoferrato regarded gold (representing light) as the most noble colour, followed by purple, i.e. red (a symbol of fire), and blue (symbolising air). In his colour hierarchy, silver was higher than black, and green was omit-

ted. The latter colour appeared in the beginnings of the heraldic era, but later on its frequency gradually decreased.

The 15th-century works of French heralds reflected another scale of colours. Compared to that of B. da Sassoferrato, it differently prioritised colours and widened their symbolic meaning by ascribing planets, Zodiac signs, days of the week, gemstones and human virtues to each of them. For example, Clément Prinsault described the symbolism of seven colours: gold, silver, red, blue, black, green and purple (Fig. 6).

Painted coats of arms became an inherent element in the medieval "play on colours". Studying the phenomenon of colour in the material culture of the past, today's scientists place it in a symbolic context. Basing on historical sources, they try to decode the positive or negative meaning conveyed by individual colours. As observed by A. Zausznica<sup>6</sup>, people still tend to attribute specific values to certain colours

Figure 6. Symbolic representation of tinctures as proposed by Clément Prinsault, 15th-century French heraldist

Tincture	Virtue	Element	Metal	Gemstone	Planet	Day of week	Zodiac sign
<b>Gold</b> (Or)	Nobleness Kindness Encouragement Sublimity			Carbuncle	Sun	Sunday	
<b>Silver</b> (Argent)	Humbleness Honesty Chastity Innocence Virginity	Water		Pearl	Moon	Monday	Cancer Scorpio Pisces
<b>Red</b> (Gules)	Courage Bravery	Fire	Copper	Ruby	Saturn	Saturday	Aries Leo Sagittarius
<b>Blue</b> (Azure)	Beauty Sublimity Praise	Air	Silver	Sapphire	Venus	Friday	Gemini Libra Aquarius
<b>Black</b> (Sable)	Mourning Richness	Earth	Iron	Diamond	Mars	Tuesday	Taurus Virgo Capricorn
<b>Green</b> (Vert)	Joy Honour Courtesy		Mercury	Emerald	Mercury	Wednesday	
<b>Purple, violet</b> (Purpure)	Generosity Abundance Wisdom	Clouds	Zinc	Amethyst	Jupiter	Thursday	

in the way imposed by former heraldic, liturgical or other conventions, e.g. green is associated with hope; blue, with fidelity; red, with love; yellow, with hate; white, with innocence; black, with mourning (not everywhere), etc.

In the times during which heraldry took shape (Middle Ages), the use of colours in everyday life followed rigid rules, and colours formed a communication system. As A. Adamska<sup>7</sup> put it, colour served the purposes of classifying, marking, differentiating, associating, contrasting and, finally, hierarchy-building. It was also an identification tool for individuals and communities in terms of various affiliations: national (national colours), class (multiple colours or a lack of colour), religious (colours of habits and ecclesiastical ranks) or emotional (colour of mourning). It is necessary to mention here Michel Pastoureau<sup>8</sup>, a French medievalist whose works extensively discuss many fascinating aspects of the sociology of colours, as well as their symbolism and functions in the Middle Ages. According to him, the way in which colour codes were created and deciphered was heavily influenced by the time and place in which they were formed. That is why the colour codes varied both with time and space, sometimes even being opposed to each other.

The general rules governing the use of colours consisted in permitting or restricting (sometimes even forbidding) the use of certain colours in some specific social circles.

According to Newton's theory of light and colours (presented in his book *Opticks*, published in 1704), colour is a phenomenon of perception by the eye and mind. In the Middle Ages, however, it was regarded as a really existing substance. As a result, shiny and matt colours were treated separately, and were included in the symbolism of light and dark. This made it possible to encode two pieces of information about colour. As a rule, a positive meaning was attributed to shiny colours, and a negative meaning, to matt colours. Only white and blue were always treated as colours with a positive symbolic value.

Deciphering the symbolism of medieval colours is very difficult. M. Pastoureau<sup>9</sup> takes a red colour as an example: lighter red symbolises fire, and darker one represents blood. Each of them can appear in two versions, shiny and matt, which yields four varieties

differing in symbolic meaning. The lighter red in its shiny version is positively associated with Pentecost, while in the matt version it carries negative connotations with infernal fire. Similarly, the shiny variant of the darker red symbolises the Blood of Christ (a positive meaning), whereas its matt variant is associated with physical violence (a negative sense).

In the Middle Ages, a multitude of colours, sharp contrasts or motleys were generally not allowed to wear. Being considered ignoble, they were attributed to individuals excluded from society, practicing "ignoble" professions, such as executioners, prostitutes, usurers, jugglers, musicians or jesters. This group comprised also paupers, beggars, cripples and infidels. Five colours: white, black, red, green and yellow and their combinations functioned as a discrimination tool (blue has never had such a function). Graphic (geometric) patterns: stripes, checks or lozenges, were intended to strengthen the negative reception of those colours. Only one layout of colours on the same plane, i.e. a chequerboard motif, carried positive connotations.

With time, some "stigmatising" colours (e.g. yellow) and colour combinations entered the court fashion canon. Establishing correctly the time point at which a negative coding turned into a positive one (or *vice versa*) proves difficult for today's scientists. When in doubt about the meaning of such problematic colours or colour combinations, scientists find it necessary to examine the context in more detail.

Interestingly, the medieval colour code applied to clothing did not have application to heraldry. The same colour combinations or graphic elements (meaning exclusion from society when used in clothes) had a completely different sense in the heraldic context. Even though both coding systems existed in the same period and the same country (or a smaller community), the encoded symbols could not be deciphered in the same way. For instance, yellow in heraldry represented the most noble metal, gold, which perhaps may have positively influenced the valuation of the yellow colour and its combinations with other colours.

Despite the fact that many studies concerning heraldic issues provide either positive or negative associations evoked by individual colours (tinctures), I am inclined to think that the colours appearing in the field of an escutcheon were meant to hold pos-

itive associations. The ones having pejorative connotations may have been used in the crest topping a knight's helmet with the aim of intensifying the psychological effect of the device (striking terror into the hearts of the opponents).

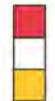
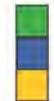
In my opinion, the scientific findings on the symbolism of colours in the past should not be transferred directly to the field of heraldry. The negative symbolic meaning of some colours (e.g. yellow) or patterns (e.g. lozenges, stripes) should not be extended to heraldry. Considering that a coat of arms served the purpose of identifying its owner, it was by nature the carrier of a positive meaning. Therefore, the intentional use of colours having a pejorative sense was rather impossible.

While two metals: gold and silver, and four colours: red, blue, black and green, were used in heraldry all over Europe, the preferences with regard to tinctures varied by country. France, for instance, preferred blue-and-gold combinations, Germany tended to favour red or black combined with gold, whereas Austria and Poland, red and silver. This was often the effect of the tinctures used in the national coat of arms on the other arms.

The above-mentioned influence is very well seen in the case of Poland. S. Mikucki<sup>10</sup>, studying the issues of colour (tincture) in Polish medieval heraldry, found a red colour and a red-silver combination to prevail among the colours and combinations used in knights' coats of arms. In statistical terms, Poland is similar to Switzerland and Austria where the red-silver combination also appears in the gentry coats of arms. The same author, on the basis of an analysis of historical sources back to the 2nd half of the 16th century, prepared statistics on colours appearing in Polish heraldry (Fig. 7).

Coats of arms grouped into heraldic sets became a vital element of the medieval and later pictorial communication. A wood engraving devoted to a session of the Sejm (Polish Parliament), included in the Łaski's Statute (*Commune incliti Poloniae regni privilegium*, a collection of legal acts and privileges compiled by Chancellor Jan Łaski and published in 1506), ranks high on the list of works of art important for Polish heraldry. Among other things, the engraving shows a heraldic set consisting of 25 coats of arms,

Figure 7. Statistics of colours used in Polish heraldry, according to Silvio Mikucki (N = 195; non-heraldic colours were not considered)

place in the coat of arms	frequency
shield	 107  50  12  11  2  1
divided shield	 2  2  2  1  1  1
bicolour charges	 58  28  23  15  7  3  1  1
tricolour charges	 3  3  3  3  2  1  1  1

whose number testifies to the vastness of the kingdom's territories (Fig. 8). Looking from the top to bottom, one can see national and dynastic-family coats of arms, and next (right and left side, alternately) the coats of arms of vassals' lands, former provinces and smaller administrative units. Newer coats of arms, created in the 15th century, were placed at the end.

The Statute, printed on parchment, was monochromatic. Fortunately, a few copies were hand-coloured, leaving to posterity some historical evidence about colours used in the clothes, and especially the coats of arms of that time. As many as 11 coats of arms in the set have a red field of the escutcheon. Additionally, the red colour appears 5 times in parts of the field (division per pale, per fess, checky field). A silver (white) field occurs 4 times; a blue one, 3 times; and a green field, only once.

The Polish family heraldry differed from West-European heraldry. In Poland, each knight had one family coat of arms. As the numbers of the gentry (*szlachta*) were huge, the same coat of arms may have been shared by a few to several hundred families (e.g. as many as 900 families bore the *Jastrzębiec* coat of arms over the centuries). Altogether, 170 Polish family coats of arms were shared among 110 thousand families.

In Poland, the change of a charge or tincture did not amount to the change of a coat of arms, but only produced its variety (Fig. 9). Polish coats of arms typically had simple charges, one-field escutcheons, two to three tinctures. Honourable ordinaries or furs were not used. The most popular crests were peacock or ostrich feathers, or hunting horns, often with a repeated charge. Escutcheons had mainly red fields, but blue ones were also relatively frequent. Gold or silver in the field appeared rarely, and there were only a few specimens with green fields.<sup>12</sup>



Figure 8. Collection of national, dynastic and territorial coats of arms arranged to form a wreath (wood engraving in the *Łaski's Statute*)<sup>11</sup>



Figure 9. Tables showing varieties of coats of arms<sup>13</sup>

### Polish heraldry in the present: Graphic design issues

The Constitution of March 1921 (Article 96) abolished family coats of arms, thus breaking the centuries-old tradition of using them by the gentry. Since that time, new coats of arms in this category have not been created (in countries with a monarchical system, new coats of arms continue to be granted when raising somebody to the nobility), so the gentry heraldry has become a branch of historical heraldry. Other heraldry branches (called “living” heraldry) did not cease to develop. This concerns e.g. ecclesiastical and self-governmental coats of arms. The 1990s brought about a major refreshing change in Polish heraldry: acts on self-governments of voivodeships, counties (poviats) and districts (gminas; towns and cities are also treated as districts) allowed the self-governmental entities to use coats of arms, flags, banners and seals.

The new administrative division of the country (introduced on 1 January 1999) offered a chance to build a modern uniform stylistic system of coats of arms, flags, etc., common to all the regions of Poland. This gave historians-heraldists and designers an opportunity to collaborate on the creation of new heraldic devices. However, since each administrative entity made arrangements for the creation of its symbols separately, the new coats of arms lack stylistic and colouristic coherence, giving a firm impression of chaos. A simple comparison of the new sets of symbols for voivodeships provides evidence that they must have been developed by different people and not by the same design team in a systemic way (Fig. 10). Because no strict guidelines on the colour system were laid down, the new coats of arms differ glaringly in the shades of the same colours. This is especially visible when they are placed next to each

other, e.g. in publications (particularly armorials) and during presentations at governmental or diplomatic meetings.

In order to discuss issues concerning self-governmental heraldic symbols and take a common position on the methods of their creation, the All-Poland Heraldic Colloquium "Contemporary self-governmental heraldry and its problems" was held in October 1999 at the Jagiellonian University in Kraków. The participants set up a committee which formulated a number of proposals and drew up a set of detailed guidelines on how to acquire charges for new administrative entities, reconstruct the coats of arms of cities and towns, create seals and flags, etc. It was generally agreed that today's self-governmental heraldry needs to be based on historical sources and tradition on the one hand, and on heraldic knowledge, on the other. Collaboration with professionals would yield positive results, so the new coats of arms would be correct in heraldic terms. This will allow them to be approved by the Heraldic Commission at the Ministry of Internal Affairs and Administration, and become an inherent part of the self-governmental sets of symbols.

Because not all the issues were tackled, it was suggested that the other decisions (in particular, those on the codification of colours) should be taken by the Heraldic Commission. The latter body managed to issue guidelines on the design of coats of arms (the rule of alternation, the number of tinctures, etc.) only a decade later.<sup>15</sup> However, no mention was made of the parameters of colours. As a result, the newly created coats of arms (apart from being stylistically not uniform, which is hard to achieve) differ greatly in the shades of colours.

The author of this study participated (from 1999) in the creation of the coats of arms and flags for the Małopolskie Voivodeship and a dozen of its counties and districts, being responsible for their graphic design and collaborating with the renowned historians and heraldists Wojciech Drelicharz and Zenon Piech from the Jagiellonian University. The work aimed at building a heraldic-vexillological system that would be coherent in terms of both symbols and colours (tinctures). We selected a set of well-contrasting colours described in the CMYK and Pantone systems, and found it very useful in the design work.

It was also necessary to find appropriate materials for the production of flags and banners (fabrics, fibres, paints). The plan succeeded well: a set of ca. 70 heraldic devices was created. Some of the design concepts and the approach taken to solve the problems encountered in the design work are discussed below.

The coat of arms of the Małopolskie Voivodeship (see Figure 11), as a principal symbol, draws directly on the old arms of the Krakowskie Voivodeship, whose origins go back to the times of Casimir the Great (14th century). The Małopolskie Voivodeship's coat of arms depicts a crowned white eagle in a red field. The eagle has the wings and legs outstretched, and the head turned to the right. Each wing is adorned with a crescent-shaped band terminating in a trefoil. The band and the eagle's beak, tongue and talons are gold. There is an obvious connection between these arms and the national coat of arms and national colours of Poland due to the fact that the arms and colours of the Krakowskie Voivodeship – dating from the time when Kraków was the capital of Poland – were identical with those of the country. Continuing their use today emphasises the fact that the present Voivodeship has a centuries-old tradition. As Jan Długosz, the 15th-century Polish chronicler (also priest and diplomat) put it in his work, the Krakowskie Voivodeship was "the mother and capital of all Polish lands".

The flag of the Małopolskie Voivodeship (Fig. 11) is a piece of cloth consisting of three parallel horizontal strips: white, yellow and red, with varied widths in the ratio 2/5:1/5:2/5. The flag's width to length ratio is 5:8.

As Old Polish counties did not have their own coats of arms, it was necessary to create them from scratch. We assumed that their appearance should be closely connected with the voivodeship's arms and colours (Fig. 12).

Let us take the coat of arms of the Krakowski County as an example. It shows, in a red field, the crowned head of a white eagle with a gold beak and tongue. Using the most honourable part of the Małopolskie Voivodeship's charge, i.e. the crowned eagle's head, as a charge for the County was meant to emphasise the close connection between the two. In other words, the coat of arms of the self-governmental entity of lower rank was created through the abate-

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Figure 10. New coats of arms adopted by Polish voivodeships<sup>14</sup>



Figure 11. Coat of arms and flag of the Małopolskie Voivodeship. Designed by Barbara Widłak



Figure 12. Coats of arms of some counties in the Małopolskie Voivodeship. Designed by Barbara Widłak

ment of the coat of arms of a higher-rank entity. Apart from the charge, also the colours of the County's arms have a direct connection with those of the Voivodeship's arms.

The coat of arms of the Olkuski County was also created by abating the superior arms (i.e. those of the Małopolskie Voivodeship), but this time the abatement consisted in multiplying the charge of the latter. As a result, the coat of arms depicts, in a red field, three crowned white eagles with features identical to those of the Voivodeship's eagle (the same beak, talons, band, colours).

Interestingly, the coat of arms of the Miechowski County bears a relationship not only to that of the Małopolskie Voivodeship, but also to local traditions.

The double red cross on the eagle's breast is connected with the Order of the Holy Sepulchre brought to Miechów in the 12th century, and two crossed sabres refer to the Kościuszko Insurrection (the famous battle of Raclawice in 1794 took place in the County area), and the January Uprising against the Russian Empire (1863–64). The image of an eagle with its head turned to the left is modelled after the banner of the Land of Kraków, under which Tadeusz Kościuszko took an oath to the Polish nation and announced an uprising in the Main Square of Kraków in 1794.

The other coats of arms shown in Figure 12 were created in a broadly similar manner to the arms described above. Two counties with a long heraldic



Powiat Oświęcimski

*Figure 13. Coat of arms of the Oświęcimski County. Designed by Barbara Widłak*

tradition: Sądecki and Oświęcimski, were the exceptions to the general rule. (The coat of arms of the Sądecki County, copying the Old Polish arms, was not designed by our team.)

The work on the coat of arms for the Oświęcimski County did not go smoothly. Much controversy surrounded the use of black in the charge – an eagle. Although the black colour was confirmed by historical sources dating back to the 16th century, some members of the County Council and a part of the local community did not want to accept the colour, associating it with German heraldry, which had a special meaning in Oświęcim where the Auschwitz concentration camp was situated during the German occupation of Poland at the time of World War II. It turned out that even a historically well-grounded colour might arouse strong emotions in present times. Finally, the coat of arms was approved in its historical form: it depicts, in a silver field, a black eagle with the gold letter “O” on its breast; the eagle has also a gold beak, tongue and talons (Fig. 13).

When designing county flags, we tried to emphasise visually the county’s affiliation to the higher-rank administrative entity (a voivodeship). That is why the flag of a county is a copy of the Małopolskie Voivodeship’s flag with the county’s coat of arms placed on it (Fig. 14).

In the way described above we developed a heraldic-vexillological system for self-governmental entities. A systemic approach to the design work made it possible to devise a coherent set of symbols that unambiguously identify counties as parts of their superior self-governmental entity, i.e. a voivodeship.

The work on the coats of arms for districts should have been approached in a different manner due to a lack of long-established heraldic tradition (it started only in the 1990s). Earlier, districts used seals, most often ones dating from the 19th century, sometimes having Old Polish roots. When looking for symbols that would serve heraldic purposes, historians needed to study local traditions, old ownership relations, or veneration of saints in a given area. The designers took a more flexible approach to colours than they did in the case of county arms, using various colour combinations (Fig. 15). The design of district flags was based on the assumption that they would bear the district coats of arms. Figure 15 shows a collection of flags designed by our team and adopted by the districts in the Małopolskie Voivodeship. The piece of cloth is divided into vertical zones (unlike the district flag which is divided horizontally), and has the coat of arms of a district placed in the centre. The escutcheons of the arms usually have blue or red fields. The flags partly copy those tinctures, with the tincture of the field being most often situated at the borders of the piece of cloth (Fig. 15).

Unlike districts, towns and cities have an old heraldic tradition, dating back to the Old Polish times. In this case, the role of heraldists and designers consists mainly in making colouristic and stylistic corrections to the coats of arms. Such an approach can be described using the arms of Kraków as an example (Fig. 16).

In 1937, Marian Fridberg, an eminent historian and heraldist, wrote a monograph on Kraków, and used it as a basis for proposing his version of Kraków’s coat of arms (he did not treat the design as a final version). Fridberg suggested that the eagle situated inside a gate in a wall should form a stylistic whole with the other 16th-century elements of the arms. He produced two colouristic variants of the escutcheon’s field: gold and blue.

In the 16th to 18th centuries, the arms depicted a red wall in a gold field, but there was no eagle



Figure 14. System of flags for counties in the Małopolskie Voivodeship. Design by Barbara Widłak

inside the gate so the gold background of the latter (the same tincture as in the field) was appropriate. Such a background, however, is inappropriate for the presentation of a white eagle (this would break the rule of alternation). In addition, gold appears in such elements as a grille in the gate, and the crown, beak and talons of the eagle, which makes the use of a gold background impossible. To solve this problem, Fridberg tried a black background (on which all those elements would be well displayed), but such an operation was improper in heraldic terms.

The blue version does not obey the rule of alternation either, but is well-grounded in tradition. Since the 18th century, the Kraków's coat of arms has depicted, in a blue field, a red wall with a white eagle placed on a blue background inside a gate. The escutcheon has been topped with a crown, and the two elements formed together a harmonious whole. The Council of the Kraków City accepted the latter design in 1937, and submitted it to the Ministry of Internal Affairs for approval. The decision, however, was not given till the outbreak of war, and after the war the issue ceased to be topical. Only 65 years later

(in 2002) came the present version of Kraków's coat of arms into being. The author of this study (entrusted with the task by the City Council) made artistic corrections to the earlier arms, while retaining their traditional 65-year-old tinctures. It is worth mentioning that a white eagle in a blue field matches well the white-blue flag and the colours of the city.

In some works, such as *Miasta polskie w tysiącleciu*<sup>16</sup> for example, we can find yet another design of the Kraków's coat of arms, this time with a white wall in a red field. Though correct in heraldic terms, it has not been supported by any historical evidence: all the sources have described the city walls in the Kraków's arms as red.

When collecting material for the present study, I fully realised the complexity of the subject. It is thus necessary to conduct further research to clarify all aspects of the fascinating issue of colour (tincture) in a coat of arms.

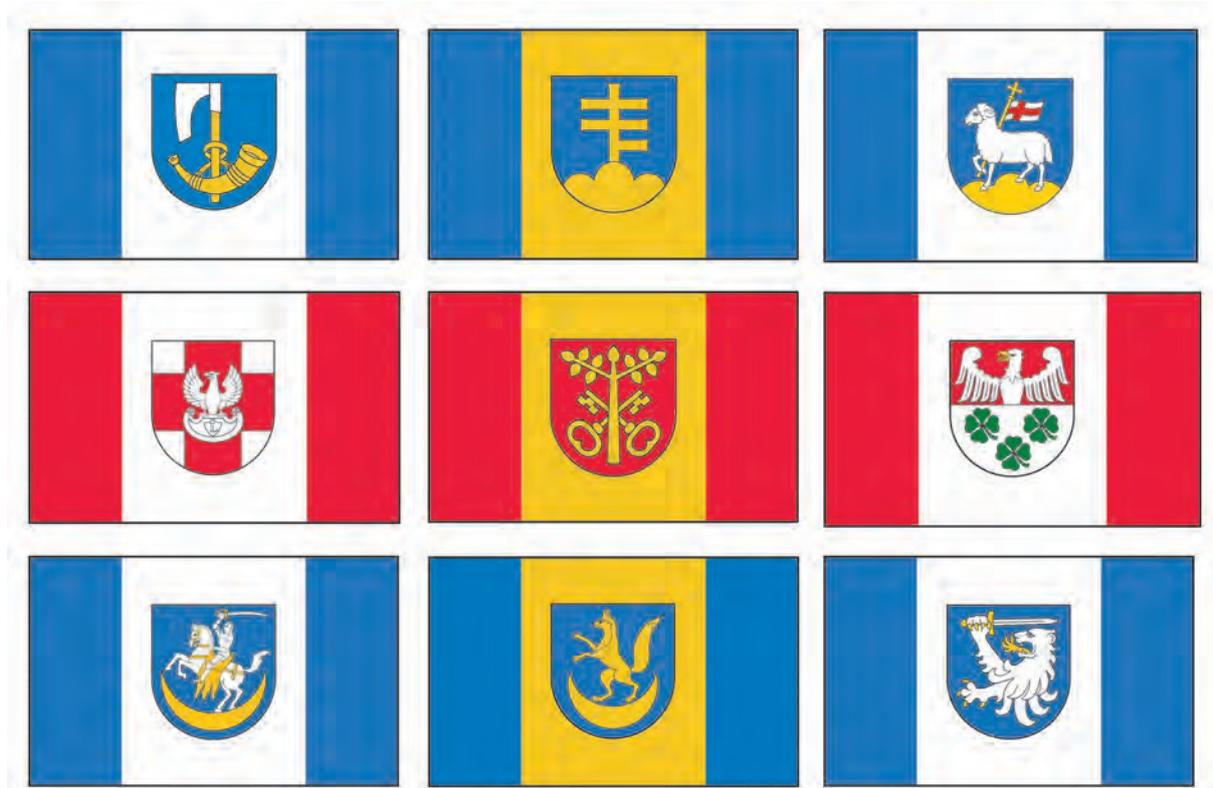


Figure 15. System of flags and coats of arms for districts in the Małopolskie Voivodeship. Design by Barbara Widlak

### Conclusion

The second half of the 12th century was an important time in the history of colour perception as it saw the beginning of transition from the former Indo-European triad of so-called primary colours (black, red and white) to the new canon of six colours (black, red, white, blue, green and yellow). Heraldry, that took shape in roughly the same period, used this canon from the very beginning.

The broader concept of 'tincture' was formulated at the end of the 13th century, and has been used since then. The tinctures encompass metals, colours and furs (ermine and vair). There are two metals: gold (considered as an equivalent to yellow colour), and silver (treated as an equivalent to white), and four colours: red, blue, black and green. Heraldry accepts also two additional, but rarely used, colours: purple – for mantles and lining of king's or prince's crowns, coronets and hats, and flesh colour – for the natural colour of human skin.

It is not allowed to combine an unlimited number of tinctures in the field of an escutcheon (an ideal coat of arms contains no more than two of them), nor to put

one colour on another colour or one metal on another metal; the rule of alternation should be obeyed.

The importance of tincture was so great that its change produced a new coat of arms, with the exception of Germany, Poland (Silesia), and Czechia, where such a change gave only a variety of a coat of arms.

The preferences with regard to tinctures varied by country. France, for instance, preferred blue-and-gold combinations, while Germany tended to favour red or black combined with gold. This may be attributed to the influence of the tinctures used in the national coat of arms, which is best seen in the case of Poland where heraldry gives priority to a red colour, and among combinations, to a red-and-silver one.

In the Middle Ages, during which heraldry developed, the use of colours in everyday life was governed by strict rules. Among others, colours designated one's belonging to a particular social group. Wearing multiple colours, sharp contrasts, checked or striped clothes was considered ignoble as such patterns were attributed to individuals that were excluded from society (e.g. executioners, prostitutes, usurers, jesters, infidels). Five colours: white, black,

red, green and yellow and their combinations had a discriminatory function. However, this did not apply to heraldry: whenever the above-mentioned colour combinations, and even geometric patterns (lozenges, stripes), appeared on the escutcheon, they always carried positive connotations.

Assuming that the current self-governmental heraldry needs to be based both on tradition and heraldic science, the author of the study in collaboration with the eminent historians and heraldists from the Jagiellonian University, Wojciech Drelicharz and Zenon Piech, has designed coats of arms and flags for the Małopolskie Voivodeship and a dozen of its counties and districts. Those devices form a modern heraldic-vexillological system that is coherent in terms of symbols and colours.

The study has led to the following main conclusions: Any negative associations concerning colours do not apply to coats of arms (negative connotations may only be attached to crests).

The fact that heraldry since the Middle Ages has not discriminated between the shades of individual colours has resulted in serious inconsistencies in the appearance of coats of arms representing the same type. It is thus necessary to work out a well-ordered system of colours in which their shades would be precisely defined.

### Acknowledgments

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Figure 16. Various versions of the Kraków's coat of arms: (a) and (b) versions designed by Marian Friedberg; (c) version presented in the publication *Miasta polskie w tysiącleci*<sup>17</sup>; (d) official version of 1991; (e) version designed by Barbara Widlak (currently used)





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## True Colours: Polychromy in Ancient Greek Art and its Dissemination in Museum Collections

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### Abstract

White is the first colour which comes to mind when one thinks of ancient Mediterranean art. However, the white marble objects from the ancient Mediterranean world that we see in museums today are not entirely representative of ancient art, as they were originally painted in various colours. Yet only a very few traces of the original colours have survived the ravages of time. Although it is now a well-established fact that ancient sculpture and architecture were painted, much more scientific research is still needed. New scientific methods, especially in the natural sciences, can contribute with new knowledge of e.g. pigment identification, binding media, and painting techniques, so that we can reach even higher levels in the understanding of ancient polychromy. The present paper examines some of the recent work and methods on the study of the polychromy of ancient Mediterranean artefacts carried out at the Ny Carlsberg Glyptotek as well as the dissemination of these results to the wider public.

### Historical perspectives on colour in ancient Greek culture

The fascination with colour in ancient Greek art and language has a long history in scholarship. The most influential approaches to colour in ancient Greek art date from the middle of the 18th century when the German art historian Johann Joachim Winckelmann in his *Geschichte der Kunst des Alterthums* (1764) expressed the view that the Greeks preferred the untainted beauty of the white marble to polychrome statuary. A century later, in his studies on the vocabulary of Homer, the English scholar and statesman

Gladstone emphasized the absence of a large and varied colour vocabulary in the language of Homer.<sup>1</sup> Gladstone's claim was misinterpreted: it was thought that he meant that this was due to a physiological difference, rather than a cognitive or cultural one, due to which the Greeks had impaired colour vision. This was believed to justify the fact that Greek, especially Homeric, colour vocabulary was dominated by dark and grey shades. Even if separated by over a hundred years, and despite their different points of departure, Winckelmann's and Gladstone's views on the absence of polychromy in the Greek colour vocabulary, both artistic and linguistic, converge. The latter half of the 20th century approaches to colour was highly influenced by the 1969 study by Berlin and Kay on the colour terms of 98 languages focused on the existence of universal constraints in colour-naming across languages.<sup>2</sup> It included Homeric Greek, but based its finds on Gladstone, thus concluding that Greek colour vocabulary had reached only the third or fourth (out of eleven or more) stages of basic colour terms emerging in the vocabularies of human languages. Yet in recent decades, classical scholars have moved away from earlier primitivist and evolutionist approaches to suggest that colour is a more complex cognitive and physiological experience and that the use of colour was ubiquitous in all aspects of ancient Greek culture in both private and public life.<sup>3</sup> Furthermore, new analytical methods in archaeology and conservation have made possible the development of new methods of revealing the original colours of ancient Greece.

### Examinations of the polychromy of ancient artefacts

The term 'polychromy' comes from the Greek words *poly* (many) and *chroma* (colour) i.e. multi-coloured. Polychromy thus covers the use of many colours, for example in connection with paint applied to architecture and sculpture.<sup>4</sup> Colours were an important aspect of ancient artefacts, but due to disadvantageous conditions of preservation, to the fragility of the paint, and, not least, to actual cleaning, the majority of the original colours have today disappeared. Due to the sparsity of these traces, studies of ancient polychromy often focus on the identification of pigments. The attestation of colours can occasionally

be done using the naked eye or by macroscopy, but usually further examinations are required.

Among the most important non-invasive examination techniques is visible induced luminescence (VIL). VIL is a photographic technique developed by Giovanni Verri at the British Museum in 2009. It can detect the pigment Egyptian blue which is a bright blue, crystalline pigment, possibly the earliest artificial pigment ever produced.<sup>5</sup> Egyptian blue is a calcium copper tetrasilicate compound ( $\text{CaCuSi}_4\text{O}_{10}$ ), made by heating a calcium compound (such as powdered limestone and sand rich on calcium carbonate), together with copper and quartz. It appeared in Early Dynastic Egypt in the 3<sup>rd</sup> millennium BCE, and its use rapidly spread thereafter throughout the Mediterranean littoral.<sup>6</sup> Using the recently developed VIL method, this particular pigment can be identified – even when present in quantities completely invisible to the naked eye.<sup>7</sup>

The VIL method is non-invasive, since it neither requires sampling nor causes any other damage to the object. Egyptian blue is often preserved in extremely small quantities in the porous surfaces of ancient objects, which makes it hard – if not impossible – to identify the pigment even with a microscope. The pigment has, however, the unique property of absorbing visible light and emitting it as infrared radiation within a particular interval of wavelengths (800–1000 nm with a peak at 910 nm.). The luminescence emitted by the pigment grains can be recorded with an infrared camera in a darkened environment. The technique thus exploits the powerful emission identifying single particles of Egyptian blue, which are otherwise undetectable. An example of the detection of Egyptian blue is a Classical marble relief, dating from ca. 360–350 BCE in the Ny Carlsberg Glyptotek (Fig. 1). The luminescence phenomenon is illustrated in the black and white image (Fig. 2) where the white glow represents Egyptian blue while the remaining elements appear grey. The image shows luminescent parts of the background and parts of the hair and face of the bearded man indicating the use of Egyptian Blue. Interestingly enough, a VIL-survey of the Greek artefacts in the Glyptotek shows no use of Egyptian blue on the Archaic material, only on artefacts from the Classical period onwards.<sup>8</sup>



Figure 1. Greek grave relief in Pentelic marble. Ny Carlsberg Glyptotek, inv. no. IN 2615. H. 138 cm. Photo by M. L. Sargent

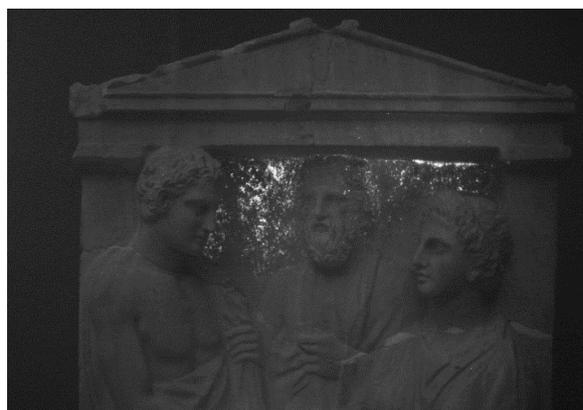


Figure 2. VIL image of the grave relief showing the use of Egyptian blue on the background of the relief. Photo by M. L. Sargent

The use of UV is also part of the examination procedure. A number of organic substances fluoresce in ultraviolet light, for example kermes and madder lake, but also organic binding agents such as resin, glue and varnish. On ancient artefacts it is typically

madder lake, which can be traced with UV. An example of this appears clearly in the UV images of the portrait of the Roman emperor Caligula (37–41 CE) (Fig. 3). The coral red fluorescence in the UV images indicates that the lower rims and inner corners of the eyes as well as between the lips were painted with madder lake (Fig. 4–5).



Figure 3. Portrait of the Roman Emperor Caligula. Ny Carlsberg Glyptotek, inv. no. IN 22687. H. 28 cm.

Photo by M. L. Sargent



Figure 4. UV image of the eyes of the portrait of Caligula, illustrating the use of madder lake.

Photo by M. L. Sargent



Figure 5. UV image of the mouth of the portrait of Caligula, showing fluorescent red between the lips.

Photo by M. L. Sargent

Yet the identification of pigments, no matter how important, is not entirely sufficient to determine the original appearance and perception of the painted artwork, the choice of binding media was almost equally important. Depending on the choice of binder, the paint could be either matt or gloss, and the nuance, intensity and coverage of the pigments would change. These binding media, which made the pigments adhere to the surface of the artefact, were often derived from proteinaceous materials such as egg or casein, vegetable gum, drying oil, or natural wax, and occasionally mixed together. However, organic materials have usually disappeared from the archaeological record, and the binding media are therefore often impossible to detect. So far, the most diffused analytical approach to identifying organic materials has been Gas Chromatography-Mass Spectrometry (GC/MS).<sup>9</sup> Yet another new pilot project carried out in the Ny Carlsberg Glyptotek in collaboration with the Centre for Geogenetics has demonstrated how Mass Spectrometry-based ancient protein sequencing can be used to confidently identify the biological species of origin and the raw materials used as binders applied to ancient art. Thus using LC-MS/MS proteomics it was possible to identify the use of animal glue, produced from either cattle skin or cattle bone, as a paint binder on ancient Egyptian architectural fragments.<sup>10</sup> This means that we will be able to better understand the painting techniques as well as the original appearance, which is important information for the potential reconstructions of ancient art.

### Communicating ancient polychromy at the Ny Carlsberg Glyptotek

The ongoing research on ancient polychromy carried out at the Ny Carlsberg Glyptotek is published digitally on the homepage [www.trackingcolour.com](http://www.trackingcolour.com). The purpose of the website is to provide an open source online database of ancient monuments which have been examined for traces of colours and thus to create a broader public awareness of polychromy studies.

Ancient polychromy has been presented in several special exhibitions during the past ten years, in particular the travelling exhibition *Gods in Colour (Bunte Götter)*, which has been shown in a host of museums in Europe and the US.<sup>11</sup> At the Ny Carlsberg Glyptotek two special exhibitions, ten years apart have been presented: *ClassiColor* (2004), which was realised in collaboration with the Staatliche Antikensammlungen und Glyptothek in Munich and the Musei Vaticani and *Transformations. Classical Sculpture in Colour* (2014), both expertly curated by Jan Stubbe Østergaard.

Since colours were an important part of the ancient lived experience, research into ancient polychromy should not only be disseminated via special exhibitions, but should be included in the permanent exhibitions. In this way, polychromy research could with advantage be carried out in collaboration with the re-organisation of ancient collections in the museums, thus forming a relevant and important connection between research and dissemination of knowledge. Furthermore, or as an alternative, the museum collections can employ “colour tracks”, which visitors can follow – preferably digitally – and in this way be able to include e.g. VIL and UV images of the ancient artworks. Thus, ancient polychromy can be communicated to many different audiences in the form of guided tours, digital “tracks”, lectures, podcasts, videos, conferences, and live workshops, where visitors can participate in, for instance, making pigments and painting using ancient techniques.

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## Aesthetic Hypnosis on the Contemporary Architecture: the Role of Colour and Light

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### Abstract

Three aspects are capturing the attention of contemporary architecture: language, politics and economy. Around these topics we can understand some key-points managing the role of today's architecture. In particular the colour, historically very important language exploited over the building facades, seems to prefer during the daytime a grey tones, but mainly changing overnight. The screen city seems to give to the life a second day, more fascinating than the sun-lighted one. The language change his way of communication in a new Babel. Many languages aren't able to express what is essential for the life. A collective hypnosis seems to have captured the minds of all generations. They are satisfied by a life spent to use playtools like smartphones till the screens disseminated along the city. But, on the other hand, few peoples are governing the world using the economic power. They use a lot of colours to distract the attention of this mass of playing people.

### Backstory

When a useful space is left free, there is a high probability that someone else will occupy it. A newly ploughed land will be occupied with vegetable and animal forms without any need to sow. It is only a matter of time and of adaptation capacity of species. The more resistant stifle the most fragile. It's a natural law. Charles Darwin has explained in his book *The Origin of Species* published in 1859 what happens by natural selection. Let's say that a kind of natural selection and evolution has taken place in the world of architecture. How this happened is matter of a long history. Few words suffice to grasp the change size.

This ancient art<sup>1</sup>, architecture, is not separated from issues of language, of politic and of economy.

Already Vitruvius mentions them in his *Ten Books on Architecture*. These three aspects are intrinsically linked to each other and take turns continuously. Sometimes they are succeeding each other or find reciprocal mediations.

1. To be understandable **language** evolved along very long time, first adapting to various local realities, then spreading to the nations, then to the globalized world. The thought is initially expressed through oral forms. The thought is translated into words interpreted by the community as distinctive of something (objects, people, concepts, etc.). The Gutenberg's invention, the reproduction of texts by printing, enabled literacy and knowledge on a larger mass of population. Finally, the mass media have spread a planetary level of communication, but low inclusively. In fact today we practice all possible forms of communication, perhaps at the expense of the language, because cultures are unable to keep in step with the speed of technical change. We could argue that the language has been replaced by other, less direct forms of relationship between human beings and between them and their works. The craft was first replaced by the industry and now from IT, and automation.

2. In the same way the **political** issues have alternated in the search for models of government which could be accepted or imposed within the various communities. The social organizations were born and grew up initially for small groups. These have expanded and then replaced by state aggregations. Subsequently, the states came together in organizations that bring together multiple states (US, EU, etc.). Ambrogio Lorenzetti (Siena 1290-1348) in 1338-39 in the room called the nine (nine citizens who in turn governed the city of Siena) of the Public Palace painted the Allegory of Good Government. On one wall he paint the allegory of good governance: acting for the common good (Fig. 1). In the other wall there is the allegory of bad government: one that operates only for the private interest (Fig. 2). Politically, we might guess that one is concerned with democracy and the other of tyranny. The latter, disguised under a pseudo-democratic semblance, now governs the world through the economy.



Figure 1. Ambrogio Lorenzetti, Palazzo del governo, Siena, *Allegory of The Good Government: 1338-1339*<sup>6</sup>



Figure 2. Ambrogio Lorenzetti, Palazzo del governo, Siena, *Allegory of the Bad Government: 1338-1339*<sup>7</sup>

3. Once the **economy** took place in a direct manner, with barter. The origin of the currency will implement an economic revolution. Thanks to technology, the use of IT for the finance area, it will upset the composure of so many centuries of refinement in ways to organize production, to give value to the goods and the way to trade them. The latest economic crises are the obvious result of the economic tyranny (interest of a few at the expense of the

masses) unable even to self regulate. The replacement of commodity production with speculation will implement systems unable to stand rules and limits. Therefore, this process underlies great disasters. The replacement of the politics by the economy, following rules that no economist can imagine, necessarily entails a number of consequences. The first of these is the introduction of a new language and the transformation of human beings from subject to

consumer. The community will be replaced by subjectivity and thus the competitiveness in itself will isolate one another.

The new language is that of science and technology (techno-science). Its introduction takes place in the modern era (beginning in 1492 with the discovery of America). The first step is to separate the brain from the body: René Descartes's *cogito ergo sum*. The body is a surplus that serves only to keep the brain alive and make it work. Immanuel Kant, follower of the Enlightenment, confirmed that only through reason you could give answers to the problems, even to metaphysical ones. Among his theories there is also that on the aesthetic judgment, which is not more subjective but it becomes a relationship between universal and particular. Therefore the human being is investigated, analysed, dissected up to discover the rules that allow a manipulation similar to that which can be accomplished on the machines. This way of think is typical of medical science. In parallel, however, the brain must be studied thorough-

ly, because managing to unearth the mechanisms of operation is easier to control and manipulate his thought. So in addition to the doctors take charge of the problem psychologists, sociologists, marketing. Science, continuing its wide-ranging research and trying to occupy every existing environment is perfected, allowing a multitude of technological implications. The technique is nothing but the practical continuation of science.

### Architecture and Colour

In the architectural field all these steps in a nutshell lead to create buildings from the most diverse shapes, placed anywhere and almost always indifferent to where they are located. The most glaring example of this architectural indifference to the place we can see in Dubai (Fig. 3). A desert climate that would require shielding the sun heat by any means makes extensive use of glass walls. These buildings require, of course, plants and energy consumption unmatched in the entire human history. In a way the architecture is going against itself.



Figure 3. Dubai, United Arab Emirates, © Oosterhuis K. 2016

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Everything seems to start about 20 years before the French revolution and is related with the shape, not with the colour. Claude-Nicolas Ledoux designed the "House of the Forestry Guard in Château de Mauperthuis" giving it a spherical shape (Fig. 4). "The ball is a no architectural form, indeed, anti-architectural. Cube, pyramid, cylinder are, however, in a very vague sense, primitive forms of architecture: the sphere certainly not".<sup>2</sup> While the colour was needed to represent the Lorenzetti's city of the good government it becomes negligible in the contemporary buildings. It is not exactly like that, but an architectural interest signal for the colour interacts with the humanization and dehumanization of the buildings. The economically advantageous position in terms of income usually needs to produce a hypnotic effect on the likely buyer. Colours that might not like cannot distract him.

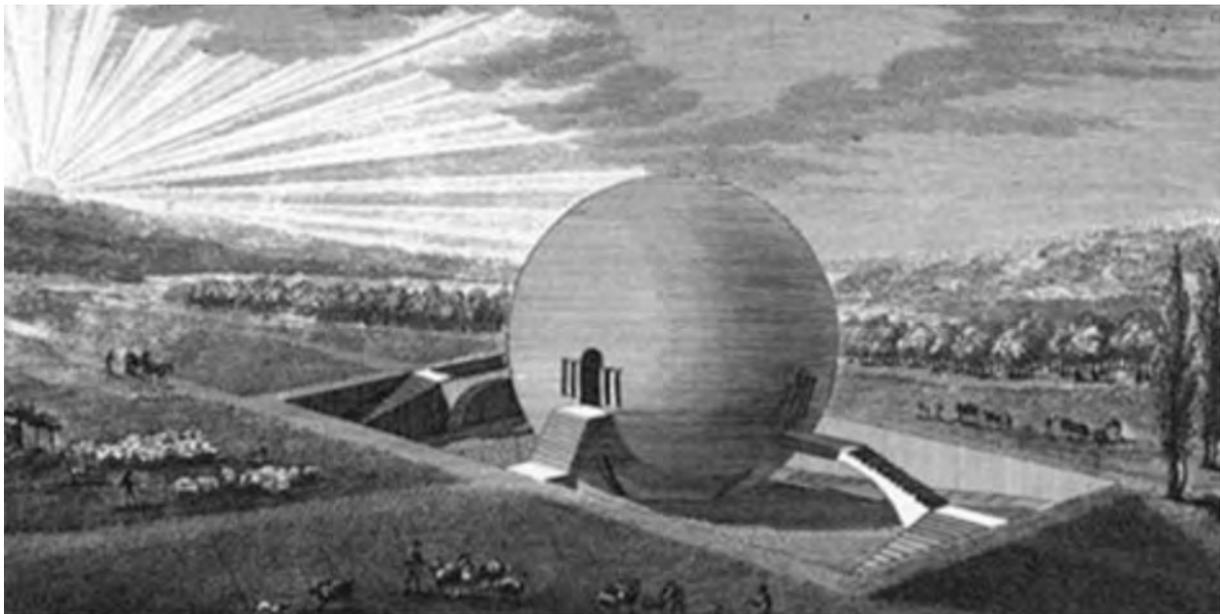


Figure 4. Claude-Nicolas Ledoux, *House of the Forestry Guard in Château de Mauperthuis*. Project, 1790, in Sedlmayr H. 1983. *Perdita del centro (Loss of center)*, Rome: Borla, figure 7

The aesthetic hypnosis you get better with formal solutions and with the use of colours to low level of eye-catching. A colourful building is very personal; touching the taste of the subjects, their intimacy and then in terms of the market a may become un-sellable. Just remember all the research in this area carried out by Wilhelm Wundt, Vasilij Kandinsky, Gus-

tav Jung, Herman Rorschach, Max Lüscher and many more up to date. The psychology of colour strongly affects different personalities. So the producers and investors orient the colours in order to capture the largest number of customers. Usually light colours, glass and metals are not very impactful in the human psyche. So many contemporary buildings are shiny and greyish.

The colour, however, belongs to the place's culture, especially in architecture. The buildings are born using the materials of the various places, and then their colours, then following laws and rules that could be political, religious, and representative. The painted city (*picta civitas*) is very frequent in places where the architectural culture and art have placed themselves at service and representing the power. Obviously the cost of pigments and dyes has done its part. Every place on earth has continued its history in such a way as to represent the steps mentioned before.

With the advent of contemporariness has happened a sudden change in the colour use, both in architecture and in many other areas. "Our environment is full of colors, by day and night, in public and in private spaces, screeching or whispering, require our attention".<sup>3</sup> The low cost of coloured materials in parallel with the advent of mass media using colour to attract and also mesmerize the users by focusing their attention on one channel, an advertisement, a theme that doesn't require from the audience the use of reason, but a strong use of emotion, distorts the historical understanding of the planet. The Earth has already become much smaller thanks to faster communications, the transmission of messages that travel at a speed never experienced before, becomes an overload of colours place, with very saturated tones occupying all hours of the day. Especially at night coloured lights eliminate the spectral appearance of urban landscapes illuminated by

street lamps using electronic screens similar to the television ones still becoming larger and larger until to occupy entire walls.

The screen, which has become a place of interpersonal communication, occupies every allowed space. The city spreads along screen information panels distributed throughout the urban and landscape space, making a completely artificial nature, as well as every single life. A global population hypnotized by screens that run from intimate to social ones can only be easy prey (Fig. 5). They are prey rather than any ideology or any ideological disappearance. The market in all this runs his business having not to respond to a government or any other authority. The truth passes along the screen, where your neighbour's voice is not heard directly, but through the filter of artificial instruments. The architecture in all this has thrown out form, as now the two dimensions are strictly necessary to enclose an unlimited space where the simulation allows everybody to move in any direction, in and out of dream spaces. Reality must be transformed into something that can be reduced to two dimensions. Sight, hearing and touch are the three ways that may exist. The body reductionism began with the transformation of the body into the brain is continuing scientifically. Only some people have benefits from this situation. They are highly myopic with the effects against nature they are producing. The colour, in this perspective, has some responsibility.

Figure 5. Piccadilly, London. Photo by P. Zennaro, 2016



## Conclusions

Staging a sort of economic-mercantile empire supported by totalitarian pseudo-democracies delights our age. This age is described as one without ideology, having nothing to celebrate. It's free of language that contemplates the beauty. In this time the built form is indifferent to the places, the local environments. This era needs arts able to represent its meaning, its sense if you find any.<sup>4</sup>

Currently there is a sort of Babel of any language, including the architectural one. In this context the "venustas" is too "babelized", confused, uncertain, unstable and inexplicable. Faced with a return to basic forms of communication it would seem necessary a return to basic communication levels, without languages, rules and formalization. The return to the communication through colourful pictures seems one of the most easily roads.

In a sort of Middle Ages again, when most of the population was illiterate or speaking a myriad of dialects, the only way to convey some message was by drawing, painting and sculpture. The representation and communication let the creation of message by the use of light, colour and shadow. In this new Middle Ages, in the Babel of languages, peoples, cultures, all that remains is to transmit iconic messages, passing through images understandable by every social member. Globalization makes use of this new approach.

So the architecture is transformed, no longer processing the forms to make them functional, but taking care to modify the walls turning them into huge media screens, where are projected and stigmatized the unifying message of contemporary living.

In this era the transmission of knowledge has shifted downwards its statutes. A last attempt to recover a semblance of mass culture isolating the beauty as useless to overpowering purposes that are self-generated is driven by some gurus of the ugly as unifying element. On the other hand the transmission of messages has increased the amount of signals with the aim of reaching every potential consumer. In this panorama the colour, together with the artificial light<sup>5</sup>, provide a kind of collective hypnosis, an aesthetic lethargy that manages to fall asleep any attempt to recover the beautiful, architectural and aesthetic in general.

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## Color as a Film Hero

Glen CASTINHO<sup>1</sup>, Marcin KOSZAŁKA<sup>2</sup>, Robert SOWA<sup>3</sup>

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### Abstract

Psychological and semantic aspects of color as a film hero. Dramaturgy of color in film image and art cinematography understood as a visual art. Analysis in the context of the color meaning and film composition, widely understood of art image (painting, photography, graphic and visual actions).

### Introduction

"Color as a hero" is about language, conception and construction through color and color meanings in filmmaking process. In the context of: dramaturgy of color, color variation and its impact on the emotional perception of film images. Approximate the tools and methods of work of the color correction in post production process (digital intermediate, digital colorist, grading, postproduction environment and color design). Theory in digital intermediate the importance of understanding the intermediate process in conjunction to VFX.

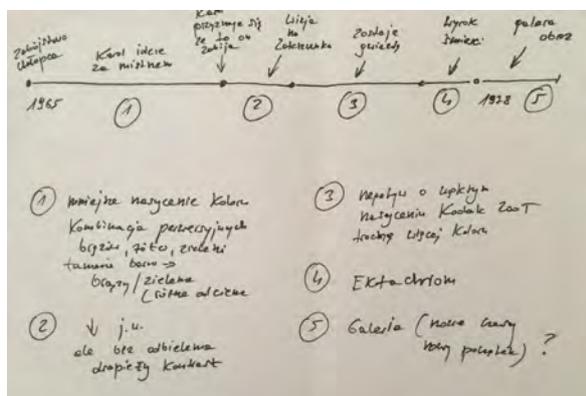


Figure 1. *Red Spider*, line of colour. By M. Koszałka, R. Sowa, 2015

### Method

#### Colour in The Red Spider (dir. Marcin Koszałka, feature film, 2015)

A crucial task in creating a coherent film world was selecting appropriate, non-obvious locations. Cracow, known for its picturesqueness and historical monuments, just would not fit into this. In the triggering of this impression, it was important to set lamps appropriately and to select correct foils, in order to create a combination of artistic colours of set design, costumes and light.

Before shooting, was a lot of rehearsals with set design, to developed a colour palette for scenography i.e. walls, wallpaper, furniture.

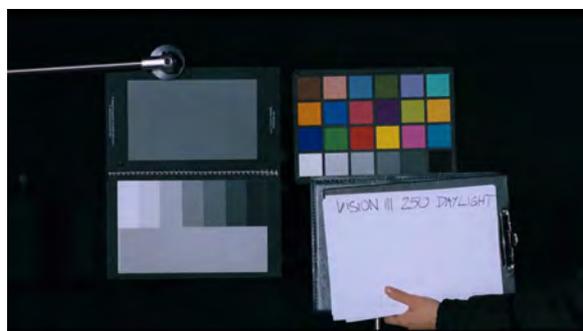


Figure 2. *Red Spider*, colour test. By M. Koszałka, 2015



Figure 3. *Red Spider*, camera test. By M. Koszałka, 2015

Having established this palette to find a suitable foil that would have given the colour of the light. Colour is one of the most important components of the film, you can even consider that it was the equivalent to a third protagonist. Colour in *The Red Spider* was like another actor. It has its dramaturgy, its variability. The colour in film has an identity and it develops. This starts with rotten, dirty green, very low key. Darkness, midtones are dominating. At the time of an important dramatic turning point both in the script and for the main character Karol, there is also

a change of colour. The darkness disappears, blues and lighter greens appear.

To obtain and emphasize such a change on the screen, in the first part of the movie was used FUJI negative, which gives more green tones, and later KODAK negative, which gives a warmer colour, also green dominants are absent. A significant sequence, important for the fate of the protagonist, is a visit to the scene of crime. In the movie there are two of them. During the first one, when Karol admits to committing the murder, which practically means that he will be sentenced to death penalty, he also becomes someone famous, a kind of a „rock star”, and finally reaches the position he has always dreamed of. To emphasize the dramatic function of this sequence was used a special technique of processing the negative, which gives sharp contrast.



Figure 4. *Red Spider*, negative and colour processing. By M. Koszałka, 2015

Another important scene was the scene of main character's execution. That scene in prison automatically creates a cultural connotation with Krzysztof Kieślowski's *A Short Film About Killing*. The confrontation with such an important scene for the Polish and world cinema was inevitable. To avoid duplication was used a new palette of colours than Sławomir Idziak, Kieślowski's cinematographer, and used a very rare positive material KODAK EKTACHROME. As a result, was highly saturated colour scheme, stronger than the actual colour palette. This contrast was extremely important to dramaturgy of the scene, which took place underground, but in a very sunny day. In this scene there is a darkness of prison corridors contrasted with bright light. There is no moment of the death of the hero. Karol dies off screen, surrounded by sun rays.

The last scene, a visit of Lucjan Staniak to art gallery, where he sees a portrait of Karol Kremer, is a scene of their intimate meeting after years. To emphasize this very personal atmosphere, the scene was shot with the digital camera SONY F65. This camera is characterized by high sensitivity, higher than negative cameras. To have very soft, natural light in the gallery. With no lamps on the set, so as not to disturb the mood that was important, and which is the dramatic end of the relationship between those two characters.



Figure 5. *Red Spider*, grading process. By M. Koszałka, R. Sowa, G. Castinho, 2015



Figure 6. *Red Spider*, grading process. By M. Koszałka, R. Sowa, G. Castinho, 2015



Figure 7. *Red Spider*, grading process. By M. Koszałka, R. Sowa, G. Castinho, 2015



Figure 8. *Red Spider*, selected frames, dramaturgy of colour. By M. Koszałka, R. Sowa, G. Castinho, 2015

### Conclusions

„There is not only a passive physiological perception of visual experience, but next to it – active cognitive work of our intellect. It is the mutual influence of thought on the vision and the vision on the thought. The thought raises questions which are to be answered by vision. From this relationship between vision and thought arises – awareness”.<sup>1</sup>

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## II. **Colour & Design**





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## Colour for Children Spaces

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### Abstract

It is important for those who design products and spaces for children to properly use the language of color. This paper provides information on visual and cognitive abilities of children at different ages, and gives the basics of the color grammar and syntax. Also, it shows how colors can be employed to allow an easy understanding of the space. Through color, one can define the function of space, its dimensions and proportions, its borders and navigation paths. With proper design, it is possible to facilitate the reading of spaces for children of different ages and to determine the emotional quality of an environment.

### Introduction

The place where a child lives is highly important for his emotional well-being. Therefore one should read and understand signals and messages that are sent by environment colors. In architectures for children who have not yet learned the verbal language, visual communication plays a fundamental role. Colors can be employed to allow an easy understanding of the space. Through color one defines the function of space, its dimensions and proportions, its borders and navigation paths.<sup>1</sup>

A newborn baby starts to distinguish the outlines of forms for differences in brightness, then distinguishes the movement; then again the figure and shape. Color recognition is the final phase of development.<sup>2</sup> At birth the baby is able to sense the stimuli coming from the surrounding environment, but he cannot elaborate them, get them into images and therefore understand them. His visual faculty keeps pace with his ability to understand what he sees.

In the first months of life the visual system is critically affected by the environmental influence: visual development is closely connected to the stimulus.

A new-born child prefers flat, very contrasty and relatively simple figures, then when he grows, he will prefer more complex shapes, volumes and colour shades. As a child grows, he improves his visual and motoric

abilities; this changes his requirements for space, and increases his level of autonomy in movement and in the communication with surroundings.

The stimuli should be adapted to the capacity of the child; color schemes, like shapes, sizes and patterns should vary with growth. If stimuli are too simple the baby will not look at them very much since they are not very interesting, vice versa he will not look very much at stimuli which are too complex because they are too tiring. To simplify, the perceptive development can be divided into three stages.

1st stage, from 0 to 3 years old – the baby pays attention to the shape.

In this stage the structural elements of the shape are more important than colour. Only when the shapes are very simple and have been experienced, thus they are no longer informative such as for example a circle, colour reading takes priority on the reading of the shape.

