Urban Colourscape Planning

----A Colour Study of the Architecture of Karlskrona

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Abstract

Our starting point is colour and the notion that colour makes a difference. We studied colour science and colour geography in order to research the architecture facades in Karlskrona. The first part of the paper introduces the significance of our study, background, research objective and methodology, along with the definitions of some concepts, and urban colourscape situation of foreign counties and China. The second part of the paper expounds problems of urban colourscape and discusses principles, significance and function of urban colourscape planning. The third part of the paper analyses the colourscape planning of Copenhagen in order to demonstrate the significance and process of colourscape planning. It also investigates geography, history and culture of Karlskrona. The fourth part of the paper has the results of our research--a colour program of Karlskrona's architecture. The fifth part of the paper summarize the whole thesis.

Key words: Colourscape; Urban Colourscape Planning; Karlskrona
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1. Introduction

1.1 Colour and significance of our study

Colour, which is the reflective performance of light on different materials, makes the world colourful. Russian esthetician Chernyshevsky said: 'The sense of beauty cannot be separated with hearing and vision.' And 'the sense of colour is the most popular form in the sense of beauty' (Karl Heinrich Marx & Friedrich Engels, 1963:145). People get refreshing feelings as well as restless mind because of different colours. Colour is described in various ways. It can be seen, but cannot be touched; it is a natural material, and it is assimilated by the civilization; it has no weight, but it is able to shake peoples' hearts. Colour is like free air, and it does affect our lives all the time. The colours of plants and pavements will bring people the feeling of excitement or tranquility. The colours of the surrounding will arouse different feelings in people with the change of the quality of the colour. In addition, a specific colour can give people certain sense of distance, weight and scale.

From ancient times to today, people have recognized the intricacy of colours more deeply, but scientific, independent research did not begin until modern times. Chromatology is closely related to the development of optics. It has been 300 years since Newton's 'spectral theory'. Over the years, people not only have a deeper understanding of colour's formation, but also develop a series of disciplines in colour application. The most important field is urban colour, and colour research are beginning to pay more attention to how people have different physiological reaction to different colours and scientifically use colour for the urban dwellers to create a pleasing, lively and comfortable environment. According to the findings of the research on urban colourscape planning and design, colour is a breakthrough point. Colour, which is indispensable for a city, should be given a comprehensive and long-term scheme and a creative vision, in urban reform.

In the various factors which influence the character of a city, colour with its feature of
"first sight" is undoubtedly a basic factor for creating a special city. Therefore, the success of urban colourscape planning and construction can greatly enhance a city's overall image and charisma, and thus it is an intangible asset of enormous value. Buildings are the main part of a city, so is the colour of the buildings. White, gray, yellow, red, blue, black and brown are the colours that people frequently apply to buildings and these colours activate the architecture of a city. It is true that there are stiff, dull and monotonous colour schemes in the world. In addition, different people have different demands. For example, young people enjoy warm colours; middle-aged people love neutral colours and the elder people prefer cool colours. In order to meet the demands of different groups of people, we usually design the colour, shape and line posture of the plant, and adopt different colours and patterns to the pavement, so that urban environment can be soft, elegant, clean, and pleasant.

Significance of our study

1.1.1 Psychological function of colour in the environment

People usually depend on their sense of sight in an environment, and colour is is usually the first thing to "see". It not only affects the sense of beauty, but also has an impact on people's emotion and the efficiency of living and working. According to certain research, when people are in the green environment, their temperature of skin and pulse would decrease by 1-2 degrees per minute and 4-8 times per minute, and they breathe slower, their blood pressure decreased, and the burden of the heart eased; people become quiet and are able to deal with the reality more calmly. It explains why almost all the hospital operating rooms are green, and nowadays people tend to choose green to decorate the environment.

Heart research has proved that colour has impact on human mental health, and there are a lot of fresh cases to prove that urban colour has an effect on the urban residents' psychology. A few years ago, there was a civil colourific commotion in Japanese Tokyo.
Many citizens felt dizzy and became irritable when they faced the buses and taxies with colours of high-saturation, as well as psychedelic colourful flashing neon lights, and colourful and dazzling advertisements on the glass curtain wall. So they brought forward a severe criticism to force the Tokyo municipal authorities to correct the colour deviation and end the public restlessness and unease. (Aihe Chen, 2002) Therefore, using colour properly in the urban planning and design can not only help people feel better, but also improve people's life.

1.1.2 Physical function of colour in the environment

Colour is the most important part of urban beauty, and it is also an important factor in the quality of urban residents' life. We study urban colourscape planning and design to continue to beautify the urban living environment. Western poet Holderlin said: 'What has always made a hell on the earth has been that man has tried to make it his heaven.' (Johan Holderlin, 2004) Today, most of European countries and the United States have achieved the dream of 'poetically inhabits', and it results from their attention to urban colourscape planning and control over the years. The design for every single buildings as well as for the whole community, and furthermore the whole city. When people walk in the streets, they are feel from dazzling colours and huge advertisements to annoy vision. Urban landscape with simple and harmonious colour is perfect environment which gives people the feeling of pleasure, and comfort.

1.1.3 Cultural function of colour in the environment

American urban planning expert Eliel Saarinen\(^1\) once said: "Let me see your city, and I will be able to tell you what the city's residents are in the pursuit of culture." (Wu Ye) Colour as one of the most representative factors of the urban face, itself is a sort of accumulation of internal contact. This historical culture has a subtle role in the

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\(^1\) Gottlieb Eliel Saarinen (August 20, 1873, Rantasalmi, Finland – July 1, 1950, Bloomfield Hills, Michigan, United States) was a Finnish architect who became famous for his art nouveau buildings in the early years of the 20th century.
development of the aesthetic taste of the residents in the city. Whether it is the yellow walls and red tiles in Beijing or the white walls and gray tiles in Suzhou, the colours are fit for the aesthetics of the residents; they are not only the incarnations of different national aesthetic tastes, but also part of different cultural traditions. Therefore, colour expresses urban historical tradition, characteristics and local culture. These are important factors in various ways to show the development of urban and social life. If the traditional colour of a city is damaged because of the passage of time and economic development, the culture with it will vanish and the city is left with loss of culture. The urban colourscape planning and design can not only help people preserve their culture, but also has an important role in the development of the tourism and economy if it can convey the personality and characteristics of the city successfully.

1.2 Thesis background

Jean-Philippe Lenclos firstly put forward the concept of "Colour geography" (Jean-Philippe Lenclos, 1997) on the basis of substantial social practice basis; 'Colour geography' is the original term used by professor Lenclos, and it is the study of colour from a perspective of geography and culture. He thought geography is the foundation of the cultural meanings of colours. Different geographical location and physical environment have a unique climate, and thus they will affect human beings, race, customs, and cultures and so on; different aesthetic tastes results from these factors. The first research began in France, and it focused on landscape architecture; then similar studies began in other European countries and other continents, and the research is carried out all over the world. He thought: 'The colours of different colours and urban architectures were different because they were at different geographical location and they were influenced by different cultures; this means both the natural geographical conditions and cultures decide the colours of a region or an urban architecture.'(Jiao Yan, 2003) Therefore, the objects that he studies are traditional architectures, and he takes little care of the industrial civilization of modern cities.
Lenclos' key work focuses on commanding the composition of the colours in a city, a region, and even a country as comprehensive as possible, and then he explains that there is a close relationship between architecture colour and local natural environment (such as local materials, weather condition, etc) and humanities geographical environment (local cultural traditions, customs, etc). Lenclos strongly advocated the protection of local culture, and he showed strong interest in different regions and cultures and architecture materials and colour differences. Therefore, his work aims at the villages and small towns which has a strong local position and a long history; many of the researched architectures are traditional, and he rarely paid attention to modern cities with heavily industrialized. Nevertheless, Lenclos's theory and research of "colour geography" is widely recognized in the academia. The theory of Colour geography has quite a profound impact on colour research all around the world.

Jean-Philippe Lenclos's colourscape investigation is divided into two steps; the first step is landscape analysis, and the second step is to sum up visual effects. The main task of landscape analysis is to investigate colour data, from the perspective of colour, considering all the elements which would affect the quality of the colourscape, and to carry out qualitative analysis of the elements of landscape colour through a series of instruments. These processes include material extraction, colour sampling, materials' brightness rating, on-site sketches, and shooting pictures and so on. When it comes to too complicated colour, we choose to simplify the explanation of the composition of the colour, and show the proportions of main colours respectively, decorative colours and surrounding colour. Jean-Philippe Lenclos' focus is on local chromatography collection, conclusion and collection, and Lenclos did not touch upon urban colourscape planning and design. Nevertheless, his research is quite significant to further studies and protection of the local colour of the city. At the same time, the research methods that established by Lenclos provide unshakable guidance for later researchers in colour data collection and summary. (Yin Enqin, 2003)
1.3 Research objective and methodology

1.3.1 Research purpose

Our study has two main research purposes. The first one is that urban colourscape planning is a new field in urban planning. There are many successful cases in western developed countries, but the scope of urban colourscape planning is not too wide; many small and young cities don't have their own and independent colourscape program. We want to gain some necessary experience and advantaged knowledge from the case study of Copenhagen.