2nd stage, from 3 to 5 years old – the baby pays attention to colour. In this stage the baby already knows the world of the shapes and therefore his attention shifts to colour. In his choices colour becomes the most important element, while shape takes a secondary role.

3rd stage after 5 years old – shape prevails over colour again.<sup>3</sup>

After the age of five years old, which coincides with the beginning of the schooling, and with the need for distinguishing different characters in order to learn to read and write, the metric aspects of the shape prevail again over colour. Colours with a low visual impact help the reading of the shape and make easier to learn to read and write.

From school age onwards the colour choices are determined by other elements, such as cultural influences and taste leanings; and also by the personal relationship that everyone has with colour.

The presented research provides information on visual and cognitive abilities of children at different ages and some rules to design color in children spaces.

### Child color and space perception

Color perception and space understanding change with age, as summarized in Fig. 1. Their different stages correspond to different levels of child's autonomy in moving around and exploring the space.<sup>4</sup>

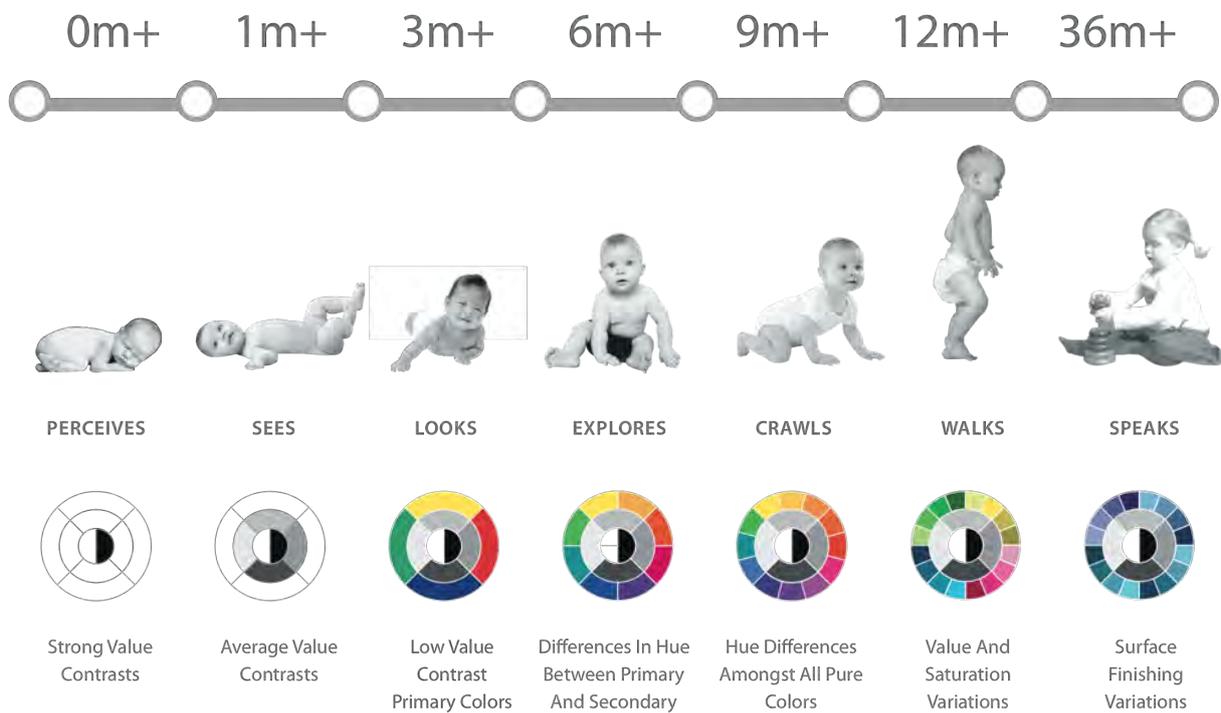


Figure 1. Child color vision stages. The visual development follows the physical and cognitive one. The child starts discriminating value, then hue and saturation. After one year, the information regarding surface finishing, by F. Valan

### 0 months: PERCEIVES

The baby is attracted by source of lights, he lives in a world of feelings. The visual system, in the first days has not developed completely and the baby distinguishes light from darkness and begins to distinguish the shapes looking at the lightness contrasts of the outlines.<sup>5</sup>

His visual sharpness is very low (05/10), he can distinguish the outline but not the details of a shape.

The baby's visual interest is restricted to objects which are 20 centimetres far from him, which corresponds to the distance of the baby's eye from the mother's face when she carries him in her arms.<sup>6</sup> He can perceive very high contrast in value only.

Already in the first days colours with a strong contrast and suitable lights represent powerful factors of visual development. One of the most important stimuli in the first days of life are the horizontal and vertical structures of the space.<sup>7</sup>

### 1 month: SEES

He does not merely see but begins to look (staring reflex). He can see till a distance of 80 cm.

He pays attention to new and complex stimuli and he is excited by objects which move and emit some sounds. During the first three months of life he looks around him in search of information that allows him to know the environment surrounding him in order to know who he is and where he is. His eyes focus on the outlines of objects that are the points which have most of the information contents, since they define the shapes.

If his eyes can perceive the hue differences, his brain is not interested in decoding them yet. He can distinguish increasingly smaller details and lower and lower lightness contrasts; if when he is aged two weeks the lowest contrast perceived is 50%, when he is 8 weeks old he distinguishes even contrasts of 30% lightness, when he is 12 weeks old he is able to distinguish contrasts of 10%.

**3 months: LOOKS**

From two to three months he follows images in motion by rotating his head and he is able to converge his eyes if you bring an object near him.

During the first months of his post-birth life his visual faculty makes extremely rapid progress; a baby aged about 6 weeks looks in her mother's eyes, and is able to distinguish objects: this a very important aspect in the organization of his visual world.

After the sixth week his brain can organize some information about the world that surrounds him: he is able to establish connections between visual and auditory perceptions and he has perception of time, remembering the past and forestalling gestures.

About in the sixth-seventh week he is already able to distinguish between surface and volume and around the tenth week he distinguishes a concave surface from a convex one. After the tenth-twelfth week he distinguishes the human and answers smiles, grimaces and lip movements.<sup>8</sup>

He begins to distinguish the main colours, red, yellow, green, blue and perceives brightness differences of even 5%.

**6 months: EXPLORES**

At about 4 months and a half he is able to seize an object, thus he can explore its tactile qualities as well as its visual ones. His eyes work together to determine the distance of an interesting object, allowing him to get closer and seize it in order to be able to analyse it.

This ability (prehension reflex) is connected to the real environment; the babies who are not stimulated enough achieve the sight-prehension co-ordination much later, while babies who are surrounded by a visual world with too many stimuli seize objects much earlier, i.e. towards 3 months, but the visual attention is weaker and they lose the important stage of hands observation. A correct degree of stimulation improves visual attention.

From the fourth to the fifth month he focuses images till a distance of some meters, and he clearly distinguishes some colours, red, green and blue. When he is 6 months old his eyes shift from an object to another and he is attracted by small sized objects.

The child coordinates eyes and hands. He can grab and handle objects. He has tactile exploration. He captures the difference between primary and secondary colors.

Between the fourth and fifth month he is able to see images up to a few meters distance clearly.

During the first six months, space perception is at a minimum level, since the field of view is limited. Independent use of space begins from six months, with the increased coordination between view and thought.

**9 months: CRAWLS**

At about 10 months eye coordination is achieved, allowing him to perceive depth through "Stereoscopic vision". Now that the baby has developed a binocular vision, a bidimensional surface is no longer so interesting to him. Through the visual examination of the space now he is able to understand where things are located and get the information about the solidity and presence of objects and persons. The difference in color is information: he is able to discern all differences in hue in very saturated colors.

**12 months: WALKS**

His visual faculty is complete and he sees as an adult. The child is able to distinguish all colours and appreciate their differences, even if he is not able yet to think about colour separated from its support, thus to name it.

Colours start becoming information to be distinguished, his chromatic outline must include all colours, from the primary ones to the secondary ones, from the ones with high saturation to the more neutral ones. A child is able to know all that he sees and understands: all that he knows determines his cultural intelligence.<sup>9</sup> Each different stimulus, each material, smell and taste is a very important information for his database. At one year a child begins to walk and interact independently with the space.

**1-3 years SPEAKS**

From one to two years old the child achieves the total control of the ophthalmic muscles and can distinguish and follow the movement of distant objects telling clearly the difference of colours.

Towards the second year the child can perfectly distinguish all the colours and the difference in hue, lightness and saturation. He can match shapes and colours. Within the third year, the child starts recognizing and naming them.

When the child is three years old, he intentionally

uses all the colours and shows his own chromatic preference. Growing up the colour perception becomes more and more a cognitive activity, rather than an emotional sensation.

After the third year polychromatic schemes are no longer informative for the child who needs other information, as he is now ready to distinguish other aspects of an object: the surface finishing and the material. They can be replaced by monochromatic and polimateric schemes, (objects that have one colour but different materials), thus the child can appreciate material differences: wood, plastic, metal; and finish: glossy, mat, rough...

Fig. 2 shows the Color Material and Finishing design guidelines, based on the visual capability of the children.

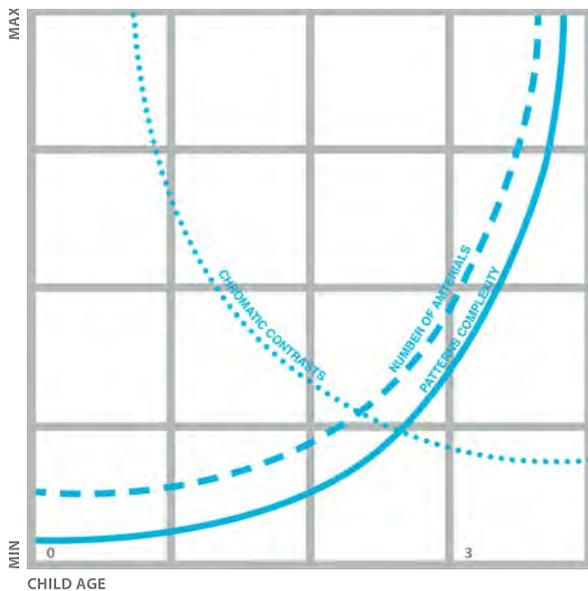


Figure 2. The diagram shows the importance for the child of colors and contrasts with respect to materials and patterns, as a function of age. Colors and contrasts, fundamental in the first months, give space to materials and patterns as the child grows, by F. Valan

**Child space design guidelines**

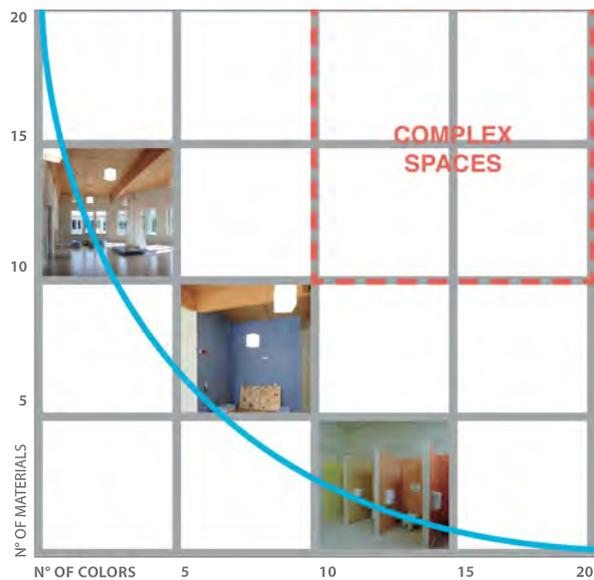
The understanding of space changes with age, the different stages correspond to the child’s autonomy to move and understand the space.

Before six months, space comprehension is minimal, the visual field is limited. From six months, with sight / prehension coordination, the autonomous fruition of space begins, although it remains essentially usual. At nine months motor exploration begins, viewpoints change and the binocular vision allows

to understand depth. At one year the baby begins to walk and interact autonomously with space.

With proper planning it is possible to facilitate the space perception of children of different age and to determine the emotional quality of an environment. The quantity of colors and materials used determines the visual complexity of the space. Spaces of low visual complexity have just few colors, mostly neutral, as well as natural materials, semi-gloss or matte. These spaces become containers that can accommodate as protagonists both children and all their activities.<sup>10</sup>

Spaces of high visual complexity are polychromatic and poly-material. These spaces are visually tiresome, and therefore narrow creative freedom. Spatial relationships can be associated to the harmonic relationships between colors. It is important for those who design products and spaces for children to properly use the language of color.<sup>11</sup>



**Visual Complexity**

Figure 3. Visual Complexity diagram. Spaces with many colors and different materials are perceptually complex and should be avoided because they narrow the visual space



### Low Complexity

*Figure 4. Example of low complexity space; reading and relaxing area*



### Orientation

*Figure 5. Colours can be employed as orientation signals to allow an easy understanding of spaces. Neutral colours have been used for the background to facilitate the colour signal detection*

## Conclusions

Color design in children's spaces must be differentiated by age. In architectures dedicated to children who have not yet learned verbal and written language, color communication plays a key role. Through color, the function of spaces is connoted, environment is dimensioned, thresholds and paths are communicated. It is essential for the child's emotional well-being to understand the space where he is: simple spaces are easily understood and lived.

The number of colors and materials used determine the visual complexity of the space. Low-color, mostly neutral and natural, opaque or semi-lucid environments have low visual complexity. These spaces become containers that welcome children and their activities as the protagonists. Visually complex spaces are polychromatic and poly-material. These spaces are visibly tedious and limit creative freedom.

With proper design, it is possible to facilitate the reading of spaces for children of different ages and to determine the emotional quality of an environment. A seen and understood space becomes a known space and takes on a familiar connotation that makes it more comfortable. Interaction with a simple space is easier.

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## A Manufactured Presence: Hazel Adler and the Colourization of Industry

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### Abstract

The paper explores maverick entrepreneur Hazel Adler's profound impact on today's use of colour in product design, trend forecasting, manufacturing, and marketing. American businesswoman Adler, a force often overlooked in the history of the colour sector, worked with powerhouse clients such as the B.F. Goodrich Company; DuPont; Ford Motor Company; Kohler; and Sears, Roebuck & Company. She flourished in spite of working in male-dominated industries such as engineering and manufacturing. Adler devoted her life to the development and influence of colour in design methodologies and commercial enterprises; she revolutionized colour systems with lasting impact on the work of colourists of later generations. This paper offers a study of Adler's career as a colour consultant, colour designer, female entrepreneur, and colour provocateur.

### Introduction

Maverick entrepreneur Hazel Adler profoundly altered the colour industry from product design to manufacturing; from trend forecasting to sales and marketing. As an American businesswoman in male-dominated industries such as engineering, Adler publicized, networked (at the likes of prestigious New York City Waldorf-Astoria hotel luncheons, no less), and misled to claim her colour throne. Adler devoted her life to the development and influence of colour in design methodologies and commercial enterprises. Through her dedication as a "deft promoter and publicist", she drummed up unthinkable (for a woman in her time) powerhouse clients such as the B.F. Goodrich Company, Ford Motor Company, and Sears, Roebuck and Company.<sup>1</sup>

In her groundbreaking book, *The Color Revolution*, scholar Regina Lee Blaszczyk claims that, as Adler "capitalized on modern colours and feminine psy-

chology", she seared a "permanent place in popular culture. By the 1970s, periodic colour features were expected in household magazines... The influence of mood conditioning was growing ever greater." Blaszczyk argues, "Tapping into pop psychology, Adler urged Mrs. Consumer to redo her 'colourless home' lest people think she had a 'colourless personality'. Consumers were led to believe that shoppers were highly "susceptible to colour's suggestive power" and that "colour worked swiftly, persuasively, and efficiently to mobilize their emotions. It touched some mysterious corner of the consumer's inner self in some uncanny way..." Adler brought conversations of colour and mood and colour and personality into popular culture. Today an expected staple, virtually every colour conversation in a current home magazine on the shelves references colour psychology. As a result, Adler's colour pop psychology saturates the media from low brow glossies to quips from leading colour industry experts.<sup>2</sup>

Whether due to the status of females at the time or the lack of discussion of colour industry in manufacturing in the decades previous, documentation of Adler's projects runs thin, even in the rigidly organized, deep archives at the DuPont estate and Ford Motor Company. It is also possible that, at the time, society held a view that colour work and other decisions within industrial manufacturing were completed by a nameless employee. (In other words, the works of the individual got swallowed within the bigger whole and credited to "The Company"). Yet, a thread of facts can be found that clearly traces Hazel Adler's impactful colour design presence.

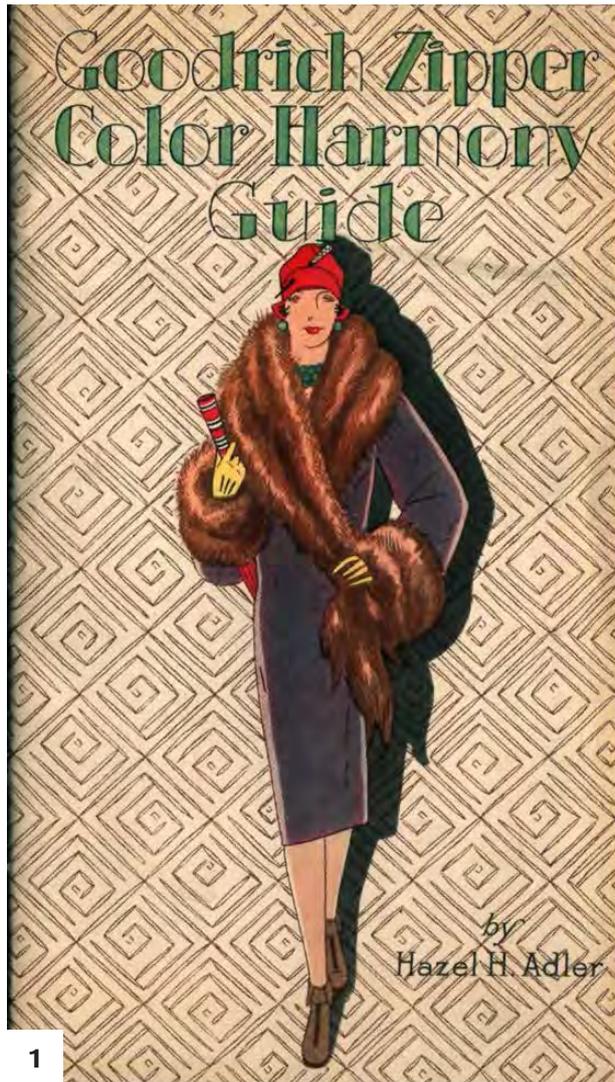
In her career as a colour consultant, colour designer, female entrepreneur, and colour provocateur, Adler revolutionized colour discussions with lasting impact on the work of makers of later generations. In addition to her tremendous influence on designers, manufacturers, and marketers in the creative sector, her vision continues with unmistakable presence in today's mainstream media and, as a result, her voice lands in the hands of millions of Americans per year.

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## Method

Launching the beginning of her rise in power, Adler latched on to the Taylor System of Color Harmony, helping the namesake creator, Henry Fitch Taylor, simplify his system to be more user-friendly. (The system rooted in musical harmony and linked steps in the music scale to patterns for palette picking on the colour spectrum.) Conveniently—and, as scholars argue, intentionally—the Taylor name perfectly misled people into thinking the system was connected to the reputable hard data of the credible scientist Frederick Winslow Taylor. This faux connection gave more gravitas to the Taylor System of Color Harmony. In addition, Adler promoted false connections between the Taylor System of Color Harmony and the then established “gospel of colour standardization”, the Textile Color Card Association (which had become credible as the head director had established an avant-garde trendsetter link with the end-all-be-all Parisian couture houses). In addition, Adler, as a shrewd businesswoman, published written documents to craft her authority and ultimately cement her vision into the minds of consumers and manufacturers (of yesterday and, remarkably, of today).<sup>3</sup> Her 1918 book titled *The New Interior: Modern Decoration for the Modern Home* offered her clout as an official design expert of the time. The 315-page book entertainingly and methodically defines the “Twentieth-Century American” and crystallizes Adler’s vision of the “Modern Home”. She plants unflappable assertions that the décor of a successful home manifests as an “adequate expression of one’s tastes and individuality, of having established a harmony between the inner and the outer life”. The book rung as a call-to-action redecorating manifesto, chiding consumers with accusations that “the atmosphere of the average American home has been described as ‘a brown ambiguity’”. Although she dedicates an entire chapter to promotion of “A New System of Color Organization” (a.k.a. the Taylor System of Color Harmony), the book reads, by-and-large, as informed, well-intentioned, low-brow design advice without an oppressively present commercial agenda.<sup>4</sup> Adler also developed publications directly for organizations such as a publicity pamphlet for B.F. Goodrich Company. Her Goodrich Zipper footwear brochure features beautiful large-scale colour illustrations and pitches the utility, comfort, and colour-as-fashion of

Goodrich Zipper boots to a variety of consumer types. Boot and outfit pairing suggestions weave throughout the pamphlet effusing, “Note how the beige and tan Zippers that girls are wearing, harmonize with their costumes” and “Most becoming are these chic gray boots when worn with a yellow coat and black furs”. Provoking with words such as “embarrassing”, “perfectly”, “smart”, “value”, “pride”, and “suitable”, the text implies that colour fashion choices are an extension of you, your character, and your inherent substance as an individual. The pop psychology message: colour intelligent boot shoppers reign socially adept, astute, and clever. While Adler’s brochures for Goodrich Zipper and others transparently offered the client name and rightfully packaged themselves as advertising, others covertly paraded as more scholarly publications.<sup>5</sup>



*They know much  
outside of books.*

**H**ERE'S a Co-Ed about to return to College. From head to foot see how she sets the pace for right appearance. She didn't forget her necessary foot-luggage you will notice, but has selected tan tweed ZIPPERS which are in harmonious contrast to her stunning green coat.

She probably has another pair of gray or biege ZIPPERS tucked away somewhere, which are light in weight, fit the ankle like a glove, and will be worn to protect her dancing slippers.

**ZIPPERS ARE MADE ONLY BY Goodrich**

CHILDREN OF CHARLES G. BEETEM. GIFT



*The Weather: Fair, except possible showers.*

**T**HE Weather Man is sometimes amazingly elastic in his statements. But Jane, starting out in the morning for shopping to be followed by luncheon and bridge, fears none of his vagaries. Her trim ZIPPER boots are so light and comfortable that she doesn't mind wearing them hours at a time. Besides she knows that their soft mottled sand color puts a finishing touch to her effective costume.

**2 ZIPPERS ARE MADE ONLY BY Goodrich**



*It is embarrassing not to have well-groomed feet.*

**N**O woman wants to suffer the embarrassment of not having well-groomed feet. An engagement for tea at the end of a busy afternoon of shopping and trotting about, carries no fear of bedraggled shoes or hosiery for the woman who has wisely provided herself with suitable ZIPPERS. Most becoming are these chic gray boots when worn with a yellow coat and black furs.

**ZIPPERS ARE MADE ONLY BY Goodrich**

### GOODRICH ZIPPER COLOR HARMONY CHART

#### How to Harmonize Your ZIPPERS in Brown and Tan Tones

	<b>STOCKING COLOR</b> 	<b>HARMONIZING APPAREL COLORS</b>	
<b>MOTTLED BROWN</b>	Grain		
			
<b>TAN</b>	Sunset	Autumn Glory	Cornflower
			
<b>BEIGE</b>	Blonde	Pekin Blue	Tarragona
			
<b>SAND</b>	Tan Bark	Mikador	Gretna Green

*ZIPPERS come in such a variety of colors that it is easy to find the right ZIPPER for every costume.*

**ZIPPERS ARE MADE BY Goodrich**

**3** Based on Taylor Color Harmony Keyboard Patent No. 1308512. Other

### GOODRICH ZIPPER COLOR HARMONY CHART

#### How to Harmonize Your ZIPPERS with Your Costume ZIPPERS in Gray Tones

	<b>STOCKING COLOR</b> 	<b>HARMONIZING APPAREL COLORS</b>	
<b>LIGHT GRAY</b>	Porcelain		
			
<b>GRAY-BLUE</b>	Moonlight	Pomegranate	Pekin Blue
			
<b>MEDIUM GRAY</b>	Dove Gray	Pine-needle	Autumn Glory
			
<b>MOTTLED GRAY</b>	Pelican	Vineyard	Antique Green

*ZIPPERS are so diversified in style and fabric that they are suitable for every kind of weather.*

**ZIPPERS ARE MADE BY Goodrich**

**4** pending. Copyright, 1927, B. F. Goodrich Rubber Co., Akron, Ohio.

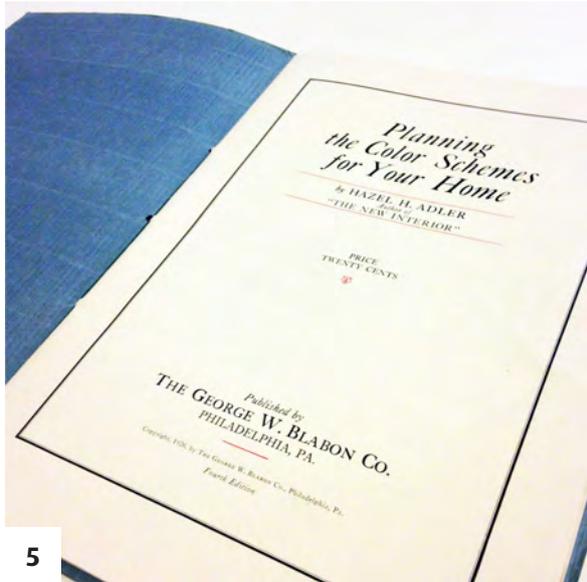
Figures 1-3. By Hazel Adler - Goodrich Zipper Color Guide. B.F. Goodrich Rubber Company, 1927

*Planning the Color Schemes for Your Home* satisfyingly reads more academic yet proves to be published by George W. Blabon Company in 1926, not a Madison Avenue publishing house as it seems on the title page, but a linoleum company. The center spread colour chart of the book handily features colour palettes inspired by 12 distinct linoleum patterns. So, yes, this seemingly official publication is, at its heart, propaganda.<sup>6</sup>

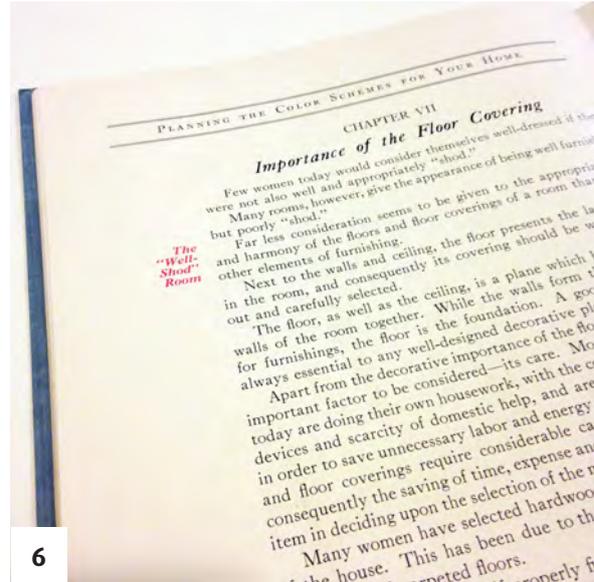


**COUNTRY** house living room in rose, blue, warm tan and gray-green. The pattern linoleum rug in a cheerful Chinese mality.

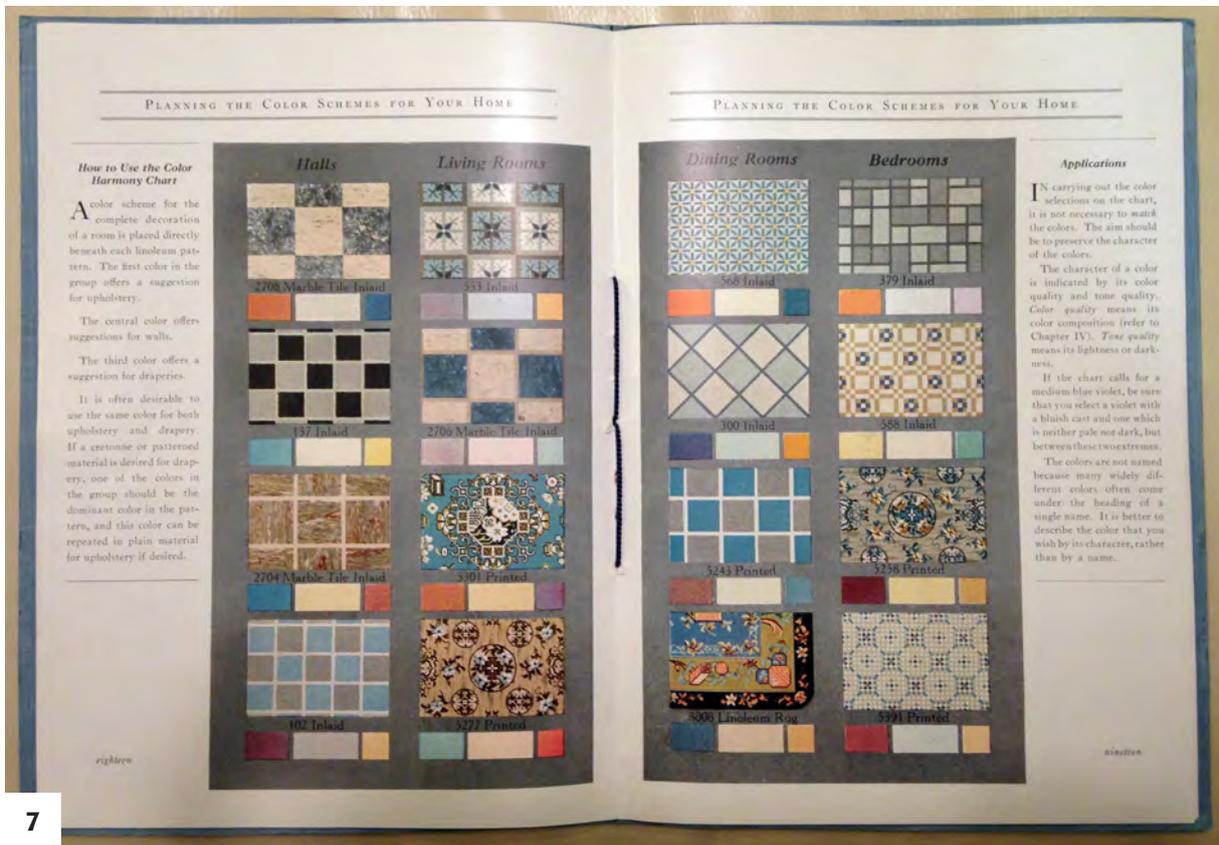
**4**



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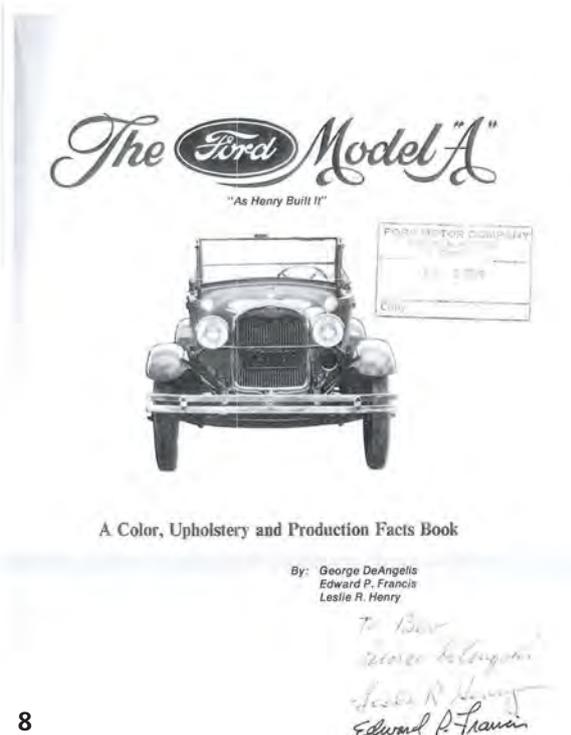


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Figures 4-7. By Hazel Adler – *Planning the Color Schemes for Your Home*. The George W. Blabon Company

The emotive pop psychology tone reverberates in her chapter on “The Magic of Color” with colour “soothes, stimulates, depresses or delights” and “If we surround ourselves with dull and gloomy colours, they are reflected in our spirits, and we be-

come disheartened and depressed. Our spirits droop under the influence of a dark and dismal day.” By the time we arrive in 1929, her ostensibly academic tome, *How To Choose Colors and Furnishings for Your Home*, proves, upon inspection, to be nothing more than an extended advertisement for Sears Roebuck and Company. Indeed, she concludes the book with outlined budgets for purchasing furniture – the equivalent of a shopping list for Sears.<sup>7</sup>



8



9

1928 MODEL "A" COMMERCIAL VEHICLES EXTERIOR COLORS (Open Cab, Closed Cab, A and AA Panel Delivery)				DELUXE DELIVERY ONLY			
Body	Upper & Lower	Roof & Moulding	Stripes	Body Upper & Lower	Roof & Moulding	Wheels	Stripes
Black Moss Green	Black Moss Green	French Gray	Stripes	Spencer Gray	Deluxe Black	Black Moss	Stripes
Black Moss Green	Black Moss Green	French Gray	Stripes	Spencer Gray	Deluxe Black	Black Moss	Stripes
Black	Black	French Gray	Stripes	Spencer Gray	Deluxe Black	Black Moss	Stripes
Black	Black	French Gray	Stripes	Spencer Gray	Deluxe Black	Black Moss	Stripes

1929 MODEL "A" COMMERCIAL VEHICLES EXTERIOR COLORS			
Black Moss Green	Black Moss Green	French Gray	Stripes
Black Moss Green	Black Moss Green	French Gray	Stripes
Black	Black	French Gray	Stripes
Black	Black	French Gray	Stripes

1928 MODEL "A" COMMERCIAL VEHICLES INTERIOR TRIM SCHEMES (Open and Closed Cab)			
Body	Seat, Window, Roof	Roof, Seat, Window, Side Panel	Roof, Seat, Window, Side Panel
Black	Black	Black	Black
Black	Black	Black	Black
Black	Black	Black	Black

1929 MODEL "A" COMMERCIAL VEHICLES INTERIOR TRIM SCHEMES (Open and Closed Cab)			
Body	Seat, Window, Roof	Roof, Seat, Window, Side Panel	Roof, Seat, Window, Side Panel
Black	Black	Black	Black
Black	Black	Black	Black
Black	Black	Black	Black

10

### Colors - Model A 1928

*Phonon, Tudor Sedan, Roadster, Coupe, Sport Coupe*

Niagara Blue (dark or light) body with French Gray belt, reveals, and stripe.

Arabian Sand (dark or light) body with French Gray belt, reveals, and stripe.

Dawn Gray (dark or light) body with French Gray belt, reveals, and stripe.

Gun Metal Blue body with French Gray belt, reveals, and stripe.

On open cars the molding carries the same colors that are used on the reveals of closed cars, the stripe also being added.

*Tudor Sedan colors (adopted February, 1928)*

Niagara Blue (light) body with Niagara Blue (dark) upper back, belt molding, and reveals, and French Gray stripe.

Arabian Sand (dark) body with Copra Drab upper back, belt molding, and reveals, and French Gray stripe.

Dawn Gray (dark) body with Gun Metal Blue upper back, belt molding, and reveals, and French Gray stripe.

Niagara Blue (dark) body with Niagara Blue (light) upper back, belt molding, and reveals, and French Gray stripe.

Gun Metal Blue body with Black upper back, belt molding, and reveals, and French Gray stripe.

*Forster Sedan (production begun April 27, 1928)*

Balsam Green lower body, Penitence Gray reveals, Valley Green upper molding and belt, and Old Ivory stripe.

Copra Drab lower body, Copra Drab reveals, Seal Brown upper molding and belt, and French Gray stripe.

*Forster Sedan*

Copra Drab discontinued August 5, 1928. Replaced by Rose Beige for body, windshield, and window reveals, with Seal Brown moldings and Orange stripe. Andalusite Blue for body, windshield, and window reveals, with Arabian Sand (dark) molding and Orange stripe.

11

Figures 8-11. By George DeAngelis et al - The Ford Model "A": A Color, Upholstery and Production Facts Book. (Ford Motor Company, date unknown)<sup>12</sup>

Colour grew as a talking point in sales and marketing as it became linked with modernity in the early years of the century.<sup>8</sup> Company corporate ladders shifted to reflect this significance as DuPont established a Color Advisory Service and Pittsburgh Plate Glass Company had a Director of the Division of Creative Design and Color.<sup>9</sup> Colour decisions were now made in dedicated colour departments with big league colour directors, a marked difference from decades past.

As her business blossomed, Adler took on other money-laden clients such as National Lead Company, Murphy Varnish, and DuPont. In 1924, she consulted for New York State to create an easier-to-read license plate. At the time, the standard colours of the plates were blue and white (although New York State briefly experimented with a red and white plate, a complete failure as the red enamel didn't hold up to the wear of the city streets). Adler convinced New York State to switch to yellow and black plates, the colour combination that, as we know from snakes to bumblebees to now caution tape, has the highest contrast for the best clear differentiation, here between letters, numbers, and plate background. Adler received notable accolades for the colour re-design from traffic police in the *New York Times* and in *Motor Magazine*, and the more visible yellow and black combination lasted in the state's plate design for decades.<sup>10</sup> In fact, many yellow and black plates still populate the streets of Manhattan today.

Ford Motor Company spotted Adler in *Motor Magazine* and hired her to design palettes for the Model A. In spite of the oft quoted phrase of car production mastermind, Henry Ford, "Any customer can have a car painted any colour that he wants so long as it is black", Ford Motor Company did offer a variety of colours. And, yes, Adler was there to make it happen; she added Arabian Sand, Dawn Gray, Gunmetal Blue, and Niagara Blue to the expanding Ford palette.<sup>11</sup>

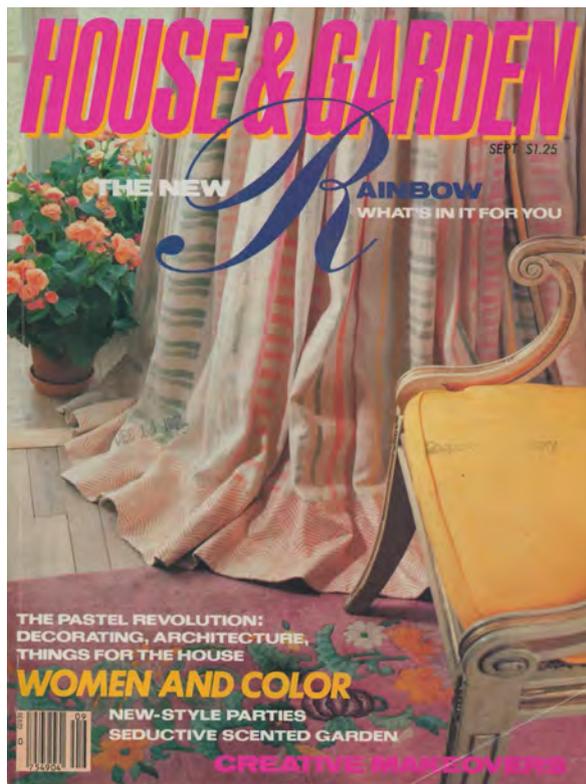


Figure 12. By Jada Schumacher – Photograph of original khaki fabric in interior of a Model A Ford

Furthering the presence of colour in the sales and design conversation, *The Saturday Post* – the most widely read American magazine at the time – announced Kohler Color Ware in 1929 with a smashing full-page colour advertisement.<sup>13</sup> And, it's no surprise to learn that Adler created a custom line titled Hazel Adler for Kohler Color Ware.<sup>14</sup> Color Ware advertisements flooded printed media in popular magazines and trade publications such as *Building Age*<sup>15</sup>, *Good Housekeeping*, and *House and Garden*. *Progressive Architecture* floated the link between their company and the now avant-garde modern view of colour in design with "COLOR MEANS KOHLER".<sup>16</sup> As Adler worked the industrial scene and clung to high profile names, her colour empire broadened.

In 1946, the Taylor Color System morphed—stepping in as a replacement to the Textile Color Card Association's antiquated colour program—into the successful and influential *House and Garden* Color Program, a leading presence in the colour field for most of the 20<sup>th</sup> century.<sup>17</sup> This transformation inked Adler's voice of colour and pop culture psychology into colour sales, design, and marketing dialogue.

Colour psychology rings in *House and Garden* through the decades with text such as “People have gained the courage to experiment, answering the innate need we all possess – to have colour in our surroundings, to express ourselves through it” and “House and Garden readers live colourful lives”.<sup>18</sup> *House and Garden* issued trade publications such as *Color Sells!* and *Sales Trends in House and Garden Covers* for training purposes and to further convince the design industry staff of the pressing presence of colour in business success.<sup>19</sup>



In addition, *House and Garden* writers trickle into trade publications with articles stating that “people are far more colour-conscious in the interior design of their homes today than they were five years ago. Their homes have become a reflection of their lives and personality.” Faber Birren, a well-known colour theorist still discussed in survey colour courses today, consulted for *House and Garden* and independently published, amongst numerous other things, a 1978 book titled *Color Psychology and Color Therapy: A Factual Study of the Influence of Color On Human Life*. Clearly, *House and Garden* – with their powerful industry and media connections – covertly embedded their colour psychology propaganda across platforms and demographics.<sup>20</sup>

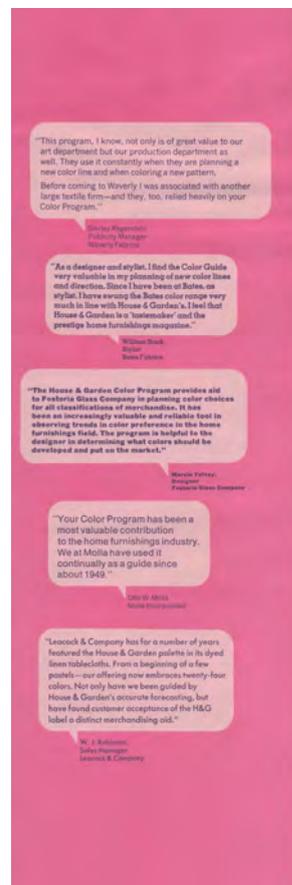
Figures 13-14. *House and Garden* vol. 16 and *House and Garden* (*House and Garden*, date unknown)



Alas, the colour psychology banter rests as a staple into today’s popular magazines and academic tomes. Today’s “colour guru” Leatrice Eisenman, of the Pantone Inc. colour matching reigns as the go-to source in America for colour information in mass market periodicals. In fact, Marylou Luther, the editor of the International Fashion Syndicate proclaims: Leatrice Eisenman knows more about the history of colour, the psychology of colour and the application of colour than anyone I have ever interviewed. She can make colour interesting to a convent of nuns who only wear black. Perhaps more importantly, she constantly updates the dynamics of colour and how it responds to the pop culture, the economy and world events.<sup>21</sup>



Figures 15-17. Color Sells! House and Garden Brochure (House and Garden, date unknown)



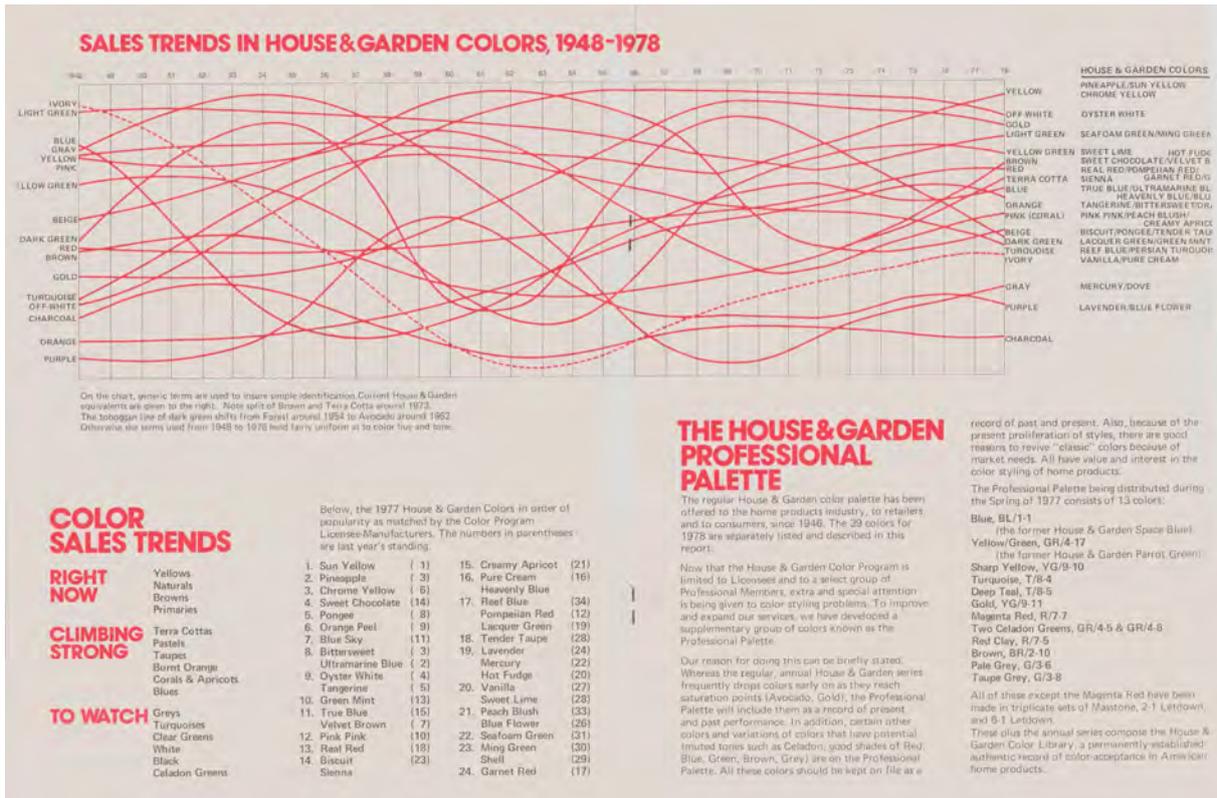


Figure 18. Sales Trends in House and Garden Colors, 1948-1978 (House and Garden Brochure, 1970s)

Eiseman's colour psychology-driven books directed at laypeople, *Colors For Your Every Mood* and *More Alive With Color: Personal Colors Personal Style*, get readers buying into the message with reviews posted online such as "The BOOK is ALIVE WITH COLOR, just like YOU!"<sup>22</sup> So, too, colour and personality as subject frequently stretch into current brand marketing discussions. Leading business magazine, *Entrepreneur*, cites a study titled "Exciting Red and Competent Blue" to assert that "colours influence how consumers view the 'personality' of the brand in question".<sup>23</sup> One of the top ten websites in the United States, BuzzFeed posted an article titled "What Color Best Describes Your Inner Personality?" with a sub-head reading, "All of the colours of the rainbow, and only one truly describes you".<sup>24</sup> Meanwhile, pop culture's Dr. Oz, now in his 7<sup>th</sup> season television show reaching millions of viewers, posted a quiz online, "What Color Is Your Personality?"<sup>25</sup> that kicks off with "Take this quiz to find out the colour of your personality and the impact that it could have on your health."<sup>26</sup> These few examples of many flooding the market illustrate the now-ubiquitous presence of colour psyche talk in the general American public.

## Results

Of the top 20 magazines in July 2016 in terms of reach, four are home and garden publications: #6 out of the top 20 – *Better Homes and Gardens* (47.76 million reach in July), #14 – *Good Housekeeping* (29.31 million), #19 – *Southern Living* (20.96 million), and #20 – *Country Living* (20.86 million).<sup>27</sup> Many of these issues discuss colour and with it, yes, psychology. In 2014, *Better Homes and Gardens* issued one of their 12 monthly issues with colour as the main front cover topic and four with colour as a subheading on the cover. In 2015, *Better Homes and Gardens* had two covers with colour as the main topic and four additional covers as a subhead. To date in 2016, *Better Homes and Gardens* has issued two covers with colour as the main topic. These covers parade pop colour psychology with headers such as "Color: Lighten up with Yellow" and "Ticked Pink: colours that lighten and brighten".<sup>28</sup> In July 2014, *Better Homes and Gardens* launched the tagline, "Life in Color", with the goal of "infusing colour into each aspect of their [readers'] lives". The editorial mission brags, we "power [the reader's] passion to live a more colourful life."<sup>29</sup> What's

more, *Better Homes and Gardens* allots colour an entire special interest publication, *Color Made Easy*. The 2016 special edition issue – that went to a second printing due to its popularity – kicks off with “Creating a home that reflects who you are begins with colour.” With the repeated use of the word “personality” and statements such as “Finding your voice is like finding the right dress”, the colour-reflecting-the-inner-you spiel hammers on.<sup>30</sup>

In *Color Made Easy*, Adler’s emotion-laden colour chatter continues to drive its own moody train. The text drones on and on about colour choices “based on the mood you want to set” and how specific hue undertones can “alter the mood”. In case the reader tuned out by page 24, *Better Homes and Gardens* spells it flat out: “If you keep coming back to a certain colour, that may mean you’ve made an emotional connection. That’s a good thing.” This issue devotes an entire chapter – “A Sense of Calm” – to a serene emotive state. Moreover, “calm” was mentioned 20 times and “soothing” seven, let alone mentions of “comforting”, “warm”, “peaceful”, “peace of mind”, “content and chill”, “tranquil”, various versions of “relaxed”, and similar. Neutral colours serve as “peacekeepers”. Optimism and an upbeat demeanor get another hard sell from a “pick-me-up” to “happy-go-lucky” to “the life of the party-room boosters” to eight references to “happy” or “happiness” and 15 versions of “energetic”. Designers in the magazine sing out, “Color truly affects the way you feel...You just have to find your ‘happy colour’”, “A colour should make you feel good”, or “Color, whether bold and bright or pale and light, definitely makes me happy”. The title proves apt, and colour really is made easy with the myopic echoing message that colour equals emotion. End of story.<sup>31</sup>

To be conservative, calculations here factor in current data numbers of reach for print media, which have steadily declined due to the rise of digital applications in recent years.<sup>32</sup> Since January 2014, thirteen *Better Homes and Gardens* issues flaunted colour as a selling point to 47.76 million readers per month, presenting a colour-focused message to readers 620 million times.<sup>33</sup>

*Good Housekeeping* issued one magazine in 2016 titled “The Color Issue”, nailing over 29 million readers with a residue of the Adler colour vision.<sup>34</sup> The issue focuses on psychology of hues as a reflection of you in your personal space with “Sunny ways to brighten your look and your home”.<sup>35</sup>

*Southern Living* launched covers with two colour subheadings in 2014, one colour subheading in 2015, and three colour headings in 2016 dispatching word on colour.<sup>36</sup> With a 20.96 million reach per month, the magazine sprayed more than 125 million colour messages.<sup>37</sup>

*Country Living* published covers with two colour headings and two colour subheadings in 2014, two colour subheadings in 2015, and one colour heading and one colour subheading in 2016.<sup>38</sup> Colour claims such as “Where will colour take you? Cheery and bright” and “Have fun with blue and white” drench the text.<sup>39</sup> With a 20.86 million reach per month, the magazine launched more than 166 million colour shout-outs on their print magazine covers.<sup>40</sup>

In all, remnants of Adler’s colour pop psychology mantra hit readers 940 million times in print magazine form in within in the last three years. (The increasing readership of digital tablet applications of these magazines has not been included so actual numbers with inclusion of more media platforms would be significantly higher.) Easily, Adler’s colour pop psychology vision affected Americans over a trillion times in the past three years.

### Conclusions

Notably, Adler dedicated her hit book, *The New Interior*, “TO the pioneers of the new movement and especially to the one who inspired me to join the ranks”.<sup>41</sup> Yes, she spouted some less than admirable blatant sales pitches and had a penchant for untruthful remarks, but her works, her initiatives, and her vision amidst social and cultural opposition forever altered the colour establishment and make her one of the most significant and underappreciated pioneers in colour history.

**Acknowledgments**

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## 100 Silesian Colours and Patterns. Project of Decorative Patterns and Sets of Colours Inspired by Applied Art of Upper Silesia

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### Abstract

There were 3 main objectives of this project: digital documentation of chosen national heritage with regard to ornamentation and colouring, project of patterns and sets of colours inspired by applied art of the region, obtaining of graphic materials (patterns of ornamentation, characteristic sets of colours) of high visual quality, possible to be applied with contemporary media (digital) employing heritage of decorative art in creative, modern, innovative approach, bringing back to social consciousness original elements of industrial design, creating art, culture and Silesian identity and promotion, building the image of the region through contemporary applied art.

As most important results of the project, we can number database of graphic elements, book of patterns and colours including set of patterns inspired by catalogued decorative elements and set of colours inspired by typical combination of colours used in applied art of the region.

Created elements can be used as elements in many identification projects and be element of visual culture of the region.

### Introduction

"100 Silesian patterns and colours". Project of decorative patterns and sets of colours inspired by applied art of Upper Silesia (region of Poland) is a project created within the framework of scholarship from Foundation of promotion of work of Ministry of Culture and National Heritage.

One important reason to undertake this project is a conviction of necessity of preservation and promotion of national heritage and industrial diversity of the region. Proposed action had to do with archiving of existing patterns and accompanying sets of colours and consequently gathering and design-

ing about 100 graphic projects inspired by original patterns.

That's how the data base of graphic patterns was created in a form of vector projects (saved in digital form, ready for printing, plotting and computer processing tools and media) publicly available to be used for promotion activities.

Applied Art of Silesia was never described from ornamentation perspective, decorative elements characteristic for this region. There were archival activities, publications about chosen objects (stained glass, ceramics, architecture) or more seldom goods produced by one manufacturing plant (catalogues of art of glass factory) whereas some graphic elements are typical for the whole industrial region.

There were 3 main objectives of this project:

Digital documentation of chosen national heritage with regard to ornamentation and colouring.

Project of patterns and sets of colours inspired by applied art of the region.

Obtaining of graphic materials (patterns of ornamentation, characteristic sets of colours) of high visual quality, possible to be applied with contemporary media (digital) employing heritage of decorative art in creative, modern, innovative approach.

Bringing back to social consciousness original elements of industrial design, creating art, culture and Silesian identity and promotion, building the image of the region through contemporary applied art.

After the collapse of important for Silesia manufacturing plants (1994), protection and preservation activities were not undertaken when comes to ornamentation and industrial forms. There were no catalogues nor technical documentation pattern saved. Even institutions dealing with preservation of folk art don't have fully digital archives of patterns and ornamentation.

### Method

While doing the project we cooperated with several museum centres (Museum of Upper Silesia in Bytom, Museum in Rybnik, Silesian Museum, Ethnographic Museum in Opole<sup>1</sup>). But it quickly turned out that they don't have in their collections objects created by craftsmen or massively produced from the period of 1900-1990. In many cases it is considered to be "too little antique". We managed to choose for the project a few patterns of hand made ceramics from

the end of XIX century from the collection Museum of Upper Silesia and Ethnographic Museum in Opole. Another part of the project was formed by decors of enamel dishes produced in Silesia Smelter. Some of the works came from objects chosen for exhibition "Silesian Smelter Design", another from rare catalogues of decors made available by curators of exhibition. The biggest source of patterns was given by private collectioners, mainly Irena and Roman Gatyś, experts of Silesian Porcelain. (Giesche porcelain in Katowice, Porcelain from Franiszek Glass factory in Bykowina). It was impossible to gather though patterns of ceramic tiles produced in Silesia in those period. Unsuprising as it seems, but none of the uplisted institutions has even the smallest collection of these kind of objects.

The biggest challenge probably while vectoring patterns on the base of hand made or delivered by museums photographs was the wide diversity of decorative themes. Themes on porcelain were made with different techniques, among others: decalcomania, glaze, hand made decorations. Such decorations had different characteristics and while digitalization of the patterns, preservation of their uniqueness was our priority.

It was necessary to take personal approach towards each theme. It was impossible to make automatic vector outline for any pattern. Decalcomania and glaze patterns from the beginning were made in program for making vector graphics by outlining the shapes by pen or painting with a tool type: "brush" allowing us to speed the process of obtaining elements of irregular shapes. Hand painted patterns on the other hand required more work – they were created on layers in a program for anilox graphic. Painting by brush allowed not only to get bigger accuracy, but also better resemblance to original tool. Subsequently all the layers were turned into vector objects and put in an appropriate order.

Another challenge was the number of elements. The easiest part was to created patterns made of repeated elements. More difficult and time consuming were themes that sometimes resembled illustrations, they consisted of many unique elements.

Next stage of work was to create sets of patterns inspired by catalogued decorative elements.

Each pattern was presented as:

- original pattern,
- pattring pattern ,
- pattern on a circle or oval,
- report surface of square filled with repeated elements for multiplication.

Here it was allowed certain kind of discretion in composing particular parts of graphic patterns, some elements of patterns were calibrated, multiplied, others minimized. In all cases graphic value was preserved (stylistics, characteristics of outline and filling) as well as colours presented in original decoration.

Following element of work was the project of colour palettes, sets of patterns inspired by catalogued decorative elements. Because in majority of the cases it was possible to see directly the exhibits or scan the catalogues of patterns, for probing colour we were able to use tools such as NCS, tester and NCS Colour Scan as well as Pantone testers. Sets of colours were described in these two systems and CMYK. Because the majority of the patterns were taken from ceramic or glaze elements, probing of colour was more difficult due to shiny surface of objects. In such cases, few samples were taken into consideration. In case of colours of uneven, not full filling (hand painted) we tried to define the most and the least repleted sample. A few cases of double layering (two decalcomanias) were considered as mechanic imperfection occurred while putting the pattern and not as conscious introduction of graphic value.

Gathered sets of colours and patterns formed part of publication that will be published in 2017 by ASP (Academy of Fine Art) in Katowice.