The second one is to formulate a colourscape program for the city of Karlskrona. Karlskrona was founded in 1680, and it is a young and growing city; there is some room for improvement in its progress. In urban planning, there are a lot of aspects to be developed, and Karlskrona don't have its own urban colourscape program. We hope that we could develop a colourscape program for Karlskrona through our research. Colour research includes many factors, but because of the limitation of time and in order to be more targeted, our thesis will focus on the architecture colour as the key objective. Our research methods are based on the theories of Jean-Philippe Lenclos, which emphasize the local characteristics and the traditional architecture with a long history. We also hold that the architecture could carry all the urban changes in its history and development. So we will focus on architecture colour in Karlskrona.

1.3.2 Research methodology

The best way of feeling a city's colourscape is perceiving through people's experiences. Urban experience important way to the research of the relationship of urban colourscape. The aim to research the relationship of urban colourscape is to study urban colour history and the current situation, and to analyze the urban nature, scale and cultural factors. Through confirming the current colour relations of the city, understanding the characteristics of the city, we could abstract the urban
chromatogram and provide a real foundation to safeguard the development of the urban landscape; thus these are the basis for further planning. When the urban colourscape relation is observed and reflected as the aesthetic object, the methodology of aesthetics will be borrowed; it is an effective way to research and analyze the relationships of urban colourscape when experience is regarded as the original aim.

Japanese colourscape expert Shingo Yoshida believes that it is very important to research deeply the local colourscape before confirming an area's colour characteristics. Building should not only be regarded as something of single colour, but also observed horizontally with the background colours in the surrounding. The key to this comparison is to interact with the city constantly. Urban experience includes people-to-city interaction and people-to-people interaction.

When it comes to the people-to-people interaction, colour psychology becomes very important to the public perception. We could make interviews and make questionnaires with the methods used in the sociological research, and the content includes urban building colour, characteristics of the landscape colour and so on.

The other kind of experience is that with people-to-city experience to understand the city; the main approaches are reading literature and collecting data. Meanwhile we should maintain a high degree of sense to nature; after all, the geographical dimensions of cities are the original dynamic of colour relationships.

1.3.2.1 Material review

Reading literature can help to get the basic text information to understand the city from others' points of view. Actually it is the indirect of the relationship between urban and colourscape. The purpose is to investigate the urban geography and historical development, and to find out the urban colour history and cultural context. Certainly,

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2 The chairman in Color Planning Center of Japan.
the urban current situation is an important factor for people who live in the city in setting up the urban image, and it is materialized by the walking. Another important task of reading literature is to study the comprehensive planning of the city. In accordance with the comprehensive planning of the city, we should designate the scope of protection and manage to know the fashion of conservation such as cultural relics and local folklore, and get a preliminary understanding of the local colour, and make a preliminary judge is protecting the regional colour. In addition, we should understand the spatial structure of urban layout, such as the layout in main residential areas, commercial areas and industrial area; areas of different functions have different psychological demands, and it comes from the different people psychological reactions.

1.3.2.2 Data collection

About the data collecting, we interviewed Karlskrona under the help of Agneta Ericsson who is working for Blekinge museum. We used digital cameras to take pictures of architectures of different period, so that record urban experience. It is also the basic pattern of the latter colourscape description and analysis of the atlas. Meanwhile we inquired the information about the construction time of the architecture, the street name where the architecture is located, the designer's name, and so on. In this process, we used Natural Colour System (NCS) to compare the colours and the corresponding standard colours; the comparison is for the analysis of preparing the establishment of chromatogram. City experience is to get the perceptual knowledge, and to relate the architectures to those described in literature; both goals intend to show the preliminary outline of the basic urban tone. About the NCS system, we will give more details in the next section.