### Conclusions

As most important (already existing or foreseen) results of the project, we can number:

Database of graphic elements, book of patterns and colours including:

- examples of catalogued patterns of applied art of Silesia (photographed, described when comes to technique, colour and material),
  - set of patterns inspired by catalogued decorative elements,
  - set of colours inspired by typical combination of colours used in applied art of the region.
-

Available as "open source: of created projects of graphic patterns and sets of colours for local government organizations and institutions promoting culture of the region so that they can be used in graphic projects promoting Silesia with help of visual elements.

Promotion of Silesian industrial design and decorative art in creative, modern and innovative approach with help of contemporary tools and graphic media. Created elements can be used as elements in many identification projects and be element of visual culture of the region.

Below quick historical descriptions of Silesian manufactures from which exhibits that inspired the project were taken.

### **Silesian Porcelain (Giesche)**

In 1920 in Szopienice was set up the first in Upper Silesia factory of porcelain which was called Oberschlesische Porzellanfabrik Gebhard & Barbabasch and then Giesche Fabryka Porcelany Spółka Akcyjna. For Giesche worked designers who designed such wonderful services of Art Deco style like: Polonia, Katowice, Krystyna, Wanda, Łucja as well as undine statuette, ladie with a scarf, kneeling lady with a bowl, chicklets and others. In 1939 factory was representing Poland in World Fares in New York. After the war, factory was nationalized. In 1952 factory changed name for Fabryka Porcelany "Bogucice" in Katowice. Thanks to continuous modernization production of porcelain rose and it was exported through out the whole world. It's hand made works were very popular. In 1993 production was stopped. In 2012 factory was taken over by Giesche Foundation. Now in factory is located joint venture Bogucice Porcelain that decorates and sells porcelain.

### **Franciszka Smelter, Ruda Śląska Bykowina**

Porcelain Factory was founded in 1928 by Richard Czuday in the are of old zinc smelter. Unfortunately because of many different reasons (among others world crisis and big amount of porcelain on the market) factory went through many financial difficulties, it was closed a few times. Untill the 1950 it was producing porcelain under the name "Polska Fabryka Porcelany Sp. z o. o. Huta Franciszka Górny Śląsk" Its works were characterised by modest decorations

and simple form. They produced coffee dish wears, tee dish wears, kitchen containers, epergnes, ash-trays etc. After being nationalized it became subsidiary of Bogucie factory (Porcelana Bogucice, earlier Porcelana Śląska).<sup>2</sup>

### **Porcelain Factory in Tulowice**

It was started by Johann Carl Prashcma in 1813 and continued production of ceramics under Erhard Schlegelmilch since 1889. That is when a modern factory was created, producing table porcelain, decorated with flower and artistic patterns. After the II World War, production was started in 1946 resigning from porcelain in order to produce dishes from porcelit. After 1990 factory was turned into public corporation and in 2001 it was taken over by private company, presently working in Special Economic Area.<sup>3</sup>

*Figure 1. Example of colors and designs inspired by decalcomania pattern ceramic from Giesche. Photo by A. Kmita, 2016*

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NCS S6030-Y20R  
PANTONE 1405C  
CMYK 36,66,100,49



NCS S3060-G90Y  
PANTONE 111C  
CMYK 33,40,100,7



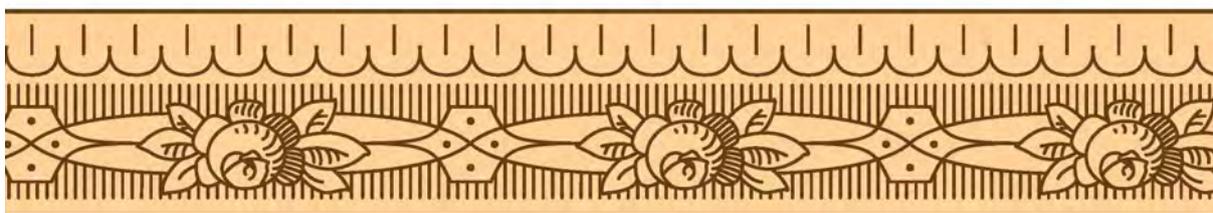
NCS S2070-Y  
PANTONE 117C  
CMYK 21,39,100,1



NCS S2070-Y20R  
PANTONE 131C  
CMYK 17,48,100,2



NCS S0515-Y30R  
PANTONE 7507C  
CMYK 0,19,43,0





NCS S4040-R30B  
 PANTONE 689C  
 CMYK 43,88,36,13



NCS S2030-R30B  
 PANTONE 686C  
 CMYK 15,41,11,0



NCS S2070-Y20R  
 PANTONE 131C  
 CMYK 17,48,100,2



NCS S7005-R50B  
 PANTONE coolgray11  
 CMYK 65,57,52,29



NCS S2060-B90G  
 PANTONE 334C  
 CMYK 100,11,68,1



### **Porcelain Factory in Pruszków**

First manufactures in Silesia were founded in XVI-II century, Pruszków is reported to start in 1763. In good economic circumstances it employed up to 80 people. From 1784 the owner of factory was Prussian Government. In 1788 it was leased to Leopold Proskowski. To produce earthenware they used local clay. Production was working until 1853.<sup>4</sup>

### **Smelter Silesia in Rybnik**

It was founded in 1754 in the area of present Rybnik Prusowiec. At that time there were several forges dealing with production and processing of iron. Forge industry declined in the second part of XIX century however factory was systematically modernized. In 1898 rolling mill was enlarged, it survived with small reconstructions until 1970. At the beginning of the 60s smelter began to produce enamel dishes, decorated with screen printing techniques. Industrial designers were responsible for the decorations, graduates of Academy of Fine Arts, Krusiatn Burda and Alojzy Śliwka. Together in 1946-1991 there were 460 million of enamel dishes that left the factory. Most of it was exported to Scandinavian countries, The Netherlands, France and Kannada.<sup>5</sup>

*Figure 2. Example of patterns and colors inspired by painted, hand made decorations from Porcelain Factory in Pruszków. Photo by A. Kmita, 2016*

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NCS S4550-R70B  
PANTONE 2735C  
CMYK 97,100,8,10



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*Figure 3. Example of colours and designs inspired by decalcomania pattern enamelware from Silesia Steelworks. Photo by A. Kmita, 2016*

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## Colour Combos. Methods in Design Education.

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### Abstract

This paper concerns the on-going development of a methodological tool for design students to be used in the creation of colour palettes. The project holds both didactic and colour theoretical considerations. The observation of students' work with colour at Designskolen Kolding shows that their approach to creating palettes is often highly intuitive. The majority of students tend to forget colour theory later in their studies and therefore do not make qualified colour choices in their design projects. Since a design process is influenced and controlled by various methods, the project investigates whether a defined methodology can be developed and implemented in the work with colour palettes in order to give more quality to the design of colour schemes. The methodology is presented to the students as method cards that can be combined and applied at different phases in the design process.

### Introduction

The paper starts by introducing the colour classes at Designskolen Kolding (hereafter DSKD) and the background for initiating the project. Next follows an account of the project, its methods and results. The paper concludes by reflecting on future action concerning implementing the colour methodology in design education.

At DSKD colour theory is taught on three levels. During the first semester all students across disciplines complete a basic colour class of four weeks. The focus of this class is on the subtractive colour theory as described at the Bauhaus school in the 1920s.<sup>1</sup> In the third semester, students have a three-week class that addresses the relationship between colour and light with a special focus on additive colour theory.<sup>2</sup> Besides these two classes, students work to a greater or lesser extent with colour in a number of individual projects on their main subject under guidance from their tutor.

The colour class on the first semester is designed so the students gain knowledge of colour theory, skills to mix and match colours and competences to work consciously with colour in design projects. The class is divided into three phases:

1. Introduction to and exercises with colours
2. Analysis of the colours in an existing design
3. Re-design of the colour scheme in an existing design

Students attend lectures as well as conduct practical work with mixing colours. Based on the three basic colours cyan, magenta, yellow and black and white the students create primary colour scales, complementary colour scales and value colour scales as well as doing a series of exercises with colour optics and simultaneous contrast. Subsequently, the students work individually to create colour schemes for designs from their field of study. The students are thus working with colour in practice, so that through their own direct experience they gain knowledge of colour theory. This teaching approach is supported partly by colour theoretical and partly by didactic considerations:

According to Albers's colour theory the perceived colour is dependent on its environment<sup>3</sup> and to fully understand this phenomenon the students themselves must experience colour perception. It is a moment of excitement when a student see the blue tones in the shadows at sunset or realises that all after images are complementary to the colours first observed. From a learning perspective we work with Dewey's theories that states that the cognitive learning is most effective when you sense and make your own experiences.<sup>4</sup> In the first part of the class a teacher-centred approach is applied through lectures and demonstration. The second part of the class is characterised by a constructivist approach where the students work actively with the material.<sup>5</sup>

### Artistic research project

In 2015 a development project was initiated at DSKD. Its aim was to provide new knowledge about teaching in colour. One of the intentions was to look at what methods students use when they match colours. The goal was to create a didactic tool for classroom use that would not only strengthen their

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competences in colour matching but also serve as a means to ensure that they made use of the learning later in their studies. The project carried the working title: *Palet*, which is Danish for palette or colour scheme. The observation of students' work with colour presented three insights:

1 – The students' approaches to creating palettes are often highly intuitive. This means that they tend to pick colours randomly. For those students who are natural colourists this approach can be satisfactory depending on the actual case they work on but for the majority this working procedure is linked to some problematic issues. The result of the impulsive approach can be that the students often work with the same personal and limited colour range project after project or they are inclined to choose whatever colours are in fashion at the moment.

2 – The students who have not had any previous experience with colour and therefore not gained a lot of confidence in the field tend to leave out colour considerations in their design projects, either by applying colour to their design at a very late stage in the project or by working entirely in a grey scale or a monochrome scale.

3 – The majority of students tend to forget colour theory later in their studies and therefore do not make qualified colour choices in their projects.

The development of the colour methodology is an on-going project that consists of two phases. The first phase concerns the development of the methods. The foundation for this is the existing colour theory and interviews with practising designers. Thus, the project has revisited the literature, including Itten, Albers and Goethe<sup>6</sup> to examine theories of colour harmonies. Parallel to the literature survey, professional designers have shared their expertise and practical experience through informal conversational interviews.<sup>7</sup> Based on insights from the survey and interviews, various theories about harmonious colour combinations has been tested and formulated as methods for the students.

The second part concerns implementing the methods in colour classes and in individual projects in design education. The methods will be presented to the students as method cards that can be combined and applied at different phases in the design process.

### Colour harmony versus colour scheme

The starting approach of the project was to investigate the colour theory and best practice in creation of colour palettes and formulate this as specific practices for the students. It became clear that there is a difference between a colour harmony and a colour scheme. The literature survey showed that the harmonies in colour theory in general are aiming at a totality with balance between contrasts, this being complementary, value etc. Whereas the interviews with design professionals showed that their colour schemes would often include an element of disruption to push the harmonious totality towards more discordance.

In 1975 the artist Kasper Heiberg set out to define the European palette.<sup>8</sup> He explained a palette as a coherent set of colours that do not necessarily have to be experienced together. The colours of a collection of nail polish or car colours are seen assembled in the store or in the brochure, but later they are detached from each other. The colours on a poster or a textile are however experienced together and stay as an ensemble.

Based on the above, the *Palet* project works with a definition of colour scheme as a combination of colours that are designed to perform together or be part of the same collection. And a colour scheme as either harmonious or with a discordance.

### Result

The result of the project at this stage is a beta version of a set of method cards for design students to be used in the creation of colour palettes. Some of the methods are simple, others more complicated. Common to all is that they can be used in many contexts. The methods are divided into three categories: *Plan*, *Create* and *Adjust*. None of the methods are conclusive but indicate possible approaches to colour work. All graphical design is made in black and white so no colour combinations are indirectly proposed.

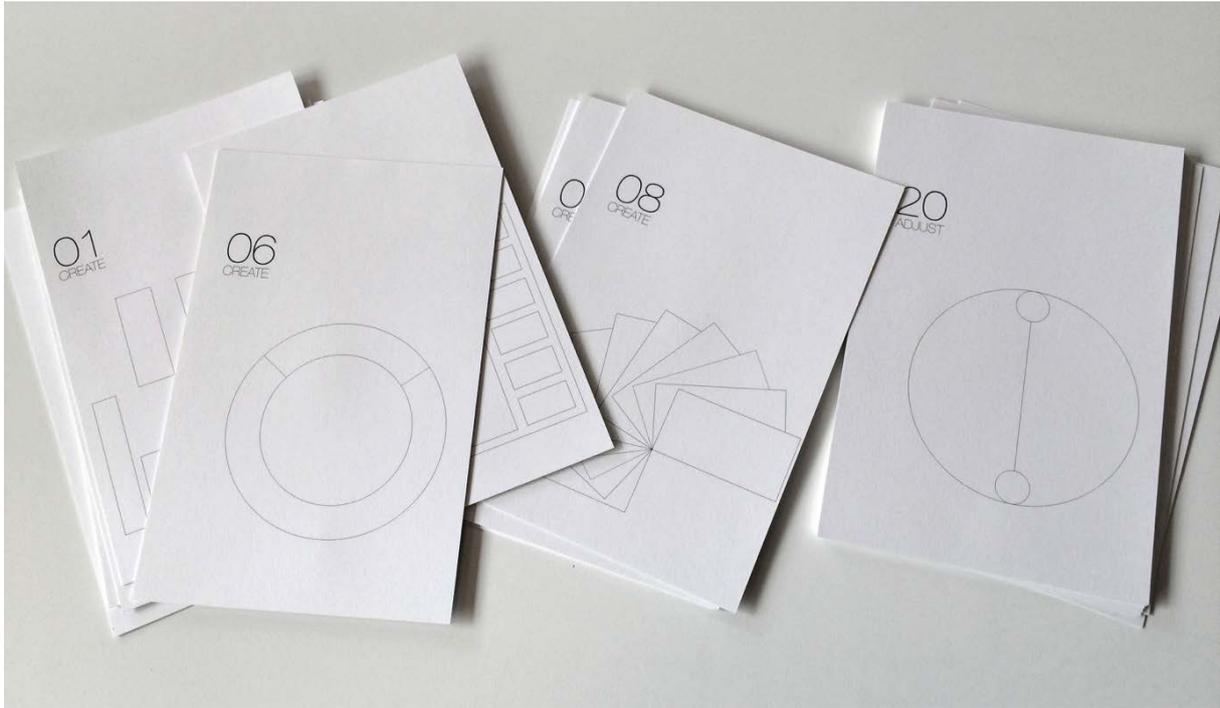


Figure 1. Method cards, designed and photographed by M. Kirk Mikkelsen, 2015

The colour work in a design process begins with considering the desired expression or the intention with the colour scheme. The *Plan* category represents this starting point and consists of nine cards, each presenting a goal for the colour palette and suggesting possible tactics. The *Plan* cards propose *Create* and *Adjust* methods that can be used to achieve the desired colour expression. The *Plan* cards are: *The Dominant Colour*. *One Pair*. *Balance*. *Contrast*. *Trend*. *Playful*. *Subdued*. *The Whole*. *Another Plan*.

The *Create* category consists of nine different methods to create a palette. The methods vary from quite practical and intuitive to completely systematic methods based on theories of colour harmonies. On the front the cards present a black and white graphic that illustrates the methods. On the reverse side of the card is a description of the method, pros and cons as well as a reference to theory or industry. The *Create* methods are: *Personal Colours*. *Complementary*. *Triad Tetrad and Max*. *Analogue*. *Colour separation*. *Historic Palette*. *Commercial Context*. *Concept*. *Monochrome*.

The *Adjust* category consists of nine methods. The methods are used to elaborate the created palette, to experiment and refine and are as such representing

the iterations known in design processes. As the *Create* cards the *Adjust* cards also features an illustration, a description of the method, pros and cons as well as a reference to theory or industry. The *Adjust* methods are: *Invert Some*. *Invert All*. *Overtone*. *Bridge*. *Perfume*. *Scale*. *Pairing*. *Double Up*. *Reduction*.

#### A hypothetical case

To understand how the method cards work a hypothetical case is here explained; a student wants to choose colours for a set of plastic toys, but intends to give it a sophisticated look that appeals to Scandinavian quality-conscious parents instead of traditional colour choices for children such as bright primary and secondary colours.

The *Plan* card; *Subdued* is chosen. The reverse of the card states:

**Goal:** Subdued is a colour palette with low-intensity colours, which are often connected to natural materials, vintage and quality.

#### **Recommended methods:**

Create: Complementary. Monochrome. Analogue. Colour Separation. Historical Palette.

Adjust: Overtone. Bridge. Perfume. Pairing. Double Up.

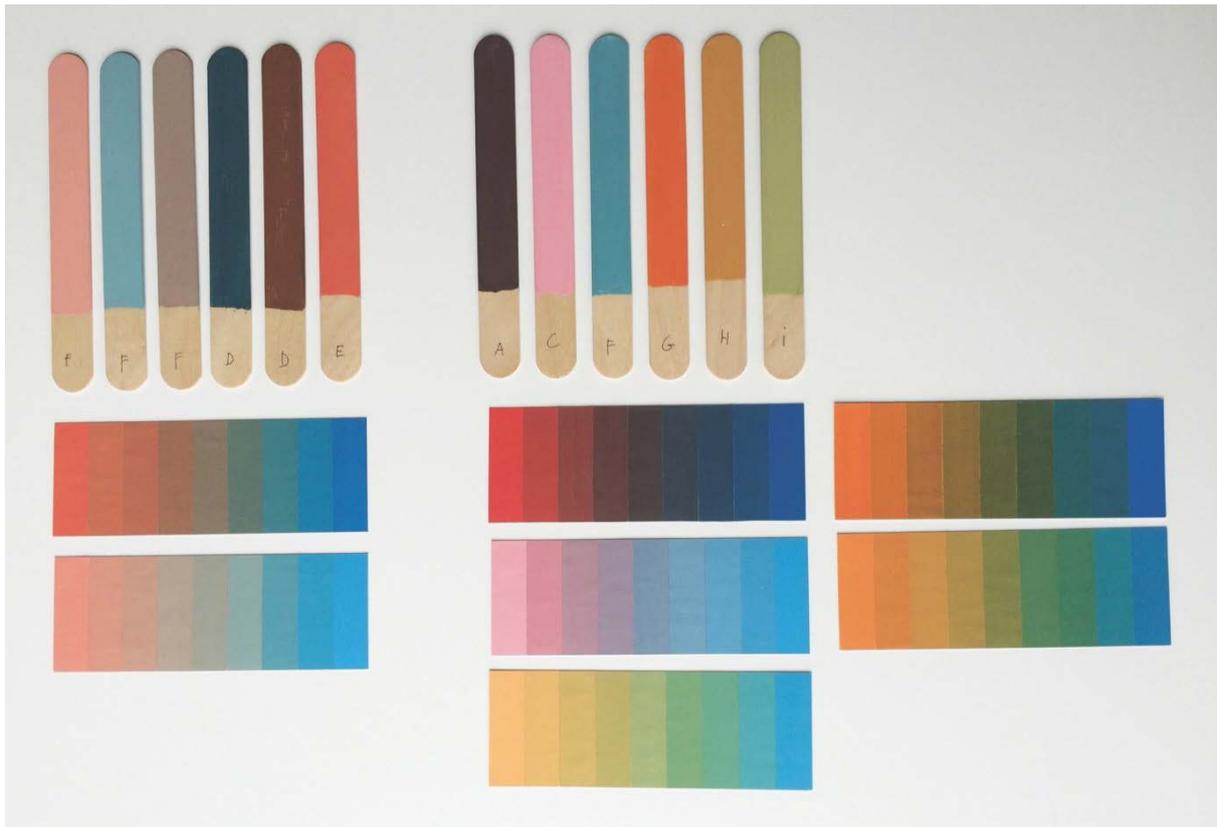


Figure 2. Experiments with the Create method: Complementary. Created and photographed by M. Kirk Mikkelsen, 2015

The photo shows work with the *Create method: Complementary* where the method has been extended with several related complementary scales. The study is based on the scale from blue to orange. Three scales are created with high colour intensity, respectively blue to yellow-orange, blue to orange and blue to red-orange. These three scales are repeated twice mixed with white in various amounts to obtain a light value and the lower colour intensities. Thus, there are a total of nine variations of the scale blue to orange. The colour palette on the left consists of colours selected from three of the scales and the palette on the right consists of colours selected from six of the scales. In its pure form it can seem a bit predictable, but the composite palettes are surprising.

From the *Plan* card the *Adjust method: Overtone* could be chosen. The reverse of the card states:  
Method: This method can be used to unite a diverse colour scheme. Select a colour that you want as the

tone and mix a bit of it in all colours in the palette. Try with both light and dark colours, with different hues and in different amounts.

Pros and cons: The method is simple and therefore easy to use. If the palette is added too much of the overtone it can become uniform and monotonous.

Reference: David Hornung has described the method.<sup>9</sup>

The photo shows work with the *Adjust method: Overtone*. The work has been carried out as hatching with markers. The colour scheme in the middle shows the original colours. Adding a layer of hatching with cyan has toned the one to the left. Adding a layer of hatching with yellow has toned the one to the right.

The final colour palette must always be evaluated up against the intensions of the design project. The method cards provide no guidelines for the evaluation at this stage, so the process will be based on judgements from the student, tutor and the potential user.



Figure 3. Experiments with the Adjust method: Overtone.  
Created and photographed by M. Kirk Mikkelsen, 2015

### Conclusion

A group of students have followed the project from idea to result and have tried several of the methods. Based on the response received from these students the colour methodology will be applied in colour classes in the autumn semester 2016 at DSKD. There has been great interest among the students. Those with little or no previous experience with colour have used the method cards as concrete tool for making colour schemes as well as a navigator in the vast field of colour theory.

The methods will be introduced to the students of our basic colour class on the first semester. Here they will serve as a didactic tool for the teachers both through theory and when students work in practice. Furthermore, it is expected that the methodology can be a tool for the students when they create and adjust colour palettes later in their education.

### Discussion

Applying design method card as for example the IDEO cards<sup>10</sup> or the 5C model<sup>11</sup> in a design process can be a rewarding way to manage and inspire the process. It can conversely also be prescriptive and retardant for intuitive workflows. Therefore, this colour methodology must be regarded partly as a didactic tool and as an inspiration to work with colours.

The project also raises the question on how to evaluate the colour work done by students after the implementation of the methodology in colour classes at DSKD. Both colour theoretical and didactic approaches must be considered and it might be executed by comparing the result of previous years colour classes. However the long-term effect on the students approach to colour work must also be taken into consideration.

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## Color Flash! The Campus as Think Tank: Designing from Art, Nature and Couture

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### Abstract

“Color Flash!” is a multi-faceted color theory project designed to use the specialized resources on campus that enable students to expand their creative options and design sensibility. “Color Flash!” emphasizes the inter-disciplinary scope of the SCAD college curriculum whereby the campus itself becomes a hands-on ‘think tank’ for an immersive approach to working with color and in its application in a variety of disciplines. This paper delineates the integration of influences from nature and culture in the student’s projects and emphasizes the omni-directional character of color as a topic for exploration, experimentation and study. This presentation documents a color theory project in the freshman program at Savannah College of Art and Design (SCAD Atlanta campus) and the stages of the assignment including research, visual problem solving, critique and exhibition.

### Introduction

Color Theory and Application is the second of three required freshman design courses in the Foundation Studies Department of SCAD Atlanta. The course is a ten-week intensive experience that examines color theory principles and emphasizes research, observation and analytical skills. The course has specific goals and objectives to prepare each student for using color and of its relevance to every major area of concentration at the college. When teaching in the Foundation Studies Department, Professors work with the broadest cross-section of the student body, where students major in wide selection of disciplines in all areas of the fine and applied arts and design. This is a key point in the development of “Color Flash!”— a project that would have a strong cross disciplinary stance to appeal to the diversity of majors and interests and of the students.

Integral to the scope of this project is the dedicated resources on campus that support the depth education of the student. SCAD is a global university with four distinct campus locations on three continents: Atlanta and Savannah in the United States, a campus in Lacoste France and a campus in Hong Kong. Noteworthy resources at the Atlanta, GA campus include SCAD FASH: Museum of Fashion + Film and the Nature Resource Room, a center for sustained study of nature specimens. In addition, on each campus, there a distinctive design sensibility within the physical spaces. Characteristic of each campus are the dramatically designed interiors and social spaces that also serve as gallery for the display of artwork by faculty, alumni and artists of renown from the permanent collection. The gathering spaces and alcoves are inviting environments and niches for conversation and social interaction that are adorned with unexpected and provocative artwork, props and furniture.

It was with these physical resources in mind that I developed a final project in color theory whereby students were encouraged to make use of the campus environment in a dynamic way. In addition, the color project encouraged the students to utilize a number of skill sets while incorporating their surroundings as part of the project. The scope and stages of the final work that transpired was challenging and varied. This was a project where the most versatile student could move from drawing and painting to constructing a three dimensional “mannequin” while incorporating color research for analysis of art historical sources to develop a costume/garment for the mannequin. When all stages are successfully synthesized, an ambitious project atypical of the first year experience can be appreciated.

### Method

“Color Flash!” evolved in stages over two weeks as a final project in the latter part of the ten-week term. Earlier in the term, students executed a number of preparatory exercises in paint and digital media including crafting a color wheel, the Josef Albers’ *Interaction of Color* exercises with Color-aid paper collage, color matching projects, vocabulary, quizzes, writing samples and field trips that make up core of this course. In an attempt to coalesce the basic exercises

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with a project that would engage a variety of skill sets the "Color Flash!" project was conceived. Important to this assignment is an emphasis on strengthening conceptual and process based decisions, art historical and design research and self-directed discovery of materials and methods. The finished project culminated with an assignment of many layers: drawings and sketches, a color analysis palette, a dimensional model/mannequin with an original garment and lastly, a digital color photograph.

Central to the success of this project was the use of three distinct campus resources that provided an augmented educational dimension to the classroom setting. These include SCAD FASH: Museum of Fashion + Film at SCAD Atlanta, opened in 2015, serves as the centerpiece for the study of fashion design. Secondly, the Foundation Design Nature Resource Room provides a hands on experience for the study of nature. Like a historical "wunderkammer" this dedicated study center is used for the scrutiny of nature specimens and the study of animal anatomy; including skulls, taxidermy mounts, collections of insects, reptiles, birds, shells, etc. for student use. Lastly, the interior spaces of the campus became a back drop for the final step of the project; a unique location for staging a photograph of the finished mannequin. This photograph, with an emphasis on color placement, composition, photo styling and ambient lighting was a dramatic finale to the project giving the mannequin a new interpretation and colorful fantasy.

The project began in the Nature Resource Room for sketching the specimens. Emphasis was placed on a planar analysis and linear interpretation of the subject matter. This was essential as the next step was to create a three dimensional wire armature. The linear simplification, styling and hybridizing of the nature specimens was reinforced. The students were encouraged to combine several species together to maximize the invention of a hybrid wire model armature that would stand 12" tall.

The critical stage of the model/mannequin was the color component and a focal point of "Color Flash!" This is where color breathed life into the project. The wire model needed a garment and that was to be directly influenced from research and a color analysis of a work in art and design history. This color

and design analysis gave each project its distinctive look. Each garment referenced a color palette of an art historical source and created the interconnectedness with critical color matching and an interpretation of color forecasting and fashion trends. Students were guided with an eclectic list to choose from in painting, decorative arts, architecture and design. After each student selected their artwork, an astute analysis of the color and the motifs of the period and style were incorporated into the garment design. A color palette of 5 swatch samples would dominate the color story of garment for the mannequin. Students were encouraged to self-select the materials and methods for creating the garment and proceed with their own research. Once the clothed mannequin was finished it was placed in an interior space on campus where it was photographed in such a way to create a final, dramatic statement.

## Results

This presentation is an overview of the “Color Flash!” project showing the evolution of the sketches, designs, model making and color study. The interpretation and color analysis of the mannequin’s garment inspired from art historical sources demonstrates the influence and transformative power of color. The final stage of the project, the photograph of the mannequin placed in an interior environment is where the active imagination and color fantasy meet.

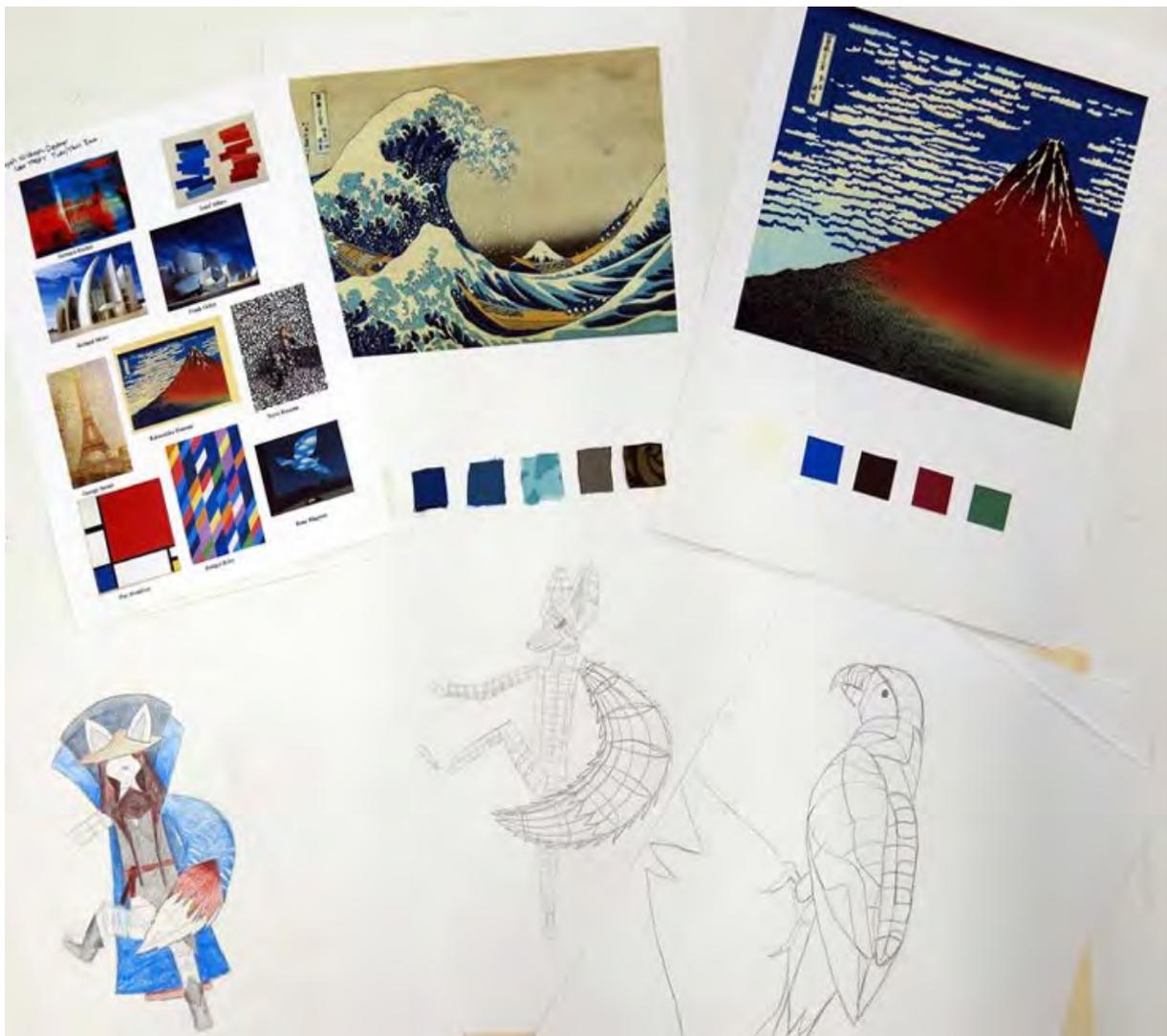


Figure 1. Sequoyah Wildwyn-Dechter: Color analysis and sketches, “Color Flash! Project”. Photo by M. R. Cohen, 2016



Figure 2. Nature Resource Room, SCAD Atlanta.  
Photo by M. R. Cohen, 2016



Figure 3. Catherine Ly, 'Mannequin in interior space'  
"Color Flash! Project". Photo by M. R. Cohen, 2015



Figure 4. SCAD FASH: Museum of Fashion + Film  
(Carolina Herrera Exhibit) SCAD Atlanta. Photo by M. R. Cohen, 2016

### Conclusions

"Color Flash!" was an ambitious undertaking for any freshman course. It was developed to meet the needs and interests of the diversity of students enrolled in a typical color theory course at SCAD Atlanta. The reach of this project was an effort to engage the range of majors and disciplines of the curriculum and to stimulate the student's interest in a cross disciplinary approach to problem solving and critical thinking. Often it is a challenge for a freshman student to make meaningful connections between the "typical" or time honored color theory exercises and their respective areas of concentration. Projects can seem remotely disconnected from their major area of study. "Color Flash!" enabled students to discover the relevance and complexity of color and its interconnectedness with nature, design, art history, fashion, interior design, animation, photography, contemporary trends in art, sculpture, model making, drawing, painting and critical thinking.

### Acknowledgments

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## From Intuitive to Conceptual Approaches in Architectural Colour Design Training

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### Abstract

This paper offers an insight into the colour design training methodology used at the STU Faculty of Architecture in Bratislava. Learning by doing and stress on colour design decisions based on objective conditioning factors rather than purely subjective experiences form the basis of the philosophy of approach. Understanding one's own responses to colour through emotions and sensations, the social conditioning factors, the effects and interactions between colours combined with mastering professional colour communication contribute to reaching a qualitatively higher level of colour design. Thus first attempts of conceptual and contextual colour design are made possible, be it in cases of products, interiors, or facades, urban spaces. Interesting colour designs such as the Trio "moody" bench, various public spaces and facades document the learning process and methodology. For the purposes of this paper examples of colour design specifically for furniture have been selected. Experimental work with students over long years has also led to scientifically meaningful results – some of them are presented in this contribution.

### Introduction

In special courses on colour, exercises carried out during seminars focus on enabling students to obtain knowledge and practical skills on one hand, on the other hand the outcomes of experiments often further enrich the scientific basis of this knowledge. Students first have to learn to "think and work" in a standard colour communication system. This is achieved through a series of practical exercises helping them to understand the system characteristics, the colour coordinates and their impact on studying colour effects and interactions. Having completed this stage, the assigned tasks can be more prac-

tice-oriented. Students start through thorough observation and recognition of the phenomena related to colour in the built environment or in various designed products. A complex analysis, identification of the key problems and needs, help students to formulate the aims and goals of the actual colour design. It is stressed that intuition, sense for colour aesthetics and trends may be a very important resource, but all colour design tasks in architecture, urban spaces and design of products need to be conceptual, based on objective knowledge and not merely reflect the subjective preferences or desires of the author. Especially public spaces serve heterogeneous groups of users, their colour appearance and perception is subject to a lot of influencing factors which all should be taken into consideration to the maximum possible degree. In the end, it is important that students are able to argue their colour choices and try to evaluate to what degree the initially defined aims had been fulfilled.

### Method

Studies have shown, that most students, even if they had had a previous special artistic training, do not have sufficient knowledge on colour as a phenomenon and the level of accuracy of their colour communication is not reaching the desired professional level.<sup>1</sup>

When given a more serious task, e.g. to define and communicate the observed surface colour of a given sample most accurately possible, almost all students tend to use colour names (hues), computer and digital technologies and descriptions. Their approach to the task falls under one, or a combination of the following typical groups, in which they make use of:

- colour hue names and their combinations,
- only a very low number of subjects indicate also lightness besides the hue, e.g. "a very light yellow" and an even lower number of them refer also to the saturation or chromaticness, e.g. "saturated blue",
- the production of the colour, indicating the mixtures, the process and way of mixing and achieving the given colour and by listing the components,
- reference to the effects of the colour, e.g. "warm impression", "cold", sensations, emo-



Figure 1. Definition of a colour in a standard colour system (NCS): “earthen” colours (students: Lenka Petrášová, Hana Šišuláková) and “beige” colour (student: Erika Nagyová). Master level Course on Colour Design Principles led by Andrea Urland

tions (“pleasant”, “calming”, “aggressive”) and dynamics (“monotonous”, “uninteresting”),

- comparisons of the given colour to the recalled colours of a well known object, product, such as “vanilla pudding with some white added”, “the colour of humid sand”, “ocean colour”, the relationship to nature: “natural”, on site matches – producing a sample of the seen colour (about 14% of the subjects).

In this context the mastering of communication using a standard colour order system is the first step in training. Parallel to that students need to get an understanding of the objectively existing common responses to colour by most human beings. A simple exercise done individually helps them to experience this, followed by a group comparative analysis and interpretation of the results.

Positive emotions such as peace, happiness, joy are mostly characterized by nuances with minimum or no blackness content. Feelings of peace are characterized by low chromaticness and hues predominantly from the third quarter / quadrant of the NCS hue circle. Feelings of happiness and joy are expressed by colours with higher chromaticness and hues predominantly from the first quarter of the NCS hue circle with a partial extension to the fourth quarter (Fig. 2).

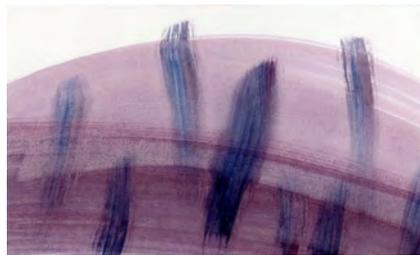
Feelings as hope and expectations, dreaming, bear characteristics of an intermediate stage in the direction to melancholy, which is characterized by medium-level (up to higher) values of blackness and whiteness content, lower chromaticness and hues from the blue area, but slightly ranging to red as well as green. Negative emotions and sensations connected to mourning, sadness are characterized by a higher blackness content, lower chromaticness



peace



happiness, joy



melancholy



sadness (and pain)



anger

Figure 2. Examples of students' experimental (anonymous) spontaneous expressions of feelings in colour in the framework of the Bachelor level course on Colour (led by Andrea Urand) and their characterization in NCS in the framework of research conducted by

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and hues predominantly from the second quarter of the NCS hue circle but slightly ranging to the first as well as third quarter. Anxiety, stress and down-heartedness also fall under this group; their expressions are characterized by more whiteness content. Anger, depression, helplessness but also pain are characterized by the presence of an almost pure red hue with a high chromaticness, usually in combination with black colour.

The objective character of these results is supported by the results of other researchers<sup>2</sup>, who confirm the links red – anger, passion, green – envy, white – fright, black – anger, yellow – joy, blue – peace, grey – exhaustion, boredom, orange – happiness. Further characteristics which result from the experiments concern mainly blackness contents: happiness, joy – colours with very low blackness content; sadness and fear – colours with low chromaticness and medium to higher blackness content; anger – colours with high levels of blackness content.

The associations emotion – colour are based on physical experiences. A correlation exists between senzomotor and subjective understanding, they are thus anchored in human beings who pass through identical psychological processes when experiencing certain emotions.<sup>3</sup>

Students are led to understand that cultures, as Mahnke affirms, develop their own associations tightly linked to economic, geographical, religious factors, changes of taste levels of education.<sup>4</sup>

The use of colours is formed by local culture – the use of building materials and adaptation of the colours to the local geography and climate.<sup>5</sup> W. Spillmann's<sup>6</sup> research has shown, that human history is marked by periods when predominantly achromatic colours were used alternating with periods with a predominant use of chromatic colours.

Tasks assigned to students aim at developing these ideas further. Over the past fifteen years such studies were regularly done in the field, when students were asked to try to define the colour culture developments and the colour preferences of people in the transforming society. Subsequent partial tasks consisted of defining what makes colour combinations seem "aggressive", "boring", "appropriate", "harmonious", etc. Knowledge gained from these studies is a helpful tool for colour design and for reaching pre-defined objectives.

In the sphere of product design, interesting examples of conceptual colour design are students' works elaborated during assignments named "Colour in Motion" and "Colour Plays". The task of the first one consisted in linking several dimensions, primarily: achieving diversity in the colour space composition with regard to individual subjective preferences, personal taste, emotions and if possible, also to the current mood of the user. It included respect to the influences of the surroundings and the possibility of the user's participation in creating the colour scenery.

The "Moody Bench Trio" (Fig. 3) is designed for a school environment, it was therefore created in three elementary colours – yellow, red and blue. The alternative with wooden seats should serve in natural, historical or countryside environments. In terms of technical concept the classical principle of rotation with the possibility of fixing the seating boards in three different positions was used. This joyful and relatively simple design solution enables easy adjustment by users, and thereby potential changes of the emotional atmosphere of the environment. This design idea is perhaps at the same time an indication for the future development of technically advanced city furniture.

The main target of the assignment "Colour Plays" was to create a functionally interactive, spatially modifiable furniture set allowing potential users to define their own colour compositions. The methodology was primarily based on the application of the following design principles: achieving dynamic visual changes by applying spatial variability of particular design-compatible elements; optional colour selection according to the user's individual aesthetic demands and specificity of the surrounding environment promoting the user's creativity, self-realization and self-expression through participation in surface colour arrangements and thus artistic forming of their own home.

Colour alternatives in the "Home Panel" (Fig. 4) are achieved through mutually combinable storage elements as to position and a built-in wall panel. Each change of position leads to a change of the artistic composition on the achromatic background of the panel. The user-friendly selectable elements are capable of reacting to altered functional and visual requirements. They also stimulate users to create peculiar, offbeat colour configurations.

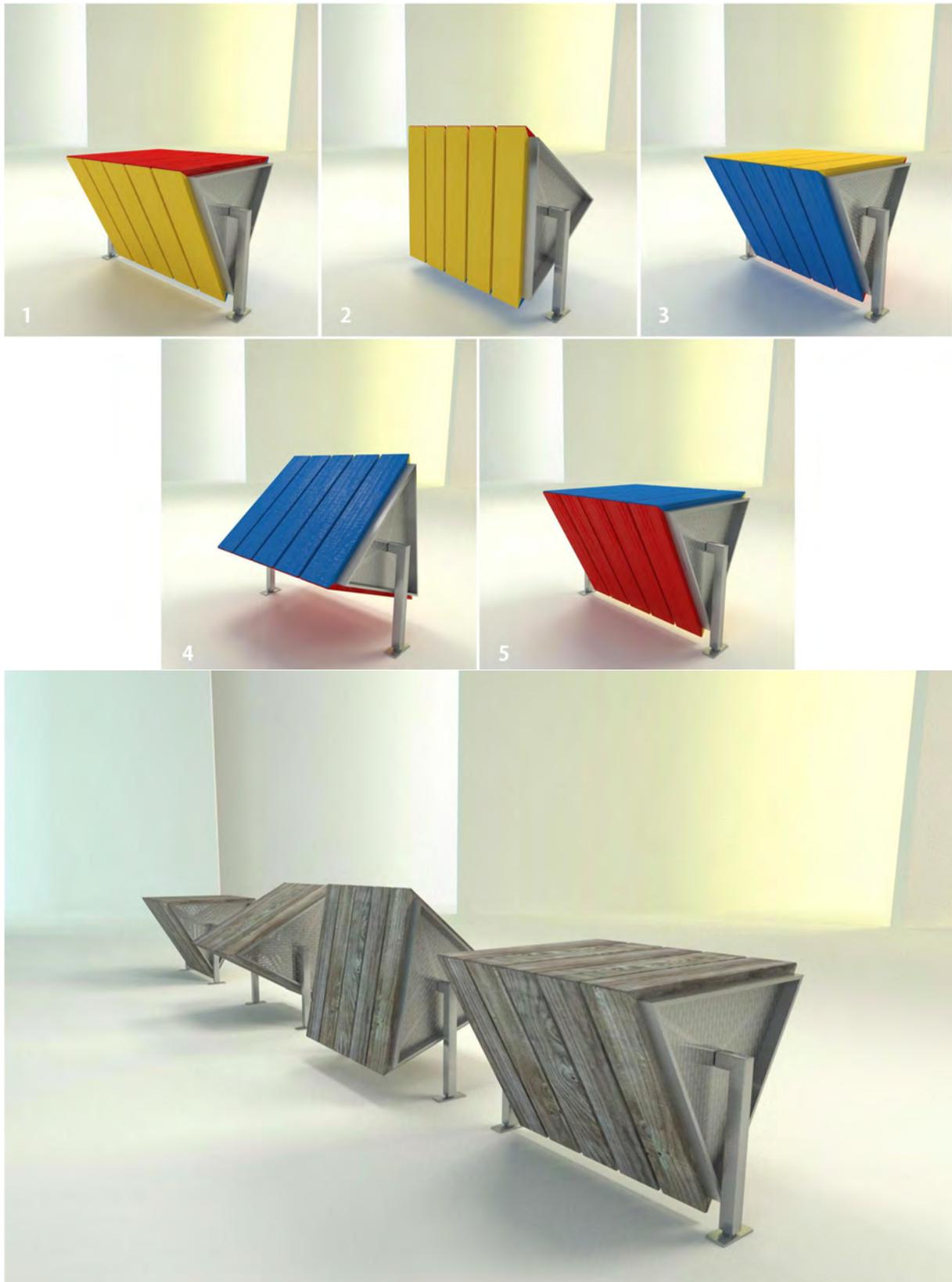


Figure 3. Colorful modifiable “Moody bench” - an example of a city furniture element allowing color changes according to the user’s mood and artistic preferences. Student: Vojtěch Moškoř, supervisor: Jana Vinářčiková



Figure 4. Home Wall Panel "Colour plays". Student: Anna Harvanová, supervisor: Jana Vinárčiková

Figure 5. Home office "Colour plays". Student: Andrea Bónová, supervisor: Veronika Kotradyová



The theme of colour playfulness has been also made “transparent” in the design proposal “Home Office” (Fig. 5) by means of four compatible colour components differentiated by shape, which allow free functional, spatial and artistic changes. The principle of free spatial variability of the components and the colourful palette of surface finishes offer solutions for people of various professions, age categories, individuals with specific personality features and artistic taste. From the semantic point of view there is an overlapping of the functional, aesthetic and emotional levels, in which the colour concept, participation of the users and their creative stimulation play a very important role.

### Results

Without training, more than 90% of new students use hue names for specifying colours, 23-45% refer also to the lightness of the colour, about 10% notice the saturation or chromaticness, only about 2% refer to both lightness and saturation, about 50% tend to use comparisons to known objects or products to better express the given colour, about 25% describe the effects and sensations linked to the colour, 20% characterize the temperature of the given colour, 20% describe the production procedure of the colour, the mixture components and their ratios.

This means, that untrained persons communicate on colour at levels 1 and 2 of the *Universal Colour Language*<sup>7</sup>, and only in exceptional cases they reach level 3 of the 6 levels. The positive or negative character of emotions is connected with their characteristics, colour coordinates, mainly blackness content and chromaticness, which both play an important role. The intensity of the emotions is linked to higher blackness content, or higher chromaticness. Less intense emotions are expressed by lighter colours with low blackness content, lower chromaticness. From the results of experimental research follows, that it is easier to connect colours to emotions than assign a certain emotion to a certain colour.

The colour designs produced by students within one semester of training already show a positive impact on their skills and approaches; colour starts to become a coherent part of the conceptual design process for them.

### Conclusions

Experiments conducted over the span of a number of years with groups of students (Urland, A. 2000-2016) clearly show, that a high degree of conformity exists between people in cases of spontaneous expression of emotions, feelings, sensations by means of colours, i.e. that a common basis conditioning human responses exists. It is possible to trace down and express the prevailing colours used for expressing the different sensations, characterizing them in NCS and revealing their common features.

The studies and experiments will continue, just as the search for innovative applications of colour science research results in the practical design process.

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## Colours in Show Gardens in the Case Studies of BUGA 2015 and IGA 2013

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### Abstract

In the garden – consciously designed spatial composition, the play of forms, colours and chiaroscuro often becomes its main asset. Appropriate colour combinations are the most important factor to be considered by designers. The examples of show gardens presented during the BUGA (*Bundesgartenschau* federal horticulture show) 2015 and IGA (*Internationale Gartenausstellung* international horticultural exhibition) 2013 exhibitions confirm that the use of appropriate colours is the key in the designing process. The main aim of the article is to prove that in temporary show gardens, the colours are a part of a garden story. They are not only the visual element, but also have big influence on human body, emotions and mind. They create garden character and atmosphere. By connotations they also allow to decode the symbolic layer of show garden – a story or an idea that inspired designers. Colours – symbolic medium become a form of silent dialogue between garden author and it's visitor. The garden colour finger print analysis enables to present the main garden colour palette.

### Introduction

At the beginning there was light.<sup>1</sup> The light enables vision, "makes objects perceived as three-dimensional and makes the colour visible".<sup>2</sup> The colour vision is very subjective, depends on the perceptive filter and psychophysical conditions of each person. The reception is also influenced by many external factors: adjacent colours, background colours, distance, light, texture of surfaces. Garden design is the art of spatial composition of plants and architectural elements. The special garden type – show garden provides also a story or idea hidden behind the design. This story takes place at various cognitive levels – at the compositional, formal and symbolic level. In all these levels, the role of colours is extremely important.

### The importance of colour in the garden

According to Gestalt psychology in the process of perception the observed object (as a whole) becomes more than the sum of its parts. This theory can be successfully applied to works of garden art, which act on an observer in many cognitive areas, not just physical. In the process of perception gardens affect directly on the body of the observer – through senses and psychophysiological impact of colour, but also on the psyche and the mind on symbolic-cognitive level.<sup>3</sup> Reception of colour phenomena involves emotions first, ahead of intellectual perception.<sup>4</sup> Even if the show garden is created as a form of the game with the user, it is still perceived emotionally and analyzed on the basis of associations and personal experiences. Observation of forms and shapes requires a mental analysis.<sup>5</sup> But so far not only the colour perception process, but the process of perception at all has not been fully elucidated.<sup>6</sup> Vision remains the main sense, which is used in everyday life, and therefore colour and other visual stimuli play a key role in the design of gardens.

Wide selection of garden building materials in various colours and shades allows to obtain many colour solutions. Natural materials such as stone or wood, are characterized by rich micropolychromics.<sup>7</sup> A wide range of modern dyes, paints and varnishes allows to create infinite number of colour combinations.

The colours in the garden compositions are constantly changing. Colours change with the life cycle of the plant, which creates different colour images in various stages of life. The colours appear, change saturation and hue to finally disappear, depending on the time of year or day. They are also dependent on the intensity and colour of light (apparent colour variation). In the morning bluish light makes the colours brighter, more pastel. In full, yellowish midday sun, they may appear to be bright or faded, because of high-contrast of chiaroscuro. In the evening, the same colours, influenced by the orange light become so called rich colours with high saturation. A similar effect is caused by the weather. Under a cloudy sky colours are grayish.<sup>8</sup> After imposing seasonal variations of colour (bright and light in spring; golden and saturated in summer, rich and vibrant in autumn, high contrasts in winter), one can receive a kaleidoscope of colours, which make the garden never the same.<sup>9</sup> In the perception of the gardens

the particular importance has a contrast of colours, formed by the different parameters of colour, that builds tension between the observed elements.<sup>10</sup> Proper selection of colours and textures determines the character of the garden. However, this does not end the role of colour in composing of gardens. It is impossible not to appreciate their traditional symbolism and the impact on the human psyche eg. bluish colour soothes and calms, orange stimulates<sup>11</sup>.

In the plant selection not only 'temporary' flower colour plays an important role, but also the colour of the leaves or bark adorning the plant for a long time.<sup>12</sup> The colours on smooth surfaces tend to be more saturated and on the porous structure more pastel.<sup>13</sup> Plants with golden leaves stand out from the green background and white flowers seem to shine among the dark green leaves<sup>14</sup> Grey colour gives a sense of elegance and tranquility<sup>15</sup>, creates visually light compositions. There is also a possibility to use optical illusions with help of colours. Cold colours with low saturation, by analogy to the aerial perspective optically drift objects from the viewer. The use of bright, warm colours, with a high saturation makes the element seems to be much closer than it actually is.<sup>16</sup>

There are various ways to compose colours in the garden to create different impressions. Monochromatic compositions elicit emotions related to the particular colour. Similar colours (analogous) create harmonized, serene designs while opposite colours create visually balanced but tense designs. Less tensions bring the use of split complementaries. Bright, highly saturated colours draw attention, so they should be used on small surfaces as accents. Their influence balances large areas of darker, less saturated colours.<sup>17</sup>

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### The show garden

The show garden is a special kind of spatial arrangement. It's history dates back to the first garden exhibitions organized from early 19th century in European countries. However its origins can be linked to the residential gardens (often with many rare, exotic plant species), created to astonish the guests.<sup>18</sup> Modern show gardens as their predecessors are "designed to amaze visitors with bold solutions, fabulous colours and new plant varieties".<sup>19</sup> Show gardens are small spatial compositions, created on limited area (usually not exceeding 10 ares /0,25 acres). As typical gardens, their main objective is to introduce beauty into human habitats<sup>20</sup>, however they often offer much more. They are often used to explore specific theme e.g. butterfly garden, white garden. They are also a great opportunity to draw visitors attention towards major social and environmental issues like river pollution or losing cultural identity of region.<sup>21</sup>

In Germany the history of the garden exhibitions is relatively long. The horticultural exhibition in Hamburg in 1869 is thought to be the first international exhibition held within the area of current Federal Republic of Germany. However numerous smaller scale exhibitions took place before in this area. Modern horticultural exhibition are organized of three levels: international (*Internationale Gartenausstellung* abbr. IGA), national (*Bundesgartenschau* abbr. BUGA) and regional (*Landesgartenschau* abbr. LAGA). BUGA and IGA are events held cyclically (every two and every ten years) in different venues.<sup>22</sup> Their influence on city structure is significant, as after the exhibition expires developed areas are usually being opened as a public parks.<sup>23</sup>

Analysed examples were presented during IGA 2013 and BUGA 2015 exhibitions. IGA 2013 took place in Hamburg in 2013. Exhibition theme - Around the world in 80 gardens celebrated water as a main factor of host city development.<sup>24</sup> BUGA 2015 exhibition was organised in five different locations in Havel region. Gardens and public spaces created during exhibition cherished that towns are linked by the same river Havel. It became exhibition theme - 'From cathedral to cathedral - the blue ribbon of Havel'.<sup>25</sup>

### Garden colour finger print method

Garden colour finger print analysis was conducted on presented photographs (Fig. 1, 2, 4, 5, 7, 8). First step covered picking up to 6 most frequent distinguishable colour shades found in four groups of garden element (further called layers) – surfaces, foliage, flower and furniture by Eye Dropper Tool. The analysis was presented in graphic form (Fig. 3, 6, 9). To enable generalisations each colour was converted to its numeric record in Natural Colour System or other closest match in standard colours. The final outcome is presented in the table 1. The general method can be applied to any garden designs. It allows to analyse both the general finger print of the garden as well as each layer alone.

Symbolical meaning of analysed garden colours was performed on basis of Popek Stanisław table 'Colours and psyche, cognitive, emotional, characterologic and symbolic aspects'.<sup>26</sup>

### Case studies – colour use analysis

#### Case study 1.

Show garden *Leben am Fluss* (Living by the river) (Fig. 1, 2) presented in 2015 in Brandenburg an der Havel, is deeply linked with the cultural identity of the city. It refers not only to the common traditions of urban development in river valleys. The reference to the latest trends in housing, especially to the popular in western Europe houseboats, also seems to be important. The show garden celebrates the relationship of the town and the river, over which it is located. It becomes a metaphor of the relationship of man with life-giving water. "On the banks of the river awaits lush life, full of mysteries and contradictions".<sup>27</sup> The main element of the garden layout is a curving path – the river made of concrete cobblestones. Along it there are 4 wooden boat, serving as elevated flower beds or terraces. Flowering perennials in purple tones are enlivened by small bright accents (white, yellow, reddish). Grasses and small flowers perennials (eg. *Gypsophila*, *Heuchera*, *Perovskia* etc.) and white background introduce sense of lightness.

Show garden *Leben am Fluss* colour finger print presents fig. 3. Violet palette symbolically may refer to the freedom of nature and the indomitable spirit of the river, which cannot be tamed by human hand. Yellow and red accents appeal to the creative power of water, its life-giving potential. Introducing a few white, 'pure', easily spotted elements can be interpreted as a plea for water resources protection. Pavement is in typical colours, which are neutral, cautious. This may mean that the only way to preserve nature is to follow its' rights. The use of black sailing cloths – like black clouds is concerning. All these elements creates thoughtful, melancholic atmosphere.