Experience is an important part in the colourscape investigation, and also is the premise of urban colourscape planning. In 20th century, the advocate of the philosophy, the German philosopher Edmund Husserl put forward the famous motto "To the things themselves"; that means we should attach importance to the direct
experience. Similarly, Emond Bacon put forward the concept of "Simultaneous movement systems", and he pointed out that "exercise on the road" is the basis for the public "urban experience"

In short, the people-to-city, person-to-people experiences in the city are important and effective research methods; the objective and subjective urban chromatography is the basis of the research of the relationship between urban colour planning and controlling.

1.3.2.3 The NCS system

Origins

The NCS system was developed, under the direction of Anders Hård, at the Swedish Colour Centre Foundation, which was found in 1964 on the initiative of the Royal Swedish Academy of Engineering Sciences (IVA), The Swedish Society of Crafts and Design and Swedish industry (Berit Bergström, 2008: 17). The original plan was to prove the system experimentally which was described by Johansson, and this method is used to create a new colour atlas in which the colour atlas would be consistent with the system in the course of work, the team would mention Hering's original concept of six elementary colours again (Berit Bergström, 2008: 17).

The colour assessment experiments

The NCS system was built up during nearly 20 years' research. The main task is ordering and denoting these colours according to the potentialities and limitations of human vision. In a large number of colour assessment experiments, people were asked to look at the colour, and then they estimated the close relationship among the six elementary colours. In the last period of the experimental documentation of NCS, 50 people participated in these colour assessments and more than 60,000 different colour assessments were made. The series of experimental results were analyzed, processed and computerized. These human subjective assessments were compared with objective
instrumental quantitative data in terms of the physical properties of the colour samples assessed and ordered (Berit Bergström, 2008: 17).

About the structure

Unlike many other colour systems, NCS is entirely based on the colour that people are able to see. People choose colour with the sense of sight. 'The way in which a colour is mixed or its physical quantitative data are, for the most part, only if interest to producers and manufacturers' (Berit Bergström, 2008: 17). An NCS colour notation provides a clear description of a specific colour perception and presents nothing concerning the pigments, light rays or signals bringing about this particular observation of colour.

The NCS system is based on six elementary colours (Figure 1) that are called pure by people. The four colours are yellow(Y), red(R), blue (B) and green (G), and at the same time, white (W) and black(S) are achromatic elementary colours. 'Compare this with the first six colour words entering the language, which correspond to the six elementary colours of NCS' (Berit Bergström, 2008: 17).

All the other colours could be described according to their relationships with the elementary colours. With the change of the degree of the similarity to the elementary colours, all of the interrelationship between the colours could be described in a three-dimensional descriptive space, the NCS Colour Space (Figure 2).
This encompasses the whole perceptual "world of colour" consisting of what are called surface colours, and thus it becomes possible to denote any colour perception. To simplify the description we usually present the colour in two projections- the Colour Circle and the Colour Triangle (Berit Bergström, 2008: 18)' (Figure 3, Figure 4).

Each quarter of the Colour Circle is divided into 100 steps, giving the hue a clear notation. The hue notation is composed by two letters of the alphabet to denote the properties of the elementary colours, and a digit indicator of their relative sizes. The Colour Triangle presents the small differences between the colours. It shows how similar other colours are to white and black and to the colour of maximum chromaticness (C), which lacks any resemblance to white and black, in each hue. The small differences and chromaticness notations together constitute the complete colour designation as per NCS. 'Starting from the gradable similarities to the elementary colours, both similarities and relations between colours are found in NCS' (Berit Bergström, 2008: 19).

The NCS colour atlas

The NCS system is showed in the NCS Colour Atlas. It is the main aim to describe the
structure of the NCS system with the aid of samples, and also to show a complete selection of colour samples and intended for colour-scheming and the blending of colours. 'The selection of colours is based principally on every tenth step in the properties of blackness, chromaticness and hue' (Berit Bergström, 2008: 19).

A general colour notation system

(Figure 5) The hue notation Y90R shows that there is yellow with 90 per cent redness and thus 10 per cent yellowness; the nuance notation 1050 presents that colour has 10 per cent blackness and 50 per cent chromaticness, and the rest 40 per cent is whiteness. 1050-Y90R is a clear definition of a colour which is usually called orange red by people.

What we mention above is an general introduction about the NCS system and how to express the colour with the NCS system. In the further research, we will use these to indicate the results (Berit Bergström, 2008: 20).

1.4 The defined concept

1.4.1 The concept of urban colourscape

1.4.1.1 The concept of urban colourscape

Being urban means being a densely populated city. Urban colourscape is a colour summation of the exposed and external objects that could be perceived in urban public space (Yin Enqin, 2003:9). Urban underground facilities and ground-based architecture and interior decoration have nothing to do with urban colourscape; the colour of the ground-level architecture cannot be perceived; so it is not included in the urban colourscape. Eliel Saarinen once said: "Let me see your city, and I will be able to tell you what the city's residents are in the pursuit of culture." (Yi Haiyong) Each city
has its own unique colour tone during its development because of its natural history and cultural environment; it is an important part of the urban culture and urban style. Because of colour resulting from light refraction, a variety of objects of colours will change according to the surface texture, the degree of light and environmental impact, and a colour of a city can be divided into the single primary colour and the visual effects colour. A yellow building, when is built on at the foot of a mountain side, or by itself independent, or is with a crevice will have different colour effects.

1.4.1.2 The concept of urban colourscape planning

Urban colourscape (Michael Lancaster, 1996) planning means to plan and design in the aspect of urban colourscape layout, including reforming the old cities and developing the new cities. Urban colourscape planning at this stage is mainly in the narrow sense. Urban colourscape planning is, comprehensively, analyzing and planning all the factors that will affect the colours, and determining the main colour, secondary colour and decorative colour system, and identifying all kinds of building and other objects' permanent colour, and determining some decorated and ambulatory objects' temporary colour in the street such as urban advertisement and public vehicles. Integrated urban colourscape planning should unify all the elements that make up the urban colourscape, and identify the basic colour of buildings and other objects, including the urban advertisements, public buses, windows which face the streets and the colour of the objects on the windows.

1.4.2 The categories of urban colourscape

Urban colourscape comprises natural colour and artificial colour (or known as the cultural colour).

1.4.2.1 Natural colour

Urban bare land (including dirt roads), rocks, grass, trees, rivers, coastal areas as well as the sky and so on, generate natural colours. Natural colour includes two aspects: dynamic and static; dynamic colour means all elements including sunshine, seasonal
and climate factors that affect the colour; and static colour means the elements such as
the land (including dirt roads), rocks, vegetation, water have relatively stable colours.

Beauty of the colour comes from the fact that nature edifies human. For humanity,
colours of nature are always easy to accept, and the most beautiful. Therefore, the urban
colourscape planning should try to protect the outstanding natural colour especially the
natural colour of trees, grasslands, rivers rather than fighting against natural colour. The
colour of a city which is surrounded by forests or ocean should be distinguished from that
of inland cities or megacities. Even the use of colour is bold in green around town; it
would not undermine harmony of urban colourscape. We should try to treat the existing
natural colour as the urban background, constitute an urban background, and have the
cultural colours follow the natural colours; that is a shortcut to make the urban
colourscape harmonious (Research on urban colourscape planning in significance and
principles).

1.4.2.2 Artificial colour
Artificial colour mainly refers to the colour of urban buildings, structures, roads, street
furniture, advertising, transport and so on. In the composition of the urban artificial
colour, the colour can also be divided into fixed colour and mobile colour, permanent
colour and temporary colour. Various urban permanent buildings, structures, transportation facilities, streets, squares, urban sculptures make up the fixed permanent
colour; urban transport vehicles, pedestrians' clothing constitute the mobile colour;
urban advertisements, logo signs, kiosks, street lamps, neon lights and windows, display
of the bay windows make up the temporary colour (LHYHXY-4).

1.5 The factors that influence the urban colourscape

1.5.1 Geography and climate
Geography and climate are important factors for urban character and urban
development. From the perspective of geography and climate, the city was classified as
the winter city, the tropical city, the temperate city, the coastal city, the mountain city, the plains city, and so on. They have different characters; for example, the building colour in the Mediterranean coastal cities is golden and the urban environment in the Nordic is heavy.

1.5.2 Historical context

If the urban colourscape was formed with the historical accumulation, it would become the carrier of the cultural of the city, and constantly displaying the city's culture and history. Because of the differences in national faith, history and customs, different countries and cities have different colour preferences and they will create unique urban colourscape styles. In addition, the urban colourscape of different time reflects contemporary economic level and mainstream culture. For example, in the 1950's the brick once prevailed in Chinese cities, and the whole country was a piece of red; some areas began to have treatment of stone wall in the 1960's, and the whole cities appeared to be gray; then in the 1980's, the white stick brick with the sapphire glass was very popular, and such architectures are still seen today.