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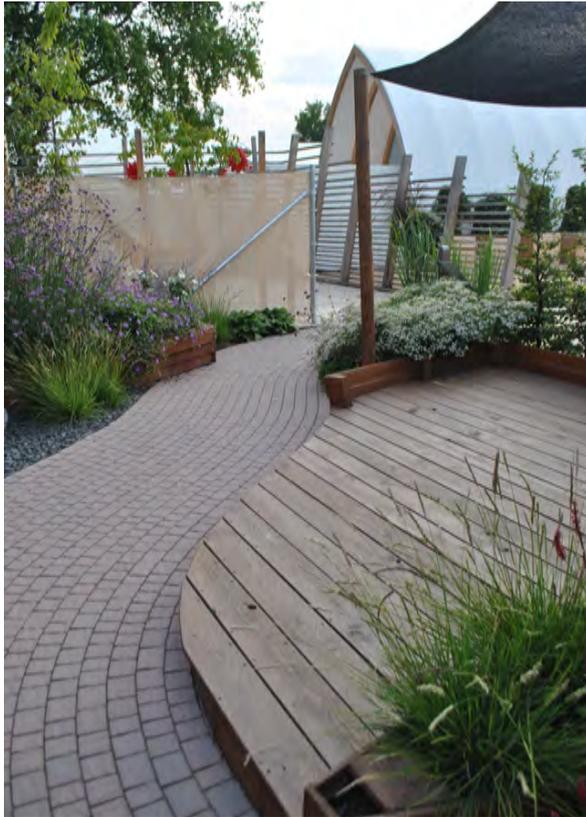


Figure 1. "Leben am Fluss" show garden. BUGA 2015. Photo by A. Wójcik-Popek, 2015, August 24

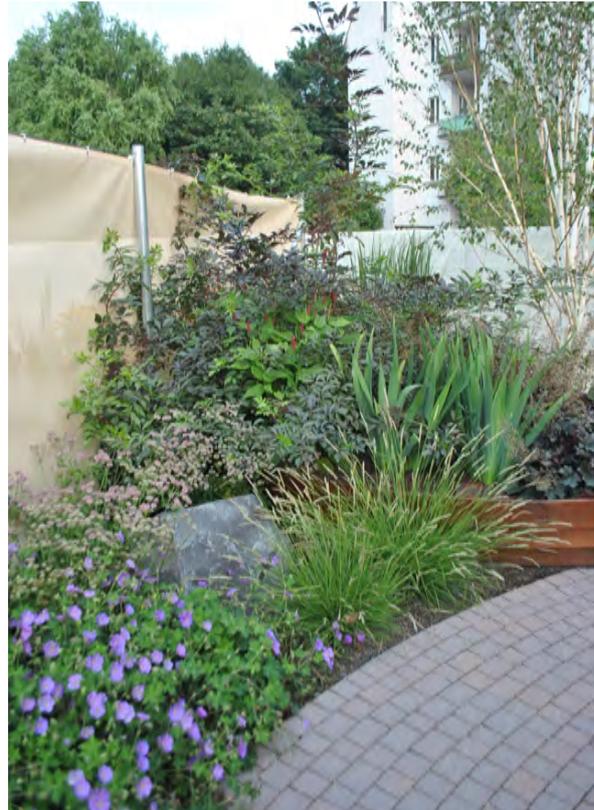


Figure 2. "Leben am Fluss" show garden. BUGA 2015. Photo by A. Wójcik-Popek, 2015, August 24

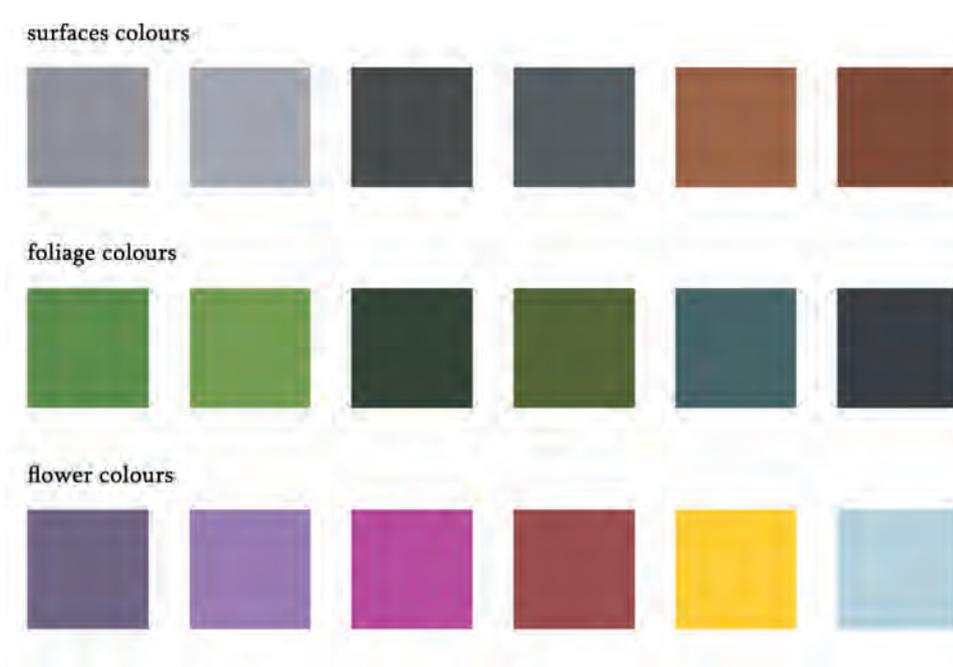


Figure 3. "Leben am Fluss" show garden colour finger print. Chart by A. Wójcik-Popek, 2016

### Case study 2.

The garden No. 63 *Landeplatz für Engel* (Landing pad for angels) (Fig. 4, 5) was presented at the exhibition in Hamburg in 2013. It is a mystical place, belonging to the "World of continents". It refers to the style of northern Europe. The layout of the garden is very simple, as "Angels need a simple place of land on the earth".<sup>28</sup> Central, planted with white willow (*Salix alba*), circular island, is surrounded by a wide water channel. The only colour accent on a dark green background is a willow-green, wrought iron chair. To get there one must first go through a dark, dense willow grove, to then reach the illuminated clearing. To get to the island everyone will be subjected to the test of courage, as only illuminated ladder leads there.<sup>29</sup>

The show garden *Landeplatz für Engel* colour finger print presents fig. 6. Almost monochromatic show garden is intriguing, but peaceful at the same time. Contrast of the dark foliage with white fence gives the place a romantic atmosphere. In the garden there are almost only natural colours – greens, browns and whites. Against this background, willow-green chair stands out, bringing lightness to the composition. The water surface replicates elements of the garden, emphasizing its mystery and uniqueness. Earth tones in this case seem to symbolize innocence, freshness (bright green), caring (dark green), maturity (bronze). White emphasizes spirituality and the supernatural qualities of this place.

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Figure 4. "Landeplatz für Engel" show garden. IGS 2013  
Photo by A. Wójcik-Popek, 2013



Figure 5. "Landeplatz für Engel" show garden. IGA 2015.  
Photo by A. Wójcik-Popek, 2013

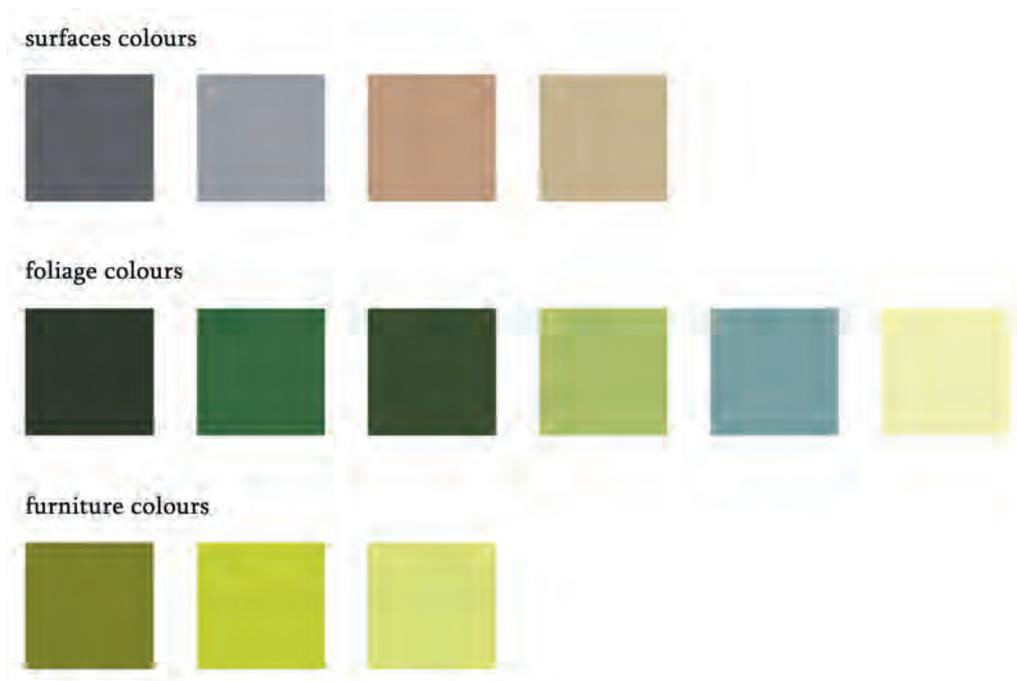


Figure 6. "Landeplatz für Engel" show garden colour finger print. Chart by A. Wójcik-Popek, 2016

### Case study 3.

The show garden *Branderburg chic – Schmuckbox* (Brandenburg chic – jewellery box) presented in 2015 in the town of Brandenburg an der Havel, refers to the bygone craft traditions, which largely shaped the diversity of this region (Fig. 7, 8). Garden *Branderburg chic* is very intriguing due to strong contrasts of large areas decorated in achromatic colours – black, white and grey. On a dark background of the walls and the flooring, the central part of the garden looks like shining diamond at the bottom of the black box.<sup>30</sup> In the central part of the garden there is a circular golden-silver perennial composition. The white frame of wood forms a structure resembling a brooch adorned with reflective mirror-like elements. Dark walls of the garden are enlightened by 'flower paintings' (*Saxifraga, Sedum etc.*) in white frames.

Garden *Branderburg chic – Schmuckbox* creates an elegant, stable composition. Selection of bright, unsaturated colours is emphasized by a light, lacy plant forms. Perennials (*Solidago, Hosta, Heuchera, Mentha, Festuca etc.*) create a balanced, static impression, thanks to the combination of cold and warm colours. Black in this case symbolizes elegance, dignity. In combination with white (purity), grays (simplicity) and gold (wealth), creates a sophisticated composition reminding old goldsmiths masterpieces. By the stark brightness contrast, the garden arouses the excitement which accompanies wearing expensive jewellery.

The colour analysis were conducted according to Poppek Stanisław table 'Colours and psyche, cognitive, emotional, characterologic and symbolic aspects.'<sup>26</sup>

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Figure 7. "Branderburg chic" show garden info. BUGA 2015. Photo by A. Wójcik-Popek, 2015



Figure 8. "Branderburg chic" show garden. BUGA 2015. Photo by A. Wójcik-Popek



Figure 9. "Branderburg chic" show garden colour finger print. Chart by Agnieszka Wójcik-Popek, 2016

Case study 1					
Su1	Su2	Su3	Su4	Su5	Su6
S 4000-N	S 3005-R50B	S 7502-G	S 7000-N	S 5020-Y30R	S 6020-Y60R
Fo1	Fo2	Fo3	Fo4	Fo5	Fo6
not found (equivalent 370 U Panetone)	not found (equivalent RAL 120 60 50)	S 8005-G50Y	not found (equivalent 2280 C Panetone)	not found (equivalent RAL 180 40 20)	S 8005-B20G
Flo1	Flo2	Flo3	Flo4	Flo5	Flo6
S 5020-R50B	not found (equivalent 2080 U Panetone)	S 2060-R40B	S 5030-Y90R	S 0560-G90Y	S 1010-R80B
Fur1	Fur2	Fur3	Fur4	Fur5	Fur6
none	none	none	none	none	none

Case study 2					
Su1	Su2	Su3	Su4	Su5	Su6
S 6500-N	S 3502-R	not found (equivalent RAL 075 70 20)	not found (equivalent 4525 U)	none	none
Fo1	Fo2	Fo3	Fo4	Fo5	Fo6
S 8005-G50Y	not found (equivalent BS381 225)	no match (closest RAL 120 30 10)	no match (closest S 2040-G60Y)	not found (equivalent 443 C Panetone)	S 0520-G70Y
Flo1	Flo2	Flo3	Flo4	Flo5	Flo6
none	none	none	none	none	none
Fur1	Fur2	Fur3	Fur4	Fur5	Fur6
S 1070-G60Y	none	none	none	none	none

Case study 3					
Su1	Su2	Su3	Su4	Su5	Su6
not found (equivalent RAL 9005)	S 8005-Y50R	S 7010-R90B	S 6500-N	S 2000-N	S 0502-B
Fo1	Fo2	Fo3	Fo4	Fo5	Fo6
S 5005-Y50R	S 5040-G40Y	not found (equivalent RAL 350 20 10)	S 6005-B80G	S 3060-G70Y	S 2020-G60Y
Flo1	Flo2	Flo3	Flo4	Flo5	Flo6
no match (closest 7767 C Panetone)	not found (equivalent RAL 260-4)	not found (equivalent 727 U Panetone)	S 6010-Y50R	S 4040-R20B	not found (equivalent RAL 530-3)
Fur1	Fur2	Fur3	Fur4	Fur5	Fur6
none	none	none	none	none	none

Table 1. Garden colour finger prints analysis. The record of case studies in NCS system or other closest match

## Conclusions

Colours are responsible for a vital, constantly changing aspect of every garden. They play a key role in building the garden's character and atmosphere. Colours are used to create specific emotions and connotations within users. Therefore the appropriate colours use is crucial in the designing process. The understanding of colour implementation rules should be significant for every designer. Presented examples prove that colours enable emotional and symbolic perception of a garden. By creating connotations it is possible to decode a story charmed in the garden. All this allows to perceive these art pieces both by mind and heart, creating not only colourful but also meaningful memories. This is very important in show gardens, as they often stand for some idea, trying to draw visitors' attention to some particular issue. Presented symbolic analysis

of show gardens is of course very subjective, as it is related to the whole perception process on different levels. Presented garden colour finger print method enables to present and compare colour features of garden as a whole or on different levels. The presented analysis can be enriched by seasonal (especially autumnal) colours.

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## Colour – Culture – Science: Colour in Play Spaces for Children

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### Abstract

The paper discusses the problem of colours that are used in play spaces for children, both outdoor and indoor. These places are meant to satisfy the developmental needs of children, which is why particular attention needs to be paid to their proper design, including the selection of their colour.

### Introduction

The discussion presented herein deals with the problem of colours that are currently being used in children's play spaces. These spaces are specifically designated and equipped with safe and proper devices which allow children to play with them. They are commonly called playgrounds. B. Krajewska differentiates between outdoor playgrounds (for instance those located in the vicinity of kindergartens, schools, commercial buildings and within housing estates and parks) and indoor playgrounds (particularly those inside commercial buildings, e.g. shopping malls, commercial chain stores, restaurants, hotels).<sup>1</sup> Their users are mostly children that have become capable of independent movement, generally up to the age of the early stages of primary education. However, they are at times used by the youngest of children, provided they are under the full care of an adult. Playgrounds for older children take on the form of more complex active recreation spaces (like line parks, fitness equipment, rollerblade rings).

### The Method

The problem has been analysed with the use of lab research based on indirect sources. Among the publications deemed important for the topic under analysis are those on the history of children's play spaces, the currently used patterns of their design (written by, among others M. Czałczyńska-Podolska,

B. Krajewska, M. Brzozowska-Brywczyńska)<sup>2</sup>, the colours that are used in architecture (the works of J. Tarajko-Kowalska)<sup>3</sup> as well as works that discuss the development of colour perception in children (the works of S. Popek, A. Moskal, D. Staniszewska-Saratowicz).<sup>4</sup> S. Popek outlines the current state of knowledge in regards to the development of colour perception in children as incomplete. S. Popek also points out the importance of this field of knowledge due to its ties with the development of tastes regarding colour and the influence of colour on the human psyche and its functioning. Preferences regarding colour stabilise around age 10. However, studies of children less than 10 years old have pointed to the fact that the preferred types of colours within this age group are warm, bright and clear colours that belong to the group of basic colours.<sup>5</sup>

An important problem regarding the topic that is being discussed is the process of the development of aesthetic opinion. D. Staniszewska-Saratowicz, while outlining the factors which affect it, points to elements associated with psychological disposition (e.g. the ability to discern colours), environmental factors (regarding the aesthetic conditions of the surroundings within which a person lives, including colour compositions), as well as socio-cultural factors (associated with views that are currently held by society). Furthermore, colour is the quality that is perceived the fastest during the process of individual aesthetic evaluation by children aged 5–6. Children often select an item based on its colour.<sup>6</sup>

Colour plays an important part in the visual perception of a space. Around the world, its selection for the purposes of architectural designs is more and more often performed while taking into account the colours that are present in the local landscape.<sup>7</sup> The colour compositions of outdoor playgrounds are rounded out by the colours of their immediate surroundings, like adjacent buildings, ground surfaces, greenery and the sky. In the case of play areas located indoors, we are dealing with a different scale of perception, with the background usually formed out of the walls of a room, the colour and arrangement of which should be carefully considered.

The discussion is supported by field research along with an analysis of the colour compositions of a group of playgrounds located in Krakow, constructed as a part of the *Multigenerational recreation and*

play spaces, so-called *Dragon Squares* program. The analyses of the selected playgrounds located in Krakow served as a form of depicting the colour palettes that had been used in them.

The depiction of a selection of original solutions regarding play spaces for children serves as an example of the possibilities regarding the use of colour in the creation of attractive and friendly conditions for the development of children, as well as for them to play in.

### Results

The colours that are currently most often used in play spaces for children include: red, blue and yellow, with a high intensity, while intense shades of green and certain shades of brown are less common. A. Kałuba-Korczak points out that children “have an extraordinarily active imagination. We can spark the interest of students by appealing to their imagination, instead of simply feeding their senses with colours”. Furthermore, children should reside in ordered spaces. Interiors which are conducive to the development of pupils have a low-key arrangement, without too much variation in colour. A dominant colour accent is recommended, to be present in some elements of a room’s equipment, such as tables, drawers or boxes (in similar colours) that can be used to put toys in. The walls should remain empty and their colours should be kept in a bright tone.<sup>8</sup>

Sometimes the number of colours, along with their intensity, causes an effect of excessive stimulation. Such a situation can take place especially within enclosed spaces – like play rooms.

The program of constructing *Multigenerational recreational and play spaces, so-called Dragon Squares*, of which a total of 18 is to be built, has been carried out in Krakow since 2012.<sup>9</sup> These are themed sites, with references to the history and tradition of the city in the form of stylising some of their elements (giving them a form resembling the silhouette of a dragon). Those that have been already built include the playgrounds located within Districts: I (Wietora street/ Skawińska street), IV (Kluczborska street), V (Młynówka Królewska street), VIII (Zachodnia street), XVII (Morcinka street), XVIII (Jana Pawła II avenue). Their dominant colour is a striking, intense, bright green. It is accompanied by: a darker shade of green, shades of brown (used in wooden elements) and red, grey, yellow and at times blue accents. The sandbox is a commonly featured element, which also influences the perception of the colour composition. Safe surfaces have less intense colours (e.g. grey, orange, green, beige).

*Figure 1. Dragon Squares. From the left: playground located at Wietora street/ Skawińska street, as well as the playground located in the Młynówka Królewska Park. Photo by M. Sawicka, 2016*



The colour schemes of many currently existing playgrounds (which are often pre-made solutions taken out of catalogues) seem to be copied in a certain way. Structures of this type often feel out of place within their surroundings. This scheme has not been repeated in original designs, which feature individual and custom solutions, not shying away from diverse colour palettes. However, they stand out due to the fact that they fit in with their surroundings, with the use of local materials with their natural colours or by the interweaving of accents into interesting landscaping forms, which are often basic colours or their derivatives (most of the time of a high intensity and brightness). One interesting solution is the design of the Yutaka Kindergarten in Japan, developed by the architects of SUGAWARADAISUKE (2014).<sup>10</sup> The main idea behind the design was based on dividing its space into three “gardens” which allow children to engage in different types of activities. The interior of the kindergarten, described as a “Garden with a Roof” is dominated by the natural colours of its material – wood. The bright space is dotted with colourful accents, like red and green chairs and pieces of furniture. Large glazed panes make it possible to introduce the colour of the landscape – the greens of the garden – the Garden of Stillness and the colours of the sand covering the pitch in the Garden of Motion, as well as the white of the adjacent buildings. Another example is a newly built part of a school for the youngest – St. Mary’s Infant CE School in Oxfordshire, Great Britain, designed by Jessop and Cook Architects (2013). The design features an interior colour scheme that is similarly based on natural shades of wood, as well as the white colour of the walls. Green, blue and yellow elements make up smaller accents, like boxes for toys. We can also see that the structure has been seamlessly tied in with the colour of the landscape thanks to a roofed “playground”.

### Conclusions

Colour is an important element in the shaping of play spaces for children. It impacts the establishment of a space’s visual harmony, as well as influencing people’s aesthetic evaluations. Aesthetic education is an important part of the teaching process during pre-school, “as the process of discovering objective reality by a child is initially based on experiences and observations”.<sup>11</sup> A positive effort in the establishment of these types of spaces is the use of local materials, the use of the natural environment along with its colour palette, as well as adding colourful accents in the form of either basic or derivative colours (of a high intensity and brightness).

The example of Krakow’s Dragon Squares illustrates the possibility of using colour schemes as an element that references the tradition of a place.

The use of colour in children’s play spaces should be deliberate, limiting excessively intense colours, making it possible for children to play in a colour environment inspired by the landscape.

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## About Colours and Relationships Between and With Objects

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### Abstract

I work at the crossroads of design and art, of word and image. In my conference presentation I would like to share my recent curator's experience related to the preparation of the *Ú Baltic* exhibition, which is a research tool in searching for design typologies within the countries that are connected by the Baltic Sea's coastline. Using visual tools, and also reaching back in my own memory and the knowledge I have gained, not while studying, but thanks to the memory of a childhood spent at the sea, I have created an exhibition in which a designer's country of origin has no significance, but rather the characteristics, family resemblance of objects designed by artists that seemingly do not have anything in common. Objects from glass and wood, ceramics and fabric, big and

small, of various designations have preserved family resemblance which ex-post facto could be defined as the Baltic genotype. One of the key tools in this process was colour, treated not as a protagonist, but as an instrument. If there were no colour harmony among collected objects, this familiar diversity would have been much harder to read.

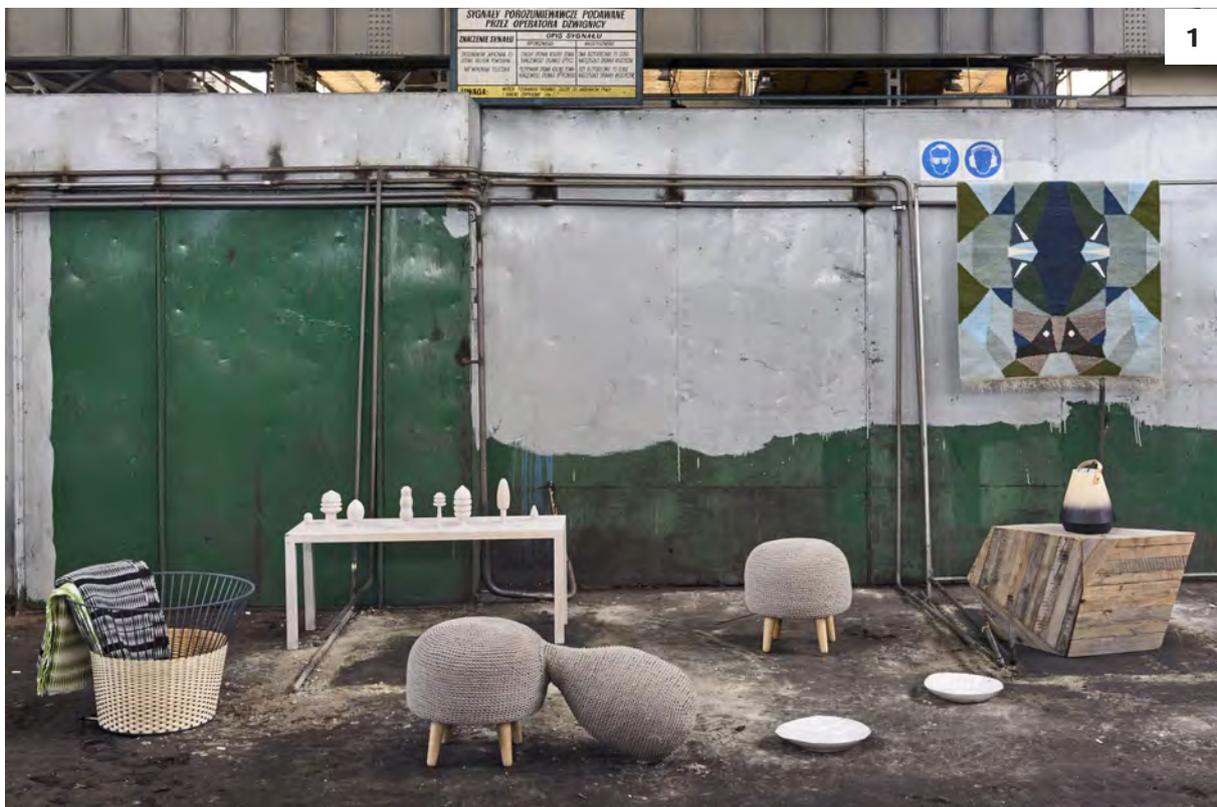
Colour is the element which bonds things together or, quite the opposite, doesn't allow them to co-exist in peace. It is an important design tool for the creation of collections and exhibitions.

### About colours and relationships between and with objects

I work at the juncture of design and art, and also of word and image. In this text I describe my recent curator's experience related to the preparation of the *Roundabout Baltic* exhibition. Although *Roundabout Baltic* is a design exhibition, it is also an artistic project, in which the design object has become a narrative tool.

#### Chapter 1. Forests, meadows, fields, villages.

*We come to the sea from the shore, across forests and meadows, undulating hills, wooden architecture and barren lands cultivated with simple tools*



Objects are objects, they are companions of our everyday life. Often invisible companions. We use them, but we do not see them, we don't watch them, don't analyse. However, although we are not speaking about this too often, besides visual value, form and colour, objects also have values that speak to our other senses. The touch, the smell, the hearing. These values are never separable. They are interconnected, they influence each other, finally – one type of sensory stimulus can be perceived as another one in our minds. It can bring back the memory, make us feel something that objectively we are not experiencing at the given moment.

We will not however be speaking here about multi-sensory cognition, but about colour and its influence on relationships between objects or rather about the influence over our concept of these relationships and over our perception of things.

The first image that I would like to recall for the purpose of this story is an image inscribed in my memory that comes from the already distant edition of Salone Del Mobile, Fuori Salone in Milan. The end of the 20<sup>th</sup> century. Furniture exhibition at via Durini, Capellini or Minotti. Inside only red couches. Identical. During the fair, where everyone is trying to dazzle with sumptu-

ousness and variety of offered products, a showroom full of red couches seemed to be quite an eccentric idea. Total sale maybe? After a few seconds of hesitation I understood. There were no two identical couches in this showroom, though all of them were red. The stratagem applied was forcing the viewers to concentrate on form, on function, size. On variety precisely, which wouldn't have been so clear if one variable, meaning colour, wouldn't have been downsized.

The second image in my memory is a scene with my mother, who after sitting down comfortably in my car, has stated with a question mark at the end of her statement, that although everybody (she had her own children in mind) have the same cars, mine is the most comfortable. It just happened so that at that time my sister was driving a silver Toyota Corolla, my brother – a silver Ford Focus, and myself – a silver Peugeot 406. Our mother, who doesn't care about brands and doesn't own a driver's licence, has seen them as identical on the outside with her eyes, but her body has felt the difference.

### **Chapter 2. Dunes, harbours, docks.**

*We walk past the dunes and rocks overgrown with austere yet persistent vegetation and just as fine constructions attached with flexible links. Seen against the skyline, they resemble drawings.*



When lecturing on subjects related to colour, I teach students that when we use colour contrast, other sensory values, such as roughness, hardness, glow, weight escape our focus, because the tension between colours captures our entire attention, while in the area of analogous, derivative colours we touch the matter with our eyes, we are able to feel what we are looking at with more senses. As it can be seen in the above mentioned examples, colours are able to bring out and highlight the object's characteristics, but also draw attention away from them.

Despite this knowledge, which I consider to be so certain, that I convince youth to believe in it, when working on the *Roundabout Baltic* exhibition I have shown the first sets of objects to someone, testing if he would see anything in common and when I heard the opinion, that yes, they match each other colour-wise, I was concerned. For a moment. I had to carry out an examination of conscience checking if by any chance I am not falling into the trap of aestheticisation, which is written into my identity shaped by artistic education and consolidated by many years of work in colour magazines.

The *Roundabout Baltic* exhibition mentioned above, to which I have devoted the last year of my curator's life (I have a few other lives) is a research tool in search of design typologies within the borders of countries that are connected by the coast of the Baltic sea, which is actually a "mediterranean" sea although we rarely think about it that way. Tracking typologies I searched through 8 countries: Denmark, Sweden, Finland, Lithuania, Latvia and Estonia, Germany and Poland. Nearby countries, neighbouring with each other, which due to their coastal location have a lot of crafts and professions in common, but are as well very diversified. Culturally, ethnically, linguistically, religiously, economically, historically. Slavs, Balts, Scandinavians, Nordic people, Germanic peoples. Scandinavian, Slavic, Finno-Ugric, Baltic, Germanic languages. The closest neighbours who do not know much about each other. Familiar strangers. The times when the sea was bringing together instead of dividing have ended long ago.

### **Chapter 3. Nets, plaits, traps.**

*We carry our belongings in baskets, plaits and mesh bags; we shelter ourselves from the wind, we catch fish in the nets. Sand and water flow through nets and mesh bags which are supple and airy and don't catch the wind like sails do.*



Searching for the key to the exhibition, rejecting the less and more measurable methods of analysis one after another, I have finally concluded that what these countries have certainly in common are the sights. We are all gazing at the same sea. I have therefore reached for visual analysis. Searching for similarities and patterns I had to refer to my own memory and embodied knowledge, written in my head not because of university studies but thanks to communing, sensing, thanks to the memory of childhood and youth spent at the sea. Looking at objects I would recall not only their image: colour and shape, but also the connotation of sensing their physical properties: weight, temperature, scent, concrete memories and situations. I would invoke not only the view of the sea, but also the experiencing of the sea. This process resulted in the exhibition catalogue, which was a difficult expedition for me, who have been writing and publishing for years. In order to explain the key for my selection I had to take up the courage to describe my memories, in which by recounting the context, I was able to transgress the border of words describing colours and shapes. Give them a texture, structure, temperature, scent and emotions. This technique is well illustrated by a quote from Juhani Pallasmaa book<sup>1</sup> selected by Ma-

ciej Miłobędzki for the opening of his foreword to the Polish edition of *The Eyes of the Skin*<sup>2</sup>: "I cannot remember the appearance of the door to my grandfather's farmhouse in my early childhood, but I do remember the resistance of its weight and the patina of its wood surface scarred by decades of use, and I recall especially vividly the scent of home that hit my face as an invisible wall behind the door."

Describing in the subsequent sections my relationship with the sea, I have placed it in sensory experiences, in the fairly distant memory which has shaped my choices through connotations and evoking not only images, but also touch, sound and scent experience.

Once the exhibition has already been figured out as a perfect set of objects, the time came for the confrontation with reality, meaning with actual possibilities of getting these objects. Some were available, some not. Others indeed were available, but in different form and colour than the one I envisaged.

#### **Chapter 4. Rocks, sand, sea shapes.**

*Wandering along the coast we watch shapes formed by water. Rocks bereft of sharpness; round pebbles from the hardest of minerals; oval-shaped lands conquered by water. We admire the unyielding, patient power of nature.*



As a result, the initially created groups of objects would change, categories were modified, and objects migrated between them. The whole time, however, I would maintain the basic colour harmony within a category, which made a group of gathered objects become a family of objects, the affinity of which, I realised, was at times confounding to the designers themselves. Objects, from glass and wood, ceramics and textile, big and small, of various designations and, what is more important, of varied origin have preserved family resemblance which ex-post could be defined as the Baltic genotype. If there wouldn't have been colour harmony among them, this family diversity would have been much more difficult to perceive. The country of origin of each exhibit no longer has any significance. Even though they were made in different places, the objects maintain cohesion through their workmanship, materials and forms. Colour along with the word is one of the characteristics that plays a prominent role in recognizing these typologies. Each of the groups, constituting a chapter with a literary, one-sentence description, refers to the elements of the landscape we know, that we have seen. Simultaneously, each of them, through the form and colours of objects, illustrates what the word foretold. In the group re-

lating to forests, meadows and architecture, the objects literally reproduce colours and the graphical rhythms of sand, soil, wood, moss. The same is true of the third group narrowed down only to colours referring to dunes, plaits and nets, sand-stone metallic-glossy and shiny, showing what we fish out of the sea; black and white, transparent and glassy pink, speaking of things that we can only suspect exist there on the basis of the few examples of underwater life known to us, such as shells and jellyfish. In the last part of this visual story, the role of colour is the most direct and most readable. With the use of aquarelles and often surprising colour combinations, the fluidity and dynamism of the transitions between them are a literal representation of the performative forces of nature. In the two-colour version, they reflect the ambiguity of the division between sky and water, reversibility, liquidity. As a media illustration for communicating about the exhibition,

#### **Chapter 5. Water, shells, underwater world.**

*Whatever the sea washes ashore, we collect as talismans. Shells, pieces of wood, pieces of coloured glass, amber. They fit into our palms, they seem precious, they shine. Once taken home, they wither away and fade, they lose value and make us go back to the seaside.*





## Acknowledgments

*Roundabout Baltic* exhibition has been organised by the Regional Museum in Stalowa Wola, in partnership with the Museum of City of Gdynia and Gdynia Design Center – Pomeranian Science and Technology Park, with the financial support of the Ministry of Culture and National Heritage as a part of the Polish Culture promotion programme during The Polish Presidency of the Council of Baltic Sea States (CBSS).

2016 Exhibitions of *Roundabout Baltic*:

22 June – 11 September, in the Form/Design Center in Malmö, Sweden.

8 October – 28 December in the Museum of Applied Arts and Design in Tallinn, Estonia.

In 2017, as the project received an extra financial support from the Adam Mickiewicz Institute, acting under its brand Culture.pl, and therefore was presented:

25 January – 26 February in the Museum of Decorative Arts and Design in Riga, Latvia.

12 March – 31 March in the Nordic House, Reykjavik, Iceland in an extended version *Roundabout Baltic plus Iceland*.

3 May – 15 June in the Museum of Applied Arts and Design in Vilnius, Lithuania.

3 July – 2 September in the Museum of the City of Gdynia within the frames of Gdynia Design Days.

4 – 29 October in The Central Textile Museum in Łódź as a part of Łódź Design Festival.

The aim is to close the round by showing the exhibition in all eight participating countries, though Danish, Finnish and German venues are not fixed yet.

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**Alicja Panasiewicz** studied at the Interior Architecture Department of the Academy of Fine Arts in Cracow, Poland. Since 1996 has been working at the Faculty of Art at the Pedagogical University in Cracow teaching biodesign, environmental art and visual structures. Since 2002 she is holding a degree doctor of arts. Works on light sculptures and glass design. She is the author of numerous of interior design, furniture, lamps, unique sculpture forms, glass forms. She leads workshops for students about visual perception and environmental art.

[http://issuu.com/alicjapanasiewicz/docs/alicja\\_panasiewicz\\_lights\\_objects](http://issuu.com/alicjapanasiewicz/docs/alicja_panasiewicz_lights_objects)



**Adam Panasiewicz** born 1963, Cracow, Poland. He graduated Academy of Fine Arts in Cracow, Graphic Department in the field of Lithography. Works at the Pedagogical University in Cracow, Art Department since 1994. To 2005 he promoted more than 40 undergraduate and master's diplomas. He is interested in digital graphics and video art.

[https://issuu.com/adpan/docs/input\\_output1](https://issuu.com/adpan/docs/input_output1)

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## Colour Coordinates, by naN, 2016

Alicja Panasiewicz, Adam Panasiewicz

naN group

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### Abstract

The project is based on *Farbenlehre*<sup>1</sup>, a five-volume work by Johann Wolfgang Goethe from 1790, which, according to the author, was the most important of his works and the result of ten years of experimenting with the light spectrum. He analysed the process of colour perception, the influence of colour on the psyche and the importance of the optical apparatus in perception, as based on his observation, and rated all the phenomena of colours in accordance with their effects on us. Coloured light changes our perception, influences our feelings and the way we see reality. His wonderful, poetic, exalted descriptions of light in *The Theory of Colour* greatly differ from cold scientific terminology. After a short period of fascination with Goethe's theory, especially among the artists of his time, the theory had been forgotten.

Goethe's experiments involving the water prism and black-and-white optical forms have inspired naN group to create the project #FF00FF and Colour Coordinates using optical effects created by processing image with water, air, crystal and glass.

### Introduction

The title of the multimedia project of the artistic team from Cracow pertains to Johann Wolfgang Goethe's favourite colour – nowadays a magenta. This colour does not exist in the spectrum; it is the mix of the two colours at the ends of the spectrum: violet and red. Goethe put his favourite colour in the centre of his colour circle in order to join the ends of the spectrum. This is also the colour he identified as the state of the soul closest to the poetical trance that manifests the spirituality of art – as if he wanted to mark this state, which was a Faustian illumination – the truth about the question of the existence of the Universe. This phenomenon, for artists, is a synonym of challenge, creation, crossing the borders – searching new aesthetic and artistic values.

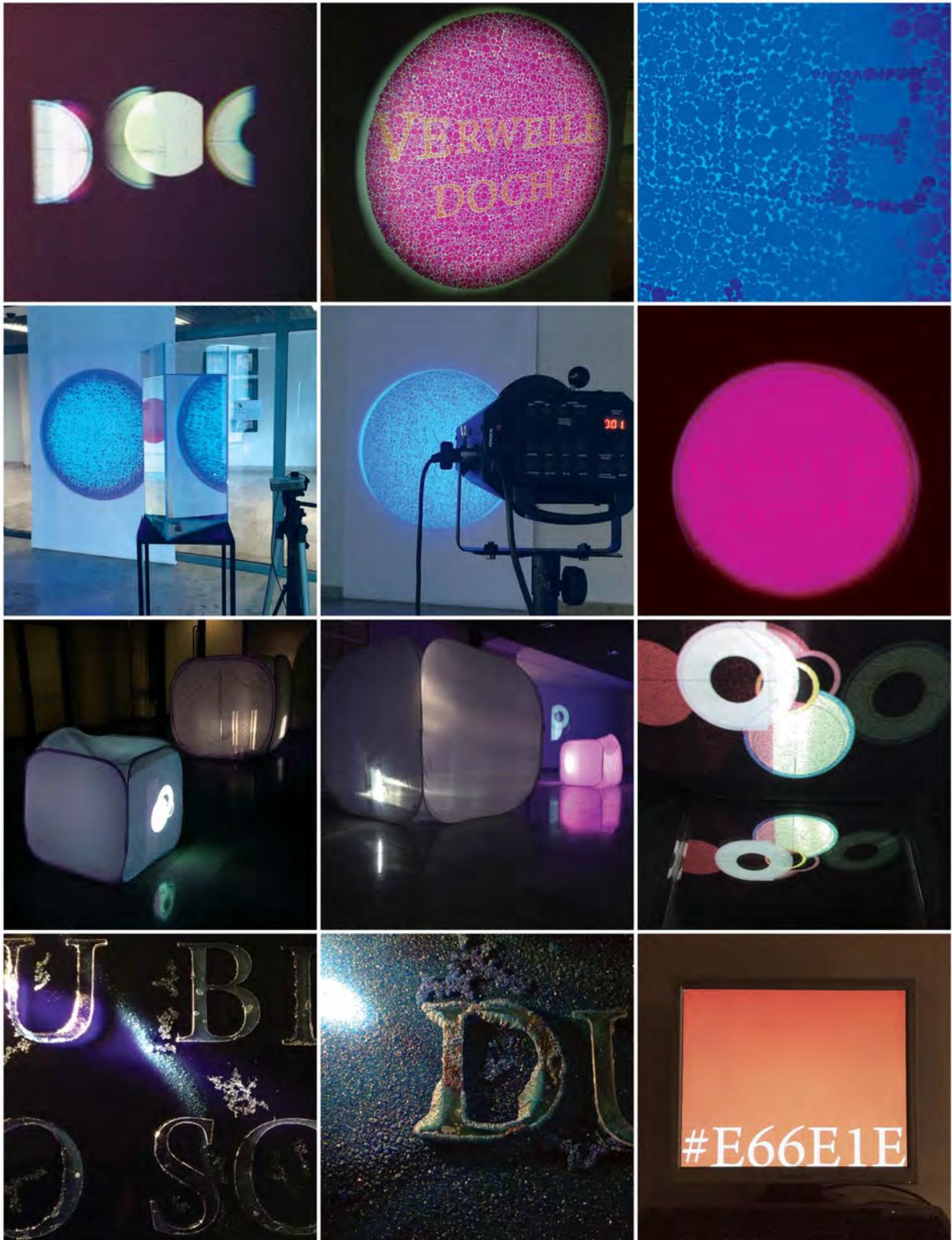
Coloured light changes perception, our feelings, and the way we can observe reality. In 1790, Goethe pub-

lished his *Theory of Colours*, which he considered his most important work. He contentiously characterized colour as arising from the dynamic interplay of light and darkness through the mediation of a turbid medium. Goethe was the first to systematically study the physiological effects of colour, and his observations on the effect of opposite colours led him to the symmetric arrangement of his colour wheel, "for the colours diametrically opposed to each other [...] are those which reciprocally evoke each other in the eye"<sup>2</sup>. In his time, the theory was widely adopted by the art world; now it is forgotten.

### Method

*Colour Coordinates* is a multimedia installation presented in 2 galleries in 2016. The project as an installation consisted of 6 parts:

- a glass prism filled with water, which filters a moving image displayed by a projector, inspired by graphics from *Farbenlehre*,
- a cuboid container filled with water inside a shadeless tent serving as a screen and filter for slit projection,
- a mirrored object with an amount of water reflecting and deforming a moving image,
- a mirrored object containing a fragment from Goethe's *Faust: Verweile doch! Du bist so schön!* (Beautiful moments, do not pass away!)<sup>3</sup> – referring to the words spoken by a scientist searching for truth, to the point of giving his soul to the devil. The growth by crystallization of the object is the "growth" of the idea of magenta; illumination; eureka,
- projection of RGB colour from a spotlight reflector onto an image created to resemble pseudo-isochromatic Ishihara's plates tests the viewer's ability to differentiate between colours. The installation tests that ability for shapes in a different way, also containing a fragment from Goethe's *Faust: Verweile doch! Du bist so schön!* (Beautiful moments, do not pass away!)<sup>4</sup>,
- an interactive program: colours shown on the monitor described with hexadecimal notation, become magenta #FF00FF through human interaction.



**Results**

The multimedia installation is inspired by *Theory of Colours* by Johann Wolfgang von Goethe, where he presents his views on the nature of colours and their perception by humans. The installation of a glass prism filled with water, which filters a moving image displayed by a projector; water container with slit projection; a mirror object reflecting moving image; the growth by crystallizing of the object; an image created to resemble pseudoisochromatic Ishihara's plates and coloured lights and an interactive computer program gives viewers possibilities to check the process of colour perception and the importance of the eye in perception.

**Conclusions**

The *Farbenlehre* by Johann Wolfgang Goethe published in 1810 contains detailed descriptions of phenomena such as coloured shadows, refraction, and chromatic aberration. Based on experiments with turbid media, Goethe characterized colour as arising from the dynamic interplay of darkness and light. "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 colour, comprehends the whole chromatic scale."<sup>5</sup> In his time, the theory was widely adopted by the art world; now it is forgotten. Nowadays, his theory has become an inspiration for artistic installations that use traditional technique, multimedia facilities, video projection and interactive programs.

**Acknowledgments**

The exhibition #FF00FF was presented in *University Gallery* in Kalisz, February 2016 Partner of the project: Adam Mickiewicz University in Poznań, Faculty of Pedagogy and Fine Arts in Kalisz and in *Schody Gallery* Warsaw, October 2016.

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**Wojciech F. Maciejewski** gained Master's degree in the field of architecture and urban planning from Poznan University of Technology. He conducted independent research on the topics of architectural acoustics and artificial lighting design. Since then he has been working as an architect with particular interest in energy efficiency and its use in buildings. Now he work in an architecture studio as well as a freelancer. He is a PhD candidate at Cracow University of Technology, being a holder of an independent grant administered by the university. The project aims to find and quantify the relation between artificial lighting of public spaces and the users' sense of security. He started his graphic design studio in 2014 with. At present he takes part in two entrepreneurial competitions, developing startup ideas that are related to my skills and expertise.

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## Using Virtual Reality in Quantifying the Relation Between Colour Temperature of Public Lighting and Perceived Personal Safety

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### Abstract

Relation between light and sense of security is intuitive but quantifying this relation is a challenging research problem. The main challenge is to create an environment that allows controlling the lighting parameters (i.e. intensity, luminance, colour temperature, lighting fixture arrangement) and grants independence from the other factors (i.e. weather, traffic, natural light).

In order to solve this problem, I suggest utilizing virtual reality technology in research and experiments. The virtual reality enables creating interactive environments. These environments can reflect the real-world physics and simulate the physical presence of the participant.

In this paper I present the process of developing this type of environment in order to analyse the impact of colour temperature on perceived personal safety. I describe the specific stages of implementation including: cataloguing of a public space, third model development and experiment procedure. The primary goal is to test whether virtual reality technology can be used in research on relations between electric lighting and perceived personal safety.

The developed method allows quantification of the relation between lighting parameters and perceived personal safety security. This may contribute in better understanding of this relationship and lead to a rise in standards and guidelines for lighting designs. What is more, the method might be useful in research on the influence of artificial lighting on human perception (i.e. spatial orientation, obstacle avoidance) as well as other studies in the field of architecture and urban planning.

### Introduction

Preparing a project of artificial lighting for public spaces is a complex process. It requires a holistic approach and demands consideration of multiple aspects. That includes project's economy, its environmental impact and influence on human behaviour. A decent lighting project should increase energy savings, reduce operation and maintenance cost, improve sense of security, limit glare, minimize light pollution, improve aesthetics, support economic development...<sup>1</sup> For this reason, creating a proper lighting project is a considerable challenge.

Unfortunately, in many cases street lighting designers focus on only one or a few specific facets.<sup>2</sup> Designers put emphasis on energy and cost savings solutions because public and road lighting represents a significant share of municipalities' total electricity costs. In Europe, public lighting represents up to 60% of that budget.<sup>3</sup> Other research shows that this type of lighting uses 2.3% of global electricity.<sup>4</sup> What is more a large part of existing fittings is obsolete and consumes a considerable amount of energy. For example, in Europe over 75% of the installations are older than 25 years.<sup>5</sup> Though implementing energy and cost savings solutions is important, it is a relatively easy task to calculate the amount of energy consumed by electrical equipment, and to specify the initial cost of investment and operating expenses.

### Light and security

Despite appearances, other aspects are equally important. It has been demonstrated that improved street lighting significantly reduces the number of traffic accidents.<sup>6</sup> It also lowers the crime rate.<sup>7</sup> It is worth noting that financial savings deriving from the reduced number of committed crimes may even exceed the cost of improving the lighting installation.<sup>8</sup> Nevertheless, good lighting reflects in increased sense of security<sup>9</sup> and raises the number of pedestrians after dark.<sup>10</sup> On the other hand, darkness increases self-interested and cheating behaviour.<sup>11</sup> Relationship between light and perceived personal safety seems to be intuitive, but its workings are largely unknown and challenging to quantify. Perceived personal safety is a person's immediate sense of security and an absence of anxiety of becoming victimized.<sup>12</sup>

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My research described in this paper is predominantly inspired by article titled: *Light distribution in dynamic street lighting: Two experimental studies on its effects on perceived safety, prospect, concealment, and escape*<sup>13</sup> developed by Antal Haans i Yvonne A. W. Kort from Eindhoven University of Technology. In two experimental studies the researchers explored effects of light distribution on the perceived personal safety. Beside acquiring significant results and drawing compelling conclusions they presented the test site and apparatus in great detail. They have conducted two experiments at the road lighting test site at the campus of Eindhoven University of Technology. This impressive open-air test site is a 300 meters long fragment of De Zalle street which is one of the main roads of the campus. However, a test site of such scale makes it extremely difficult to recreate the described experiments. It also has few limitations. First of all, the experiments have to take place after sundown. Due to the limited number of participants, which could take part in the experiment on a single night, the study spanned over several days. That implies the occurrence of external factors such as different weather conditions and traffic intensity. What is more, the number of controlled parameters is limited to capabilities of installed luminaires and their location. How to overcome these limitations? To answer this question, I propose utilizing virtual reality technology. Virtual reality is a realistic simulation of a three-dimensional environment created using interactive software and hardware. It is controlled by movement of the body. Virtual realities artificially create sensory experiences, which can include sight, touch, hearing, and sometimes smell. Current virtual realities are displayed either on a computer monitor, a projector screen, or with a virtual reality headset. Right now, the headset is the most immersive experience. Virtual reality allows creating environments similar to the real world, so it might help in overcoming aforementioned limitations.

### Research goals

The primary objective of my research is to test whether virtual reality technology can be used in research on relations between electric lighting and perceived personal safety. At this point of my research, I consider quantification of the relation between colour temperature and perceived personal safety as less

important. If the virtual reality technology will prove to be effective in this type of research, this method will not only allow analysis of aforementioned relation. It will be useful for quantifying the impact of other lighting parameters on the perceived personal safety. This will contribute in better understanding of these relationships and lay foundation for lighting design guidelines. What is more, the method might be also useful for understanding the influence of electric lighting on human perception (i.e. spatial orientation, obstacle avoidance) as well as other studies in the field of architecture and urban planning.

### Method

#### Participants

Ten people participated in the experiment. Six (60%) of the participants were men. Participants were aged 23-35 years. The participants' mean age was 28.3 with standard deviation  $\sigma = 2.67$ . All participants were unfamiliar with the test site and have never been to the actual location. What is more all participants were unfamiliar with virtual reality technology and never used it before the experiment.

#### Apparatus

During the experiment the virtual test site was presented to participants using *HTC Vive* virtual reality set. It is manufactured by HTC with technology developed by Valve Corporation. It consists of a headset, two handheld controllers, two base stations and a link box. The set is designed to utilize technology called "room scale" which turns any room into three-dimensional space. That is achieved by utilizing more than 70 sensors including an accelerometer, MEMS gyroscope and laser position sensors. This technology allows the user to navigate naturally, with the ability to walk around and use motion tracked handheld controllers to interact with the three-dimensional environment.

The headset (or head mounted display) is a window to the VR environment. It has sensors that are tracked by the base stations. The headset uses two screens with a refresh rate of 90 Hz, one per eye. Each display have a resolution of 1080x1200, giving the a total resolution of 2160 x 1200 pixels and an aspect ratio of 9:5. The base stations beam signals to the headset and controllers. Each base station has a 120-degree field of view. The headset and the

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controllers should remain at least 0.5 meter and no further than 5 meters away from a base station.

### Setting

The experiment was conducted in an empty room measuring 4.5 by 4.5 meters. The room was lit by 6 LED lights mounted to the ceiling. Base stations of the virtual reality device were mounted diagonally at opposite corners of the room and above head height. As vibrations may affect their tracking abilities, the stations were mounted on tripods using 1/4 – 20 UNC threaded mount. The distance between the base stations was 5 meters from each other, which is maximum supported distance. The base stations were angled down 40 degrees and adjusted so that the front panels were facing toward the centre of the play area. All infrared sensors (i.e. TV remote controls) were removed from the room as they may affect the stations. Subsequently, the base stations were synced together remotely without sync cable. The virtual boundaries of the virtual environment, where participant can interact with virtual reality objects is called the *play area*. The device is designed for a room-scale setup that needs a minimum play area of 2 by 1.5 meters. The play area of the experimental setting was 3.5 by 3.5 meters. The computer was placed right next to the play area.

### Virtual reality setting

The virtual test site was reflecting an actual location in Pakość, Inowrocław County, Poland. It is a small town best-known for its Calvary - a complex of chapels resembling Jerusalem and commemorating the Passion of Christ. Selected site is the main square located in historical part of the town. The front façades of the buildings located on the east side of the square are representative as to what kind of architecture and colours the observers can expect (cf. Fig. 1). The site was carefully catalogued and photographed. For the present study, the virtual test site was divided into two parts. The south part is flanked by buildings on

one side and a park on the other. The north part is flanked only by buildings. Each segment is about 110 meters long.

The three-dimensional virtual model of the test site was prepared in Blender v. 2.77. It is a professional, free and open-source 3D computer graphics software. It is used for creating animated films, visual effects and video games. The model was prepared for viewing in virtual reality by using Blender add-on *Virtual Reality Viewport*. This add-on is a non-commercial project developed by William Culver. It allows presenting a three-dimensional in the Vive device. Except few minor software crashes, the add-on was stable during the experiment. The crashes did not affect the results. It is a promising tool and I hope that it will be further developed and stabilized.

### Experimental procedure

In each experimental session only one participant took part at the same time. As all participants were unfamiliar with virtual reality technology and never used it, before taking part in the experiment every participant was shortly introduced into how the headset and handheld controllers function. Then each one of them was helped with putting on the headset and placed in the centre of the play area. In order to better understand how to orient themselves within the virtual space, before showing the test scene, they were presented with *theBlu: Whale Encounter* for approximate 5 minutes. *TheBlu* is a deeply immersive virtual reality application that allows audiences to experience the wonder and majesty of the ocean through different habitats. After this short introduction every participant was presented with the test scene.

During the experiment, the participant was standing at the centre of the virtual test scene close to the square's east side (see Fig. 2). The experiment consisted of pair-wise comparison of the three different experimental conditions differing in colour tempera-

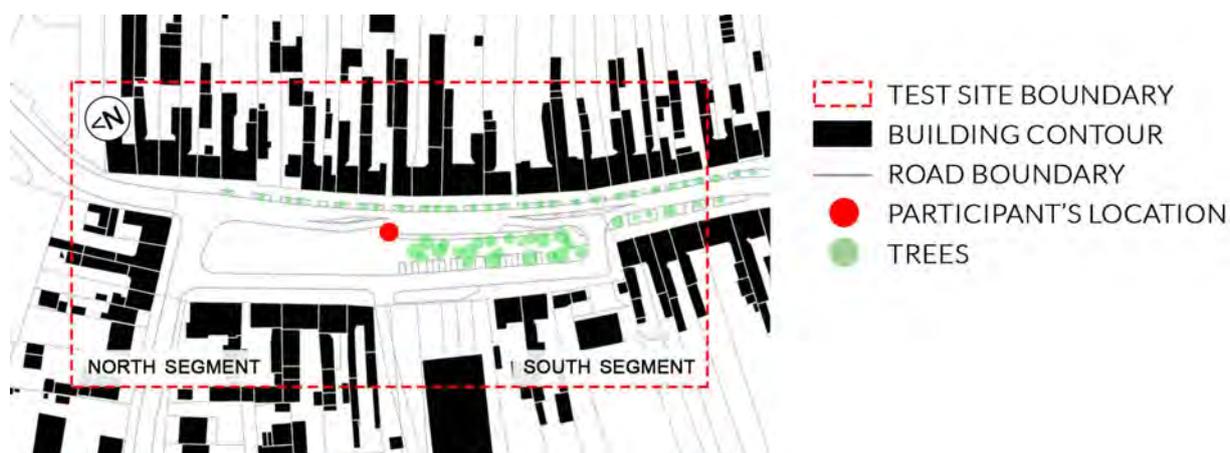


Figure 1. Front façades of the buildings located on east side of the town square in Pakość. Photo by W.F. Maciejewski, 2016

ture of the light sources: 3000K (warm white), 5000K (horizon daylight) and 6500K (daylight, overcast). The colour temperature of a light source is the temperature of an ideal black-body radiator that radiates light of comparable hue to that of the light source. Colour temperature is conventionally expressed in kelvins (using the symbol K). Kelvin is a unit of measure for temperature on the Kelvin scale.

Figure 2. Plan of the town square in Pakość. Test site boundary is marked with red dashed line.

By Wojciech F. Maciejewski



Six different lighting scenarios were prepared for the purpose of the experiment. The experimenter presented the participants with one of three colour temperature setting on the north segment, and one of the two remaining colour temperature on the south segment of the test scene. Then the order was changed to check if the virtual site geometry affects perceived personal safety. Participants were asked to indicate which light distribution they preferred with respect to their personal safety. In total, participants were presented with all possible combinations, resulting in six pair-wise comparisons. The order of the pair-wise comparisons was counterbalanced across participants. After the experiment participants were asked to assess the level of reality of the virtual test site on the 1 to 10 scale.

**Measures**

Perceived personal safety was assessed as the preference for one of each pair of colour temperatures presented on the north and south segments. For each pair-wise comparison, participants were asked to indicate whether they felt more comfortable having to walk into the north or the south segment of the street when alone on this street during the night. Selected option scored one point.

**Results**

The virtual test site was regarded as relatively real, with average of 5.9 points (standard deviation  $\sigma = 1.45$ ). The site part did not affect perceived personal safety of the participants and this variable was not taken into account. For this reason scores from each two experimental scenarios with same colour temperatures were summed. That resulted in three cases with the following colour temperature settings: 3000/5000 K, 5000/6500 K and 3000/6500 K. The perceived personal safety scores are summarized in Table 1. An effect of lighting colour temperature on perceived personal safety was found. The results demonstrate that, with respect to their perceived personal safety, participants preferred settings characterised by higher colour temperature. It is especially noticeable the third case, where difference between the colour temperatures was the biggest.

Case no.	1		2		3	
Colour temperature (in Kelvins)	3000	5000	5000	6500	3000	6500
Score	8	12	9	11	5	15

Table 1. Results of pair-wise comparisons.

By W. F. Maciejewski

## Conclusions

Virtual reality technology can be successfully used in research on quantifying the relation between lighting parameters and the perceived personal safety. It successfully provided an experimental environment that allowed controlling the lighting parameters and granted independence from external factors. The developed method is a helpful tool and acquired results may lead to better understanding the relationship between lighting and personal safety and lay foundation for lighting design guidelines. What is more, the method might be useful for other studies on the influence of electric lighting on human perception (i.e. spatial orientation, obstacle avoidance) as well as other studies in the field of architecture and urban planning.

However, as the method is still under development, there is plenty of room for improvement and more research is needed. The virtual test site was regarded as only relatively real (5.9 points on ten-points scale). For this reason, further work is crucial to understand how to improve this result and what elements of virtual environment are most important for the participants' sense of reality.

## Acknowledgments

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III.  
**Colour & Environment**





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## Colour Harmony & Image of the City

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### Abstract

The colour image of the city is rooted in its geographical space, but changes over time: its modifications have always been due to the evolution of architectural and urban planning of the city and is still constantly changing. If all the visual elements of urban space and land territory compose the integral image of the city, the colour remains an essential part of the architectural, cultural and social heritage. Today, a city, a town, aspire to offer their inhabitants a high quality of living environment while respecting its geographical properties, landscape and architectural culture of their own. This is why the debate on the sustainable town must include a chromatic environmental strategy. At present, designing colour in the towns & cities is part of new planning ideas and urban innovations.

### Introduction

The harmony of colour is a universal, transcultural phenomenon. Whether the creation of images, the invention of drawings for the design industry or the construction of urban spaces, it represents a system of coded messages of the visual world that helps us to apprehend, evaluate and act in different contexts. On the other hand, the harmonies of colour, with its many nuances and complex combinations, form a synthesis of knowledge and understanding of the environment. Created or appropriated by man and full of subtleties, they affect all human activities for centuries, even millenniums...They influence us, surround us and create a pleasant or depressing environment, and they affect our mind, change our mood, our influence or behavior. Today’s Fashion and industrial design, Urban Planning, Architecture and Visual Art – all aspects of creation are concerned.<sup>1</sup> That is why our working method is at the crossroads of artistic, historical and scientific reasoning and it help to do the imaginary trip through time and space to explore the infinite universe of colour harmonies in different cultures and cities around the world (Figs. 1, 2, 3).



Figure 1. The View from St. Marc's square, one of the most beautiful squares in the world create a very famous colour image of Venice (Italy), which symbolizes the union between the city and water, 2006



Figure 2. The colour image San Francisco (California, USA) represented by one of the best-known groups of "Painted Ladies". This row of Victorian houses at Steiner Street, in front of Alamo Square Park considered as "Postcard Row", 2013



Figure 3. A few traditional facades of Stortorget, the central square of Gamla stan create a worldly known image the Old Town of Stockholm, one of the largest and best-preserved medieval city centers in Europe, and one of the foremost attractions in Sweden's capital, 2008

## Method

The intelligence in the choice of colour codes and chromatic harmonies can revitalize urban space by promoting a sense of security and serenity among citizens. It results to the ecology of colour as a major constituent of the environmental project to be included in the global project of sustainable development of the town & city. (Figs. 4, 5).



Figure 4. Ecological district Vauban of Fribourg city in Germany of colourful houses try to create a connection between a modern architectural design and sustainable conception of buildings, 2008



Figure 5. Since the Eighties, the colourists have tried to give to postmodern architectural ensemble of the buildings a major significance. They proposed for district La Defense (here Nanterre, colourist Fabio Rieti) a concept of colour and suggested the general colour plan for typical facades of social buildings in order to give them a more human image, create a specific visually comfortable atmosphere, 2014

This approach earns the esteem of architects and designers for whom it seems obvious. It allows up-

dating of knowledge on the visual qualities of the city and its local characteristics with the *in situ* study of existing colours, their synergy, also through the analysis of key harmonies of each place, and environmental design that study a colour interaction with architectural forms and urban composition. It identifies the “genetic heritage” and create visual pallets respecting the “spirit of the place”.<sup>2</sup>

This approach is also social because it takes into account the preferences of the population of the city. The harmonization of city centers with their peripheral and industrial areas and their landscape, the development of their dominants or visual accents can break the feeling of isolation and of disproportion. This environmental strategy allows the continuity in the perception of the town or city: to analyze the overall image of the city and of each of its neighborhoods, and of its districts and their buildings, and even the design of street furniture, landscape qualities and setting of artificial lighting. All this should have a colour consistency in order to form a harmonious urban area. As the image of an ecological system, this strategy will prevent cases of visual pollution (which makes no less damage than those of air, water or noise pollution), but also this program will help restore some past mistakes and to upgrade the ancient heritage by harmonizing it with contemporary interventions. It will create an environment of good chromatic quality for new neighborhoods by integrating new national and international cultural contributions, and therefore leaving the door open to creation. Urban colour, rich and complex, lively and full of meaning will participate in the image of the town/city of the XXI century, thus becoming more sensitive and human.

Chromatic study of inhabited spaces as well as knowledge of the local historical heritage are fundamental to developing a strategy in reconstruction, restoration or rehabilitation. The method and the results of investigations devoted to the colour image of the city will be an indispensable part of the training of architects, urban and landscape designers and artists. The mission of the colourist is to conceptualize a chromatic scale plan of the city that responds to the request of the town center revitalization and allow the renovation of the existing façades that respects existing geographical and landscape context. The proposed colour palette will reveal a specific lo-

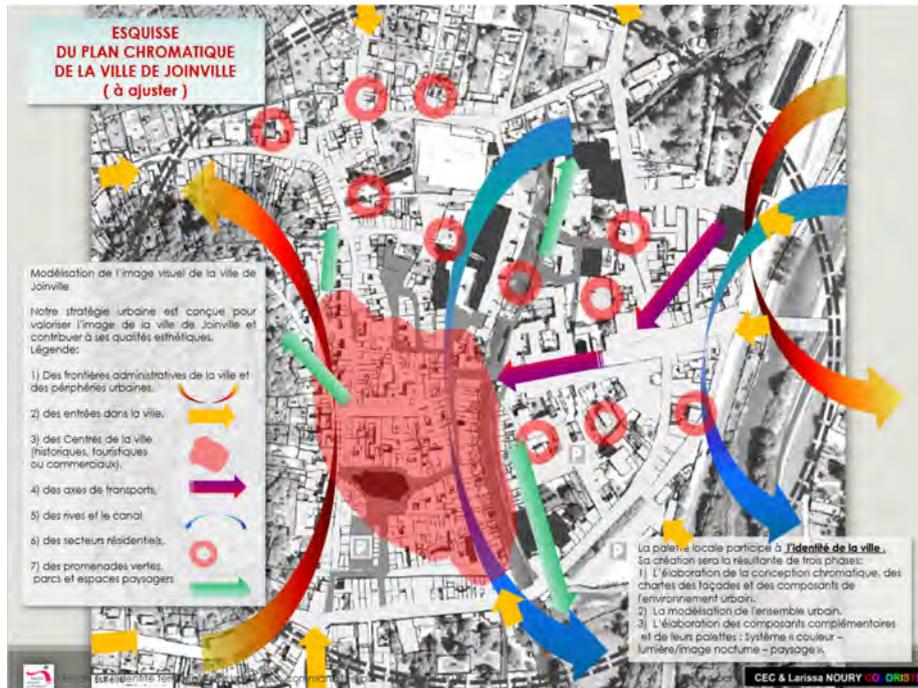


Figure 6. Colour study for Joinville-en-Champagne city, France. Conceptualization of urban morphologies: Operational Plan, 2015

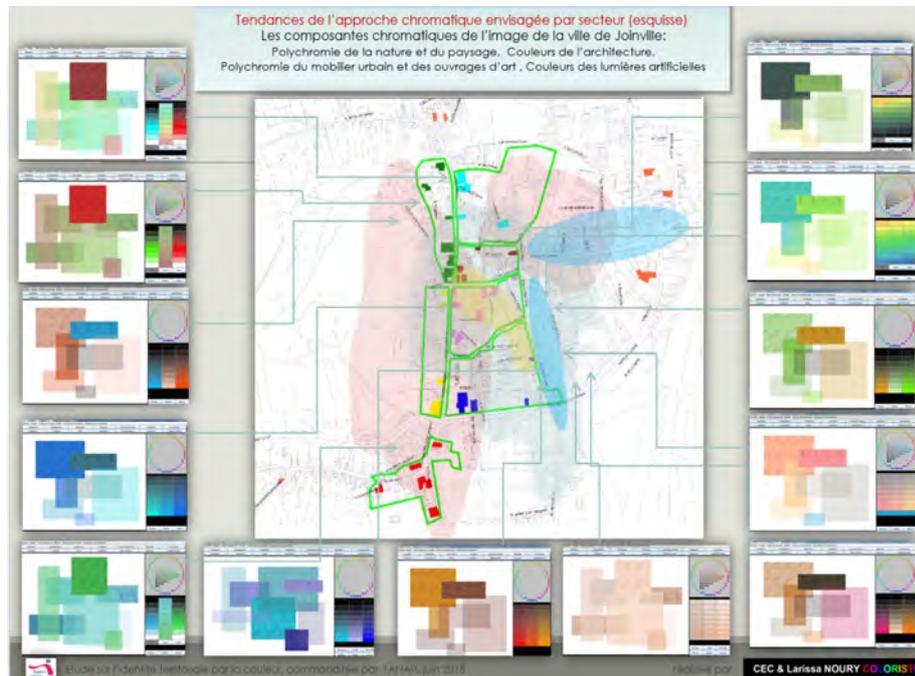


Figure 7. Definitions of chromatic harmonies and presentation of the colour conception in connection with the analysis of urban and historical part of the city, 2015

cal character of the territory and take into account the architectural features of previous epochs. It will become an important complement to the revision of the Local Plan of Urbanism with the obligation to use existing local materials while strengthening the characteristics of the place (Figs. 6, 7).<sup>3</sup>

This mission includes three main areas:

- 1.1. Analysis of urban and historical part of the city.
- 1.2. Regional and landscape analysis.
2. Conceptualization of urban morphologies: Operational Plan.
3. Definitions of chromatic harmonies and presentation of the work.

The search for a visual balance on image of the city provides a specific identity, context and an atmosphere that are able to create a unique image and make the city attractive. The analysis of visual ecology and colours of environmental strategy will be part of an overall investment program in the development of territories and enhancement of the urban fabric as a whole.<sup>4</sup>

## Results

The results of chromatic study on the entire territory of the city carried out in sectors in the different neighborhoods based on the environment of urban and landscape analysis will:

- improve the quality of architecture in the growing development of the city;
- help architects, designers and investors understand the wishes and objectives of the Region and its people regarding the qualities of the new developments;
- provide a database, tools and means to make an analysis of the existing state and to make proposals to improve the quality of environmental design and ensure more effective urban planning;
- maintaining in the long term this planning.

An urban colour reflection will allow not only a global vision of city's territorial but also the harmonization of its centers with devices and industrial areas. The harmony of the urban landscape and its colour consistency will be composed of various elements – architecture, landscape features and the “fifth facade”, street design and lighting at night – to form an entity. The synthesis resulting from the chromatic study

of the city will offer specialized and streamlined palettes and become a simple and fundamental tool of work to be able to form a harmonious whole while respecting freedom of expression and the choices of the owners. The determination of chromatic harmonies as an essential stage in each project will offer to architects and residents a wide variety of solutions whenever new diverse ideas and proposals will give a creative, innovative and personified character to the image of the city.

The colour in the townscape along with scale, form, light and texture plays a significant role in the acceptability and success of its development. Using colour with rigour and subtlety in the domains of the chromatic restoration of the urban heritage as well as in the contemporary architecture can help to alter perceptions of scale and mass and assure the integrity of surrounding buildings, streetscape and public places.

The knowledge about existing “environmental colour strategies”, about different colour group and visual harmonisation, needed to make urban space more comfortable and visually balanced, is an important theoretical base for practical experience.

Colour harmonies and its classifications considered as indispensable for colour study of the urban space: buildings, equipment, and the transport infrastructures. An environmental approach of urban colour design should not be seen separately but simultaneously with other design principles: townscape character, public realm, movement and legibility, sustainable development, diversity and adaptability.

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Her practice in both agency and in the field as well as her role in training color in architecture and her regular appearances as a speaker, makes Xavière, a recognized expert in the field of urban design quality and heritage enhancement.

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## The Colorist Designer: an Archeology of Chromatic Imaginary

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### Abstract

The notion of *chromatic archeology* as the center of the professional practice as colorist will guide this text. This approach to the practice of the colorist leads us towards a way of thinking by levels (stratums). This way of thinking evokes the ground and sedimentary layers it is composed of. It is an allusion to the architecture and to the succession of layers of paint and coatings that build up the practice over time. It is an evocation of the city and its evolution. Finally and above all, it is the influence of a thought that is built through successive levels, becoming essential to each other.

The creative part, as an imaginary territory, takes place at the center of this singular thought, and it is from this archeology of the chromatic imaginary that we will define the steps to follow and the issues we will encounter.

### Introduction

The colorist's field of study: the city and its architectural history.

A working method is established, the archeology of the multiple, that accompanies us in what follows: 1.) from knowledge of the field to knowledge in action; 2.) from collected samples to our research into the depths of the specific site; 3.) at the level of both visual and practice and at the level of history, culture, customs and architectural and know-how heritages. The city, as contemplated, questions itself in its diversity, its complexity, its heterogeneity and according to different visions: it is on the ground, from the ground, it is incorporating the place, trying to approach its spirit and borrowing "the memory of the place" and "the act of gathering" that this chromatic archeology research, will be implemented.

To exemplify our approach, we rely here on the chromatic study of the city of Nîmes, France, conducted in 2015, for which the above-mentioned method makes perfect sense.

### Methods

#### Understanding the context and objectives

The city of Nîmes has implemented numerous projects to protect and enhance the architecture from the Roman period to the twentieth century. These initiatives have enabled it to benefit from the label of a City of Art and History. Furthermore since 2012 the city is part of an indicative list of cities accepted to apply for the inclusion of the *two thousand year-old city* as Unesco World Heritage.

The chosen theme: "Nîmes, Antiquity today" well reflects the current issues of the city, which has to combine a historical heritage, where the respect for its identity, particularly its chromatic identity, is one of the keys to sustainability, to renovation issues of more recent, or even new buildings.

Several façade cleaning operations were conducted in the past which impacted the perception of both urban environments and architectural heritage. It is in this context that the city intended to initiate a color study and the establishment of a guiding color chart. This study has been conducted by the colorists of the company *Nacarat*, established in Toulouse, France, a company specialized in the enhancement of urban areas by the use of color, in the utmost respect of the architectural heritage. The work carried out, is now used as a reference tool to support project promoters, particularly in areas subject to the authority of the *Architecte des Bâtiments de France*. This work constitutes also a central part of the UNESCO project of this City of Art and History.

#### Périmeter of study

The work carried out was focused on the perimeter of the protected area and the perimeter of reflection UNESCO & AVAP Nord Gambetta. In this respect the work was conducted in close cooperation with the Architecture and Heritage Territorial Service, the architects that work as advisors of the city, the local elected officials and the relevant departments. Some brief extracts of the study help to understand how the chromatic exploration of plural and multiple historical data have contributed to the study:

## I. Methods used for implementing a chromatic archeology of the field

### A. Collection of samples at the limits of the city Historic Polychromies: The Arena of Nîmes and the Roman quarry of Roquemaillère

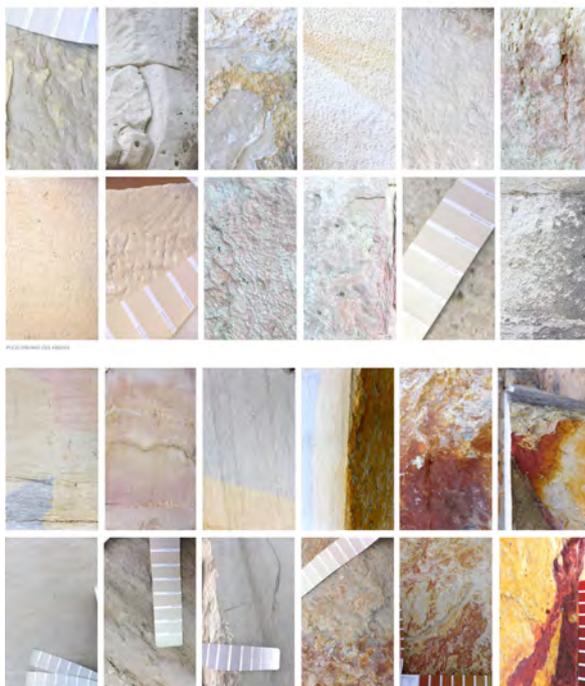
The colors of the stones of Roman monuments are important in Nîmes: it is indeed around these (The Arena "Arènes", the Square house "Maison Carree", the Great Tower "Tour Magne") that the city was built over the ages. This is why the colorists have identified and carefully collected the color samples of the city.

We could notice the diversity of chromatic aspects that these ancient stones included: white, cream, red, gold, brown. A non-specialist might not have seen or noticed more than the whiteness or he might have only identified the colors of the surrounding pollution: it was important, with a keen eye, to see the traces of a patina not as a result of the pollution, but built up by and over time. Ochre and golden colors adorn the ancestral stone. Revealing historical polychromies, full of finesse and with a beautiful diversity.

The photographs and the chromatic samples collected at the Arena of Nîmes, which are focused on these historical colors, showed the great diversity and richness of nuances of the amphitheater building stones. While dominated by light tones, we find as well beige, pink and also denser and darker tones. White is not the dominant color. During a visit to the Roman quarry of Roquemaillère, a quarry near the town that is being exploited since antiquity, and used on some parts of the Arena of Nîmes, the chromatic relationship of this quarry with the Arena of Nîmes, but also with colors of the city, attracted our attention. The different colors samples collected from the quarry stones revealed a wide range of yellows, yellow ochres and reds, from lighter to darker, as well as more gray tones with green grays, more red warm grays and more blue cold grays. This beautiful diversity, as a richness of colors and lights, reveals a local geological history, which put in connection with the polychrome of the analyzed ancient buildings, will allow to make the right choice in defining the new color palette of the city.



Figure 1. Couleurs des Arènes de Nîmes. Carrières de Roquemaillères - Nacarat - Photography. Contretype practice, 2015



### B. Searching for: at the hearth of the museum The historical patina, pictorial representations

In addition to research in the field, we have conducted a detailed study of the various pictorial representations of the city at different times. Centered around the question of the patinas, we try to understand which is the historical color of the Arena: a real color? A cultural color? A color dreamed by naturalist artists and historians?

Italian and Dutch artists are inspired by theatrical scenes, palaces and Roman ruins. These paintings, although they are not always representative of Nîmes, give us an idea of the colors of the stones, contemplated in a Roman aesthetic. In the treatment of the pictured buildings, the variations of beiges, light and medium ochres and gray tones are present. These refer to relative tones of those collected in the field. The concept of patina is then introduced, for its memorial value and its role as a witness of the passing of time.

The historical color of the Nîmoise limestone is perhaps not the one we think it is.



Figure 2. Tableau. Hubert Robert, *La Maison Carrée, les Arènes et la Tour Magne à Nîmes* (1787), Paris, Musée du Louvre, INV 7648

### C. Samples taken from the most oldest facades Sample map: range of colors of architectural details



Figure 3. Color map of collected samples – Nacarat – Photography. *Contretype practice*, 2015

The color map consists of building a « real » or digital model based on colours identified in situ or directly based on the collected samples. In the given example the colors correspond to millwork and ironworks color samples taken from the oldest and most damaged facades of the city of Nîmes. We organise them according to the three usual parameters that define a color: hue, saturation, lightness. It is the fundamental purpose of a color map to convey a unique information: the chromatic panorama of a city, a neighborhood or a region at a given time. The organization of the classified materials constitutes a tool that allows us to transmit the essential and ephemeral knowledge embodied by colors. The approach of taking samples in the territory is a frequently applied technique at the French company Nacarat. Being an excellent analysis tool, the collected data, once classified by type and color family, allow us to update our color archeology methodology. The color maps are one tool in this process.

#### D. Exploring the History of the city and its emblematic colors

##### An inspired palette

Extensive documentary research helped us to understand the place of color in Nîmes throughout the ages, especially in the textile sector. In Nîmes, the textile sector was developed under Henri IV and Louis XIII, in basic operations such as carding, spinning and weaving of wool. Later, the city turns to the production of serge. Dyeing, and therefore the relation to color, has a strong presence in the history of Nîmes. A specific blue, called “Denim” has indeed marked the history of clothing. Nîmes also produces a wide range of red textiles, highly appreciated for their aesthetic qualities. The red dye called “Andrinople”, very present in the city, is more complex than the indigo dye since the thread must be prepared before receiving the desired color.

Following a tour of the Museum of the local archives and a meticulous work of color-matching of ancient textiles in the region, a color synthesis of local textiles was performed. The tour has provided, in a complementary manner to each of the studies presented, a territory of inspiration in the creation of the palette of the city.



Figure 3a. Nîmes (Gard – France), rouge d’Andrinople, Industrie textile au XVIIIe, Musée du vieux Nîmes.

The examples given above are only a small sample of the work done in Nîmes for nearly a year. They allowed us, step by step, to browse the chromatic history of the city.

#### II. The colors of the facades of the city of Nîmes (Final Color palette created in cooperation with the “Chaux de Saint Astier”)

The colors arranged on the floor on the image above, made of lime coatings, represent the 48 façade colors of the new color palette of the city. In Nîmes, the coated facades were traditionally composed of sand from local quarries. They were usually treated with a final layer of lime milk as a final topcoat. In the protected area, coatings are chromatically close to the color of the stone, especially near the Antiques monuments. The color palette of the city, created by the colorists of Nacarat, combines in its first part, the lightest palette, inspired by local limestone, the chromatic domains of yellow ocher, orange and sand tones in very soft and gradual shades. On stone facades, it is important to keep the identity of colored local limestone where it is present. This color palette, inspired by limestone colors will thus be quite suitable. It comes in light lime paint, patina and coatings and serves as protection or colored base for the mortar used for repairs. It also provides colors of joints, which will always be made in matching tones with the stone.

The second part, more colorful, is reserved for smaller buildings, in a chromatic tradition of decorations from the Roman era. It is to echo techniques that were known in the eighteenth and nineteenth century. The Palette for facade details (“palette ponctuelle”), is inspired by the pictorial representations we studied, but it also draws on chromatic heritage of the local textile industry.

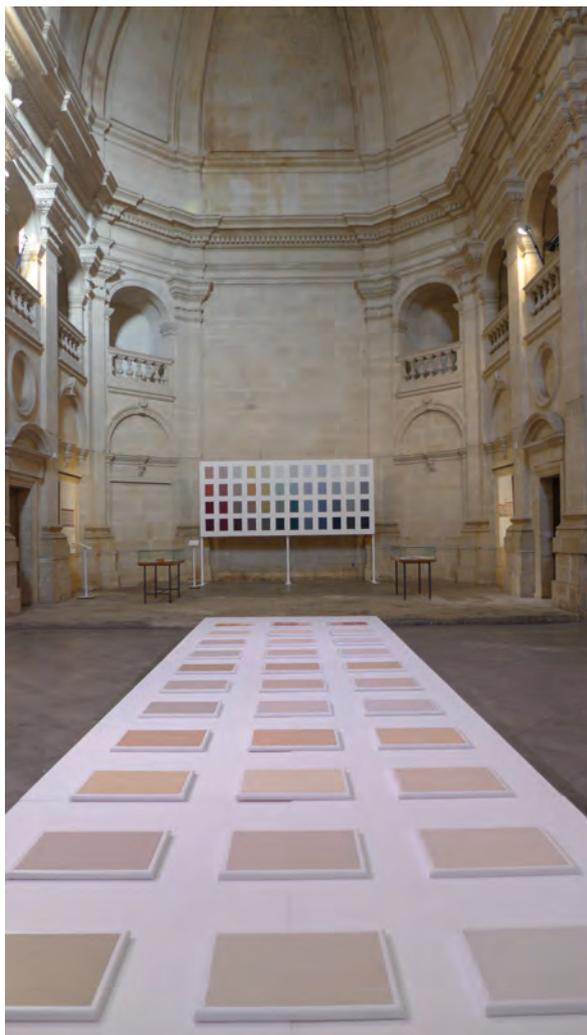


Figure 4. The colors of Nîmes, color palettes exposure, Chapelle des Jesuites. Février, 2016

## Conclusions

### Borrowing from archeology: a documented and creative process

#### Posture, between observation and interpretation

Archaeology is «knowledge of the human past from material remains» and «Excavation» is designated as its main method. The notion of Archaeology is primarily intended for material remains of a given period, whether they are hidden, buried, or still standing. However, archeology cannot be limited to a particular domain, because it is based on research that is both action and subject.

The archaeologist seeks, and it is precisely by this research into action that he positions himself as a researcher and with respect to his research. In this then, archeology is not a closed science but it is still being built. If there is authenticity, the irrefutable nature of the collected information has to be put in perspective. The collected object will always be authentic, there is no possible deception in the act of gathering and classification. However, the transcription of the collected and the subjectivity of the author will have an impact on the result. As the artefacts cannot speak for itself, observation and interpretation will then constitute the key to the study.

It is here, perhaps, that the archaeologist and the colorist will distinguish their approaches: For the first, the systematic review and classification of recorded data will be an objective in itself, and for the second, creative posture taking the upper hand, choices and freedoms taken with respect to the city and its future then fall under this chromatic imagination that we are trying to question.

The excavation, the archaeologist's tool, and the archeology's *raison d'être*, is a common theme to both experts. If the archaeologist explores different modes of excavation, on the field and in the workshop (because the latter is not limited to material operation), the colourist, himself, explores, for his part, surface spaces of architectural levels and surrounding lands. This "archaeologist of surfaces" works on the outermost layer of things but he is now also deprecated for this singular way of thinking. In reality, the colorist produces rich and documented studies, that go much further than we can imagine. Of course, perhaps because of a lack of cooperation, and maybe because of the relative novelty of the profession, some people are still far from an archae-

ological practice of this profession. It is then the subjectivity of the researcher that will determine the quality of the study.

In this, returning to archeology, in addition to the choice of the collected elements, which thus depend on the subjectivity of the researcher, collection and classification of the collected data are a further step in the construction of an archaeological approach:

«Le dessin d'une coupe stratigraphique – que la photographie peut aider, mais sûrement pas remplacer – ne peut mettre en évidence que les éléments aperçus par l'archéologue: si le dessinateur prétendait traduire objectivement la tranche de terre qu'il a sous les yeux, malgré la réduction imposée par l'échelle, les déformations entraînées par les crayons de couleur ou les symboles conventionnels, il s'illusionnerait, et s'il arrivait à réellement reproduire tous les éléments de la coupe, couleur de terre, pierres, racines, etc., il ferait peut être une œuvre d'art, mais ne fournirait pas un travail d'archéologue.»<sup>1</sup>

“if the designer claimed to objectively reflect the portion of land he has before his eyes, (...) he would illusion himself, and if he could actually reproduce all the cutting elements, it would be a work of art, but not the work of an archaeologist.”

The choices made by the colorist-researcher constitute then an experimental search but also an imaginary one, fueled by history and territory. That's what we tried to defend, using as example the Nîmes project, where an archeology of chromatic imaginary has managed to write the story of a city that continues to reinvent itself.

### Acknowledgments

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## Vague Memories: Old Colour in the City- the Re-introduction of Copperas Lime Wash in Scotland

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### Abstract

This paper considers the role of colour in constructing and re-constructing social and cultural memory. The recent return of lime wash render using the mineral 'Copperas' (iron sulphate) is used to illustrate the varied responses to the re-introduction of an historical colour within Scotland's, predominately stone built, environment. With reference to Bonnington House, an eighteenth century house near Edinburgh, which has re-appropriated the strong orange render as part of a recent renovation and extension, the paper will suggest that, in addition to providing a breathable, protective coating to stonework, the colour of the render can support a reading of historical and cultural value, even when applied to contemporary properties.

### Introduction

Scotland is a country of stone and slate, of modest buildings that sit comfortably in the landscape. Occasionally, houses may be painted in black and white, set against rusty-red corrugated iron sheds. Unlike Scandinavia, central Europe, or neighbouring England, the majority of buildings in Scotland are defined by a material-based colour palette of natural stone and white-painted windows. Regional differences are apparent by the source of the stone – creamy yellow sandstone in Edinburgh, sparkling granite in Aberdeen and red sandstone in Glasgow. Vibrant colours on buildings are less common in this context and, where used, can spark controversy. UNESCO World Heritage sites, such as the New Town of Edinburgh (1767-1850), (Figs. 1 and 2) are of vital importance to the economy and identity of the country, yet conservation brings dilemmas. Evidence may be ambiguously interpreted, memories are not always clear, and may therefore be subject to creative invention. What role can colour play in constructing and re-constructing social and cultural memory?

*Figures 1 and 2. The predominant materials in the city of Edinburgh are natural stone and slate, in this context, strong applied colour is unusual. Photos by F. McLachlan, 2015*



The recent re-introduction of lime wash using the mineral 'Copperas', has been met with varied responses. Some are in favour of the liveliness of strong colour within an otherwise homogenous environment, others find the appearance incongruous. One example that will be explored in depth is Bonnington House, an eighteenth century house near Edinburgh, renovated and extended in 2009–2014 (Fig. 3). It will be suggested that the use of the ginger-ochre render supports a reading of historical and cultural value even when applied to contemporary properties. How has the colour itself, and the associations it brings, contributed to the acceptance of change within significant historical environments?

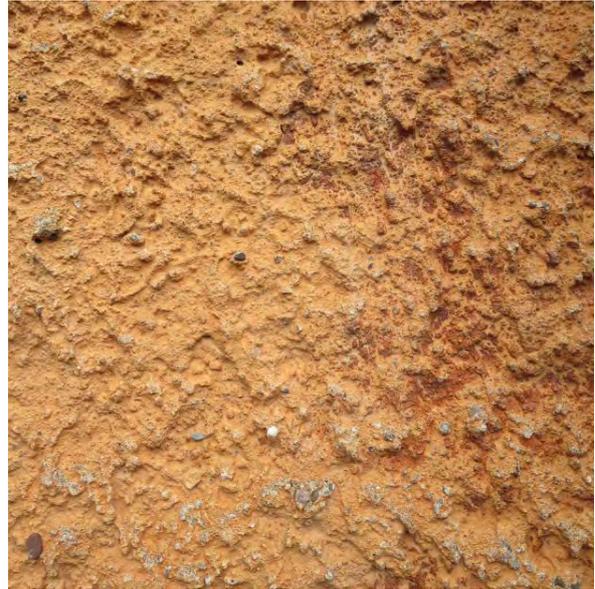
### What is Copperas? Reasons for the resurgence in traditional techniques

'Copperas' is the slightly confusing term for the mineral iron sulphate as it has no relation to copper. Iron sulphate is a blue-green salt, which is hygroscopic

and gradually oxidises on exposure to air. When added to lime, the mixture becomes thixotropic and requires more water to be added to achieve the right consistency for lime washing.<sup>1</sup> Initially it turns green, but then quickly changes to a strong orange colour and, when used as a coating, adds a layer of weather protection to rough stonework. The original recipe sounds akin to a witches' brew. Traditionally, the mix of crushed lime rocks, Copperas and water required fat, oil or grease, usually tallow, sometimes imported from Russia. The fat, (now magnesium stearate is used) makes the medium lighter and more workable. Occasionally, a dead cat was thrown into the mix, in a similar way that oxen blood was added to lime mortar in the past. The protein has the effect of accelerating the hardening and strengthening process. The exothermic reaction takes around three hours for the green to turn orange.<sup>2</sup> Today, lime wash is rarely made on site, partly due to health and safety concerns, and more commonly it is pre-mixed. The surface finish of many historic masonry buildings in Scotland is an applied traditional technique using lime harling, often known as wet dash. It is also used in Ireland and has a distinctive lumpy appearance, unlike the smooth stucco of London or

*Figure 3. Bonnington House, West Lothian, Scotland renovated and extended by Benjamin Tindall Architects (2009–14). The final finish is a Copperas lime wash applied to a base lime render. The colour acts to unite the historic sections of the house with the new extensions. Photo by B. Yu, 2016*





Figures 4 and 5. Copperas lime render at Bankton House, late seventeenth century house, (renovated 1995, East Lothian, Scotland. Photos by F. McLachlan, 2016

central Europe.<sup>3</sup> The vernacular rendering method adds a protective layer to the stonework, which can reduce the rainwater penetration to the wall and allows the evaporation of moisture from inside to reduce the dampness of the building. It is one of the most effective methods of adding a weatherproof shield for stone buildings and is well suited to the Scottish weather. Render was also applied to cover uneven rubble stone or common brickwork that was perceived to be poor quality.<sup>4</sup> Typically, topcoats of lime wash were applied as a subsequent process to consolidate the harling and, when a pigment was added, to add a natural vibrant colour. Lime wash may also be used as a thin coating directly onto stone. Used internally, it can act as a sterilising antiseptic and mould retardant. In many countries, similar techniques are used to finish buildings, most commonly incorporating naturally occurring 'earth pigments' such as red and yellow ochre. Without pigments, lime wash is naturally white, and coats the render or the stone work with a matt, slightly chalky layer.<sup>5</sup> It is not long lasting and must be renewed regularly. Along with earth pigments, Copperas has been used since the sixteenth century to tint exterior lime wash to create a gingery-ochre colour (Figs. 4 and 5), but had fallen out of common use in Scotland by the twentieth century, perhaps due to its need for maintenance.

The extensive use of lime harling also related to its decorative function. It has been suggested that it may have been used to distinguish buildings from the otherwise consistent, material-based colour palette of the built surroundings made of natural stone.<sup>6</sup> One possible reason that accounts for the use of the distinctive strong orange colour lies in the ease of availability of iron sulphate, coinciding with the prosperity of the Copperas industry in the south-east of England.<sup>7</sup> The mineral was commonly used as a fertiliser and as a fixative in the dye industry in the seventeenth century. In Scotland, this traditional industry went hand-in-hand with the making of cloth. The use of iron sulphate spread quickly nationwide with the expansion of the woollen industry and as industrial chemical processes became more established. Unsurprisingly, historic Copperas lime wash buildings, for example the recently restored Pittencrieff House Museum and Merchant's Palace in Culross, are found around Dunfermline, the home of a great many hand loom weavers from the sixteenth century onwards.<sup>8</sup> Copperas lime wash is extensively used in Scandinavia, but is now rare in the UK. Today, iron sulphate is readily available to order on the internet, and is commonly used as a conditioner to make grass greener.

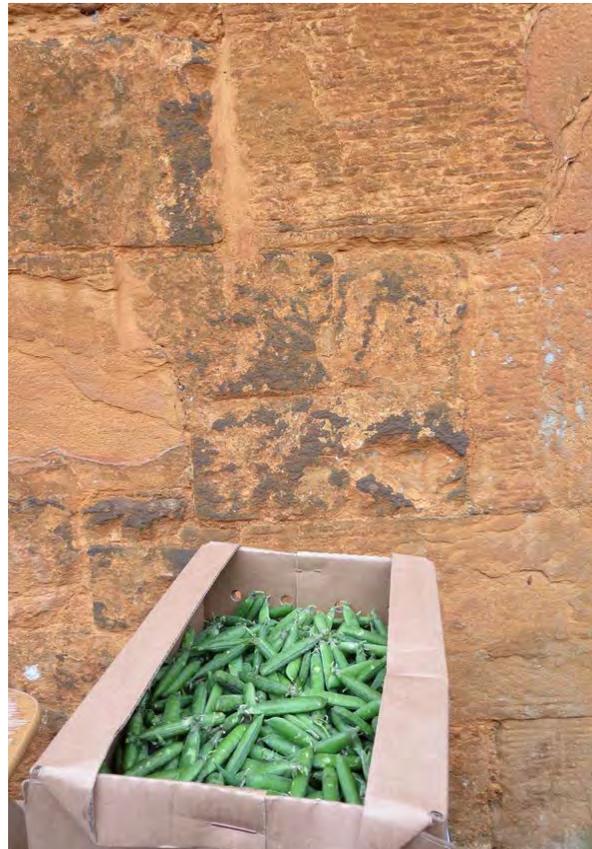
### Time, taste and controversy

Our appreciation of this traditional surface coating has modified with time. The use of lime render declined partly due to changes in fashion and later the introduction of modern materials. In the late nineteenth Century, external harling and render was stripped to expose the underlying stone or brick with the intention of revealing, what was felt to be, the natural beauty of the stone.<sup>9</sup> Damage may also be inflicted by misunderstanding. During the twentieth century, lime mortar was often replaced by modern cement in order to avoid the regular maintenance and have a more durable and lasting finish. Impervious modern coatings are often incompatible with mass masonry construction because they stop the movement of water vapour, which can lead to problems with internal dampness.<sup>10</sup> Nevertheless, the advantages of this traditional technique, especially for the restoration of historic masonry buildings, have since been recognised.<sup>11</sup> In addition to the technical

performance, the distinctive 'glowing' colour contributes to a cultural identity and sense of place.

The re-introduction of lime render as part of the conservation of the Scottish built heritage has been controversial. At the Great Hall of Stirling Castle (1503), for example, the local community found it difficult to accept the decorative and vivid colour, which suddenly appeared when the stone building was renovated using traditional vernacular skills and after a full archaeological study.<sup>12</sup> A similar reaction to archaeological evidence that classical Greek buildings were richly painted has been well recorded. To the contemporary eye, the colours appear garish when people prefer to think of the pure, unadorned white stone.<sup>13</sup> Differences in the perception of colour will also be stimulated by social and cultural associations. It is therefore important to be aware of the strength of collective constructed memories when we re-introduce old and forgotten colour in specific conservation and new architectural projects.

*Figures 6. and 7. A thin Copperas lime wash was used on a small farm steading at Bonnington House and provided a test for the durability and application of the material. The uneven appearance is part of the process, but may not be acceptable to every client. It is soft and dynamic in appearance with a distinctively gingery-orange colour. Photos by B. Yu and F. McLachlan, 2016*



### A half-forgotten craft – why has it been reintroduced?

By the 1950s, only a few examples of buildings with the distinctive warm orange colour remained, etched into cultural collective memory – even if neglected in reality. When Sir Basil Spence was designing new housing in the historic centre of Edinburgh in the early 1960s, he was keen to use strong colour and had memories of the orange colour from Loretto School to the east of the city.<sup>14</sup> The project architect, Richard Cassidy, now in his 90s, recalls that Spence had also seen the colour being used in the restoration at Ford House, East Lothian (1680).<sup>15</sup> Cassidy notes that, at the time, the craft had been semi-forgotten and so in their case, they simply mimicked the Copperas colour using paint. The post-war period was a time of shortages of material, and the low-budget housing meant that the use of stone was limited, yet the purpose of the colour was clearly to make some connection to the memory of these vernacular buildings, albeit one which was not pretending to be authentic in its making. Basil Spence has proved hard to pigeonhole as an architect, partly because of his combination of clearly modernist principles with an

unusual search for meaning derived from historical sources as an approach to connect with the past. In this case therefore, the materials used were of their time, but the use of this specific colour suggests something otherwise – vague memories of vernacular architecture and of grander, historical houses.

Today, local planning officers and Edinburgh World Heritage, generally welcome the re-introduction of coloured renders, although guidelines encourage soft, ‘earth’ colours, more likely with ochre than the strong orange of Copperas. The vast majority of buildings in Edinburgh are a creamy-yellow natural sandstone, blackened over time with soot from chimneys, with strict regulation on the colours for railings, windows and doors in some conservation areas.<sup>16</sup> In this context, warm coloured renders offer a lively contrast, with a sense of authenticity, but to date the re-introduction of Copperas has tended to be in more rural areas.

*Figure 8. Bonnington House, Jupiter Artland, West Lothian, Scotland, restored 2014. Photo by B.Yu, 2016*



### **Bonnington House – re-appropriation of an old colour**

A recent example of such re-appropriation is Bonnington House, a large, Grade A Listed building, to the west of Edinburgh. It is currently in private ownership as a family home, having lain empty for some years, but the estate and the extensive landscaped gardens were re-invented as an outdoor contemporary sculpture park and art gallery – Jupiter Artland – in 2007, in order to make the property economically viable and to provide new employment.<sup>17</sup> The history of the house itself is confused and there is no record of the exact date of construction, but it is thought to have been erected in the early 1700s and appears on maps in the mid-eighteenth century. It was extensively altered in the nineteenth century, and by 2009 the house had a contemporary conservatory to one side and was white painted with stone features. The architects proposed to demolish this addition and to replace it with two symmetrical wings in a similar traditional construction to the main house. This was a controversial alteration, and planning permission was initially refused, but later won on appeal. The drawings show white walls and the decision to use the strong orange colour was taken late on, while on site. The nearby farm steading building, converted to form a visitors' centre, provided a test for a thin layer of lime wash coloured with Copperas, (Figs. 6 and 7). This thin coating stabilises the stone and gives a breathable, water-resistant coating. On the main house, previous layers of render and paint were retained, and the lime wash added, following a series of around thirty test samples to establish the adhesion and colour.

### **'Old' colour and identity**

The extensions, completed in 2013, are so well executed that the visitor is almost certain to believe that they are original (Fig. 8). The colour of the render plays its part in this illusion. It is uneven in appearance, somewhat blotchy and lumpy in texture. The architect, Benjamin Tindall, reported that the clients were at first uncomfortable, feeling that the patchy colour made the house look uncared for, in comparison to a bright new coat of white paint. Although the architect disagreed that there was ever any intention to use the material to make the house 'look old', the aesthetic is carefully constructed. The historical

technique gives an appearance of age, and instantly unites the new wings with the older central section of the house. This hybrid approach is highly appropriate to the true history of the house, which, far from being constructed at one time, was modified quite radically in the mid-nineteenth century, and its origins as far as the historical records are concerned, are contradictory. What is clear is that the addition of the Copperas is wholly new, not in any way authentic in the case of this property, adding a further layer of re-invention in the palimpsest of its conservation.

Although the responses and perceptions of the public to the 'old colour' in this particular case requires further research, the recurrence of this vivid orange, and the traditional skills of making it, are significant. As a form of objectivised culture, traditional colour in architecture has the potential to provoke memories of the past and to support the regional culture of groups who share local knowledge. Jan Assman argued that this memory is important for a group to reproduce its identity, thus a society becomes "visible to itself and to others" through its cultural heritage.<sup>18</sup>

### **Conclusion and findings**

The paper has considered the re-introduction of traditional skills of using Copperas (iron sulphate) lime wash in buildings in Scotland and in summary would suggest:

1. Lime wash is well-suited to the local Scottish climate, and can provide a good protection for buildings through an economic and practical process using local materials and vernacular skills, although the process requires maintenance every 8–10 years.
2. There is a growing awareness of the use of traditional techniques that, in terms of conservation, can be more effective than modern technologies. Impervious coatings may not always be the best option as they may cause damage to masonry construction.
3. The mineral Copperas can be used in lime wash applied directly to stone, or as an additional layer on a lime render base. It is an alternative to the more commonly used ochre pigments.
4. 'Old' colour can be a crucial bond to connect to the past and link to our culture and history.

The colour helps give identity and an apparent authenticity to the architecture. In some cases, paint analysis is used to identify and replicate historical usage. In other cases, Copperas lime render is used even where there is no evidence of previous use, simply because of its functionality, dynamic aesthetic appearance, and the vague memories it may provoke.

5. Colour preference may vary from time to time, and group to group, thus it is necessary to be thoughtful when considering bringing 'old' colour back to the city. Further research is required to measure public reactions to the resurgence in use of this strong colour in the public realm.

### Acknowledgments

With thanks to Benjamin Tindall Architects, and Douglas Johnston of Masons Mortar for their invaluable knowledge and recollections.

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  13. Jacques-Ignace Hittorff (1792-1867) published previously discovered fact about the polychromy of the Greek temples in 1851, cited in Caivano, J.L.2006. Research on Color in Architecture and Environmental Design , Current Developments, and Possible Future. *Color Research & Application*, vol 31, No 4, Aug 2006, p. 352.
  14. Lorreto School, Musselburgh, has been recently restored but using a masonry paint rather than a lime render. To most observers, it is the colour that will be memorable, rather than the process. The effect is more consistent in appearance, but flat and dull compared to Copperas render, which reflects light.
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## Semiotics of Material and Colour in Wooden Sacred Architecture of Historical Volhynia: Past and Present

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### Abstract

The paper gives coverage on the problems of semiotics of wooden sacred architecture at the territory of historical Volhynia under past and modern circumstances, including semiotics of material itself and the colour as its main aesthetical characteristic. There are considered the main peculiarities of the colour semiotics of basic structural elements of churches' exteriors. The authors tried to analyse the main reasons and tendencies of the changes in semiotics of wood and coatings applied for church exteriors and to define their colour as the most important aesthetical feature. Main evolutionary stages for changing the semiotics of wood as a material and colour of wooden churches are suggested.

### Introduction

Since the ancient times, wood considered to be one of the most applicable construction material in Volhynia (at present – north-western part of Ukraine).<sup>1</sup> Over centuries of sacred architecture in Volhynia and other historical regions of Ukraine wooden temples had taken a main place, mostly for the chapels and small parochial churches.

It was caused mainly by the natural reason – the availability of this material at the territory – and technological reason – high workability and simplicity of mechanical treatment and therefore, wide creative potential. Unlike the expensive masonry construction, wooden construction did not require

peculiar experience and it was usually based on ascertained vernacular traditions. Structural and formative approaches descended from one generation to another. Analysis of ancient historical experience confirms that natural colour of different species of wood applicable to construction met psychological perception of the material and agreed with certain aesthetical preferences.

At present, the wood cannot be competitive material to more durable ceramic brick, concrete masonry and other artificial materials. However, from the point of aesthetics and semiotics, it has peculiar, morphological features providing high individuality. Apart of mentioned availability and workability, wood is a renewable material, which is one of the key features of sustainable environment.

Regardless of quite positive feature of natural colour, wood lost gradually its exclusive self-sustained status at certain historical stage and obtained new impulses for visual semantic variety by active application of natural and later artificial dyes. In its turn, it led to semantic changes of architectural image of the sacred building. Primary dyes were white chalk and lime and the trend was analogical to huts' white-painting. Semantically these phenomena also corresponded to the attempts to emphasize on status of a building in the environment. Gradually the tradition of painting became common in the Ukraine and persisted until twentieth cent. First, local changes gradually implemented regarding of Russian Empire period, with its intensive detailing and therefore required coloristic variety for emphasis and visual appearance of the details.

Along with that fact, preceding historical experience of wooden construction of temples demonstrates quite disputable and contradictory processes in coloristic aspects of application of this material.

At present time among the churches considered as architectural monuments at this region around 80% are wooden temples.

In twenty-first century, most of wooden sacred buildings faced the problem of the spontaneous amateur renovation processes, which include replacing or covering authentic decorative coatings on walls and roofs with artificial imitative materials. There change of authentic finishing for new one which often imitates some aesthetical characteristics of the original materials leads to losing original identity

of the objects and suggest new identity not attributable to wooden architectural patterns. Even professional architects make mistakes during restoration<sup>2</sup>, but the main problem is neo-vernacular restoration of the wooden churches.<sup>3</sup>

## Method

### During the research, following research methods have been applied:

- empirical method of observation of wooden churches of a region;
- theoretical methods such as observation, comparison, hypothetical-deductive reasoning;
- general logical methods: generalization, abstraction, synthesis, analysis.

### The key issues on colour value in architecture

Before analysis the semiotics of colour of wood in sacred architecture of a region, we should not but mention the issue of colour in sacred architecture by itself.

In contemporary architecture, as in other visual arts, colour is perceived through the theory of colours and psychology of colours. Most of the works devoted to colour in architecture are related to contemporary period and normally pay less attention to ancient buildings, probably due to the lack of relevant information about color. At the same time attention is usually paid to interiors. However, building's exterior is also of great importance in the environment.

It is known, that psychological reaction is primary effect of colour.<sup>4</sup> Some researchers consider colour as intermediate link in the communication process between human and space in architectural environment.<sup>5</sup> As visual symbol of architecture colour serves a language for communication.<sup>6</sup>

Barbara Linz thinks that colour "brings architecture closer to people" as it 'speaks to emotions' even when building is not significant in its architectural form "has an immediate effect".<sup>7</sup> That is especially true for sacred architecture.

According to Patricia Sloane, "response to colour symbolism is a response to colour preconception, and is a predetermined response based on literary and psychological ideas about colour, rather than a response to the nature of colour itself".<sup>8</sup>

In recent years, we observe hiding the true colour and texture of a material and applying imitative

coatings. John Ruskin argued the imitation of materials due to colouring giving examples of ancient buildings.<sup>9</sup> The discussion raised at new level in most famous work by Adolf Loos.<sup>10</sup> The long-lasting discussion on interfering architectural material and its colouring aroused by John Ruskin and continued by Adolf Loos, is actual until nowadays. First of all, it was and is related to simulation of appearance of natural materials by artificial ones. However, in the case of wood as architectural material, we deal with opposite thing: painting hiding natural colour and unique texture.

Still colour became an integral part of contemporary architecture including sacred one. Regardless of the conservatism of sacred architectural forms, its materiality could not resist with technological innovations. According to Serra et al.<sup>11</sup> "colour is not something added a posteriori, and it is not a skin or a layer that hides, that perverts or lies about the real material composition, and colour may finally be assumed as a finish itself". This is true for artificial materials. However, for wood the naturalness is undoubtedly its primary aesthetical value.

### The semiotics of colour in sacred architecture

Colour in sacred architecture has particular value due not only to physiological but also spiritual value.

Most of the researches consider the colours in Christian architecture within the context of liturgy (e.g. colour of sacerdotal robes etc.).<sup>12</sup>

As it can be seen from Tab.1, the liturgical colours of Christianity became colours of architectural images of the churches. Traditionally colour of exterior walls usually reflects consecration of the church of the God, the Holy Mother, the Saint or the feast. The colour of domes used to have the same correlation with consecration.

Table 1. Semiotics of colour in Christian architecture

Colour	Christian liturgical colours <sup>13</sup>	Eastern church		
		facade <sup>14</sup>	dome <sup>15</sup>	dome <sup>16</sup>
<b>Yellow</b>	Light and purity, youth, happiness, harvest, hospitality, love and benevolence	Consecration of sainted hierarch	Synonym of gold, colour of all saints.	-
<b>Golden</b>	-	-	Symbol of celestial glory and the God	Consecration of Jesus Christ or the Twelve Great Feasts
<b>Green</b>	Associated with Christmas and Trinity	Consecration of hosiomartyrs (Saints)	Colour of Trinity	Trinity, the Holy Spirit
<b>Red</b>	Colour of Pentecost	Consecration of martyrs	Blood of martyrs	-
<b>Black</b>	Liturgical colour of Good Friday	-	-	Colour of monkhood (monasteries)
<b>Blue</b>	Sky, hope and good health, alternative colour for the season of Advent	Consecration of the Most Holy Mother of God	The Holy Mother	-
			The mother of God (dark blue with stars)	The mother of God (dark blue with stars)
<b>White</b>	Virginity, purity, birth, liturgical colour for Christmas and Easter	Consecration of the Transfiguration of Christ or the Ascension of Christ	-	-

However, there is a lack of researches on the coloristic of the sacred wooden architecture. In different periods coloristic decisions were different. Therefore, we cannot but say about semiotics of colour in wooden architecture as constantly changing.

The problematics of colour application is confirmed the fact, that well-known researcher of wooden architecture professor Ryszard Brykowski in his work on wooden church architecture demonstrates the pictures of the temples exceptionally in their natural texture.<sup>17</sup> Whereas Grażyna Ruszczyk in her research demonstrates the examples of painted orthodox churches.<sup>18</sup>

#### **The stages of coloristic evolution of wooden sacred architecture in Volhynia**

Timber as most common natural material since the ancient times remained its natural view of logged structures of the region. As far as pigments and paints based on them appeared in vernacular archi-

ture it is can be suggested that they were applied for colouring the wood. Apart of aesthetical value painting have another important function of preservation the wood from the environmental impacts. In research on the colouristics of wooden sacred architecture of Volhynia obtaining the information from primary sources play the main role in the triple system "wood – paint – supporting materials". There is rich research material both historical and contemporary at this region comparing to that at the Left-Bank Ukraine.

The main historical sources of evidence of colour in sacred architecture of old Volhynia are the drawings and watercolours. There have been suggested the hypothesis of colour appeal.

Quite well-grounded idea has been ascertained in Ukrainian artistic historiography, about keeping natural colour of the timber until the end of seventeenth century. Ukrainian researcher Stepan Taranushenko,

the author of the monograph, published upon the long-lasting observations of sacred wooden heritage ascertained the fact that in 1920s there were just few churches with natural original colour at the Left bank of Dnieper, most of churches have been painted.<sup>19</sup> However, he wrote about some examples of keeping the natural colour (primary pine) in churches' interiors. Along with it, he emphasized the irregularity of this process on the territory of Ukraine due to conservatism at the territory of Western Ukraine. For instance, external surfaces of churches walls in Galicia and Transcarpathian Ukraine in forthcoming two centuries (18-19 cent.) remained unpainted. Different situation occurred at historical Volhynia after partitions of Poland and establishing the new Volhynian governorate (guberniya), as a part of Russian Empire. As Greek Catholic (Uniate) Church has been eliminated soon there has started the process of adaptation of religious life to the canons of Russian Orthodoxy. That meant russification of stylistic trends also. Along with construction of new churches, there was massive rebuilding of Uniate temples according to Russian manner and the directives of Synode – with edged steeple tops, onion domes, peculiar ornamentation, etc. This quite long historical period can be considered as *first stage* of the implementation of potential capacities of the wood. At this stage form-building properties of wood were discovered completely, and its semantics was easily readable and corresponded to such qualities as “versatility”, “organics”, “naturalness”, “warmth”, “tolerance”, “availability”, “workability”.



Figure 1. St. George's Church, Drohobych, Lviv region (oblast) 1657. Public domain, <https://commons.wikimedia.org/wiki/File:DrohobychCer3.JPG>

Primordial wooden temples were easily recognizable and comparatively cost-saving structures.

Nondeformed, unmasked, authentic wooden materiality corresponds to fundamental protective criteria for such types of architectural monuments. Nowadays this condition was one of the dominant at making decision on including the group of 16 wooden churches located at Ukrainian-Polish frontier to UNESCO cultural heritage list. Among them – original St. George Church in Drohobych (Fig. 1).

It is evident that preservation of natural coloristic for wood was typical in seventeenth – nineteenth cent. at Volhynia as well. In this sense, wooden church originally located in the village of Kysorychi (currently Rivne region) and relocated to National Museum of Folk Architecture and Life of Ukraine near Kyiv, preserved its authentic colouristic is a significant sample of Volhynian sacred wooden heritage (Fig. 2).

*Second stage* in colouristic evolution of sacred architecture of Volhynia can be attributed to the start of mass painting of existing and newly built wooden churches. Due to lack of the relevant sources the determined conclusions on the coloristic of early wooden churches are complicated. The oldest historical iconography gives evidences on start of the process in first half of nineteenth century.

Initially the most common painting materials and dyes were applied: whitewash with chalk or lime grouts for the walls, and green verdigris for painting of tin roofs.



Figure 2. Church in the village of Kysorychi, Rivne region. Museum of Folk Architecture and Life of Ukraine, Pyrohiv. Photo by P. Rychkov

One of the sources about coloristic evolution of sacred wooden architecture at current territory of Ukraine is a unique album by French doctor Dominique Pierre de la Flise, which contains a series of watercolours.<sup>20</sup> Some typical examples are shown there in colour. For instance, there was reproduced Medvedsky St. Nicholas monastery at the outskirts of Kyiv not existing at present as of mid-nineteenth century (Fig.3). Here we can see two Orthodox churches. One is smaller and obviously older, shown in white and green colours. Another temple is five-headed monumental church of the Exaltation of the Cross (Zdvyzhenska) built in 1792, at that time, apparently, still retained the natural colour of wood on the exterior walls. Although both had tin roofs, painted by so-called verdigris. In general, it should be noted that white colour to certain extent contributed to the recognition the temple in the environment, attracting attention to multi-coloured background of the rural and urban landscapes.



Figure 3. Medvedsky St. Nicholas monastery near Kyiv in the middle of 19 century. Drawing by De la Flise

The characteristic colourful solution can be seen now at historic church of St. Paraskeva from the village of Zarubyntsi Cherkasy region, built in 1757. Now it is at the exhibition of National Outdoor Museum of Folk Architecture and Life of Ukraine (Fig. 4).

Apparently, quite limited information on colouring of wooden churches in the mid-nineteenth century we receive due to the works by Napoleon Orda, a famous master of architectural and landscape veduta. Primary we keep in mind his original watercolour drawings, however there are not so much wooden churches of Volhynia. Several painted wooden churches (Komargorod – Komargród, Markowka, Peczara, Bazalea) were pushed to the side lines, and as



Figure 4. Church of St. Paraskeva from the village of Zarubyntsi Cherkasy region, 1757. Museum of Folk Architecture and Life of Ukraine, Pyrohiv. Photo by P. Rychkov

far as can be judged regarding their colour, there has already established tradition to whiten the outside logged wall in 1860s, and in the case of tin roof give it a green colours.

Painting exterior walls of wooden churches became common in the 2nd half of the 19th cent. Not least development of lacquer and paint industries contributed to the that. For example, descriptions by M. Teodorovych observed numerous cases of such colouring in Volhynia: wooden Assumption Church in Rivne<sup>21</sup>, and churches in Bronnyky<sup>22</sup>, Novy Dvir<sup>23</sup>, Arrestiv<sup>24</sup>, Bohdashiv<sup>25</sup>, Orzhiv<sup>26</sup> and others. M. Teodorovych gives detailed information about triple-headed typical church in Hrabiv, recording its tin coating and painting outside in 1870, and painting inside in 1874.<sup>27</sup> There are reasons to assume that white and blue colours dominated in the 19th century. To emphasize certain architectural details sometimes yellow, black, green colour applied. Along with the replacement of roofs' shingles with tin, colouring of old churches of pre-Russian age their material authenticity significantly changed.

As an example, a unique three-tiered bell tower in the village of Lukiv, Volyn region (Fig. 5), and

three-headed church with three naves in the village. Tuchyn of Rivne region (Fig. 6), the Church of St. Demetrius in Sernyky, Rivne region (Fig. 7), a small church at the cemetery in the village of Shubkiv, Rivne region (Fig. 8). Occasionally you can still meet the domination of green paint on the facades (Fig. 9), although today its application is rather rare. There was different situation with the coloristic solutions of churches designed and built in the 2nd half of the nineteenth century in accordance with the guidelines and recommendations of the Orthodox

Synod. Evidently their colouring from the beginning was consistent with the specific Russian Revival architectonics and broadly implemented at the design stage (Fig. 10, 11).



Figure 5. Bell tower in the village of Lukiv, Volyn region. Photo by P. Rychkov



Figure 6. Transfiguration church in the village of Tuchyn, Rivne region. 1730. Photo by P. Rychkov



Figure 7. Church of St. Demetrius in Sernyky Rivne region, 1821. Photo by P. Rychkov



Figure 8. St. Nicholas church in the village of Shubkiv, Rivne region 1629. Photo by P. Rychkov



Figure 9. Church of the Nativity of the Mother of God in the village of Bilashiv, Rivne region, 1736. Photo by P. Rychkov



Figure 10. Church of Sts. Cosmas and Damian, Korets, Rivne region. 1897. Photo by N. Lushnikova

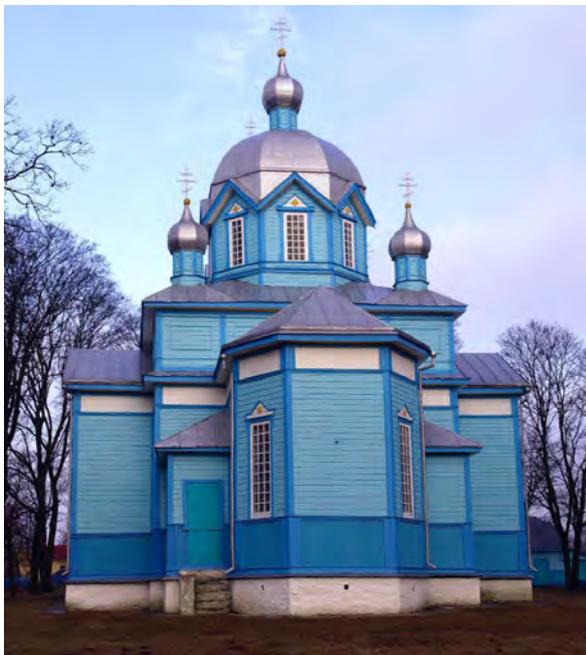


Figure 11. Church of the Nativity of the Mother of God in the village of Berezhnytsia, Rivne region, 1911. Photo by P. Rychkov

However, further design decisions often undergone significant changes. Wooden church of St. Trinity built in 1892 in Vyshnyvets village could serve as a significant example. The original design project of the church was discovered made by famous Ukrainian architect V. Leontovych (Fig. 12a). As we can see, the designed church is notable for expressive restraint of colour, but plenty of shredded exterior detailing. In the early twentieth century colour played tangible role in the general composition (Fig. 12 b). In 2016 repairing works caused even greater distance between the actual state and its initial project (Fig. 12 c).

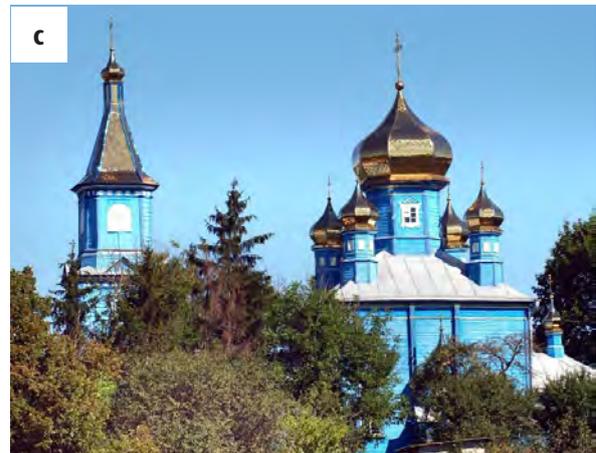


Figure 12. Wooden church of St. Trinity, Vyshnyvets, Ternopil region, 1892: a – design project by V. Leontovych; according to materials given the priest of the church; b – general view in 2010; Photo by P. Rychkov; c – general view in 2016. Photo by P. Rychkov

The impetus for the massive distortion of wooden churches was also their deliberate architectural transformation. There has observed a mass “correction” of the old Greek Catholic (Uniate) churches by extensions and risings. Mass replacement of shingle roof with iron sheets painted by oil paints mostly green or dark grey to prevent corrosion should be recognized as related transformational phenomenon. Complete colouristic range of the natural wood, was supplemented by new irrelevant colours.

Colouring Volhynian churches in a white-blue range generally recognized as a characteristic element of the cultural landscape on Ukrainian territory in twentieth century. “These blue churches, depending on the brightness of light, time of day and year, either merge, or intensively stand out against the blue sky. They create a unique climate of the place “where East meets West”, where the encounter and coexisted for centuries different religious and cultural traditions, borrowing in return each other from their rich experience”.<sup>28</sup>

*The third stage*, to our opinion is none the less as threatening, began already at the age of independent Ukraine. It is predefined not so much by purposeful and destructive intentions as uncritical, often unmotivated and uncontrolled application of advanced finishing materials. This is the phase making threat of complete degradation of architectural authenticity of wooden churches. The main criterion for that is considered as nearly almost total masking of internal wooden nature by prefabricated novel materials: polyvinyl chloride (PVC) framed doors and windows normally white in colour, PVC and galvanized steel facade systems (siding).

At present advertisements in Ukrainian mass media offer church domes of stainless steel and titanium nitride coatings imitating gold and cooper. This is common not only for newly constructed temples but also old churches including architectural monuments. There is also widely spread application of paints imitating gold for domes (titanium nitride and others).

One of the earliest examples of coating the wooden facades with PVC siding at Volhynia is Church of the Presentation of the Mother of God (1791) in Lytovezh, Volyn region (Fig. 13). Mostly due to tolerant attitude to such “renovations” sad example was even published on the pages of respected art journal in such distorted appearance.<sup>29</sup> Similar examples of ap-

plication yellow siding panels are a wooden church in the Velyka Lyubasha Rivne region built in 1742 (Fig. 14) and light green panels in Zhorniv Church in Rivne region, 1867 (Fig. 15). The example of a wooden church in a Zaborol’ near Rivne – an architectural monument of the eighteenth century is also significant.<sup>30</sup> Now the PVC panels of the most popular colours in housing construction (creamy, beige, light green) as well as steel panels of dark blue (according to RAL colours) are widely used in neo-vernacular renovations of the churches. Such materials cannot form any allusions with timber thin boards initially applied for cladding the facades.

Tolerant attitude to dominant white-blue range of painting of the temples within society and art critics, formed at the last century, now faces a different, much more conflict challenge to the existence and preservation of monuments of wooden sacred architecture. The scale of uncontrolled use of modern finishing materials mentioned above has reached a critical measure considerable popularity in the last two decades. At present, we can talk about the significant threat to wooden heritage. Similar problems are in the Russian cultural environment, as known Russian researcher in wooden architecture Mikhail Milchik wrote.<sup>31</sup>



Figure 13. Church of the Presentation of the Mother of God in Lytovezh, Volyn region, 1791. CC BY 3.0. [https://commons.wikimedia.org/wiki/File:Введенська\\_церква\\_](https://commons.wikimedia.org/wiki/File:Введенська_церква_)



Figure 14. Wooden church in the village of Velyka Liubasha, Rivne region, 1742 p. Photo by P. Rychkov



Figure 15. Wooden church in the village of Zhorniv, Rivne region, 1867. Photo by P. Rychkov

### 3. Semiotics of colour: past and present

Semiotics of colour in sacred architecture in general in Volhynia can serve as an effective analytical tool in two basic areas – syntactic and semantic. Both components are closely related to each other, but have different meaning and practical content. A colour syntax is in the field of professional architectural culture, while the semantics of colour serves primarily as an abstract significative “superstructure”. Role relations between these elements are not stable and balanced. They depend on the role and place of sacred object in a social environment, the personal preferences of priests and the faithful.

*Syntactic* properties of colour in sacred architecture, as, in architectural creativity in general, are directly related to its structural and compositional, formal and stylistic “instrumental” value. In this case, polychromia is one of the tools of architectural work along-

side such aspects as volume and spatial composition, tectonics, style, structure and others. By speaking of a coloristic syntax in architectural design, we should mean purely formal search for architectural harmony – as the architect understands and sees it.

The architectural work by Austrian artist Friedensreich Hundertwasser, including his famous church of St. Barbara in Bärnbach, is one of the most striking, well-known examples of creative realization of coloristic syntax. It can be said that the colour acts as a self-contained and relatively autonomous creative tool.

Colour in many cases acts as an effective syntactic tool for resolving compositional ideas in the creative work of architect. Often it happens without regard to functional purpose of the architectural object. This allows designer to distribute major and minor accents, to highlight the key elements of the composition, to balance its separate parts, and so on.

*Semantic* aspect of colouristics in sacred architectural objects acts as more diffused analytical surface. It depends on local traditions in terms of the symbolic value of a colour as well as colours semiotics in Orthodox architecture (see Tab. 1). However, the Church under modern circumstances does not strictly norm these symbolic links and does not propose a single canon on the use of colour in the external finishing of churches and their consecration.

Local traditions along with some liturgy rules associate specific colours with certain symbolic significance. For example, very popular white-blue-dark blue tones often painted the church with consecration to the Blessed Virgin Mary, called “temples of the Blessed Virgin” (Fig. 16). Although in recent decades, this has become dominant range of colours. Rare red colour sometimes can be found in Resurrection churches and those consecrated of martyrs (Fig. 17).

Yellow colour that has a universal symbolic value as the colour of truth meets occasionally. White colour with its universal symbolism under current conditions it is used quite rarely, and sometimes is recognized as appropriate for the newly built churches.

We should also note some attempts of return the old churches, which previously had a painting in white-blue range, to the natural colour of wood. Such “pioneer” example is recent renovation of the wooden church in the village Lyuchyn. Previously, it was traditional painting exterior walls and today has natural wood colour (Fig.18 a, b).



Figure 16. Church of the Dormition of the Blessed Virgin, Mother of God in the village of Karayevychi, Rivne region, 1740. Photo by P. Rychkov



Figure 17. Church of St. Paraskeva in Korets, Rivne region, 1914. Photo by N. Lushnikova

Similar reversible measures certainly have a significant semantic implication, which is to revive figurative function of material.

The level of blurriness and uncertainty of present criteria of material authenticity of buildings, which today are recognized as “wooden” can be indicated in the album by known journalist and photographer Will Pryce “Architecture in Wood”.<sup>32</sup> However, it should be noted that many of the figures presented here demonstrate only a distant allusion to the traditional image of wooden structures, and some examples correspond generally more to style of masonry buildings. At the same time, we could not but mention that



Figure 18. Church in the village of Lyuchyn, Rivne region: a – general view in 2010; b – general view in 2016. Photo by P. Rychkov

contemporary architectural practice in Volhynia and other regions of Ukraine increasingly promotes the construction of new wooden churches, while using of logged walls with appropriate industrial processing (square-cut timber, shaped timber). This approach to the design of wooden temples without any complementary finishing visually revives old architectural tradition (Fig. 19).

Such technique is filled with greater symbolism when it comes to straight revivalism of architectural monuments like St. Nicholas Church in Ostroh, which was lost in fire in the late nineteenth century. (Fig. 20).

### Conclusions

The facts of colour change of wooden churches in the past and present give evidence on variability of external decorations and some separate details and therefore semiotics of the colour. The researchers acknowledge the right of the modern architect to his own vision on coloristic solution of the designed temple. However, the semiotic definition of “wooden



Figure 19. Church of Job of Pochayiv, Smyga, Rivne region, Photo by N. Lushnikova 2013

church" make provision of unequivocal (monosemantic) coloristic component. Its essence is in easy visual recognition of the signs of timber as a main material of wooden church.



Figure 20. St. Nicholas Church in Ostroh, Rivne region. Photo by P. Rychkov 2016

There is no reason to doubt that the aesthetic capacities of wood are completely self-sufficient to address critical aesthetic applications. This fundamental position corresponds to global experience of architectural heritage preservation. It demonstrates that the strategic direction in the protection of the wooden church architecture is principle in preserving its historical authenticity as "wooden" in its external and internal imagery. Among the parameters of authenticity along with the texture of wood and its structural peculiarities, basic colour of building material plays important role. That comprehensive range of natural shades of wood, including flaws and changes caused by weathering and aging, acts as an essential, integral factor of semantic identifica-

tion of the material. This identification involves the psychological appeal of structural and aesthetical properties of wood as a psychologically attractive, "friendly" material. Positive characteristics such as "naturalness", "warmth", "decorativity", "sustainability" are inherent to this material.

Therefore, modern neo-vernacular trends oriented to the widespread application of advanced artificial materials, in addition to significantly limited palette of colours is a dead ended and destructive direction for the future of this unique architectural phenomenon as "wooden church."

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## Colour Planning in the Early 20th-century Germany: Lübeck and Zerbst

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### Abstract

Research on history of colour planning in the built environment has been undertaken in order to deepen our knowledge of colour in urban planning. The methodology used included analyses of archival sources and field studies. Scattered archival materials were analysed, especially articles published in architectural magazines, city records, building regulations and architectural designs. Several examples of colour planning were detected and two examples of colour planning from the 1920 Germany are presented in the paper: guidelines on colour for the old towns of Lübeck and Zerbst. The comparative analysis of those two cases provides insights how colour proposals for city centres were constructed in Germany at that time.

### Introduction

The attempts to coordinate colour within the built environment by regulations and guidelines have been undertaken in various German lands since the 18th century and reached their peak in the 1920s during the period described as 'the call for colour'. Colour was regulated by rulers in the 18th and 19th centuries, and in the early 20th century the Association *Die Farbige Stadt* included colour planning in its activities in order to promote colourful architecture and to create more exuberant image of German cities and towns.<sup>1</sup>

Thus far, selected historical cases of colour planning in Germany have been discussed in literature. Friedrich Kobler and Manfred Koller (1981) listed regulations on colour introduced in several cities in the 18th and the 19th centuries: Dresden (1720), Mannheim (1738), Würzburg (1788), Karlsruhe (1814-15), and Munich (1840). The case of the Ludwigsplatz in Karlsruhe was discussed by researchers from the Academy of Fine Arts of Karlsruhe (1976).<sup>3</sup> Johannes Uhl (1976) presented a colour proposal for Berlin

Kreuzberg.<sup>4</sup> Karl-Jürgen Krause (1980) cited several old regulations on colour and presented colour planning for Osnabrück.<sup>5</sup> Anna Markowska (2000) discussed two methods of colour planning from the early 20th century for Wrocław, the former introduced by an architect Ernst May and the latter by the Association *Die Farbige Stadt*.<sup>6</sup> The author of this paper presented colours that were proposed by the same association in the early 1930s as standard colours for Silesia<sup>7</sup>.

As mentioned previously, the 1920s were the years when colour in architecture was widely discussed and appreciated, and as a result, numerous colour proposals were prepared for German towns. Two of those proposals are discussed in this paper: colour plans for the old towns of Lübeck and Zerbst<sup>8</sup>.

### Sources and Method

Archival research was identified as a source of data to explore historical cases of colour planning. The following archival materials were examined: articles published in architectural magazines, building regulations, city records and architectural designs. As a result, two examples of colour planning prepared for the old towns of medium size towns were selected, analysed and compared in order to explain the way colour proposals were created at that time. Additionally, field studies took place to illustrate discussed case studies.

### Case Studies

#### The case of Lübeck

Colour planning for the old town of Lübeck, Schleswig-Holstein, was prepared in the 1920s in order to make the town more appealing in a simple way – by removing dirt and dust and by replacing weathered and stood-stained layers of paint on exteriors with vivid colours. The colour proposal covered only small part of the old town, the area around the Market Square, Town Hall, St Mary church (Sankt Marien), and was bounded by the streets: Breite Strasse, Beckergrube, An der Untertrave, Holstenstrasse, and Kohlmarkt (Fig. 1)

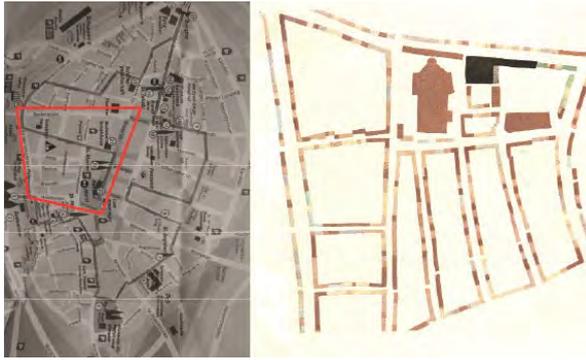


Figure 1. By *Die Farbige Stadt*, Jh V, Nr. 3. Colour planning for the part of the old town of Lübeck

The proposal provided general suggestions to follow and, as a rule, aimed to respect and emphasise three characteristic features of Lübeck's architecture: the wide spread of brick as finishing material, the domination of two colours (green of copper roofs and red brick of walls), the mixture of gables and eaves set to the streets (Fig. 2).



Figure 2. The characteristic features of Lübeck's architecture listed one hundred years ago still remain the same today: the wide spread of brick; red brick of elevations and green of copper roofs; the mixture of gable and eaves. By K. Białobłocka, 2016

Generally, the colour plan aimed to unify different finishing materials by a skilful application of limited hues that varied in intensity and lightness. Three methods were suggested to unify colours of brick and colours of plaster depending on significance of buildings and the treatment of façades. The first method would have resulted in the total unification achieved by applying a red brick colour of the same intensity and lightness to plastered surfaces. This solution was recommended for these streets where both brick and plastered buildings were of

no importance. In case of brick buildings were much more significant to plastered buildings, it was recommended to differentiate slightly surfaces by applying various shades of the same colour. And the third method suggested the application of different hues of different lightness and intensity in order to emphasise contrast of both finishing materials: brick and plaster. The last solution was advised in areas where both representative brick buildings and plastered buildings were equally important, like for example at Beckergrube or Mengstraße (Fig. 3).



Figure 3. By *Die Farbige Stadt*, Jh V, Nr. 3. The three methods of unifying brick and plaster elevations: unification, partial differentiation, differentiation

The proposal did not differentiate highways and byways by colour despite the differences in their importance and capacity. For instance, Breite Straße and Holstenstraße, the main busy streets where sandstone and plaster were often applied to exteriors, were to be kept in natural shades. But Beckergrube and Mengstraße, the busy streets filled with large plastered and painted buildings, were to be painted brighter than the other streets with brick houses. Here, more contrasting colour compositions could have been implemented.

The three minor streets Alfstraße, Fischstraße and Braunstraße that were filled with narrow, high gable houses of different architectural styles could have been painted colourfully; however, similar shades should have been applied to the elevations decorated in the same architectural style. The historical

development of these streets was perceived as a value that allowed to introduce various colours, but still, a strong colour contrast was not welcomed, and shades of red brick were recommended: muted shades of brown, red, but also yellow. Accents of cool blue and grey were suggested only for Fishstraße (Fig. 4).



Figure 4. The narrow streets were destroyed during World War II; however, selected dwellings across the old town are still painted hues that resemble brick. By K. Białołocka, 2016

The plan only provided a specific, detailed treatment for one location, the Market Square. As the rectangular square resembled an interior it should have been united by colour: houses located at the southeast corner of the square were to be painted dark green similar to shades of the green-black glazed bricks of the Town Hall. However, the small plastered houses that were located next to a massive red brick St Mary church should have been painted bright yellow in order to emphasise the contrast with the huge church (Fig. 5).



Figure 5. By Die Farbige Stadt, Jh V, Nr. 3. The colour proposal for the Market Square

In regard to the characteristic feature of Lübeck's architecture, a mixture of buildings set with gables and eaves to the streets, it was suggested that contrast of gables and eaves could have been deepened by applying contrasting hues to the elevations, with brighter hues being applied to the elevations with gables as those were perceived as more important. Gables of different architectural styles: medieval, Baroque and classical were proposed to be treated with different colours; however, the same colour should be used on the elevations of the same architectural style (e.g. all medieval façades were to be painted the same colour). The side elevations (the another characteristic of the town's image) should have been painted plain and one hue. There were numerous brick buildings plastered only at the level of the ground floor. In this case it was suggested that plastered parts were to be painted hues of brick: brown to red-brown. It was especially advisable if brick buildings belonged to the category of important buildings and contrast of materials had to be hidden. Brighter and more lively hues, such as yellow or brown-yellow, were suggested to be applied in case of buildings were of less significance and contrast was allowed to emphasise different finishing materials. Bricks in good condition should have been left untouched, whereas damaged surfaces of bricks should have been repainted in order to mask unpleasant marks. It was not recommended to paint mortar joints, but the timbered parts of brick buildings were to be painted. Windows were suggested to be painted two colours: white (window frame) and the other colour such as blue, green-blue or blue-green (casement). Red and yellow were less recommended and brown was to be avoided (Fig. 6).



Figure 6. Some window frames are still painted two colours. By K. Białołocka, 2016

Plastered elevations were recommended to be painted in brighter and livelier hues than brick elevations. Red and brown were recommended as hues related to clay. Yellow was perceived as a colour that is related to brick, but in the same time so different that it was considered as inappropriate. Green was perceived as a significant colour, since it is a complementary hue to red. Blue was only recommended in special cases, and grey and white were to be omitted as they did not suit to be arranged with brick. The elaborated plastered ornamentation should have been kept in shades of one colour. Similarly, architectural sculptures were not to be painted multi-coloured; and gilding, multi-coloured wall paintings and architectural structures, such as e.g. portals, were described as 'working well under certain circumstances'. Dark and unobtrusive, brown or grey bases were advised to be removed. In regard to windows, old windows were suggested to be painted two colours: white and blue, green or red. However, in case of brick and plastered façades were set side by side, window frames were suggested to be painted homogeneously white in order to unify a row of houses. Doors dated from the 18th century were recommended to be painted one colour and doors dated from the 19th century could have been painted two colours. Here, dark green, blue-green or deep red (blue-red) were advised.

#### The case of Zerbst

Colour planning for the old town of Zerbst, Saxony-Anhalt, was prepared in the 1920s by Edmund Meier-Oberist. The city centre was characterised by a regular grid of streets with two dominant churches: St Bartholomew church (Bartholomäikirche) in the south part of the old town and St Nikolai besides the Market Square in the northern part of the old town. Plaster, sometimes used together with sandstone, was the most common finishing material of

exteriors. The other characteristic feature of Zerbst's architecture was deep red, nearly black colour of roofs. The colour plan provided information on individual colours for the wall surfaces for the most streets and squares within the old town (Fig. 7).

Schloßfreiheit, the neighbourhood of St Bartholomew church (Bartholomäikirche), was one of the most important areas in the south part of the old town. Generally, the buildings that were of small architectural value were requested to be painted uniformly in yellow shades, but the buildings of greater value, e.g. with Renaissance or Baroque gables, should have been treated more colourfully. As a result, various colours were to be applied to the square and unity of the area was to be achieved by uniform intensity and lightness of different hues, but also by the balance of contrasts. For instance, the Renaissance houses at the north side of the square were suggested to be painted yellow and grey, hues perceived by the author of the plan as the most appropriated (light yellow ochre was recommended for the walls and light grey for the architectural details). As newer houses, dated to around 1800, were located on the south side of the square this area was to be more colourful: yellow and red were designed for the west side in order to match brick buildings located further west and vivid ochre, for the east side. The palace was also suggested to be painted shades of light yellow to brown or red (Fig. 8).

The colour proposal suggested that the main street that led from the train station to the square should be more pleasant and the whole area should be unified by the means of colour. Shades of medium light, dull yellow and brown were suggested as the most appropriated, with an exception of one Baroque house that could be emphasised by multi-coloured colour scheme.

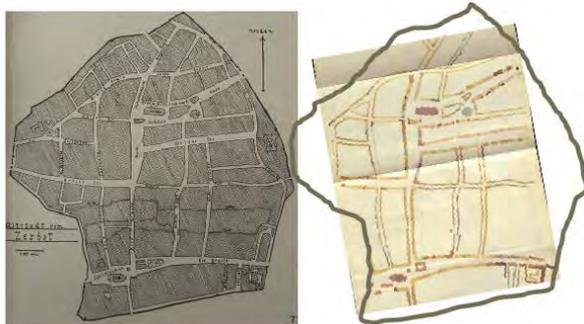


Figure 7. By *Die Farbige Stadt*, Jh IV, Nr. 3. The map of the old town of Zerbst as in the late 1920. Colour planning for the old town of Zerbst. The wide strips indicated more important areas, whereas the narrow strips indicated side roads and back courtyards. The black lines indicated houses of timbered structure. The colours provided were recommended as colours for the wall surfaces. Colours for the architectural details were usually not specified

The Market Square, the other important area, was proposed to be colourful. The buildings around the square varied in architectural value, and as a general rule, the most significant buildings were suggested to be painted bright and multi-coloured, whereas less important buildings or those of worse condition should have been concealed by applying less noticeable brown shades. Hohen Holzmarkt, the wide street north of the Market Square filled with stately houses, was to act as an enclosure of the square. This is why calmer, rather dull but still pleasant (described as 'friendly') hues were recommended over there, with stronger colourful accents applied to valuable architectural details (Fig. 9).

The careful colour design was also recommended for the area filled with "beautiful houses" around the churches St Nikolai and Holy Trinity (Trinitatiskirche) and the squares Hohe Holzmarkt and Fischmarkt. A contrasting, multi-coloured colour scheme was proposed for the houses located next to the Market Square in order to match the colour composition of the whole square. Further from the square, houses were of different, good and poor conditions, so it was advised to paint them uniformly in order to conceal those of poorer condition. Most of the buildings around the churches were brand-new and simply designed. They were recommended to be painted calm hues, with more vivid shades applied to architectural details of houses of historical significance. Heide was described as one of the most picturesque streets within the old town. The south side of the street was filled with plastered gable houses, some of them were additionally adorned with elaborate portals. This area should have been painted colourfully, with individual architectural details emphasised by the means of colour. Bright hues were suggested, with lighter shades applied to the houses of smaller architectural value. Despite the rows of trees planted along the street, green was allowed to be used occasionally. The north side of the street was rebuilt in the 19th century. Here, the houses were perceived as less significant and were not to be highlighted by colour.

Brüderstraße, the wide street east of the Market Square, was filled with plastered houses of half-timbered structure that created a calm atmosphere and a feeling of insignificance of the whole street. As a result, a muted colour scheme was suggested to

correspond with the character of the street; however, it was still suggested to apply some brighter shades to buildings of higher architectural value.

Mühlenbrücke was estimated as a street with some picturesque areas spoiled by ugly intervals, especially in the south part. This is why, the north part of the street should have been highlighted by more vivid colours, whereas the south part should have been treated with similar, toned down colours. The parallel street Wolfsbrücke was estimated as of poor condition and boring. This is why it should have been concealed in dull hues.

Set with eaves to the street, small half-timbered houses along Mittelstraße provided an impression of a nice, well-structured area. Vivid blue and green were recommended for this street. Lütge Brüderstraße and Weinberg were the streets of no significance but pleasant, so some contrast and brighter hues were acceptable there. Rennstraße was filled with the simply designed, 19th-century houses. The overall effect was estimated as pleasant and consistent, therefore brighter hues could have been used over there.

Located in the north part of the old town, the minor but pleasant Ankuhsche Straße was to be painted yellow. A similar uniform treatment was suggested for the other minor streets: Lange Straße and Bäckerstraße. Breite Straße, a wider street but filled with plain houses set with eaves to the street, was also recommended to be painted various shades of yellow. Newer and larger buildings were erected at the east side of Judenstraße and those were recommended to be painted cool shades of blue and green. As a general rule, only selected houses located at minor streets that were adorned with valuable architectural details could have been emphasised by vivid hues.

A street Neue Brücke was located north of the Schloßfreiheit in an unimpressive area but offered an interesting view towards the St Bartholomew church. As being perceived as uninterested, most of the houses did not deserve the emphasis by colour and, as a result, cool tones of blue and green were recommended for the street. Kleine Klosterhof and Große Klosterhof, the narrow streets located in the southeast part of the old town, were filled with small houses next to the ugly long brick wall. Here, more colourful shades were suggested in order to improve the area (Fig. 10).

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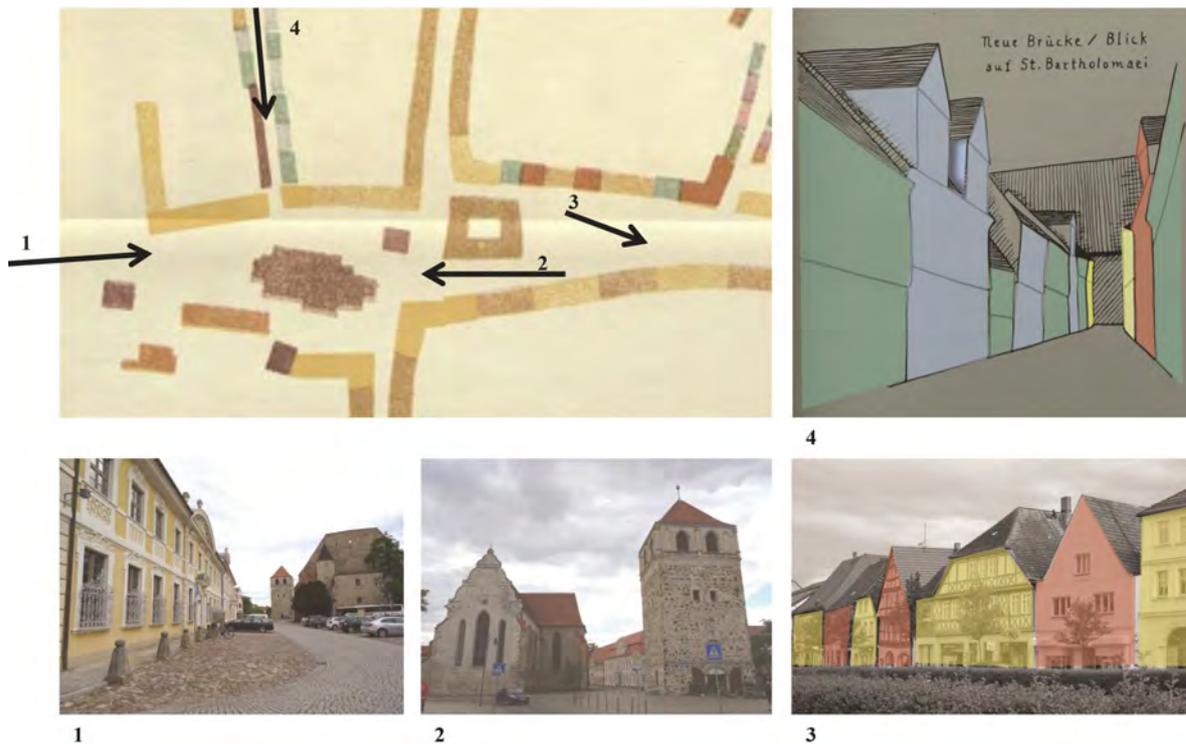


Figure 8. Colour planning for the square *Schloßfreiheit*. The colour plan and the street view by *Die Farbige Stadt*, Jh IV, Nr. 3. Pictures (1,2,3) by Karolina Białobłocka. The general colour reconstruction of street views (3, 4) was prepared by Karolina Białobłocka using as a basis the original black and white sketches published in *Die Farbige Stadt*, Jh IV, Nr. 3 and the author's own pictures

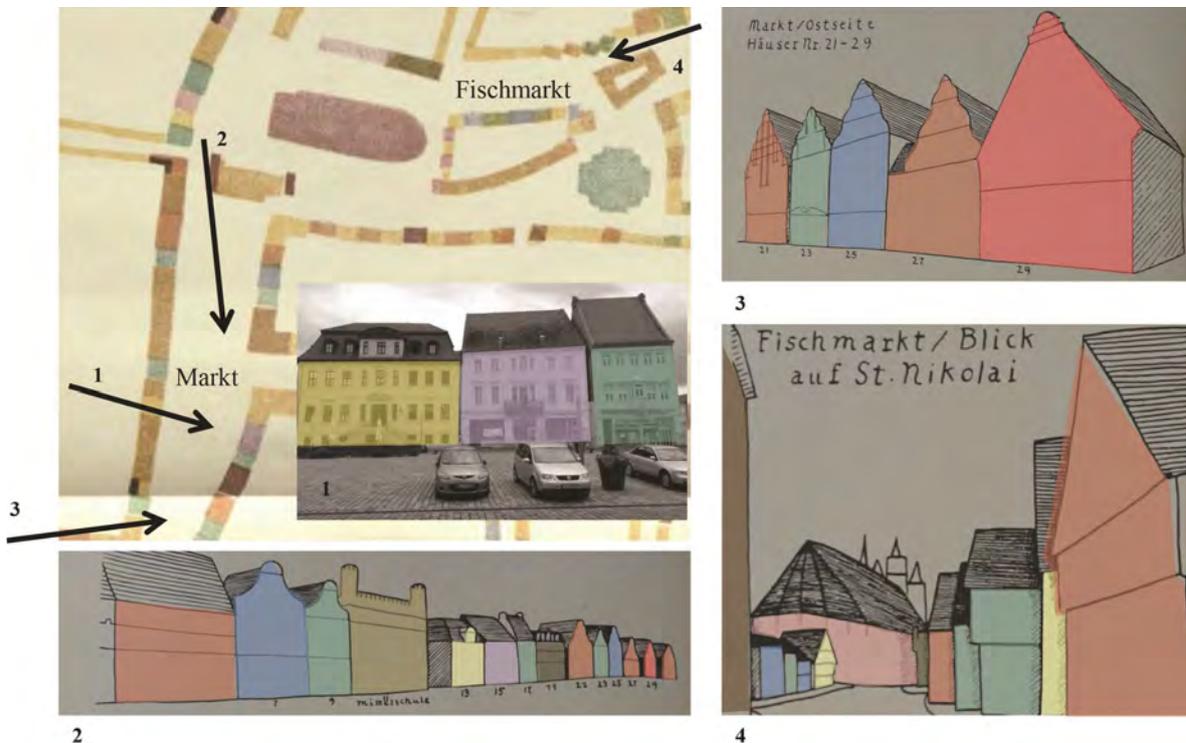


Figure 9. Colour planning for the Market Square. The colour plan and the street views (2, 3, 4) by *Die Farbige Stadt*, Jh IV, Nr. 3. Picture (1) by Karolina Białobłocka. The general colour reconstruction of street views was prepared by Karolina Białobłocka using as a basis the original black and white sketches published in *Die Farbige Stadt*, Jh IV, Nr. 3 and the author's own pictures

## Conclusions

The two discussed examples of colour planning were prepared in the 1920s, during the years when colour and colourful architecture were highly recommended in Germany by the Association *Die Farbige Stadt*. The plans were prepared for similar areas as both Lübeck and Zerbst's old towns were centres of the middle size towns of medieval origins, rich in houses that represented various architectural styles. In terms of colour, the main difference was in the finishing materials: brick was recognised as the characteristic finishing material of Lübeck's exteriors, whereas plaster - of Zerbst's exteriors. Both colour proposals meant to improve images of those towns, both respected the characteristic features, but they differ in the way they were constructed.

The colour plan for the old town of Lübeck was constructed only for a small part of the old town and the rest of the city centre was to follow these guidelines. In this way it served only as universal guidelines but did not provide strict, detailed rules for each dwelling. The general recommendations were provided for both brick buildings and plastered buildings, but colours of smaller elements, such as window frames and doors, were also recommended. The aim of the proposal was to provide an order within the city centre by indicating the manners how to make plastered and brick elevations harmonious along a single street, but also, how to match buildings of different architectural styles located at the same street. It seems that the town's brick architec-

ture was highly valued and the colour plan served as a tool to emphasise this feature. To achieve that goal and to provide a harmony hues similar to red brick: mostly brown, red, yellow were often recommended. Additionally, colour served as a tool to highlight grander buildings by applying to them brighter shades. Similarly, elevations with gable roofs that were perceived as more valuable than with eaves were highlighted by more intense hues. In terms of colours suggested, a vast range of warm shades was usually recommended, whereas cool blue and green were very rarely mentioned.

The colour plan for the old town of Zerbst was much more detailed in comparison with the colour plan for Lübeck as it recommended hues for individual buildings for most streets and squares within the whole old town. Still, in most cases information was limited to comments on colours of the wall surfaces, whereas comments on colours of the architectural details were omitted. As a general rule, the plan for Zerbst emphasised main squares and the most important streets by applying various and more vivid colours, whereas the less significant areas were to be painted more uniformly with duller hues. Furthermore, the colour plan emphasised buildings that were estimated as of high architectural value by applying to them brighter hues despite their location at a highway or byway (the author of the colour proposal usually highly valued Renaissance and Baroque houses but perceived the 19th-century houses as lacking any architectural values). Similarly, scattered architectural

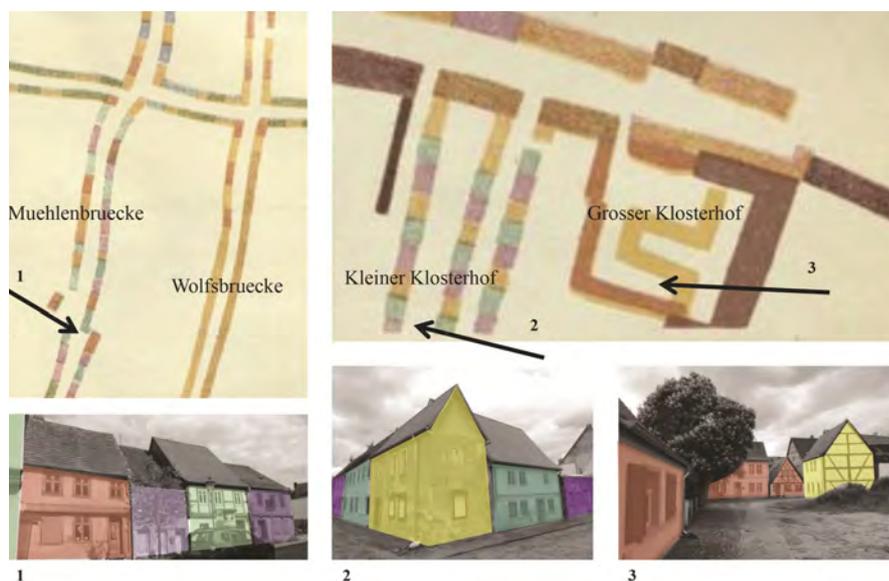


Figure 10. Colour Planning for selected byways. The colour plan by *Die Farbige Stadt*, Jh IV, Nr. 3. Pictures (1, 2, 3) by Karolina Białołocka. The general colour reconstruction of street views was prepared by Karolina Białołocka using as a basis the author's own pictures

details of high architectural value were to be singled out by brighter hues. As a result, brighter colours were usually recommended for areas estimated as important, pleasant and in good conditions, whereas less noticeable, dull tones were advised for areas that were perceived as less pleasing and for houses of poorer condition. However, contradictory suggestions can be spotted as sometimes bright hues were recommended for minor streets in order to improve the area. Generally, warm hues were more often recommended, whereas cool tones were very rarely suggested.

The discussed colour plans indicate both similarities and differences in approach towards colour planning in the early 1920th-Germany. The aim was the same - both colour plans meant to improve the image of the town by introducing more coherent colour design. By the means of colour the area was to be united, and more important, significant or more valued buildings were to be highlighted. Both of the proposals recommended a vast range of shades of warm hues, and indicated an importance of skilfully provided compositions of similar tones and contrasts. However, the goal was to be achieved in a different way. The colour plan for Lübeck was more universal and provided general information how the colours should be handled across the whole old town, whereas the plan for Zerbst was more detailed and provided exact information on colours for separated buildings.<sup>9</sup>

### Acknowledgments

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### References

1. Rooted in the Expressionism, the movement described as 'call for colour' flourished in Germany in the years 1925-1930. At that time, the bold use of vivid colours was widely discussed in magazines, presented on special meetings (so-called 'days of colour'), and promoted on exhibitions. In the same time, various organisations, including the Association *Die Farbige Stadt*, helped to replace the random use of colour with more appropriate, harmonic applications, and representatives of those organisations prepared colour proposals and advised on designs. The whole movement have been discussed in detail by: Rieger, H J. 1976. *Die Farbige Stadt*. Zürich: Fotodruck.
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9. Research did not reveal whether the colour proposals were applied in the 1920s or not. Most of the Lübeck's old town is well preserved and some examples of the use of colour similar to the suggestions made in the pre-war colour proposal can be noticed today (numerous frontages are painted brick colours and window frames are often two-coloured). This may suggest that the colour proposal had been applied at some point, but this conclusion needs verification. In regard to the other town, most of the city centre of Zerbst was destroyed in 1945 and remains do not allow to estimate if the colour proposal had ever been used (further archival research could provide more information).





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## The Role and the Meaning of a Colour in Creating Parks and Palaces of the Henckel von Donnersmarck Family

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### Abstract

Colour seems a substantial role in human functioning. Its symbolism is important for recipients in various countries, originating from different cultures. It has been changing throughout years. What has been immutable, is the fact that due to the properly arranged details, it is possible to pass given information to a given recipient. The example illustrating this principle are plant compositions used in landscape architecture. It should be remembered that it is not only the colour which creates the space of a park or a garden. Only professional and intentional combination of forms, shapes and colours allows to receive the required artistic and spatial effect. Obviously, on the basis of such information, park and palace complexes owned by aristocratic families, were created. Example of such complexes are those owned by Henckel von Donnersmarck family, located in the Upper Silesia region. There exactly the colour (both plant and cubature elements) became one of the essential elements forming the whole composition.

### Introduction

Colours themselves carry important information. We are often unaware of the fact that we are involuntary addressees and forwarders. This is the reason why, for the spatial meaning, it is essential to combine particular sets of colours intentionally and professionally. The same rule applies to light which is directly involved in our colour perceiving. Its proper arrangement may cause some particular emotions: it may increase or decrease the value of a given residence, composition or a colour. It is a typical phenomenon also for the landscape architecture. Properly shaped space allows to pass some information and ideas and therefore to create a place which is

user-friendly. In order to achieve these landscapings, cubature objects, different artefacts and material, including plants, are used. Properly chosen kinds and varieties of trees, bushes and perennials allow to form a garden correctly.

Well balanced and matched plants create the structure and the rhythm of a given landscaping, adjusting it the individual needs of the owners. This rule known for years was used in architecture. Therefore, we may admire today a lot of great examples of various garden landscapings. One of them are definitely park and palace complexes. These interconnected, both in terms of composition and the content, vast objects became an evidence of architects ideas and imagination of their owners. There is a big number of such perfect landscapings in Poland. Quite a lot of them there are in the Upper Silesia region. As they were mainly owned by industrial potentates and aristocratic families, the palaces increased the value of places where they were constructed. Such complexes were owned by one of the richest and important family – Henckel von Donnersmarck. They came to the region of Upper Silesia in seventeenth century and almost to the end of the second world war, their activity was of the substantial branch of regional economy. In 1671 the family split into two lines (with the seats in Bytom and Siemianowce and with the seats in Tarnowskie Góry and Świerklaniec), however it did not restrict their economic activity.

### Method

The Donnersmarck came from Spiski Thursday. Initially, it was a family of bankers, however due to their work, they became one of the richest families in the contemporary Prussia. Due to the numerous business contacts, the Henckle's needed also appropriate seats (which constituted the part of their wealth). Built and acquired palaces were mostly surrounded by parks in landscape style. On the basis of source materials and field research, it should be stated that the palaces had interesting and extensive functional and spatial programme. After preliminary archival research we may receive a general outlook on the layout and features of particular parks. Important information on the form of creating the flora, used species, is provided by iconographic material. Essential details were provided also by the above mentioned field research. The analysis enabled to

draw correct conclusions. This is the reason in which way, used material (colour, texture, matching particular elements) caused the increase of the value of the residences.

### Results

Park and palace complex consists of: main residential seat, surrounding garden and outbuildings. Connections between particular elements form its composition. The palace itself, is most often the dominant feature (content, composition) of the whole landscaping. The social life and location of particular residences were concentrated around the palace. The Henckles in the Upper Silesia Region owned about sixteen palaces. One of the most famous were located in Świerklaniec, Brynek and Krowiarki. On the basis of those three examples, the meaning of a colour in creating the composition may be presented. Park and palace landscapings in Świerklaniec belonged to family line from Tarnowskie Góry and Świer-

klaniec. Its central element was a palace, called Small Versal, which was built by prince Hugo Henckel von Donnersmarck. Inspired by the French influence, the residence (it was designed in style called "french costume") had interesting layout and colour of elevation. Their main characteristics was obviously the colour – namely applying bicolour part of a wall. Built of red brick, the wall was significantly contrasted with the white colour of details-rustication of corners and window openings. Therefore, cubature of the palace was seen from the large distance and constituted the content and visual dominant. In such style, with the same composition rule, in Świerklaniec so called the Bachelor Palace, dedicated for guests, was built. However, not only the cubature residences ensured the colour in the complex. Its basic elements were mainly plants. As has been already mentioned, the complex included the main seat of the owners and the surrounding park which was designed in landscape style.



Figure 1. Perennial beds in Świerklaniec. Photo by B. Łebzuch, 2015

The applied plants were planted in a free style – imitating the nature. Properly matched trees and bushes created the place full of charm and peace. There was a combination of coniferous and deciduous trees, both native and exotic. It ensured seasonal change – the park was attractive throughout the year. In the winter, the plants of dark leaves contrasted with the white snow. In the spring, vivid green colour encouraged to walk. In the summer, there were vivid spots of colourful flowers appearing. In the autumn, the trees became yellow and red, which was additionally emphasised by reflects on the centrally located lake. All species were arranged in such a way that appearing colours increased the value of the landscaping. With the blooming plants, the elevation of the palace was highlighted. On the adjoining terrace, there were designed perennial beds which became additional value of the palace. The palace in Świerklaniec does not exist at present. On its location there is a plant carpet (Fig. 1). Still the blooming plant compositions emphasise the place.

Residential landscapings in Krowiarki was owned by Hugo II Henckel von Donnersmarck, who acquired his wealth by marriage with Wanda von Gaschin. Existing there palace may be compared to the above mentioned residence (it was also inspired by French architecture). The building consisted of two parts – younger one (Art Nouveau – the northern part of the palace) and the older one (Renaissance Revival). Elevations of the older part were covered by the smooth plaster and ornamented with rustications, elevations of the younger part remained unplastered. The material used to build was a brick, seen especially in the northern part (Fig. 2). The walls of the palace in Krowiarki, similarly to the one in Świerklaniec, were of a red colour (at least in some parts) which emphasised its cubature. Also the park surrounding the residence was designed in a free style. Composition referring to naturalistic plants allowed to proper arrangement of colourful plants. Evergreens could grow together with deciduous ones making the park the place in which various shades of green, red and



Figure 2. Palace in Krowiarki. Photo by B. Łebzuch, 2015

yellow accompanied the owners and their guests. On the terrace located from the garden elevation side, there were plants of colourfully blooming flowers. This task, as in the above mentioned example, caused additional emphasise the importance of the residence and increase of its visual value.

Palace and park complex in Brynek belonged to the family from Bytom and Siemianowice line. The Donnersmarcks built there a residence which served as a dwelling residence mainly during organised then hunting trips. The palace in Brynek had elevation of subdued colours opposite to the previously mentioned residences palace in Brynek had elevation of subdued colours. Its roof however was of an intensive, dark red colour which was a contrast to the adjacent walls. Once again, the rule of contrasted colours was repeated to highlight the residence in the general composition of the landscapings. In case of this complex, outbuildings, among others stables and riding areas, appeared to be very important. The

Henckles liked spending their free time horse riding and hunting. It was the reason why the places for horse keeping were of a proper standard and of proper ornaments. Built of red bricks, the buildings were competently matched to the green colour of the surrounding park. Therefore, in this case the colour of elevation became means of expression which helped to highlight important cubature objects (Fig. 3). Similarly to the previous residences, also in the landscape park in Brynek, the plants were planted in a free style. High, native trees were accompanied by exotic ones. It was made in such a way that they were an ornament for the whole vegetative period. It allowed to maintain change of colours during various seasons.



Figure 3. Outbuildings in Brynek. Photo by B. Łebzuch, 2015

### Conclusions

Colour is essential in everyday functioning. In architecture, colour is used to communicate different ideas and information. In case of park and palace residents belonging to the Henckle's, the colour was used to emphasise the function of their owners (colour of residence) and allowed to forming a specific creation. In parks the main colour notion were obviously plants. Using such plants, the relaxation space was created. Due to various species of trees and bushes, seasonal variability could be achieved, allowing to introduce into the garden calming green colour, contrasting white and black or vivid yellow and red colours. They made it even more interesting place (both natural and visual). Colourful perennial plants, directly adjacent to palaces, emphasized additionally the representative character of those residents. All above mentioned introduced to residential complexes, the proper quantity of colours and their shades, which allowed to create a unified and cohesive composition.

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## On the Role of Colour in Context-Concept Relation

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### Abstract

The presentation deals with the role of specificity regarding a place and its *genius loci*, in particular “a colour of the place” in architectural design process. Considerations refer to the concept creation stage, to be more precise – time connection between “incubation” period and the moment of “intuition shift”, i.e. sudden change in perception of the design problem. One of the basic relations analysed in this separated period is a relation of the context with the future concept. Study of a context is a rational process. Intuition shift” (if occurs) is the most important and the most mysterious phase in design. A process leading to this change in perception of a design problem often escapes from scientific analysis, however, the result may be evaluated and assessed. This attempt is shown by the three examples of architectural projects. The outcome is an observation that sometimes “a colour of the context” may be an important factor when taken into account while the analysis is undertaken in the early stage of the design process. Therefore, the thesis was adopted that “intuition shift” can be inspired by a characteristic colour noticeable in the context. Considerations relate to defining key colours present in urban interiors (outer spaces created by architecture) subjected to design action, which in some cases decide on the future form of the designed space and the object. This attempt is illustrated by three examples of architectural projects in Poland: Na Skarpie Housing Estate (1985), Nowa Huta in Krakow; Millenium Hall (2008–2011) in Rzeszów; and, Park Pedestrian and Cycling Bridge (2015) in Busko-Zdrój, which show the use of associative and symbolic interaction of colours and a phenomenon of mimesis in architecture.

### Introduction

This paper describes a role of taking into account a specificity of the place and its *genius loci*, in par-

ticular “a colour of the place”<sup>1</sup>, in architectural design process. Study refers to the process in which the architectural concept is created, stressing the importance of inspiration coming from a “colour” and its results. Especially the early stage of the design process may seem interesting from the point of view assigned to the issue formed in such manner. One of the basic relations analysed in this separated period is a relation of the context with the future concept. Considerations refer to the concept creation stage, to be more precise – time connection between “incubation” period (process of making analysis, collecting information etc.) and the moment of “intuition shift” – i.e. sudden change in perception of the design problem, following the terms introduced by J.Ch. Jones.<sup>2</sup> “Solution to a complicated problem, or the emergence of an innovative idea, often happens absolutely suddenly (intuition shift) and takes form of a dramatic change in perception manner of a problem (change of set).”<sup>3</sup>

This phenomenon is characteristic for the designers, artists or scientists. “Suddenness” and “dramatics” are usually attached to scientific developments or creative illuminations, however, in terms of architectural design this phenomenon, commonly referred to as the “observation”, is usually less dynamic and develops gradually (although, one could probably point to the exact “moment” when it occurred for the first time).

### Method

As mentioned before, occurrence of the “observation” results from “incubation”, i.e. process of collecting data and its analysis. This process is slightly different for each of the mentioned fields of action. A designer or scientist collects information relevant to the issue concerned, while an artist may use his observations or gathered life experience (not always precisely targeted), as a “database”.<sup>4</sup>

Scientific and artistic manners of obtaining input data often mix and intermingle at the stage when architectural conception is created. It refers especially to the process of research and proper understanding of broadly understood context in modified space.<sup>5</sup>

A “colour” may become one of the important features of the analysed context, understood as physical phenomenon or symbolic attribute of some definition

characteristic for the place concerned. This feature must be consciously “observed” and the observation should be understood in order to have a significant influence on the occurrence of change in perception of project situation.

## Results

### Renovation Project: Na Skarpie Housing Estate (1949–1950), Nowa Huta in Krakow

Sometimes, an “observation” refers to a dominant colour or a range of characteristic colours. This situation is depicted by the first example, i.e. a competition work<sup>6</sup>, focusing on the colour scheme of the estate named Na Skarpie nearby Nowa Huta centre, designed by Romuald Loegler and his team. Blocks of individual objects in the complex, according to postmodernist style of this architecture, have been enriched with risalits, bay windows and arcades. Impression of sculptural-like form was complemented with horizontal grooved texture in lower parts and emphasis on individual pieces by “separating” them with clearances or dividing with glass sheets with quite dense partitions.

There have been numerous on-site inspections marking the beginning of the colour scheme project creation. Close contact with this architecture encouraged the search for a manner to highlight individual parts and pieces with a colour. Historical architectural quotes inspired their colour articulation in compliance with postmodernist style adopted by the authors, i.e. pastel colours. One could not ignore less substantive strategies, often present in competition or tender procedures. Therefore, willingly or unwillingly, we analyzed marketing aim of the competition, clearly suggested by the organizer: “The aim of the contest is to pay attention towards the necessity of colour come back in terms of existing architecture, newly designed buildings and urban complexes. Contest task is to create an elevation colour scheme project for the buildings in the Na Skarpie estate in Nowa Huta with the use of plasters and/or paints from BOLIX, which are available in 108 colours displayed in BOLIX Colour Palette. By organising „Kolorowe Osiedla” contest for architects, we would like to draw attention to the possibilities provided by colour in architecture. A grey estate may look dramatically different due to the architect’s ideas. New

artistic form of the grey block of flats and diverse elevation colour will have a positive impact on the residents and enhance the panorama of the city.”<sup>7</sup> (Fig. 1)



Figure 1. Illustration accompanying the terms of the competition was a colourful photograph showing a piece of the complex. Photo credit R. Loegler, 2002

Constantly lacking the innovative concept, we added an analysis of the “colour atmosphere” characteristic for more distant surroundings of the concerned residential estate to the collected database which meant, in the first place, to define a dominant colour in the historical buildings of Nowa Huta.(Fig. 2) Making simulations of the colour sequences, moving from the Central Square towards the estate, was a continuation of the previous step. Nonetheless, each of the colourful versions of our estate seemed less or more inappropriate in relation to the context of the neighbouring buildings. It seemed that the stage of “incubation” is nearly finished, however, we still lacked “observation” which could change the conventional perception of this project situation. It emerged at the time of verbalising the idea of joining the new estate with the urban development of Nowa Huta. This idea, despite being on the contrary to the expectations of organisers, generated final colour conception.



Figure 2. A piece of historical development in Nowa Huta.,  
Photo credit: W. Gawłowski, 2004

Colour no. 6800 (Fig. 3a) selected from a variety of 108 colours by BOLIX Colour Palette, which is a dominant colour in Nowa Huta development, has been used to “paint” the entire complex. This orthodox modernist approach turned out to be the only concept of this kind among submitted works. The risk of monotony of such solution seemed low due to a phenomenon related to colours interacting together, change of shades and colour brightness depending on the lighting. (Fig. 3) Excerpt from the project description: “‘Real’ colour of the building will come out after “adding pigments” to a base colour. These will be: light modified by weather, the seasons, daytime and direct background, i.e. plants, objects and people.”

Purism of the designed colour scheme for the estate is also justified by the quality of architecture. This point is included in the description: “Good architecture does not need a makeup. One does not need to



Figure 3a. Colour no. 6800 (BOLIX Colour Palette 2004)



Figure 3b. Colour scheme. It shows changes of shades of the used colour under the diverse light conditions and in relation with the shadows change (both its own and cast shadows, depending on the angle of incidence of light)

artificially alter proportions and scale; one does not need to artificially divide a block or replace the lack of details with illusionist painting.”

Applied methodology rely on the colour of the surroundings and historical features, at the same time isolating itself from treating the object as an individual formal work and diminishing current colour trends.<sup>8</sup>

#### New Shopping Mall Project: Millenium Hall (2008–2011) in Rzeszów.

The second example depicts the situation without a distinctive colour background. Defining a colour scheme for the space concerned has not been obvious due to the lack of physical relation in this scope. The circumstances took place while designing a large shopping mall in Rzeszów.<sup>9</sup>

On-site inspections, analysis of the Spatial Development Plan regarding the area proposed for rehabilitation and discussions between the representatives of the Spatial Planning Office formed a database in relation to the context of the designed object, in particular it raised awareness of the expectations of the urban planners and city authorities regarding relation of the future object with cultural background of the most valuable city areas in close neighbourhood. (Fig. 4)



Figure 4. The Old Town Square in Rzeszów.  
Photo by W. Gawłowski, 2005

We can read in the planning documents: “[...] Activities that ensure protection of cultural heritage resources and operations considering the best examples of maintenance and conversion (architectural and urban solutions selected, in particular, by means of a call for proposals) should be undertaken on the areas proposed for rehabilitation. Such actions are and will be extremely significant for the maintenance of the unique, individual character of the most valuable areas of our city”.<sup>10</sup>

Additionally, the designed object was to become a strong form<sup>11</sup> in the urban landscape, competing only with the block of the reconstructed Lubomirski Castle (Fig. 5).



Figure 5. Photograph taken from the designed shopping mall towards the historic centre of Rzeszów. A block of the Castle can be seen. Photo by W. Gawłowski, 2010

Balancing a contemporary form of a shopping mall (Fig. 6), cultural context highlighted in planning and maintenance guidance and difficult spatial relation with historic centre, has become a real project challenge. Searches for spatial solutions aimed at the achievement of integrity of the new structure with historical aspect of “the most valuable” areas of Rzeszów have been unsuccessful, since the complicated functional scheme, the shape of the plot and the original urban layout defined significantly the block of the mall. Implementation of historical quotes seemed artificial to us and not in line with our approach. The problem seemed irresolvable, which has been unacceptable for the council members, city authorities and urban planners, and raised questions about the further fate of the project (such position of the decision-makers has been officially communicated to us at the meeting of the City Council of Rzeszów).

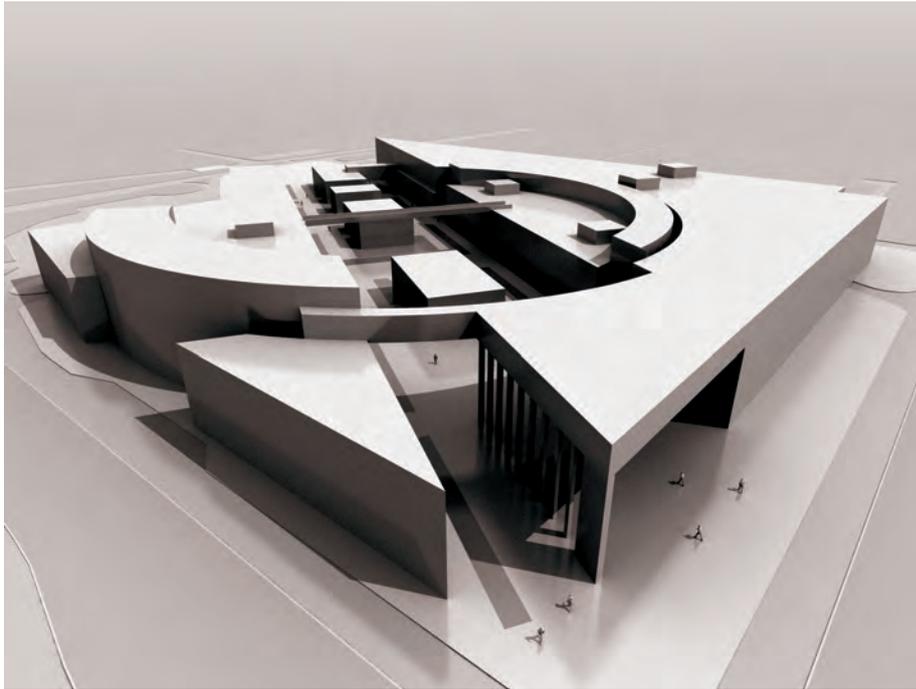


Figure 6. „Cardboard model” – study of a block, visualisation

Reflections on functional, spatial and material issues emerged alongside the context analysis. The skeleton construction of a building has naturally imposed the use of curtain walls. The necessity of visualisation of the individual project stages (investor requirement) forced us to define colour scheme. The initial idea included shades of grey, however, such neutral solution has not match the colour chaos of the architectural-landscape entity, it has been too elegant when compared to the suburban character of the surroundings, and at the same time, “cold” in reception. Numerous further attempts, choosing colour preferences of the designers or functional properties of some colours (light reflection, resistance to dirt etc.) have not produced the desired result.

Finally, a change occurred in the approach towards the colour scheme project of the elevation. It emerged from “observation” of a material and a colour unequivocally identifying this material, a noble and durable material, bringing associations with historical architecture, solid building methods, but also some more distant and symbolic associations such as: security, warmth, home, and which is commonly accepted. This was ceramics in brown shades. Not in the form of a brick or a roof tile, but as a cladding made of large panels, adequate to scale of the structure. (Fig. 7, 8)



Figure 7. Shopping and services centre Millenium Hall in Rzeszów. A piece of the southern elevation. Photo by W. Gawłowski, 2012

It was intended to achieve the two-stage perception effect: first, we notice the colour of the object from distant perspective, which evokes conscious or subconscious symbolic associations with the material. Such image, in turn, brings symbolic associations with the world of values.

This “observation” has influenced project decisions on the outer layer of the whole object (and not only a paint coating applied on the surface), implied changes in geometry of the elevation (divisions), tectonics, specificity of the architectural details, and finally resulted in defined costs, selection of proper technologies and a deadline change. It is therefore concluded that influence of the material-colour



Figure 8. Shopping and services centre Millenium Hall in Rzeszów. Entrance hall. Photo by W. Gawłowski, 2012

conception has been significant for the entire design and realisation process of the shopping mall, but the symbolic message turned out to be clear. Following the presentation of the project and discussion at the meeting of the City Council of Rzeszów, the outcome was accepted by the decision-makers and urban planners.

#### Park Pedestrian and Cycling Bridge (2015) in Busko-Zdrój.

The third example concerns design of the pedestrian and cycling bridge connecting park areas close to Children Hospital "Górka" with park areas in the central part of Busko-Zdrój<sup>12</sup> spa town. The project task included creation of a comfortable cycling and walking path which connects the two park areas. Specificity of this task has been determined, on the one hand, by a group of mobility impaired users and, on the other hand, by morphology of the site characterised by a significant slope.

The cycling and walking path actually transformed into a significant 200 meters long engineered object, since a long overpass in the park area was the integral part of the project. It resulted from the terrain layout, necessity to provide 4,5 meters high clearance for road lane and a normative gradient for the designed route. On-site verification provided the

most important information. We have not been impressed by neither the architecture of the hospital, nor by the spatial composition of the entire complex. However, the park was beautiful. The thought of distorting this space was difficult for us to accept. Analysis of numerous overpass routes meandering on the park slope and their appearance has not brought satisfactory results. Apart from the axis of historical site, partly overgrown and almost unnoticeable, this space lacked directions and reference points. Each attempt of searching for the spatial inspiration and establishing assumptions for the project ended with conclusion that the park is the only pretty thing in the area. And probably such recognition has led to the change in perception of the project theme. Greenery has been "noticed". An organic structure, omnipresent in the spatial context, which important attribute was green

colour with its all shades. The further development of the concept has gone quickly. There has been one conclusion: engineered structure should “disappear”, since the park constitutes the highest value. Therefore, the entire project has been camouflaged with a “wallpaper” imitating the nature of the park. This wallpaper turned out to be panels made of polished stainless steel sheets<sup>13</sup>, which reflect the surroundings; in this case the structure and colour of flora. This technique is called mimesis, in this case copied from nature and used almost literally. (Fig. 9, 10) Such concept has completely changed the approach towards search for the routing, form of the struc-

ture and its details. The overpasses have been put in the most economical manner i.e. a straight line (with highlighting historical axis), which also proved to be the best solution to achieve the least distorted reflections possible (from a perspective of the main idea it has been the most consistent practice, although verismo of the proposed illusion has not been a priority) (Fig. 11).

The above considerations, irrespective of their basic intention, also describe the manner of thinking about colour in design. Maria Rzepińska states that a painter does not need to know why, but he knows how.<sup>14</sup> A designer must know both: how and why.



Figure 9. Plan of the designed overpass.



Figure 10. Elevation of a piece of the designed overpass.



Figure 11. Visualisation of the designed overpass.

## Conclusions

The outcome of these considerations is an observation that sometimes “a colour of the context” may be an important factor when taken into account while the analysis is undertaken in the early stage of the design process. Designing architecture can be sometimes inspired by a characteristic colour noticeable in the context. Considerations relate to defining key colours present in the space subjected to design action, which in some cases decide even on the future form of the designed architecture.

The above considerations, irrespective of their basic intention, also describe the manner of thinking about colour in design. Maria Rzepińska states that a painter does not need to know why, but he knows how<sup>14</sup>. A designer must know both: how and why.

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## The new aspects of the walls of the blocks of flats

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### Abstract

Modernist idea of the housing development implemented after World War II in Europe, applied a new type of total space in urban space and entailed many social, economic, ideological or finally aesthetic consequences called "negative legacy of the modernism". Widespread attempts breaking the monotony of the Polish housing estate's aesthetics taken at the turn of the 20<sup>th</sup> and 21<sup>st</sup> centuries brought deplorable results and led to the crystallization of the free, unhampered style which has been a testament of a bad taste. In recent years, slowdown in the process of development of this poor style has been noticed. The new projects arising in the process of the thermal-modernisation don't glare with a kind of fantasy, so common few years earlier. The monumental wall of the block of flats, regarded until recently as a large canvas painting, is changing its aspect nowadays. The observed changes in the expression's process of the Polish settlement's aesthetic, which takes place in front of our eyes, is an interesting field to analyze the case. We examined the latest projects taking a time period for the years 2006-2016. There were flagship projects of the post-war Polish modernism and the average realizations of socmodernism's current, among the investigated objects.

### Introduction

Modernist idea of the housing development implemented after World War II in Europe, applied in urban space a new type of total space and entailed many social, economic, ideological or finally aesthetic consequences called "negative legacy of the modernism". In Poland, as in other countries of the Eastern Bloc, we are dealing with a distinctive mutation of these assumptions, called - "socmodernism, which in communism only feign the execution of the idea

of house as a functional, humanistic and hygienic space, yet in practice created fiction and pathology of the objectified society, in a scale unprecedented before".<sup>1</sup> The housing units in the assumption designed for the middle class, providing a high standard of workmanship, on our side of the "Iron curtain" were put in the hands of the working class and deprived of finesse and unnecessary details. Widespread attempts breaking the monotony of the Polish housing estate's aesthetics taken at the turn of the 20<sup>th</sup> century and 21<sup>st</sup> century brought deplorable results and led to the crystallization of the free, unhampered style which has been a testament of a bad taste. On the surfaces of the facade blocks, which were, according to the original plan, a raw plane, started to serve as a great painting canvas, on which a colorful fantastic visions appeared. These were taken often as an expression of a longing for the natural landscape, or the exotic, joyful paradise garden.<sup>2</sup> These attempts were intended to alter the unacceptable building into an imaginary reality, and were a proof of visitors' longing for a diverse landscape, both in terms of shapes and colors. Color was used with almost childlike naivety and covered the large tracts of the buildings taking away the remains of the seriousness associated with the attempt of their aspirations to wear the monumental architecture title. In recent years, slowdown in the process of development of this poor style has been noticed. The new projects arising in the process of the thermal-modernisation don't glare with a kind of fantasy, so common few years earlier. The monumental wall of the block of flats, regarded until recently as a large canvas painting, is changing its aspect nowadays. The observed changes in the expression's process of the Polish settlement's aesthetic, which takes place in front of our eyes, is an interesting field to analyze the case.

### Method

Contemporary thermo-modernisations performed on the modernist housing blocks settlements are still a wide field of research to carry out in-depth analysis of the changes in color decisions and factors that affect them. The authors, in order to reveal a full spectrum of changes, explored the latest investments, without limiting their research to the

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region. The housing settlements of the Polish territory has therefore become a research field. Moreover, this decision has been made in order to check the possible impact of the regional building traditions on the decisions, which were taken to breathe a new aesthetic into post-communist housing blocks. The authors analyzed latest projects, i.e. the time period for the years 2006–2016 was adopted. There were flagship projects of the post-war Polish modernism and the average realizations of socmodernism current, among the investigated objects built in large urban centers across Poland.

### **Thermo-modernisation of the housing blocks settlements in Poland.**

#### Modernisation of the Polish modernist settlements' icons.

One of the most famous example of post-war modernist housing estates in Poland is the Plac Grunwaldzki Housing Estate<sup>3</sup> in Wrocław with characteristic high blocks called "sedesowiec" by Jadwiga Grabowska-Hawrylak. Implementation of the Polish designer was found in the atlas dedicated to the architecture of the twentieth century "The XX century architecture: Phaidon atlas" among the 757 best examples of the architecture of the twentieth century. Currently executed thermal modernization of residential and office complex is carried out according to the concept of "Jednostka Architektury" ("The Architectural Unit")<sup>4</sup> – the foundation under the patronage of Jadwiga Grabowska-Hawrylak; all the works are approved by the author of the project. Authors of the concept of modernization – VROA Architects, set up some changes in their project according to the plastering of a clinker cladding and giving it a new texture and colors in shades of gray. However, they refer to the original concept of white concrete, offering insulation and plastering the greater part of the facade in white.

The housing estate – Sady Żoliborskie is also well known and recognized. Erected in the years 1958 to 1964 in Warsaw by Halina Skibniewska, Andrzej Kiciński, Andrzej Malek and Kazimierz Wojtowicz, is an excellent example of comprehensively designed and executed residential modernist architecture and urban planning - covered in greenery, average-sized blocks made of white żerań brick and finished with bright plaster. In 2011 the buildings underwent ther-

mo-modernisation and have been awarded the Barbara and Stanisław Brukalscy Prize, which is given since 2011 for the best construction projects completed in Żoliborz. The award commemorating the outstanding Polish architects granted thermo-modernisations respecting the atmosphere and character of the district. In support of the verdict of the jury, we read that the prize was awarded for "[...] a comprehensive work on the thermal insulation of the entire estate, with respect for the original detail and color (the jury focused on the need for thinning out too dense plants hiding the architecture, and the rehabilitation and reconstruction of the small architecture, which was an integral part of assumptions architectural and urban planning of settlements designed as a late modernist redefinition of the Garden City)".<sup>5</sup> A drawback of the award-winning implementation is hiding original brick under Styrofoam and reproducing it on layer of insulation.

### **Towards the color on the Polish modernist housing estates**

The examples described above illustrate the trend of the white modernist architecture and more or less successful attempts to preserve its character during modernisation treatments. However, one should remember, that despite widely known opinion, theoretical assumptions of modernism did not exclude color significance in the current architectural space. The speeches of the modernists as well as numerous colorful modernistic projects, like the housing estate in Berlin by Bruno Taut are a pure evidence of the mentioned role of color. At the beginning of the twentieth century one of the precursors of modernism – Max Berg in his undated lecture spoke about the vision of the colorful city (Wrocław), "Colour opens up enormous creative possibilities. However, we should stick to the principle, that the function of color does not mean covering up anything in architecture, but clear emphasizing the spatial features, highlighting the essential elements of a static object".<sup>6</sup>

Recommendations proclaimed by Max Berg can be noticed in a model realization of the housing estates by Oscar and Sophia Hansen. In case of the Juliusz Słowacki Housing Estate in Lublin and the Przyczółek Grochowski Housing Estate in Warsaw as well, color arranges the architectonic blocks and introduces a logical hierarchy of importance. Modernization of

the building commonly known as "Pekin"<sup>7</sup> on the Przyczółek Grochowski Housing Estate was loosely refers to the original color scheme.<sup>8</sup> Unfortunately, the divisions of color in a uniform tone with distinguishing the color saturation were applied on selected elevations. These divisions redundantly split solid mass of the blocks. On the Juliusz Słowacki Housing Estate in Lublin<sup>9</sup> vast majority of buildings kept the original colors, while the famous mosaics in the passages under the blocks, implementing a new aesthetic quality and giving an individual character, are now in a deplorable state. It is hoped, that they will not be plastered as in the case of the ceramics elements in the buildings of the Plac Grunwaldzki Housing Estate in Wrocław.

In the Polish cities, the massive development of the typical standardized blocks made in the technology of the large concrete panels was preceded by research and development program of housing construction under the name PR-5 (Government Programme-5), which was initiated by decision of the Council of Ministers in 1974. The program was designed to test in practice the assumptions of the pioneering solutions that later were supposed to be implemented on the housing estates throughout the country. The construction of four housing estates in Warsaw, Krakow, Tychy and Zamość was a crucial part of the project. Only one of them, the Jan Zamojski Housing Estate in Zamość was finally accomplished, being at the same time last so ambitious and innovative implementation of modernist housing estate in Poland.<sup>10</sup> In the mentioned implementation we should, besides usability, notice an undeniable aesthetic qualities that distinguish it from many other settlements accomplished in the spirit of socmodernizm. The use of color, as a kind of signpost for easy orientation in space, was applied on the façades of the buildings in the form of colored window sills but also on elements of small architecture. This method distinguish a prototype solution among many subsequent housing estates. Modern thermo-modernisations of the Jan Zamojski Housing Estate, reaching step further in creating a color in the housing estate, are effusing coloristic "signposts" on the whole façade of the blocks as a result of conscious design activities. Unfortunately, not all coloristic decisions seem appropriate.

### New trends in thermo-modernisation of the Polish settlements

Aside from several polish outstanding implementation, we have to deal with caricatural realizations of the original modernist assumptions. Therefore, Polish housing estates can be divided into those few outstanding modernist projects and common socmodernism variants. As far as a thermo-modernisation of the iconic urban planning is not the subject of such fierce debate, their originality and the need to preserve their authentic aesthetic has never been questioned, the matter is not so obvious throughout many other settlements in socmodernism current. Accordingly, it is difficult to establish a coherent renovation strategy pursued in Poland.

A retreat from the fairground style, popular among the modernization implemented throughout Poland, is observed in recent years. This process can have its source in a number of reasons connected with the social nature's condition, i.e.:

- dissemination of critical remarks about the colors realized on the Polish settlements,
- fierce debate conducted on online forums about the function of color in the city
- competitions on properly conducted thermal modernization,
- basic social initiatives in the form of establishing associations working to improve the aesthetics of the Polish cities,
- artistic actions carried out on the Polish housing estates,
- new trends in fashion, interior design etc. influencing architecture.

Increasing criticism of the activities related to the casual combinations of color or decorative motifs in the Polish thermo-modernisations of housing estates leaked from the area of expert research to the public consciousness. Even a new type of terminology characterizing these activities has been created - the famous Springer's "pastelozą".<sup>11</sup> Therefore by naming the phenomenon, the opportunity to build a personal opinion arouse, both directly throughout concerned residents and the wider environments. For years color on the Polish socmodernism settlements was discussed on Internet forums in parallel with academic research. It perfectly illustrates the process of retreat from unhampered suggestions of

architectural color, which takes place also in the public consciousness. Members of the online forums, with a lot of enthusiasm, exchange of opinions, critical observation skills are often offering their own solutions. The analysis of Internet users' suggestions clearly demonstrates described shift towards monochrome color solutions. As far as in 2009 some projects, f.e. the modernization of the Nowa Huta Estate pursued by subdued natural shades, were criticized by Internet users, few years later suggestions of color combinations made by Internet users flow towards chromatic grays with accents of vibrant colors from a palette of primary colors.

In the process of repairing the image of the Polish housing estates equally important are also competitions organized for a proper thermal-modernisation, as for example well-known architectural competition "Fasada Roku" ('Facade of the Year'), held since 2007 and initiated by Baunit.<sup>12</sup> The award-winning projects are certainly a model for newly undertaken thermal-modernisations. The analysis of winning modernizations over the course of decades, shows us a process of change in terms of the color management methods on prefabricated buildings. The awarded realizations selected by the jury of "Fasada Roku" ('Facade of the Year') evince clear trend of gradual retreat from the artificial divisions of color on the facades towards calming them and adapting to the form and structure of the block. Additionally, by observing the combinations of colors used in the award-winning realizations, their minimizing process up to monochromatism achieved in the implementation of the award-winning in 2015. In thermal-modernisation of student's dormitory – DS 2 "Babylon" of the Academy of Science and Technology on Rostafińskiego Street in Krakow jury appreciated consequence, keeping the tectonic of blocks and respect to the original assumptions of the project. It should be noted that all thermal-modernization realizations awarded over the last decades stood in radical opposition to those commonly applied in Poland practices of freely composing colors. The large-scale patterns on the surfaces of the walls were never appreciated by specialists, but found supporters among the residents and board members of housing cooperatives.

An interesting phenomenon of social activity connected with a discussion on the state of the aesthetics of Polish urban space are certainly associations established in major cities, which statutes contain taking care of the aesthetic expression of urban spaces, e.g. Towarzystwo Upiększania Miasta Wrocławia / Wratislaviae Amici ('the Society of Beautifying the City of Wrocław / Wratislaviae Amici'), Stowarzyszenie Estetycznego i Nowoczesnego Szczecina ('the Society of Aesthetic and Modern Szczecin')<sup>13</sup> in Szczecin. The associations are taking care of the high quality of the proposed thermal-modernization projects, as well as shaping the aesthetic taste of the inhabitants. One of the positive effects of these activities is the modernization of the "Mister Szczecina" ('the Mister of Szczecin'), a residential building from 1962 in Szczecin. The thermal-modernization took place in 2011 and was carried out according to the original design, while respecting the genuine combination of colors used by the author Janusz Karwowski. Interesting are also many proposals and projects of modernization inspired by the Towarzystwo Upiększania Miasta Wrocławia / Wratislaviae Amici ('the Society of Beautifying the City of Wrocław / Wratislaviae Amici').<sup>14</sup> Among the suggestions of the colored metamorphosis for the buildings from the area of Wrocław (e.g. housing estates on Gajowa Street 66–68, Kuźnicza Street 25, Nożownicza Street 28–32, Łaciarska Street 7–11, Nożownicza Street 40) a coloristic schemes based on chromatic grays with the possible accentuation through the use of primary colors dominates. All of these projects are implemented with high consequence in part of the principle of describing by the color of tectonics of the architectural block. To the activities of a social nature having a real impact on shaping the universal aesthetic tastes, we can include numerous artistic actions performed on the residential blocks, or inspired by the spaces of PRL housing estates. One of the interesting activities was the project "Falowiec Colour System" by Kamila Szejnoch<sup>15</sup> implemented while taking the temporary residence at the Centrum Sztuki Współczesnej Łaźnia ('the Łaźnia Centre for Contemporary Art') in Gdansk in 2013. The "Falowiec" ('Waver') was an inspiration for this action – housing block which is standing on Obrońców Wybrzeża Street in Gdansk and at the same time – the longest building apartment in Poland. The author

has initiated action in which she performed a coloristic transformation of garages standing near the 'wavy' block. She also conducted a survey among the residents, aimed to reveal color preferences of the residents according to the mentioned block and give the author an answer to a bothering question: Does the color of our revitalized neighborhoods, even if sometimes adequate, has to be the result of "joyful activity"? "Falowiec" ("Waver") inspired also a young architect from Gdansk – Adrian Mania.<sup>16</sup> In 2015 he proposed, with the help of a graphic program, new, snow-white color for the 'wavy' block, asking the similar questions about his transformation, which Kamil Szejnoch asked.

### Conclusions

Analyzing the changes, which took place in the public consciousness, about the function of the color in the architecture, influenced by many complexed socio – cultural conditions, and which effects are visible on the latest examples of the Polish settlement's modernizations, we become witnesses of the awakening of a new trend in the colouring proposed for the modernist objects in Poland. Slow process of calming the tones and palettes of colors takes place throughout the country. Although, we can observe far more of such modernizations in the major Polish cities, than it should be expected, eventually the new trend will spread all over country. The aesthetics of minimalism, promoted in the 1990s and at the turn of the 20<sup>th</sup> and 21<sup>st</sup> centuries in various areas of the culture, came to the public awareness with some delay. Hence, we can probably observe changes towards the minimalist palette applied on the blocks of flats. Let's not believe the sudden understanding of the modernism assumptions. Past and current projects are a mirror of the currently prevailing trends. After a period of rebellion against the communist greyness there was a period of acceptance of the monochrome, muted palettes of colours presented in fashion, design and interior design trends. Currently the Scandinavian trend of the aesthetic straight from IKEA is shaping Polish imagination and aesthetic taste.



*Szczecin's example of the modern thermo-modernisations of the residential block which is a style characteristic of the last two decades. Piastowskie Housing Estate, ul. Cyryła i Metodego 1-4, Szczecin. Source: A. Rek-Lipczyńska, 2016*



*In 2011 thermo-modernisation of this building was carried out with respect to the original color scheme used by the author of the building Janusza Karwowskiego. The residential block: ul. Wojska Polskiego 51, ul. Jagiellońska 16a, Szczecin. Source: I. Kozłowska, 2017*



*In 2013 thermo-modernisation of this multi-family building was awarded the architectural competition „Fasada Roku” ('Facade of the Year'). The residential block: ul. Wielkopolska 43a,b,c, Szczecin. Source: I. Kozłowska, 2017*

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## The Colours of the Ephemeral World

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### Abstract

Tokyo streets are bursting with life. During the day millions of pedestrians create a typical metropolitan, chaotic human river pouring along the walls of buildings, sparkling with all the colours of the rainbow. At night, the bright advertising, illuminated billboards and flashing neon signs overcome darkness with a riot of colours. Japan means manga: teens with big blue eyes and pink hair; Japan means yellow Pokemon; Japan is in pink Hello Kitty with red bow, it is in multi-coloured areas of trade and entertainment: porn-cinema, clubs and karaoke places, but Japan is also (and perhaps primarily) in a silk kimono with deep shades, that veils a geisha with hair as black as night; and Japan is in red temples among green trees, in the magnolias and flowering cherry-trees...

This accumulation of symbols of pop culture, this richness and diversity created some of the most acclaimed works of contemporary architecture. The three out of six Pritzker prizes that were granted this decade went to Japanese designers. Japanese structures that are constructed worldwide fascinate – paradoxically, if we consider the atmosphere of Tokyo and other Asian cities – with calmness and lack of literalness; lack of literalness manifests itself also in the colour combinations, which is the main subject of this paper. The contemporary interiors are devoid of bold colour accents. The unsaturated colours oscillate within the colours of nature – dominated by whites, wood tones, such as beiges and browns, and the gray of stone – so that the space is flooded with a mist of understatement. It seems to be suspended “between temporal transience, fragility and impermanence of the world of phenomena and extending infinite ‘space’ of the trans-phenomenal world of nothingness”<sup>1</sup>, thus being a tangible expression of traditional Japanese aesthetics. Recognition of colour in that aesthetics and its role in building almost immaterial, ephemeral architecture will be investigated on the base of the works of contemporary Japanese designers.

### Introduction

“Everything warm, that moves, all love is round, or at least oval and moves spirally, in any event, along a curve. Only cold, motionless, worthless and hateful is as easy as a stretched rope or angular.”<sup>2</sup>

The purpose of the article “Colours of the ephemeral world” is to explore the connections formed among different areas of cultural life in Japan that have a direct impact on the colours used in the projects of modern interiors designed by Japanese architects. Due to the broad range of the topic, that expands its territory not only on an archipelago off the east coast of Asia, but basically on the whole world, the scope of the study has been narrowed down to four selected projects by Kengo Kuma<sup>3</sup>, that constitute an exhausting illustration for all assumed arguments.

What distinguishes Japanese architecture among the contemporary achievements in the world? What makes it so ephemeral and so material in the same time? It is its attitude to the past that builds its unique character and becomes its essential value. The traditional European interiors are full of splendor, created with colours obtained by dying materials, gilded surfaces, and reflective mirrors. Even in more modest periods, which were characterized by the negative reaction to the excess imposed by their predecessors, moderation expressed also in wealth. On the contrary, in Japanese architecture throughout its history, also in epochs of splendor, reigned peace and harmony conducive to contemplation. Appearing colour is both a means and a sign of expression, which in the art of the East is “the result of meditation, aiming to penetrate the spirit of nature, is an expression of consciousness that reaches to the very nature of things.”<sup>4</sup> The colour results from deep experience and understanding of the designed space, which enhances contrast relationships between inside and outside, nature and art, softness and hardness, light and darkness. A beautiful example of this approach is the Katsura Villa, established in a burst of emotion caused by descriptions of nature and gardens in *Genji Monogatari*, which pushed the prince Toshihito to build the imperial headquarters in Kyoto. Built in shoin style in 1620-1658 this residence consists of three main blocks connected by a common roof and indoor galleries. From the outside dark, almost black construction elements and white walls are lost among the trees and shrubs. On the inside

wooded surfaces, paper walls and *tatami* mats only frame beautiful garden. They seem to change during the day following the path of the sun. The grayish greens of plants and the brown-yellowish water of the pond emphasize the warm shades of the natural materials of the interiors. This is caused by a very close relationship with nature that has an influence on the colours and atmosphere of the Villa.

### Method

Materials used in the traditional Japanese buildings are not artificially superficially dyed, but rather are used in natural shades of beige and brown – bamboo and wood from local production (vast area of Japan is wooded mountains, and only 13% of the area is the inhabited coastal lowlands), gray – stone, green – nature seen through the window, and off-white tending to cream – shoji sliding wall with glued paper, reflecting the softness and warmth of Japanese paper, the surface of which, in contrast to the western paper, does not reflect light. The paper “behaves as if it covered and absorbed it [the light] as the first surface of the heavy snow.”<sup>5</sup> The exceptions are the precisely coloured Japanese screens and objects painted with lacquer, with the right shade of black,

brown or red that is obtained by coating the multiple layers of darkness.

The Japanese art theory, called *gei-dō*, or Way of Aesthetics undoubtedly has influence on the exceptional nature of contemporary Japanese interiors. According to Donald Keene, author of *Japanese Aesthetics*, one of the chapters of *Estetyka japońska*. Antologia, it is defined by values such as: the suggestion, irregularity (seen also in the passion for primes), simplicity (which expresses itself in the form of cost-effective measures to achieve the target) and impermanence (similar to the Arab concept of *barak*, meaning “magical property that things acquire by a long-term use with care”<sup>6</sup>, such as the use of wood in the interior that allows space to age in dignity).

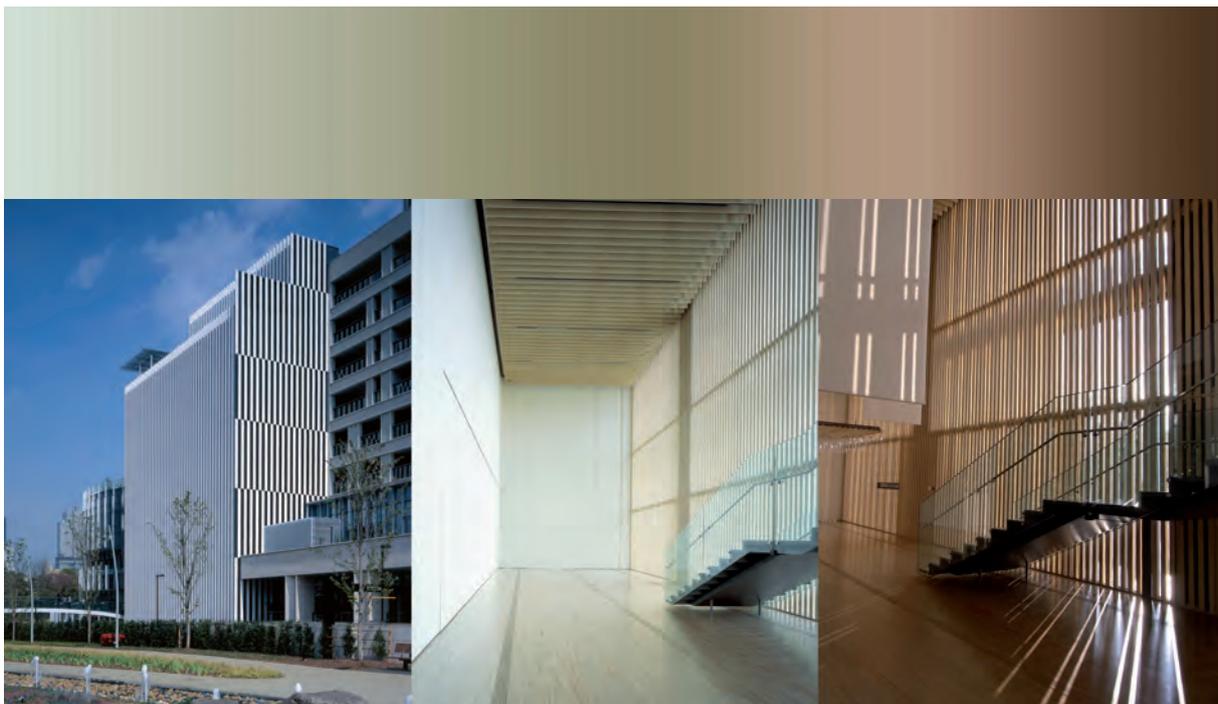
### Results

#### Suntory Museum in Tokyo

##### Suggestion

“...weak, flickering light, shimmering here and there, once flows all over the mats in pale, blurry streaks, once merges in luminous spots in the likeness of the accumulated water in the pond, then again embroi-

Sumtury Museum [http://kkaa.co.jp/img/2007/01/web\\_030.jpg](http://kkaa.co.jp/img/2007/01/web_030.jpg); <https://s-media-cache-ak0.pinimg.com/originals/7e/62/1c/7e621cfe168c7a39c482ed17722dd2ef.jpg>; <https://s-media-cache-ak0.pinimg.com/originals/31/ce/70/31ce7085bc308ee91337538057a4ff4a.jpg>, accessed on: 29 Nov. 2016.



ders patterns, as if it adorned the night with a painting of powdered gold.”<sup>77</sup>

Built in Roppongi – the popular bustling day and night district of Tokyo, that agglomerates fashion shops – as a part of a complex of buildings designed by the architectural team (Skidmore, Owings & Merrill; Nikkei Sekkei, Kengo Kuma), which includes shops, restaurants, offices and hotel, Suntory Museum created as an individual project of Kengo Kuma is the major cultural center in the district, exhibiting so traditional and contemporary art in Japan, as foreign collections. The headquarters of this institution is the original, calm, focused on the contemplation version of the contemporary international type of museum. Its dual nature, combining international policies of an art museum and Japanese values, is reflected by the very structure of the building. Outside the vertical black and white thin ceramic panels reinforced with aluminium are the coating of worldliness, with colour being an equivalent to what today is also happening in the West. Under this elevation hides, as Kuma described, quiet and comfortable Japanese space that surprises with soft warm light that spreads all over the wooden layers of finishing, colouring space with golden shade of brown.

This spatial arrangement is the material expression of an idea of *iki*, combining opposites, in which under the simple, light, ephemeral, full of understatement surface, which is basically a suggestion expressing coquetry rooted in aesthetics, is also concealed the arrogance characteristic of the Japanese soul walking on the Way of the Warrior (*Bushidō*), as well as the resignation typical of Buddhism. But words alone are not enough to understand *iki*, an idea derived from the decadent, elegant neighborhoods of debauchery, which to have been recognized must be experienced, and that to some extent is made possible by the dual structure of the Suntory Museum.

Only two of the nine stories that form the gallery spaces are available to public. They create a two-story gallery (the third and fourth floor), united by a characteristic staircase of three flights, built as a wooden harmonica floating above the floor along the two glass walls shaded with wooden shutters dozing light that comes into the interiors. Depending on the setting of blinds, rays of the sun can clearly illuminate the space, highlighting the back-glass

panels covered with paper washi. Thus, the space is overflowed with the warm whites from coffee-with-milk to cream and enters a relationship with the cool shades of nature of the adjacent park visible through the slats of blinds. However, this astounding space may also become obscure, highlighting the warm oranges and browns of paulownia wood extracted by a warm shade of light concealed in the crevices of the walls and ceiling.

Entrance hall on the third floor, opening to an atrium of the Midtown Mall, with a shop, a cafe and few complementary galleries, is bathed in the golden light sipping from the apertures in the ceiling along the walls, where the vertical rhythm is underlined by dark stripes referring to the vertical nature of the external shell of the building. The fourth floor is a gallery, in which the exhibits are excavated from the dark with the beams of light.

The museum also has an exclusive zone accessible only to its members. On the sixth floor is a lounge with a terrace arranged as a Japanese garden and a teahouse maintained in traditional character, with its equipment referring to the common Japanese interior. It has light pine furniture – benches with slats seats and long narrow tables with dark reflective tops set along the windows veiled by lattice shutters filled with Japanese paper, letting inside the dim light of the day, which emphasizes beige colours of light wood and cream-coloured paper. Darker floor with clearance under the shutters give lightness to this warm interior. The podium lined with tatami mats is crowned with four panels also filled with paper. The unobvious colour that fills the Museum appears as a crafted with light suggestion of gold in the darkness.

#### Ginza Onsen Fujiya. Simplicity

Darkness in the culture of the East is greatly respected. It is the source of all things, a substance that builds the world. In ancient times, the darkness coming out of the woman was an essence of the house. Alabaster face of a lady of the house surrounded by a halo of dark hair had hidden in the black eyes and between dyed green lips in a dark abyss deepened by blackened teeth the hearth and home. Japanese house as a building arises from the darkness. The shadow of a spread roof determines the construction site.



Ginza Onsen Fujiya: <https://s-media-cache-ak0.pinimg.com/originals/91/6b/c6/916bc60a69f1dec100baf0c3a7e65b79.jpg> <http://kkaa.co.jp/img/2006/06/Ginza-Onsen-Fujiya-06.jpg> (fragment); <http://media.cntraveler.com/photos/54885ae7860c74c1162c7c8b/master/pass/ginza-hot-springs-fujiya-inn-japan.jpg>; <http://www.uniqhotels.com/media/hotels/73/fujiya-ginza-inn-09.jpg>, accessed on: 29 Nov. 2016

Shadow is the subject of many dissertations and often appears in literature, for example in *In Praise of Shadow* by Tanizaki Jun'ichirō. In Japanese culture shadow is not the result of light and darkness, but it is considered as the basis of existence. The Japanese find the beauty not in things, but in the streaks of shadow.

A beautiful example of a space built by shadow is Fujiya Ginza Onsen in Obanazawa, Yamagata Prefecture, built in 2004-2006. This guest house with a wellness center is located by the river, among a homogeneous environment of three-story buildings. It refers to them by interpreting characteristic of the region white-washed walls and natural beauty of the aging wood that designates the vertical rhythm of the façade.

The public space is maintained in the colours of yellows oscillating in the direction of orange and brown, obtained by the screening of large windows with walls of bamboo, as well as highlighted with warm light coming from sources hidden in apertures in pale walls. This atmosphere is intensified by an arrangement of pale wooden elements. Brightness is filtered further by numerous partitions inside, with walls constructed of bamboo with a total of approximately 1.2 million thin bamboo and wooden poles, so that the public area is dominated by a shadow.

Private area is also maintained in creams, beiges and light browns. The Wellness area is designed entirely in wood. Guest rooms, for functional reasons, are decorated in warm dark ecru shade, with wooden floors and light wooden elements of interior design. Natural light is filtered by shoji screens, that do not allow for literality.

The simplicity of the measures taken in this project is expressed in only two colours: white of the walls and light brown of bamboo, shimmering in many shades in the constant play of light and shadow. The only added colour is a cool bottle-green of stripes of glazing made of sheets of cast glass. Those additional vertical screens do not allow the warm shades for unlimited expansion. The space of Ginzan Onsen Fu-

jiya is overflowed with shadow, which is maintained through many filters. This world of shadow is full of mysterious beauty of *yūgen*.

#### Yien / East Archipelago. Irregularity

One of the features that constitute the aesthetics of the Japanese is a specific form of suggestion, called *yūgen*, which term means indeterminacy, mystery and depth. It is not a trivial suggestion formed solely for entertainment, but a way of being and a metaphysical ground of reality. *Yūgen* penetrates the mystery of the deepest feelings and consciousness, transfers to infinity. In the *Noh* theater *yūgen* is expressed by a withhold of action, in painting it is expressed by the clouds. "*Yūgen* may be captured by the mind, but cannot be expressed in words. Its character can be suggested by a clear view of clouds covering the moon or autumn mist enveloping the red leaves on the hillside."<sup>8</sup>

Literally *yū* suggests insubstantiality or denies the spontaneous existence; it means insignificance and lack of clarity. *Gen* means dimming, obscurity, darkness encompassing within the unknowable depths. *Yūgen* combines nothingness and shadow, brings depth to the essential blackness in the process of experiencing, it "refers to a sense of aesthetic harmony

*Yien East Archipelago*: <https://s-media-cache-ak0.pinimg.com/originals/69/83/fe/6983fe5b4f144d6905da94a364dd7aa2.jpg>; <https://s-media-cache-ak0.pinimg.com/564x/35/9e/a2/359ea2b7171bba0caa04eb50ef6c4e51.jpg>, accessed on: 29 Nov. 2016



produced by the contemplative consciousness and flowing out of it.”<sup>9</sup> It allows to see the invisible and thus to have an extrasensory experience.

*Yūgen* is a suggestion, and, as already has been mentioned, the use of colour reduces the scale of suggestions. Hence, in the project Yien / East Archipelago surface coloured with pigment does not appear. Located in a quiet neighborhood in the west of Japan, among the ancient Buddhist temple this private residence was established in the years 2005-2007 as a combination of three historic buildings from the Edo period: the wooden gates of the temple Taima-ji – the entrance to the house, *shoin* of the temple Nannya-ji – tearoom, which are accurate reconstructions of objects from Nara, and the scene *noh* – living room, which has already been a part of the house in Yokohama, before it was moved to the current location, with the actual requirements of the investor, realized in the form of three additional new pavilions serving as a bathroom, a bedroom and a studio. Dark brown construction made of burnt wood – in a shade almost black, is filled with white walls and Japanese rice paper, which, by filtering the light makes its white walls become creamy-grey. Tokonoma in the *shoin*, thanks to the warm, dulled light, makes a golden-beige background for a roll of medium-brown shade of red border. The cool grey appears in the stone used in the space between – on the terraces surrounding the yellowish-greenish water and in rhythmically spread stones, hovering just above the surface. Grey stone, highlighting the warm tones paradoxically emphasizes a cosy atmosphere. This colour complements the colours of nature, which builds an atmosphere of the archipelago of buildings floating around the water in a semi-circular arrangement, adjacent to the famous gardens of the Meiji period, designed by Jihei Ogawa (known as Ueji), which may be appreciated as an example of the perfect garden, that expresses “the sweetness of solitude of the landscape overflowed with the glow of moonlight pouring down from the clouds and the dim light emerging from the trees”<sup>10</sup> The garden is framed to the views similar to the composition of the *ukiyo-e* prints.

Colours in Yien / East Archipelago are also an effect of other values of the Way of Aesthetics. Incorporating historic structure in the contemporary residence, which forced milky and carbon black colours, is an expression of *sabi*. This concept expresses the characteristic appreciation of poverty associated by the inhabitants of the east with specific objects and environments – as is the case of the buildings from the Edo period which are patinaed, battered and express loneliness.

Nature, in turn, flows through the entire project in the form of putrid green water and seemingly disordered garden, that paint white walls with shades of beige with green, orange or red undertones – depending on the season. This is associated with *shibui* and *mono-no-aware*. The first of the values cherished by the aesthetics of the Japanese literally means astringency and bitterness. It is a natural and intuitive understanding of the sense of beauty of nature, which gives the flavour of inevitability and spontaneity as if the thing could not have a different nature. Like *yūgen*, incompleteness provides opportunities for the imagination, allows active perception of the observer / recipient.<sup>10</sup> *Mono-no-aware*, meaning “the sadness of things”, describes the Japanese dialogue with nature, which is an expression of sensitivity to the world. It is a direct, open expression of awareness of the inevitable consequences of natural phenomena. To understand *aware* means to be able “to be moved by the sight of the moon appearing in the evening sky.”<sup>11</sup>

Composed in irregular patches the colour in Yien / East Archipelago, coming out of the nature of the materials, also has a value of *iki*. It builds an atmosphere of understatement with cool shades of bluish grey stone, brown construction elements and greenish water. The colours of *iki* discreetly proclaim relationality and coquetry understood as a never achievable opportunity. As such are considered grey and ash, which tones come from the intermediate stage between black and white, giving the impression of blandness, thus expressing denial; as well as browns and cool colours from green through the blues to violet. The browns have *iki* nature because they are warm colours, dazzling, derived from gold. Moreover, their saturation has been reduced because of the scarcity of light, and thus they express the “coquetry, that met renunciation and refined sensuality.” The dark greens and blues exist in the dark, in

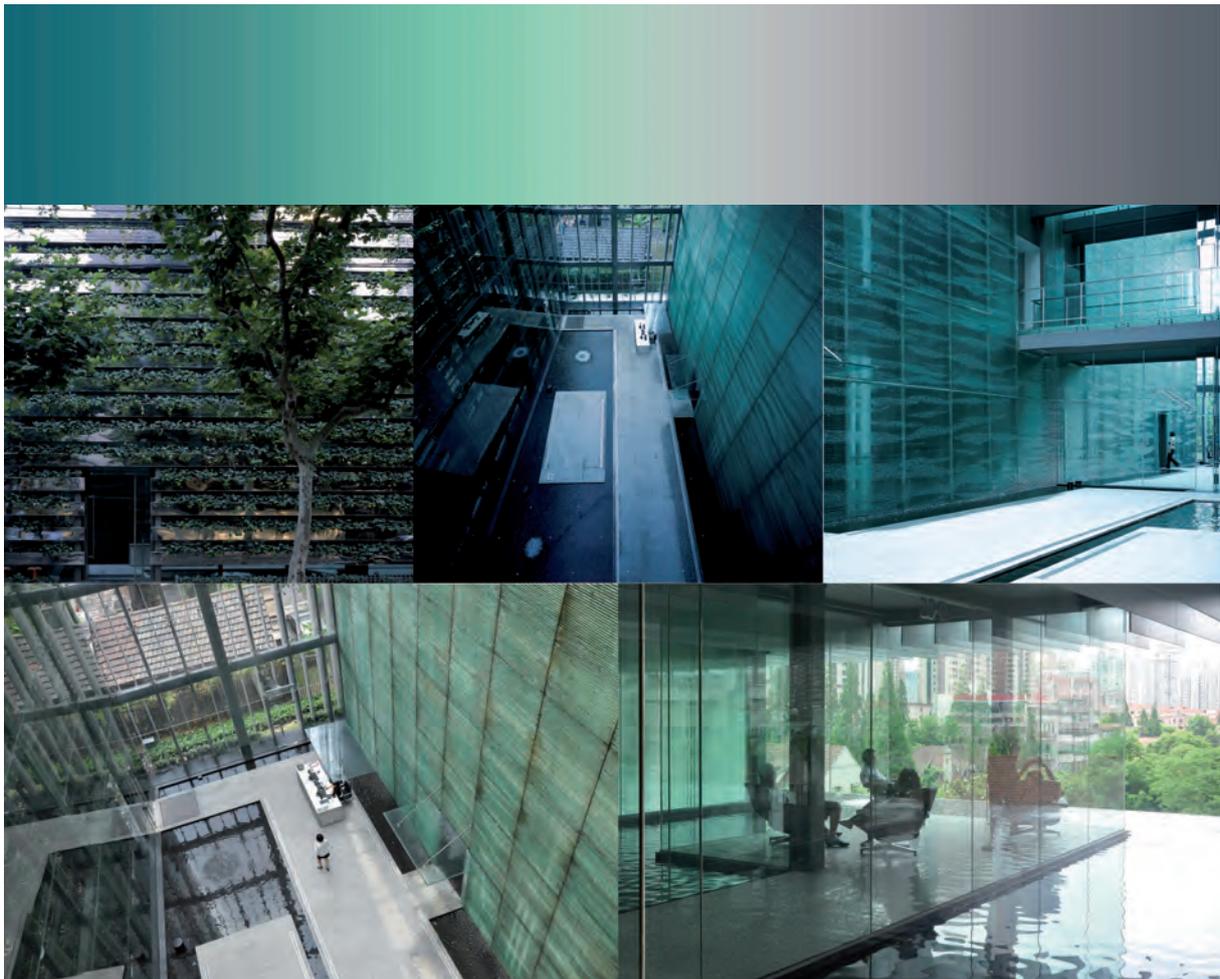
contrast to the range of colours from yellow to red they are also seen with a lack of light. Moreover, they are afterimages of natural warm colours and as such evoke memories of exciting emotions hidden in intensive oranges, magentas and golds.

#### Zhongtai Box Z58. Impermanence

In the colours of *iki* appears to be the space of the Shanghai headquarters of the famous Chinese manufacturer of lighting. Z58 Zhongtai Box is filled with dark green with blue undertones, coming from the vegetation planted on the front elevation and freely growing on the other side of the building, with

sea shade of greenish blue coming from five thousand glass rods sparkling beneath a falling wall of water, and with greyish green of the pond that fills the fourth floor, on which float rooms enclosed with bluish glass. Floors with light grey finish receive the colour of the accompanying blues and greens. These colours are not permanent. They have a temporary nature, depending on the whims of nature, weather, time of the year and day. The space thus is variable, except for the guest rooms, which, by contrast, are maintained in traditional Japanese warm colours with light wood furnishings and tatami-mat floor.

Zhongtai Box Z58: <http://www.metalocus.es>; [https://static1.squarespace.com/static/50c5b4bbe4b033df8f3001f5/t/50c85986e4b07fc6f47eb302/1355307399333/ZT58V\\_2.jpg](https://static1.squarespace.com/static/50c5b4bbe4b033df8f3001f5/t/50c85986e4b07fc6f47eb302/1355307399333/ZT58V_2.jpg); [https://static1.squarespace.com/static/50c5b4bbe4b033df8f3001f5/t/50c8599de4b07fc6f47eb30f/1355307422414/ZT58V\\_5.jpg](https://static1.squarespace.com/static/50c5b4bbe4b033df8f3001f5/t/50c8599de4b07fc6f47eb30f/1355307422414/ZT58V_5.jpg); [http://2.bp.blogspot.com/\\_svVm7Mia0uk/TEv2eDeAOvI/AAAAAAAAALjw/YSQdXnSSKT0/s1600/DSC\\_3738.JPG](http://2.bp.blogspot.com/_svVm7Mia0uk/TEv2eDeAOvI/AAAAAAAAALjw/YSQdXnSSKT0/s1600/DSC_3738.JPG); [http://3.bp.blogspot.com/\\_svVm7Mia0uk/TEwCwulem1I/AAAAAAAAALk4/ppFXC9a0RuU/s1600/DSC\\_3693.JPG](http://3.bp.blogspot.com/_svVm7Mia0uk/TEwCwulem1I/AAAAAAAAALk4/ppFXC9a0RuU/s1600/DSC_3693.JPG), accessed on: 29 Nov. 2016



## Conclusions

In Kengo Kuma projects, despite their obvious contemporary nature, there is a clear influence of tradition. On the contrary, Western architecture draws ever new patterns and is open to external influences. Because of this European aesthetics is unstable, its intrinsic qualities are subject to mutations, the characteristic features are blurred by the new values. In the history of European architecture are visible clear references to the past and especially formal repetitions in historicist periods, but essentially the change of the style is associated with the denial of previous patterns, recognizing them as stale, old-fashioned, not worth applying. Japanese architecture is in this regard more airtight, which is associated with isolation from the western world of the islands that lasted for centuries. While Europe conquered the world, gained additional lands overseas, Japan cultivated its tradition, which is evident in art and architecture. There is no rejection of the past, every line, every block, every spatial arrangement derived from some previous line, solids, spatial layout. This thread connecting now to yesterday is still clear, not in blind duplication of designs, but in a deep understanding of prior thought and technology, revealing itself somewhere between craft perfection and the spontaneity and originality of the creator. This is how beauty inexpressible in words is born, the beauty of "detachment from the world," "achievement of unsophistication after exhaustive attempts of research".<sup>12</sup>

The colour scheme of Japanese interiors results from a deep understanding of the tradition in which aesthetics has always taken precedence over ethics and

logic, and the "flow of the spirit – the breath of life"<sup>13</sup> has constituted an inherent feature of a work of art. Spaces emerging from the love of beauty that comes from live experience and from deep feelings are filled with colours obtained with simple means, colours that are only a suggestion, colourless, that take the right shade by filling them with filtered light and from shadows falling on them, and from trespassing nature. They are distributed irregularly in the interior, creating temporary, impermanent impressions.

## Acknowledgments

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## Mural Versus Painting in Architectural Space

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### Abstract

There are numerous problems with defining and qualifying painting associated with architecture and, consequently, it is almost impossible to analyse and assess the phenomenon of the mural. Today, the word mural is applied to everything that appears on a wall that has the characteristics of large format graphics. It is often a foreign tattoo stamped on empty, dirty walls that has no connection with the local environment. Wall painting in architecture (fresco) is characterized by a holistic way of thinking about space, colour, architecture, and also takes into account the aesthetic, stylistic, symbolic, and social contexts of place. Painting can transform architectural objects and change their semantics. An alternative to the mural is to return to extremely durable and appealing techniques such as *al fresco*, or Keim A. Painting in architecture has the characteristics of contemporary work, it is intermedial and interactive; created contextually, it creates the effect of immersion and synaesthesia. Ignoring the technology and using synthetic paints on old, grimy coatings, leads, in the short term, to their destruction, which further spoils the aesthetics of urban space.

### Mural

Urban space in Poland is heavily degraded. The tyranny of large format graphics creates a toxic visual environment, the space suffers from the effects of all kinds of negligence in both small architecture and detail. Contemporary wall forms of artistic activity such as graffiti and mural, dominate public space. Małgorzata Bąkowska believes that the presence of “foreign” colours can destroy the unity and harmony of a street or a square due to their loudness and intrinsic property of attracting attention. In many cases, this causes disruption of harmony and spatial composition; objects-intruders and their neighbourhood are seen in an inadequate, distorted way<sup>1</sup> (fig. 1). Today’s mural, which is set to maximize the visual effect, often through overscaled forms and repetitive patterns, not only litters the public space but also creates the uncomfortable impression of an unbearable superimposition. However, many mural creators make no attempt to disguise this; treating the wall as though it were a giant canvas in their studio, they fail to establish a relationship with the architectural form and the existing contexts (Fig. 2). There are valuable mural projects implemented by festival “stars” from Poland and from the rest of the world, but they rarely fit into the landscape of the city. A typical mural has the features of a graphic artwork made with paint. The mere use of colour does not mean that we are dealing with painting. They often lack a specific painter’s thinking, and the message is conveyed in an insolent way that is characteristic of advertisement graphics. Chomątowska<sup>2</sup> notes that the prevailing fashion for murals is accompanied by a decrease in their quality. The term “muralitis”<sup>3</sup> (*pl. muraloza*) is becoming increasingly common in various publications and presentations. It relates to the repletion and festivalisation of the phenomenon of the mural. Despite the scale of the phenomenon, the mural is not subjected to qualitative analysis, nor serious artistic criticism.<sup>4</sup> Can one imagine any alternative to the mural?

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Figure 1. Mural in the city centre of Poznań, Poznańska Street. Photo by P. Drozdowicz, 2014

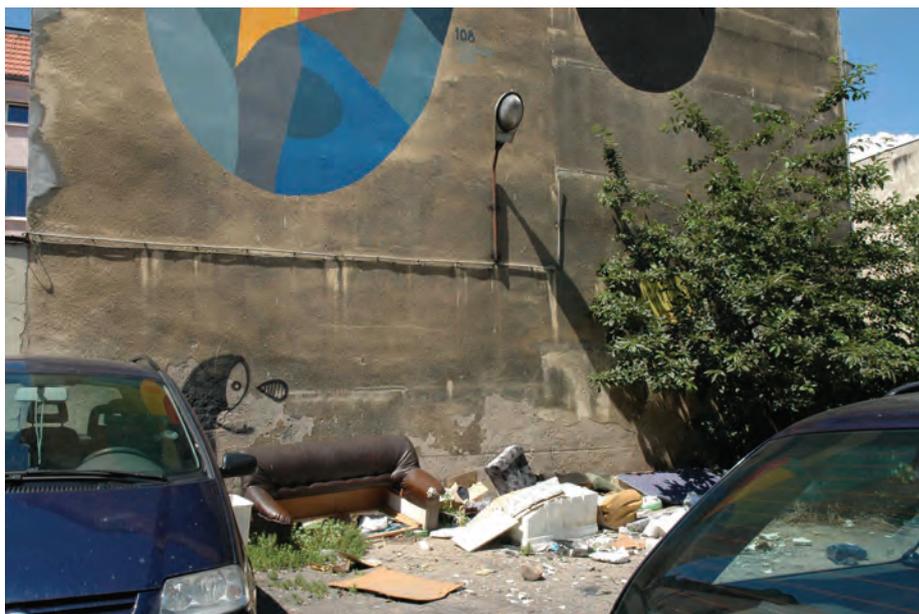


Figure 2. Surroundings of mural, Poznań, Poznańska Street. Photo by P. Drozdowicz, 2014

### Definitions

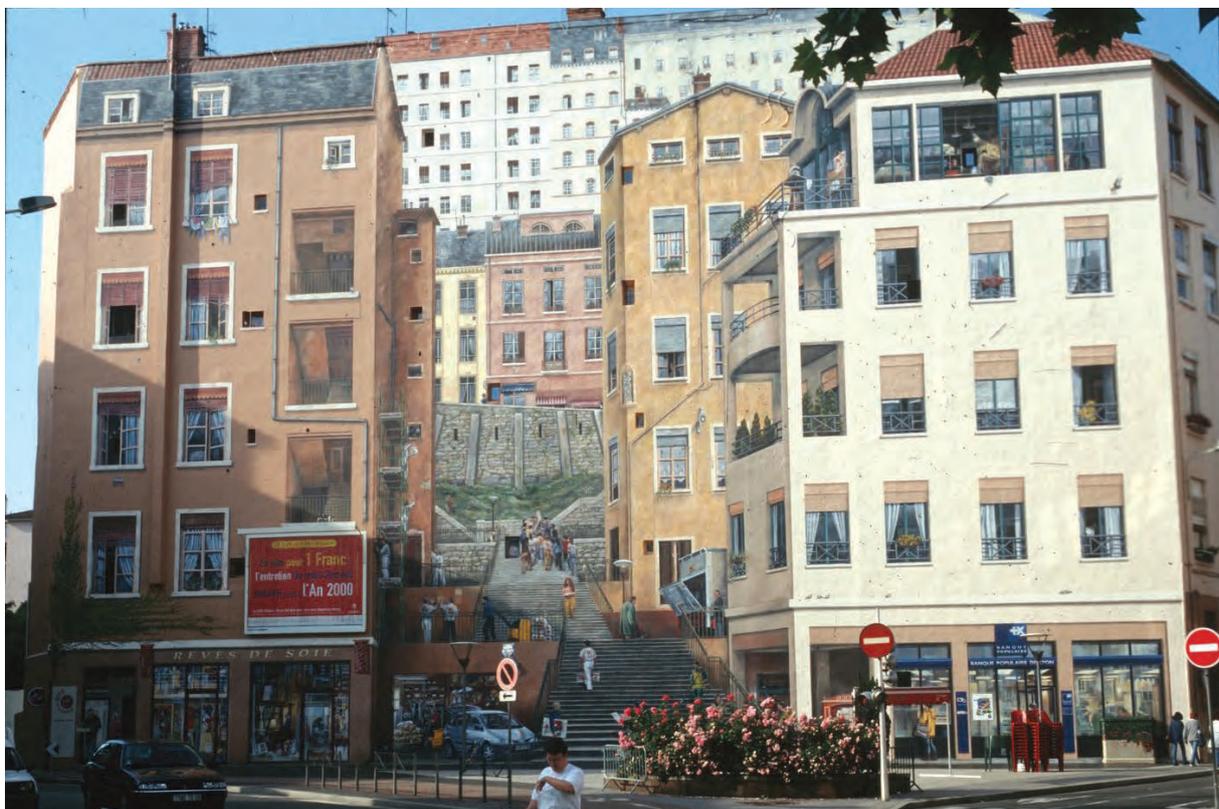
We are experiencing serious difficulties in defining the phenomenon of the mural. Old terms such as monumental or architectural painting are both inadequate and inaccurate, being language constructs like muralist painting, which simplified, mean as much as wall painting.<sup>5</sup> For clarity, the terms mural and painting in architectural space should be sepa-

rated from each other and regarded as two distinct artistic phenomena, with specific roots and traditions, located on opposite poles of artistic experience associated with colour in space.<sup>6</sup> Traditionally, many painting experts and critics have used the word fresco, which still has a positive connotation. As used in this article, the terms painting in architecture

or wall painting suggest an association with architecture. The term painting in architecture highlights the relationship between painting and space together with architecture, it would seem to be a more general and broad notion. The concept of wall painting refers to the characteristics and the structure of the substrate material and to technology, but also indicates that it can exist beyond architecture, eg. in a gallery space. However, the term wall painting in architecture would convey the complexity of the relationship between colour and space, and it would identify this area of painting. The lack of accurate terms for painting in space is a consequence of the blurred boundaries that exist between artistic disciplines which causes a lot of confusion, depriving us of assessment tools and of the possibility of analysing the contemporary manifestations of painting and large format graphics. In Polish, the word mural has ceased to mean anything. Despite its apparent capacity, it does not include the area of traditional painting in architecture. It is misleading because while it seems to be universal, defining everything that has been done on the wall, in fact, it refers to artistic activities associated with street art, often of subcultural provenance.

In spite of the “muralitis” (muraloza) prevailing in Poland, contemporary wall painting related to architecture is still being practised in the world. There are regions where the ancient traditions of painting in architecture have never been abandoned. Poland, in this respect, is a desert, because apart from a few realizations, there is just so called “mural”. We suffer from a lack of studies of the kind of painting which is not a mural. A considerable amount of amateur, sometimes very naive and kitschy wall activities, eg. restaurant interiors, display a strong social need for painting in architecture that can grow with the development of economic and civil freedom. The public is helpless when it comes to their aesthetic needs, which are not properly developed. In the arena of social consciousness forms of wall creativity are limited to graffiti and the mural. In many professional groups, one can observe prejudices both in relation to painting in architecture, and to the mineral techniques themselves. It is believed that they are a relic of the past, or are alleged to be crafts; synonymous

*Figure 3. Cite de la Creation, „Le mur des Canuts”, Lyon, 1987 [c] Bibliotheque municipale de Lyon, 2011, <http://numelyo.bm-lyon.fr> <sup>12</sup>*



with a lack of “artistry”. Stereotypes are duplicated about the alleged bad influence of painting on the interior, or about its impermanence and high maintenance costs. After-postmodernist designer fashions continue to impose narrowly conceived modern styles, taking into account neither the traditional relations of painting and architecture, nor the potential of forgotten classical painting techniques.

### Modern aspects of the perception of painting in architecture

The classically understood wall painting is a manifestation of a holistic approach to the notion of space which is an intangible element of architecture. Painting in architecture is based on a strict relationship between painting (colour), and architecture (object), on full symbiosis in the design process, as well as in the way the recipient is being influenced (Fig. 3). This combination results in a multi-faceted multiplication of spatial impressions where we have to deal with a kind of emergence.<sup>7</sup> Architecture and painting, while retaining their autonomy, offer new aesthetic-spatial qualities which cannot be described by simply describing their components. “This approach is associated with the thesis of today’s theory of architecture as art (Raumkunst), the idea of which is the integration of technology with the objectives of aesthetics and social ethics.”<sup>8</sup> We should distinguish two basic functions of wall painting towards architecture: complementary and transformative. Wall painting, despite its subservient role, retains its artistic autonomy and constitutes a homogeneous structure together with architecture.

Painting and architecture existed in a state of symbiosis through intermedial interactions, they formed a kind of a total work. The modernist attitude of negating tradition makes it difficult to see that a lot of “news” in contemporary visual arts has been used for centuries by painters and architects in wall painting. Intermediality, interactivity, and the immersion effect were intuitively used, although such concepts were not at the disposal of the pre modernist painters.

Painting properly implemented in architecture represents the correspondence of the arts. It is based on a specific, multi-sensory experience of a piece of art. The user of architectural space who is looking at wall painting can experience rich colour phenomena or illusions which take place in this space. The recipient



Figure 4. *L'Arche Chapel, Poznan, Polanska Street, Keim A technique. Photo by P. Drozdowicz, 2004*

experiences the works as a whole, also kinesthetically, with their body; they can receive acoustic effects of the surroundings which complement the visual stimuli because the work affects the whole mind, giving an effect that seems to be synesthesia. It is easiest to experience this in an architectural interior where painting transforms the obviousness of architecture. (Fig. 4).

**Intermediality** results from a combination of influences of different elements (media) the message of which is completed in space. Painting and architecture carry a variety of messages, but they have an overall impact. In Pompeian villas, luminous, transparent colour multiplied spatial experience beyond the limits of architecture and wall surface. Another aspect of the impact of painting in architecture is its **interactivity** understood as a non-trivial<sup>9</sup>, mutual interaction of a work and a recipient. The recipient has an impact on the perception of the work. A perfect example of this is the Baroque illusionistic painting, which created virtual, spatial experiences. While moving, with every step, a viewer read the painting in a different way in order to finally find themselves in a place where the illusion in the space of the interior was finally revealed.

**Immersion**<sup>10</sup> is also a feature of painting in architecture. It is understood as a state of sinking or absorption of the person by artistic reality, when the so-called immersion of the senses happens. Immersion seems to apply to the whole art from its beginnings,

although today the term is promoted in relation to the cutting-edge virtual realities. "Being immersed deep in a virtual three-dimensional space means to experience one's own body, which becomes an integral part of the virtual spectacle, because there is no framework that separates us from the picture, because we are inside."<sup>11</sup>

### Wall painting techniques

Mineral wall techniques have remarkable optical properties which act in space. A small amount of pigment can generate strong, but noble, colour phenomena. Mineral pigments bound in the mortar have a crystalline structure, hence the light that falls onto the surface of the fresco is scattered and multiplied as in a fragment of diamond. In the al fresco technique, one paints with light because the technique is transparent, and the whiteness of the lime base enhances the brightness, as in watercolour. Here we obtain unusual colour effects which are not achievable with synthetic materials. An important feature of the fresco technique is that the pigment is "immersed" in the wall during the crystallization process; painting becomes the wall itself.

Another technique, developed in the late 19th century, unusually weather resistant when used outside, is the Keim A silicate technique. In this technique also, a white base and a suitable way of applying the paint provides a layer of paint, and thus the wall,

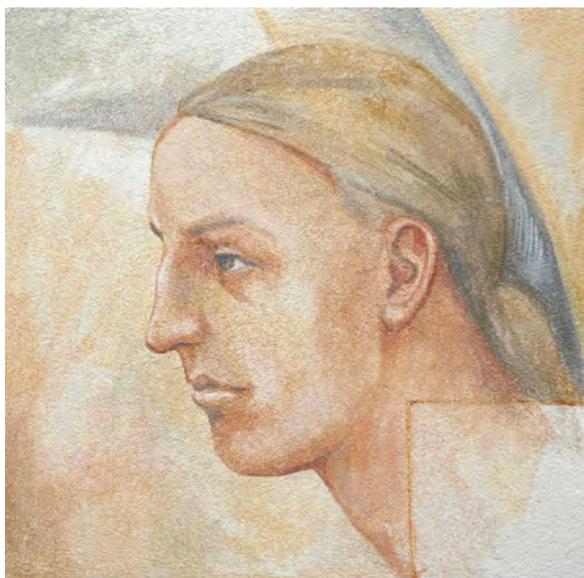


Figure 5. *The Angel – portrait of Michael*, 60 x 60 cm, Keim A technique, P. Drozdowicz. Photo by P. Drozdowicz, 2011

with lightness and a brightness of colour which creates the impression of expanded space in the interior. Treating the paint layer in this way has a tremendous impact on linking painting with architectural space. Like in al fresco, the colour palette is limited to a dozen of shades of ochre, brown, russet reds, green earth, ultramarine blue, and white together with black, which contrary to appearances, gives a richly nuanced range of colours and a certain degree of nobility to the painting. The tone of frescoes is warm, muted with greys and umber, clean and sharp colours do not occur here. Painting compositions exude a soft inner light. In any other case, the paints create an additional coating applied to the plaster, which, in a short time, flakes off under the influence of atmospheric conditions. This happens in the mural, where synthetic acrylic paints are applied, often laid on old, dirty bases.

### Summary

Wall painting in architecture has enormous creative potential and offers an alternative to the short-lived mural. Mineral wall painting can complement the architecture, and transform objects and entire spaces. It allows us to design painting in architectural space and architecture in an innovative way. With far lower spending, it can create a new architecture from a banal, ordinary building (Fig. 5). Painting dedicated to particular objects sets up intermedial and aesthetic interactions, it is contextual, and brings about the effect of immersion. At the same time, it saturates the space with ideological or symbolic content, which is characteristic of art. Painting undertaken with respect for local social, and historical contexts has many characteristics of contemporary art. As a consequence of its emergence, wall painting in architecture has become one of the emergent trends of research in the field of more humanistic architecture. Painting gives new life to interiors, objects, the city – it gives a human face to architecture.

Figure 6. *Melancholy design of the fresco for The National Museum in Poznań*. Photo by P. Drozdowicz, 2014.



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## Space and Image

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### Abstract

*When architecture becomes an image and the image is read like architecture.*

The illustratory architecture – a commentary on plans and sections of specific objects in a form of paintings or drawings – is a part of creative process and the confirmation of relationship between the value of a design structure and the value of an artistic image. Art is a transfer to understanding the reality around us, where we live, work, love and die... The social aspect of the utility of a designed space may be defined by painting definitions, which may be a continuation of the dialogue between pure art and design art. The ideology of analytical view and evaluating architecture in connection with image as an autonomic approach is expressed in new creations of the emotional image of architecture representations where colour, gesture and composition play an important role of information carriers.

### Introduction

Image – the illustratory architecture – reflects the quality of architectural form. Transferring the projections of architectural plans, once from carbon paper, blueprints, today from electronic media, to the image plane, addressing the subject of architecture in painting, is a separate artistic value regarded as pure art. The analysis of the technical records of architectural projects leads to classifying created spaces. Painterly presentations, emotionally coloured in plus or in minus depending on relationships between the viewer and architecture, are the result. The character of architectural creation expressed with proportions, an assumed function (ergonomics) and used building materials translated into the language of paints and brushes may validate a positive or a negative solution on the conceptual level of the project. The interdisciplinary journey along the routes marked on painting planes forms another image in the act of seeing, just as in the English “I see” which means

seeing and understanding, extending the scope of the awareness of perceiving two realities: the real one and the painterly one. The geometrised world of architecture transformed into a sequence of autonomic shortcuts requires pursuing the identity of sensuality and meaning, opening new interpretation possibilities. Interactivity arising from such a process adds new possible voices to the discussion, which may influence the form of space in which we live our lives.

### Method

The painterly message includes format, composition, technique and colour which predominantly influences the viewer. It draws attention with the sharpness of colours, expressively expressing emotions, calms with the monotony of toned-down colours, or makes one fall into melancholy or depression with colours soaked with the gloomy aura of sadness.

Gesture, a parallel thread enhancing the message, complements the position expressed in a matter of image. Hints about architectural experiences coupled with the painterly organisation of composition embody interdisciplinary creative articulations, where we find solutions belonging to the domains of other media in one work. The transformation of autonomic delving into the language of artistic message, backed up by architect’s designing practice, proves that cognitivist methodology may be used resulting in positive impact in the area of architecture and painting, where “various forms of mental activity” are voiced (sensual perception, visual perception, physical experience etc.).<sup>1</sup>

The creation of architectural space determines the quality of perception. „Because architectural output is mainly addressed at the society, the educational goals of autonomous pieces can also be identified at the social level”<sup>2</sup> Directing a painting message to the viewer, following insightful observations or random, often subliminal, associations with a given architectural form, we carry a message related to a specific object. We evaluate the object, attributing to it subjective assessments, classifying it into the appropriate emotional and quality range (an objective review based on the set of research will be the outcome of the set of subjective assessments). An original painting representation is a unique relationship, including one-of-a-kind presentations resulting from experienc-

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es of the saturation degree representative for the creator. Clear emotions included in the image rub off on viewers. With the support of a set of colours characterising an architectural form, we construct our work to be as faithful to our feelings as possible.

The colours of a work of art based on the characteristics of a given object give a trustworthy representation of data. Gesture, as author's personal mark, through which we can read the genius loci of a project, becomes a developed code, enriched with relatively objective values. Becoming a painting matter, architecture makes us perceive images as architecture. Each brush stroke is information, the combination of colours results from the observation of structure and details, shading as depth and space is ambiguity in the subjective perception of interpretations. Transferring a set of information into the image plane regarded as a readable code for both disciplines – fine arts and designing – also reaches viewers, at the same time inviting them to interdisciplinary discussion. Engaging in the subject, the viewer, interpreting painterly notation, creates an individual definition of the perceived work, automatically applying for the group forming opinion triggered by a direct reaction to the message. The phenomenon of transfer occurs, which naturally blurs original assumptions, interacting indirectly, yet the multidimensional nature of view is often a more valuable source of information than data flow circulating within close circuit.

Serving people, architectural craft becomes, because of painting actively participating in the process of forming the space of our life, the reason for reflexive research on its quality and standards. The consequence of recognising painting architectural projections is increasing sensitivity and imagination by starting the chain of reactions with a provocation inviting you to continue, not with a pushy, but with a gentle stimulus. "Each object – a painting, architecture – has a value in itself, an absolute value, regardless of what it presents".<sup>3</sup>

Creating a painterly story, based on facts obtained from the analysis of architectural works, or their technical records, we generate new ones. Acting within categorised spaces – toxic, transparent and identity spaces – we represent a specific position and, as a voice in multidimensional discussion, we actively participate in building relationships be-

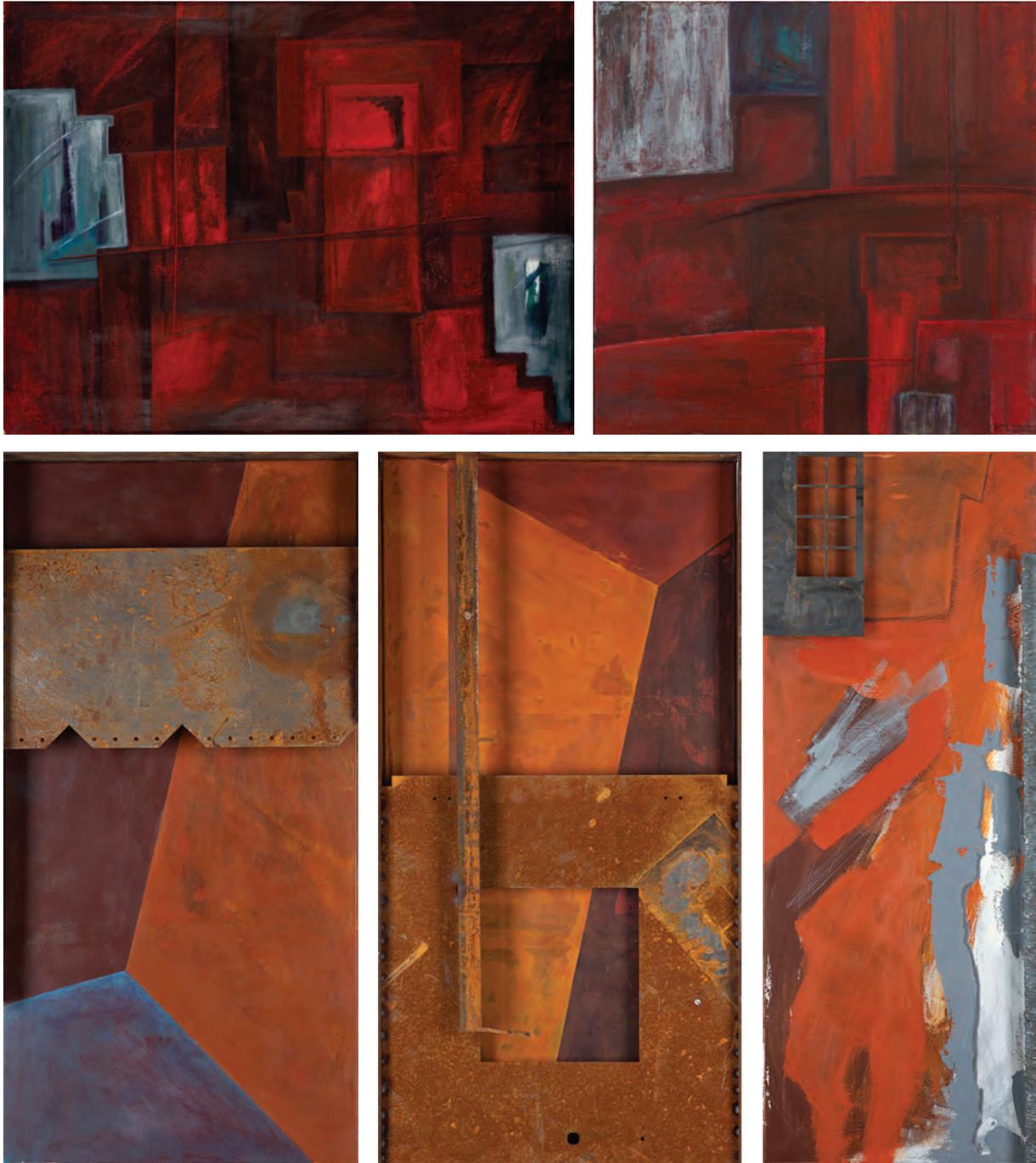
tween space and man. Place and a person. Time and existence. Reaction and the quality of life. Mental shortcuts developed as symbolic "links to" are metaphors containing architecture and emotions. The latter determine the quality of our lives locked in architecture frames. "Every time the original meaning of an image results both from the special "logical" structure of the image and from the characteristic form of sensory experience, which corresponds only to this structure."<sup>4</sup>

### Colour and space categorisation

Colour becomes the primary carrier of personal excitement resulting from the activity in social dialogue with a specific space, its beneficiary and time. Prolongation of the latter does not destroy the value of the work which, regardless of the moment of creation, relevantly contributes to constructing a sensitive message. The toxic space and its toxic effect on metaphorical articulation of images emanating emotions defining negatively coloured phenomena, for example, representing a protest against unexpected turns in history, crossing the finely woven for years strands of human chronicles. Passing and oblivion simultaneously erect new walls of future contexts, at the same time blotting out elements that witnessed the past ones. The memory of events, emotionally expressed with red, is present in painterly presentations *Konceptualnie [Conceptually]* and *Przeszłość [The Past]*.

The burnt interiors of barrack-huts in one of Poznań districts take their toll on the minds and hearts of homeless people staying there. Forlorn hope for owning. Callously neglected possessions, closed in four walls, consumed by fire, scupper another chance for a better living. Again I have nothing, I do not exist and, as a kind of "nothing" I do not deserve my own place. Painful toxicity. The colour of life and extreme emotions shout to us, not letting ignore the tragedy.

Specific spaces dedicated to viewers generate direct associations with places about which the world would rather not remember. Ascetic forms, practised amount of graded light. Design perfection. Without words, without explanation, we become partakers of situational simulations. The form creates feelings we carry for a long time. Daniel Libeskind has created perfectly toxic spaces – the Jewish Museum



Berlin. He achieved his goal of evoking unpleasant feelings that, at least partly, help us to realise what happened behind the gates of concentration camps. In terms of colours, the painterly "annex to" is in opposition to the whole of the museum layout. Grey concrete expressed mostly by dimmed reds and rust, as interiors formed depending on recalled places, here is a metaphorical inner scream. The processual conception of image allows for articulating synergic associations, leaving the ways of perception open

Figures 1, 2,  
3, 4, 5

1. *Konceptualnie/Conceptually/*, acrylic, 100x120, 2012
2. *Przeszłość/The Past/*, acrylic, 50x50, 2013
3. *Wartość podwójna/Twice the Value/*, acrylic, steel, 130x60, 2015
4. *Życie/Life/*, acrylic, steel, 130x60, 2015
5. *Nieotwarte/Unopened/*, acrylic, steel, 130x50, 2015

for reinterpretations. The paintings *Wartość podwójna* [*Twice the value*] and *Życie* [*Life*] were constructed with the use of rusty scrapyard steel elements, still bearing a trace of their previous use, which give them a second, recovered, saved, donated life. The unimaginable extermination of thousands of human beings, called history, seems more bearable in the paintings which depict it. Building conditions that awake our imagination also deepens our understanding of the content.

In the painting *Nieotwarte* [*Unopened*], dedicated to the residents of the Rawicz prison<sup>5</sup>, contesting colours, red ochre, umber, white and greys symbolise untameable, herded, very different emotions locked behind the bars and walls. Aggression, depression, fantasy of freedom expressed with strikes of impasto is limited by the steel of real bars, like an “unopened” door with no key to normality. *Yuri Avvakumov* is another artist, who, in his work *Hołd dla Władimira Tatlina* [*Tribute to Vladimir Tatlin*], focusses on the issue of the recovery of memory by references to the past. Vertical projection, 1988 screen printing on a newspaper, is a perfect reinterpretation of the utopian visions of the past propagated by constructivists in reference to modern problems.<sup>6</sup>

The synergistic process of seeing painting and space generates another kind of space – the transparent one. This kind of space optimises the conditions of staying there in a given time period, and references expressed in painting give multiple meanings to the effects of the collisions of different environments. The idea of the message is defined, revealing author’s position in an original way (Fig. 1-5).

*Narodziny* [*The Birth*], *Macierz* [*Matrix*] – are paintings where the advantages of a place which is also inspiration for works are brought to the fore. *Genius loci* Archaeological Park in Poznań provides friendly atmosphere for visitors, inviting them to come back, guaranteeing the comfort of working. Its modern look – concrete, steel, glass – as soft exhibition background, leads through the route of museum collections, not interfering the curators’ scenarios of temporary and permanent exhibitions (Fig. 6-10).

Following the visual grammar, feelings do not go far beyond the nature of the space in question. Transparency is the common denominator of architecture and image, opening to the freedom of interpretation

and to continuing dialogue with the content included in painterly presentations and architectural spaces. The range of greys reflecting an interesting aspect of concrete, with compositional lines of shade representing light that is omnipresent in the object, organises the real and the imaginary space, the seen one and the represented one. Red tones mark the essence and stress the main place – the source and pretext – archaeological artefacts, above all the structure of bulwarks from the times of Mieszko I.

Moving away from the complete textuality and focusing on colour is intentional moving the focus to the effects of architectural operations characteristic of painting subjects. Elevation colour, type of building materials, character and function of the created architecture, appear as painterly implied meanings. Emotional expression of architecture in representations, mainly two-dimensional images, is inspired by the concept of designer and sensory perception. Architecture is considered both as object and subject. The correspondence between architectural forms and painting, directing at sensory content, implies the view of architecture and pure art from a slightly different perspective. It creates a common area where technique and emotions meet, and a symbolic transfer of characteristic features of architecture into „the plane of a painting” contributes to the excavation to the foreground of the core of the recorded contents, at the same time evoking associations with the Archaeological Park<sup>7</sup>.

Painting messages reflecting human emotional states, related to identity spaces, will be interpreted slightly different. The *identity space*, personal, safe, as a form of external characteristics, allows for limitless possibilities and for using media taking into consideration the personification of presentation. The quality of painterly message is determined by author’s personal feelings and their approach towards architectural context. What we perceive as image – is based on the relationship between the impact of space and reactions it triggers. In this discipline, colour plays individualised role, outlining an original profile through the offered set of metaphors, applied onto canvass or cardboard planes. (*A personal Frame, This is where, During the conversation*) (Fig. 11-13).

Deciphering author’s metaphoric code in the painting and pairing it with a logical sequence of remarks



Figures 6, 7, 8, 9, 10

1. *Narodziny/The Birth/*, acrylic, 130x50, 2013
2. *Macierz/Matrix/*, acrylic, 130x50, 2013
3. *Efemeria/Ephemeris/*, acrylic, 130x50, 2014
4. *Wyznaczone/Designated/*, acrylic, 130x50, 2014
5. *Dwoistość materii/Duality of Matter/*, acrylic, 130x50, 2014

and conclusions results in an ideological transfer into further reinterpretations.<sup>8</sup>

Such back-coupled dependencies can be observed in visual presentations of architectural designs, which are simply supplements to the entire work set. As an attachment to the development of design of a given architectural or urban form, such visual presentations are often autonomous painting compositions, which could constitute independent pieces of art. More examples can be found in David Dernie's *Architectural drawing, (Case Studies: Plans)*.<sup>9</sup>

Furthermore, it must also be stressed that many actively practising architects are also independent artists in such fields as painting, drawing, graphics or sculpture. Such strengthening of cognitive processes of an object structure reinforces the position of the output of fine arts as a „tool for the analysis of space which is the subject matter of an outdoor painting workshop or space which is the subject matter of designing activities”.<sup>10</sup>

### Conclusions

Admiration for pure art and architecture, as a wide-ranging view, has resulted in transposing one into another, strengthening the sense of looking for

close links and relations between the areas of both disciplines.

Image implementing architectural experiences creates a bridge between subsequent links, enriching the cognitive source of architecture, bringing the viewer closer to both, pure and design art. Presenting the technical records of architecture in a form of an artistic image – gives more possibilities of the sensory perception of architectural contexts – the subject, which gives them new quality aspects. Presentation of technical records of architecture in the form of a painting increases the sensory range of architectural context, and at the same time allows for changing the nature of respective space. Analysis, synthesis, merger of perception planes – they all – determine the attire of dedicated architecture (space and image; continuation through interpretation). When creating an artefact based on other artefacts, implication of new ones is automatically triggered, extending the spectrum of space perception stimuli, whereas its multidimensional nature allows for crossing symbolic boundaries, bringing to life new cognitive means.

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Figures 11, 12, 13

*Kadr osobisty/A Personal Frame/, acrylic, 50x130, 2015*

*To tam/This is where/, acrylic, 40x40, 2015*

*W trakcie rozmowy/During the conversation/, acrylic, 40x40, 2015*

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## The Colour of the Light in Urban Nightscape Formation

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### Abstract

Today, one can observe the dynamic transformation of the nocturnal landscape, which fundamentally altered the image of modern cities. This is due mainly to an unceasing development of lighting technology and computerization, offering a wide range of opportunities for the use of artificial light in the existing urban environment. The opportunity of using the medium of light to create spatial compositions with a significant aesthetic impact enabled the effective use of colour in urban space. As a result, the relationship between light and colour, which guarantees instant visual effects, has made contemporary lighting solutions one of the most common tools in shaping the urban iconosphere.

### Introduction

In the current process of globalization, cities are becoming more and more similar to each other while competing for the benefits related to the acquisition of new investors, business partners, tourists and residents. More and more often city authorities consciously seek to gain a competitive edge and enable further development and victory in the inter-urban competition. In this process, urban landscapes in the whole world are subject to numerous, often dynamic structural, functional and visual changes. In the face of the increasing complexity of urban structures, the colour of light becomes increasingly important, serving as a tool for shaping the city's nightscape, influencing both the aesthetic aspects of composition as well as emphasizing its functional, ideological and symbolic content.

The purpose of this article is to present the role of the colour of light in shaping the urban night landscape and the function it can serve in this space. The study will analyse the factors and conditions influencing the value of night landscape using methods employed in work from the field of urban planning, architecture, landscape architecture and environmental psychology.

### The colour of light in urban night landscape

The modern development of innovative multimedia technologies and the latest trends in public lightning and illumination has brought about deep transformations in the urban iconosphere. As a result, the night-time urban space began to generate new image landscapes – or systems of images of various colour palettes, which became one of the basic forms of multimedia communication, as well as an important tool in shaping the society and culture.

The purpose of the analysis of the colour of light in urban landscape is to present the role it serves in urban spatial compositions.

A comprehensive outlook on the subject lends itself to the compositional analysis of the vast views encompassing the whole or significant parts of the city. The examples of positive night landscape arrangements are presented in the context of the most attractive (according to the author) panoramas of a given spatial unit, which are in themselves of significant cultural value and in many cases achieve the status of urban symbols and shape the city's night image.

As noted by K. Lynch: "A vivid and integrated physical setting, capable of producing a sharp image, plays a social role as well. It can furnish the raw material for the symbols and collective memories of group communication".<sup>1</sup> As noted by the author, detailed development of the visual aspect of the city imbues it with a particularly strong significance.

An essential part of actions aimed at shaping the city's visual presentation by night is the proper management of its identity – the system of visual identification involving the recognition of image-shaping elements and the selection of unique traits and values that are characteristic of a given urban environment and make up its unique and distinct nature.

A carefully planned urban nightscape is the result of the city identifying with its users. It also presupposes identification with specific cultural and ideological contents. This phenomenon can be described as the communicative and informative process of shaping the city's image through a specific visual system – including lighting and illumination. This process leads to the creation of an urban nightscape.

Developing the urban nightscape is usually a long-term multi-stage process, strictly planned and conducted,

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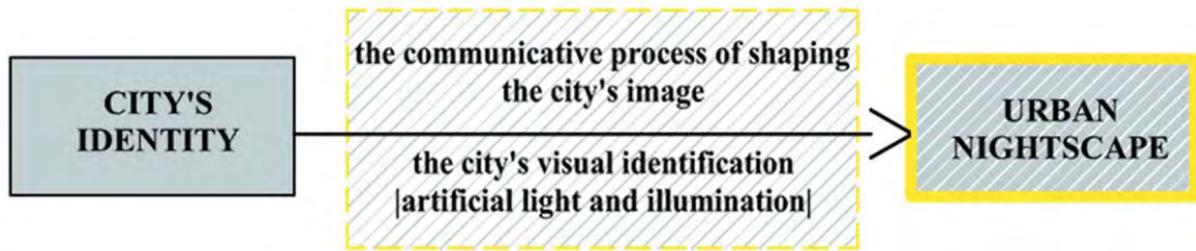
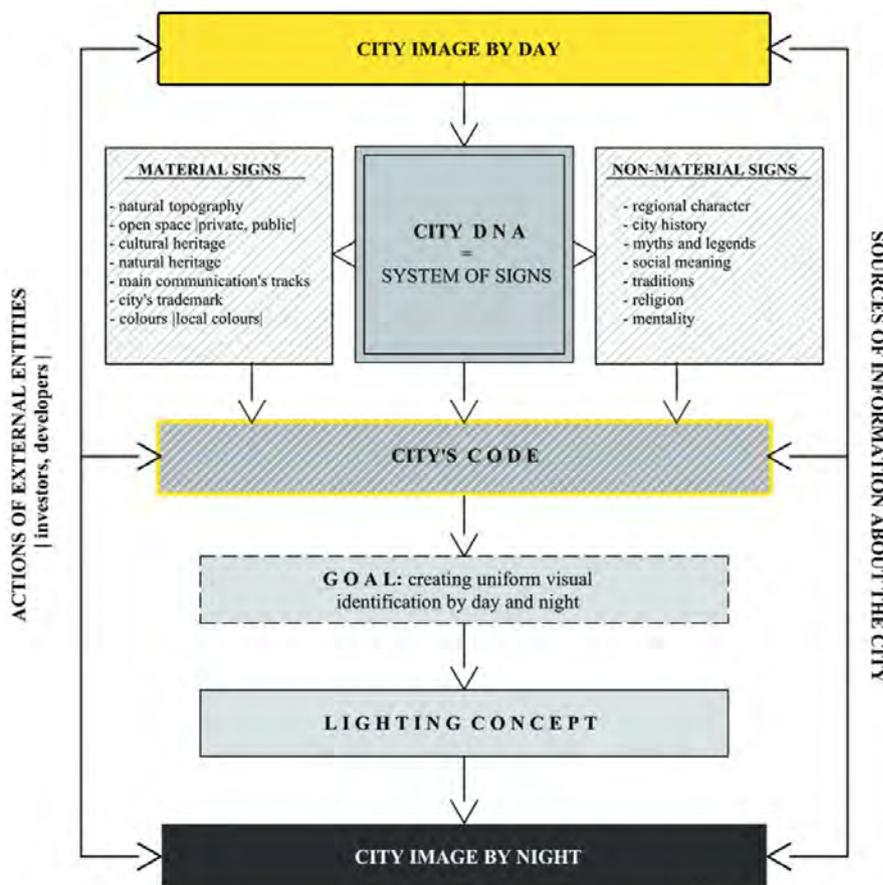


Figure 1. Relations between the city's nightscape and its identity. By J. Szwed

and aimed at increasing the city's competitive edge. This is why it is necessary to look for methods enabling the efficient use of artificial lighting in urban nightscape composition, which could help achieve a desirable city image and the appropriate level of recognizability and attractiveness among residents, tourists and investors. One of the research methods enabling a detailed analysis and assessment of the urban environment in the process of lighting planning in the urban scale was proposed by N. Wasserfurth-Grzybowski *Urban Code*.<sup>2</sup>

This method refers to the logical theory of language understood as a system of signs – a semiotic system based on the pillar of *code*. It allows us to perceive

Figure 2. The city as a system of signs. By J. Szwed, inspired by the "Urban Code" method developed by N. Wasserfurth-Grzybowski



the urban landscape as an urban message arising from the city's culture and tradition. This communication should contain a "genetic code" of the city's identity, which constitutes one of the main guidelines in the search for design solutions within the scope of planning the nightscape in the context of the whole spatial unit.

The architect must be able to accurately read this symbolic coded content in the form of material and non-material signs, which constitute the value of cultural heritage. Material (visual) signs encompass natural topography, man's living space (private, semi-private, public), the cultural heritage, including works of art, architecture and technology, main transport routes and distinguishing marks – easily recognizable symbols of the city, including trademarks and the city's coats of arms. The material substratum of the city also encompasses the local colour climate foregrounded by the city's characteristic traits or the geographical-cultural climate which should constitute the starting point for developing design guidelines concerning the use of proper artificial lighting colours in exterior space.

On the other hand, signs of non-material heritage create the location's identity and spirit, helping to determine the unique traits of the city and its atmosphere. Here the semiotic elements related to the city are limited to the concept of the sign as a symbol arising from intentional and conscious activity aimed at creating a specific visual and spatial message. These signs have extra-visual value and are related to the region's character, the city's history, legends, myths, traditions as well as the customs and beliefs of the local community.

Accurately reading the system of material and non-material signs can support creative activities from the field of light art, whose key goal is to provide the city with a uniform visual identity by day and by night, which would be understood and respected by its recipients. This means that the image of the city observed in daylight is combined with the light design visible at night-time. Attempts to control the colour of urban space by local laws dictating the use of specific artificial light colours or limiting them to a specific group or colour palette can be observed mainly in general urban lighting plans.

Moving on to the presentation of exemplary projects from the field of lighting and illumination planning

on an urban scale, this author will first discuss the method of classical illumination on the basis of the French city of Mont Saint Michel and the project developed by the Parisian lighting designer Louis Clair<sup>3</sup> (Fig. 3). Mont Saint Michel, a city in South-Western Normandy, owes its popularity and attractiveness to its location on a rocky island in the Mont Sant-Michel Bay, at the top of which stands the Sanctuary of St. Michael the Archangel.

The architecture of the sanctuary and the bay with its high sea tide make this the most frequently visited – besides Paris – tourist location in France. Initially, many structures on the island were classified as historical monuments and the city, viewed as a historical spatial landscape, received this privilege in 1962. Since 1979 it constitutes part of the UNESCO *National Heritage*.

Due to its location, shape, size and function, this historical architectural-urban complex serves as a landmark in the city's spatial composition which, together with the wide field of exposition, was a point of reference in the lighting design of Mont St. Michel.

One of the characteristic traits of classical illumination is the use of toned-down – white or yellow light which enables the creation of a credible, non-deformed image and shapes a historical space in which historical heritage values are maintained and exposed. In the case of the illumination of Mont St. Michel, three artificial colours were used which enabled the designer to achieve the desired visual effects and elicit proper symbolic associations. The inclusion of the whole city in the lighting plan enabled the author to develop a number of scenarios concerning the interpretation of the nightscape composition, depending on the point of observation.

The first scenario relates to viewing the city from a distance. The light intensity rises vertically toward the top, at the same time changing its colour – from orange to yellow to white, concluding at the top of the cathedral. This way the structure's peak seems farther, thus creating an illusion of greater height which symbolizes the structure's and its community's communion with God.

The second scenario involves observing the structures from up close. The use of three light colours resulted in a contrast aimed at differentiating the three levels of the building's façade, arising from the



Figure 3. Illumination design of Mont Saint-Michel in France. Performed in 2006<sup>11</sup>

layering of various architectonic styles. The Roman style is accentuated by the darkest (orange) colour, the Gothic style – with the intermediate (yellow) colour, while the High Gothic, together with the cathedral's tower, is illuminated with the brightest light. The illumination design of Mont Saint Michel presents the potential use of diverse light colours as a way of exposing the symbolic and spatial content which in turn provide the place with a unique and credible image. The design also constitutes the example of a comprehensive approach to urban colours, taking into account the knowledge of basic composition, the intended effect of forms and their visual perception as well as the principles of erecting complex spatial structures. Examples of the good practices developed in Europe

can also be found in the increasingly numerous initiatives of city authorities around the whole world – especially China.

Early 21<sup>st</sup> century saw many significant projects from the field of urban light and illumination planning in the cities of the Middle Kingdom, which were developed largely in collaboration with Western experts in the field of exterior lighting. Roger Narboni achieved great success in this field. Currently he is one of the world's most valued planners and experts in the field of urban lighting design.

Due to the above, the next presentation will concern the implementation of a lighting and illumination project in the Chinese city of Dujiangyan (Figs. 4,5,6). This example is presented to show the influence of European ideas on the nightscape of cities

from a different continent as well as the differences arising from cultural diversity in the planning and implementation of light art projects.

The city's lighting plan was developed by the Chinese lighting company *Zhongtai Lighting Group* together with the French *Concepto Studio*. The city's lighting design is based on the principles of Taoism. This religion describes two primal and opposite, but complementary, forces of Yin and Yang which can be found throughout the whole universe. The concept of Yin and Yang stems from ancient Chinese philosophy and metaphysics where Yin was understood literally as "the sun". This force is represented by the colour white, yellow and gold. It symbolizes strength, activity, joy, warmth and summer. It corresponds to daytime and the sky. Yang, on the other hand, means "night" or "darkness". It symbolizes passiveness, submissiveness, sadness, coldness and winter. It is associated with the colour black. Yin and Yang are co-dependent. One cannot exist without the other, just as the day cannot exist without the night or light without darkness.

The main compositional element of the city's lighting plan is the night-time exposition of the hydrotechnical structures which entered the UNESCO World Heritage list in 2000 and constitute the biggest tourist attraction of the region.

In view of the above, one may conclude that water serves a key role in the composition of the city's nightscape. The illumination of the 5-kilometre section of the river Minjiang was aimed at creating a harmonious relation between the unique scenery of the city's historical and modern part and the local community, making full use of the resources of the national and natural heritage with focus on the exposition of the local topography.

The light colours introduced along the river bank relates to Taoist symbols such as nephrite, cinnabar or gold. Due to its hardness and durability, nephrite is considered to bring eternal youth and immortality. Cinnabar has the most magical qualities, driving positive transformation, while gold symbolizes welfare. The implementation of the lighting plan of Dujiangyan is an example of the use of water foreground in the night-time exposition of works of architecture which became unique spatial signs in the urban landscape and a destination of cultural tourism.

The new face of Dujiangyan inspired other Chinese cities to take actions aimed at increasing their competitive edge and using the potential of their cultural and historical heritage to increase the region's attractiveness on the domestic and international market.

### Summary

There is no doubt that light is one of the primary tools used to shape nightscapes with intentional visual effects. Nightscape planning opened many possibilities for the use of light of diverse colours. As K. Wejchert notes: "Colour is the background of many aesthetic and spatial experiences. It creates the characteristic traits of an environment – both positive and negative – which impact the experience of the users of a given space".<sup>10</sup>

Its proper use can help establish a visual hierarchy of the urban space, accentuate the unity and continuity of urban layouts, increase the legibility and informative content of public spaces and the attractiveness of degraded and neglected areas, as well as create a specific local atmosphere. A discussion of the topic cannot neglect to mention the symbolism – the manner of communicating specific contents through the sign of light.

Sadly, despite examples of good practices, there are numerous dangers arising from improper understanding of the qualities of natural light and the illuminated space itself, the consequence of which is the spreading phenomenon of the visual overload observed in cities throughout the whole world, including in Poland.

The main causes of the aesthetic chaos present in the public space of Polish cities include the flawed regulations and the low efficiency of its execution which allows complete freedom in shaping the colours of urban iconosphere. One may ask the question: Can new law be a factor determining the form and function of the nightscape and preventing its coloristic degradation?

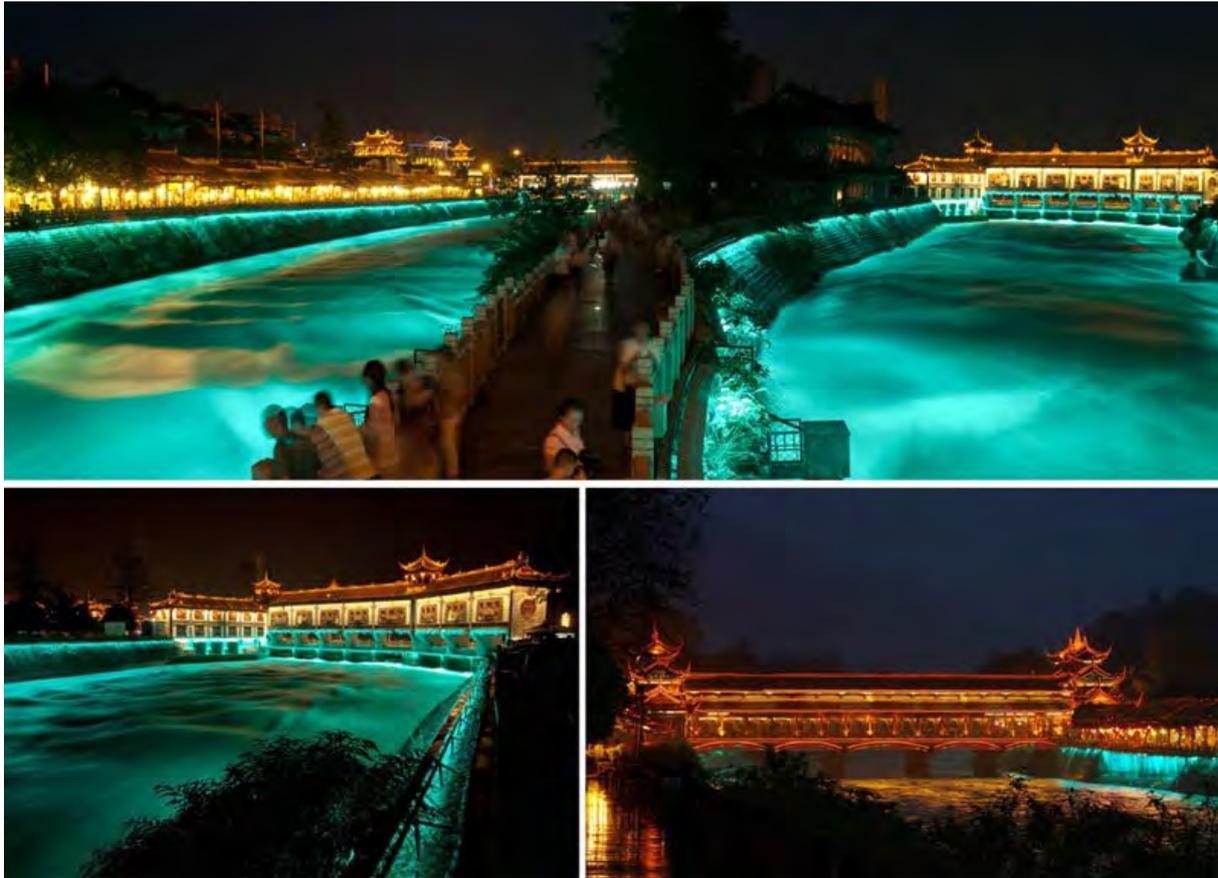


Figure 4, 5, 6. Illumination of the city of Dujiangyan in central China. Performed in 2010/2011, <http://www.concepto.fr>

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## Obedience to Unwritten Urban Color Norms

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### Abstract

The paper describes the results of the breaching experiment conducted with fifty Russian participants. The experimenters violated residual rules of everyday interaction in urban space by telling adult residents of many-storied buildings of various types that a man of means who lived in the same building and did not like the existing color of its exterior facade, wanted to repaint it at his own expense after his own design. After that they were shown a project with an unattractive color concept, dissonant, unused in architecture and strange-looking tones, and asked to sign the agreement. The assumption behind this approach was that individuals were accustomed to obey unwritten urban color norms, but that they were unaware they were doing so, that's why they did not know, how to react to information. After performing the break, the reactions of the people who witnessed the break, were observed and tape-recorded. An important aspect of research was the emotional reactions felt by the experimenters as well. The experiment was structured in a way, which allowed not just to observe but also to count people's reactions and to quantify the results.

### Introduction

#### Unwritten urban norms.

Urban life is imbued with a great number of norms. Many of them regulate everyday life of individuals and remain unwritten for a long period of time. Thomas J. Scheff<sup>1</sup> identifies this class of norms as "residual rules", noting that they regulate the sides of human behavior that are not covered by formal, reportable and well-ordered social norms. Stanley Milgram<sup>2</sup> defines "residual rules" as rules which correspond to two criteria: 1) people must be in substantial agreement regarding them; 2) they are not noticed until a violation occurs. These norms can be compared to grammar rules – an individual follows them without knowing how they are formulated, but immediately notices any violations.

#### Obedience.

Stability of unwritten (residual) norms in urban culture is connected with psychological experience of urban citizens. In a city individual is surrounded by a continuous information flow. Different strategies are used in urban environment in order to reduce the information overload. One of them is to ignore decision making and social responsibility. In urban environment with a huge number of bystanders, the citizens apprehend all the events as if they do not refer directly to them, but to some collective and undefined addressee, thus they do not feel personal responsibility for what is going on. The greater is the number of bystanders, the less is the probability that somebody will intervene. Thus, new norms are gradually formed in urban environment which impose and encourage nonintervention and submission.

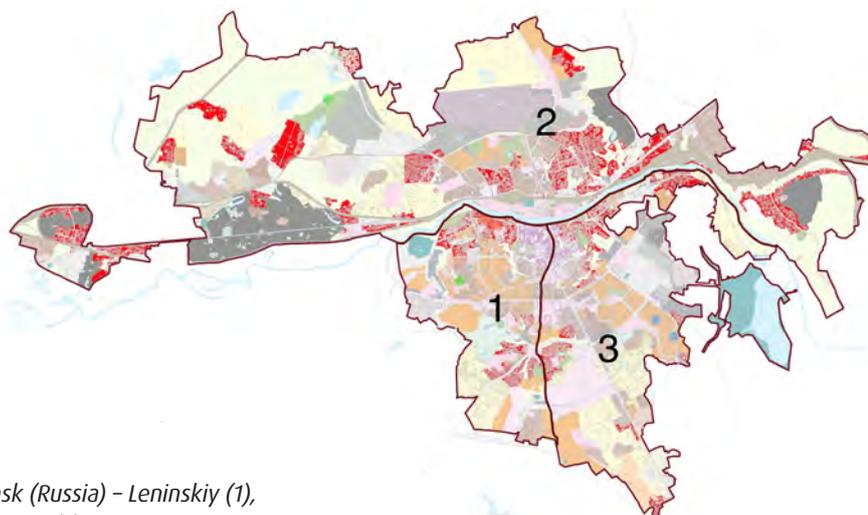


Figure 1. Three districts of Smolensk (Russia) – Leninskiy (1), Zadneprovskiy (2) and Promyshlennyy (3)

## Method

### Breaking experiment procedure.

Obedience to unwritten urban norms is usually explored using a breaking experiment. Breaking experiment is one of the most provocative ways of studying informal norms in sociology and social psychology. In this type of experimental survey, a participant is intentionally placed in a "you shouldn't do this" situation in order to examine the relevant reaction. The experiment is designed to break residual rules and grasp the corresponding outcome. This method allows to draw conclusions regarding methods, maintaining the observance of residual rules and consequences for the breaker.

The necessary theoretical basis of the method was formed in the works of Harold Garfinkel<sup>3</sup> and Erving Goffman.<sup>4</sup> Rising of interest in experimental studying of everyday urban life and habitual actions of citizens was greatly influenced by social-psychological observations of Milgram<sup>5</sup>, that allowed not only to quantify the resulting empirical data, but also drew attention to the problem of submission to legitimate authorities. During the first experiments, conducted by American psychologists Stanley Milgram & John Sabini<sup>6</sup>, passengers of New-York subway were asked to give up their seats to observe their reaction. A number of cross-cultural comparisons with the same initial experimental arrangement were drawn some time later.<sup>7</sup> Such experiments were reproduced in entirely different contexts as well. For instance, in 1990s in Russia there were some observations regarding submission and opposition to the authorities.<sup>8</sup>

### Experimental situation.

The aim of our field experiment was to study the problem of observance of informal social norms in the sphere of urban coloristics.

A residual rule of everyday interaction in urban space is that citizens don't participate in the urban color planning process and individuals are not supposed to choose colors for any large objects within the urban built environment.

The experimenters violated this implicit rule by telling adult residents of multi-storied buildings of various types that a man of means who lived in the same building and did not like the existing color of its exterior facade, wanted to repaint it at his own expense according to his own design. After that they were shown a project with an unattractive

color concept, dissonant, unused in architecture and strange-looking tones, and asked to sign the agreement.

The assumption behind this approach was that individuals were accustomed to obey unwritten urban color norms being unaware of them, that's why they did not know, how to respond to such information.

### Research location.

The experiment was conducted in three districts of Smolensk (Russia) – Leninskiy, Zadneprovskiy and Promyshlennyy<sup>9</sup> (Fig. 1)

*Leninskiy* district is situated in the south-west part of the city with the total area of 23,71 sq km. There are 153 streets in the district. Residential population accounts for 103,2 thousand people, representing 32,5% from the total number of citizens. Housing stock consists of 2 784 houses.

*Zadneprovskiy* district is situated on the right bank of the Dnieper River. This district is characterized by a large expansion in comparison to other city districts: its length from east to west accounts for 28 kilometers with the total area of 101,41 sq km. Overall roads length is 256,7 km. Residential population accounts for 86,1 thousand people, representing 27,7% from the total number of citizens. Housing stock consists of 1 237 multi-family and 6 894 single-family houses.

*Promyshlennyy* district is situated in south-east part of Smolensk with the total area of 50 sq km. There are 153 streets in the district with the total length of 239 km. Residential population accounts for 126,3 thousand people, representing 39,8% from the total number of citizens. Housing stock of Promyshlennyy district consists of 3 048 houses.

Multi-storied buildings were chosen in all three districts to conduct the experiment.

### Experimenters.

There were 3 female volunteer experimenters with the average age of 19,3 years (min=18, max=20). Experimenters worked in pairs: while one of them conducted the survey, the other recorded the data and observations.



Figure 2. One of the variants of “unattractive” facade design

### Experiment participants.

Three groups of participants took part in the experiment.

*The first group* included 10 experts among architects, designers, city planners, and representatives of city administration, politicians and public persons who took part in a discussion of experiment material. Experts worked in a “brainstorm” mode and were asked to develop designs of buildings that were subsequently shown to the participants. The main requirement was to create disharmonious and gaudy designs using unusual and appalling colors (Fig. 2).

*The second group* of participants “forecasted” the survey outcomes. The average age of respondents (10 men and 10 women) accounted for 21,0 years ( $SD=2,1$ ,  $min=18$ ,  $max=29$ ). All of them were asked a question describing the experimental situation: “What do you think: if one of the residents of a multi-storied house in Smolensk is willing to repaint the exterior facade at his own expense according to his own design in gaudy and unpleasant colors, how many percent of other residents will agree to that? What will be the percentage of men and women?” The third group of participants was unaware of our

experiment and also knew nothing about breaking experiments on the whole. This group included residents of multi-storied houses from three districts of Smolensk. The screening of participants was multi-stage. On the first stage there was a quota, area sampling. The population of experimental groups was defined according to population distribution within the districts: 16 individuals in Leninskiy district, 14 – in Zadneprovskiy and 20 – in Promyshlennyy. On the second stage the strategy of contrasting sampling was used. Each of the experimenters was to address a man younger than 25 (according to approximate assessment of the experimenter), a woman younger than 25, a man and a woman of middle age (25–50 years) and a man and a woman older than 50. The age of participants was firstly estimated visually and then specified during the interview.

50 individuals in total were randomly chosen from the general population (Table 1).

	Zadneprovskiy District		Promyshlenny district		Leninskiy district		$\Sigma$
	m	F	m	f	m	f	
< 25	2	2	3	3	3	2	15
25–50	3	3	3	5	3	3	20
> 50	2	2	2	4	2	3	15
	7	7	8	12	8	8	
$\Sigma$	14		20		16		50

Table 1. Experiment participants

## Results

The results of the experiment included analysis of “forecasting” accuracy (1), evaluation of reaction of participants (2), breakers of informal norms of urban coloristics (experimenters) (3) and casual experiment witnesses (neighbors and passersby) (4).

The experiment was structured in a way that allowed not just to observe but also to count individuals’ reactions and quantify the results.

### “Forecasting” of experiment results.

A survey with “forecasts”, conducted before the experiment, showed that participants significantly underestimate the power of informal norms which refer to color usage in urban environment (Table 2). Such a result was rather surprising for us due to the fact that the authors of all previously conducted experiments<sup>10</sup> recorded an opposite reaction. In the previously conducted surveys participants, on the contrary, overestimated the power of informal norms and their forecasts were much lower than actual values.

	Zadneprovskiy district		Promyshlenny district		Leninskiy district		$\Sigma$
	m	m	m	f	m	f	
“Forecast”	100	100	100	58	75	75	87
Actual value	57	71	63	25	38	50	47

Table 2. “Forecasting” accuracy of experiment results (%)

**Participants' reaction.**

Almost half of the residents (47%) agreed to the repaint of their house in dark and unknown colors (Table 3). However, the majority of the participants were angry and demanded some explanations. They did not expect anything of the kind and were obviously nervous. During the experiment the faces of the residents expressed surprise, puzzlement and different types of negative reactions (from resentment to indignation and aggression). Similar reactions were noted in the previously conducted experiments<sup>11</sup>.

Participants' reaction varied depending on their age. Young people showed the greatest degree of indifference. On the contrary, middle-aged residents rejected to agree with the experimenters' proposition. Gender and geographical differences turned out to be statistically insignificant. Statistical significance of differences was examined using F-test (Fisher's angular transformation).

**Experimenters' reaction.**

As in the experiment in the subway, experimenters' behavior was an important aspect of the research as well as residents' reaction, as they had to break unwritten rules. Noncompliance with residual norms turned out to be a difficult task for them. While observing gesture and complexion of experimenters, their self-esteem of emotional and general state during the experiment, we've quantitatively confirmed the fact of stressful impact on the breakers caused by the experimental situation, which was firstly noticed in American experiments. Experimenters felt guilty for disturbance and spreading of misinformation among people.

**Reaction of casual experiment witnesses.**

On the whole, in the majority of cases the reaction of casual experiment witnesses was rather weak and passive. During the experiment they usually silently observed the participants.

	Zadneprovskiy district		Promyshlennyy district		Leninskiy district		Σ
	m	f	m	f	m	F	
< 25	2 (100%)	1 (50%)	2 (67%)	2 (67%)	2 (67%)	2 (100%)	11 (73%)
25–50	1 (33%)	2 (67%)	1 (33%)	1 (20%)	1 (33%)	0 (0%)	6 (20%)
> 50	1 (50%)	2 (100%)	2 (100%)	0 (0%)	0 (0%)	2 (67%)	7 (47%)
	4 (57%)	5 (71%)	5 (63%)	3 (25%)	3 (38%)	4 (50%)	
Σ	9 (64%)		8 (40%)		7 (44%)		24 (47%)

Table 3. The number of experiment participants who conceded

### Conclusions

The experiment allowed to draw a number of important conclusions.

*Firstly*, urban coloristics is regulated by strict informal norms, that are not noticed by citizens until a violation occurs.

*Secondly*, the power of informal norms is significantly underestimated by citizens. The majority of them are accustomed to obey existing unwritten rules and their break causes a negative reaction and protest.

*Thirdly*, informal norms are equally obeyed by men and women. The reaction degree does not depend on the areas of residence (central, residential or blue-collar neighborhoods).

*Fourthly*, young people are characterized by the greatest degree of nonconformity. Middle-aged and senior citizens show evident conformity.

### Acknowledgments

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