If the traditional colour of a city can be destroyed arbitrarily, it will cut off his history and reveal a pale face. Therefore, protecting urban colourscape of a city is as important as protecting its cultural heritage. If the original urban style was destroyed, at least the new colour of buildings that are around the historical architecture and cultural heritage must harmonize with the ancient architecture colour.

Urban colourscape and urban history and culture complement each other. Therefore, we should focus on the urban historical and culture in the urban colourscape planning, and adopt the principle of "exploration-succession-development", so that we can study the historical characteristics of the city deeply, develop them, and form new features.

1.5.3 Development of technology
With the social development and progress of science and technology, technology continually develops, and it provides more opportunities to the performance of urban colourscape, and also affects the traditional urban colourscape; it affects the further development of the urban colourscape. In recent years, academia and urban workers focus on the discussion of the urban night colourscape and it is also a new field and it is closely connected with technological development; it provides new opportunities for the development of urban colourscape.

1.6 Urban colourscape situation of foreign counties and China

1.6.1 The symbolic meanings of colours

In this part, we want to illustrate the meanings of colours in different cultures. We choose Chinese traditional meanings of colours which we are familiar with. There are two typical colours that we focused on--Red and Yellow. Our analysis will give you some impressions of people's reactions to colours in China and other countries.

First of all, let's focus on red. In many countries and cultures, red has a function of expelling the evil. In China, red symbolized celebration and blessing. Lots of ancient palaces and temples have red walls. Ancient wedding clothes and the decorations are also red. Moreover, there are red lanterns, red firecrackers and so on. Chinese spring festival, the most important day in a year is also decorated with red. Furthermore, red symbolizes the proletarian revolution. In modern times, red has become synonymous with the proletarian revolution. Chinese five-star red flag, emblem and the party flag are all dominated by red. Meanwhile, red is a commonly used colour in Christmas; North American stock markets use red to express the fall of prices; but in East Asia, red means the rise of prices.

Secondly, we want to talk about yellow. Yellow is a symbol of authority, nobility and
elegance in China. Golden yellow is a symbol of wealth. For instance, the royal families liked using golden powder to decorate a variety of containers. Many sculptures, architecture were all decorated with golden yellow, and it made them appear magnificent. Yellow stands for Chinese culture and civilization, and it is also the colour which stands for Chinese nation. In Chinese feudal society, after the Song Dynasty, the light yellow was exclusive for emperor, and many palaces were decorated with yellow. In Chinese traditional culture, yellow has been given a supreme power. Only the emperor can wear the robes of yellow; ordinary people cannot wear yellow clothes. Any other person who did so would be killed. Till today, yellow and red are main colours in China.

In ancient Rome, yellow was also used as a noble colour; ordinary people are not allowed to use it. Buddhism in Southeast Asia, chooses yellow to express high religious significance. The halo around God and Buddha represents sacredness. Americans and Japanese think that yellow is a symbol of missing and expectancy. In Christianity, Judas wears the yellow clothes; therefore yellow is considered as the most vulgar colour in Europe and the United States. However, yellow represents liberals in international political organizations nowadays.

Next, we will come to the current state colour research in Europe and China.

1.6.2 Foreign urban colourscape situation

Developed countries began to pay attention to the urban landscape colour design in the early 1960's; they believed it is an important factor in the improvement of urban environment and character, and did systematic researches to a considerable depth. In recent years, there are a French well-known colour expert Jean-Philippe Lenclos and an institution called Japanese Colour Planning Center (Yin Enjin, 2003: 68-73).

As for Jean-Philippe Lenclos, his research has been mentioned in the background information.
Japanese Colour Planning Center established the study on the basis of Jean-Philippe Lenclos's research. They mainly study the overall environmental colourscape of the city; meanwhile they set down urban colourscape decrees for Japan's urban management department. Technically, the center uses electronic colour measuring instruments for sampling colour. They do the data marker using Munsell's colour system\(^3\) and Japanese practical colour coordinate system; the aim is to analyze these data used for the architecture colour and planning with a more rational attitude.

At present, Japanese urban landscape colour management is primarily actualized by local guides, regional planning and urban landscape law. In March 1995 in Osaka, "Urban landscape Basic Planning in Osaka" and "urban colourscape planning in Osaka" are used to solve the problem of colour chaos, and to create harmonious and high-quality colour landscape.

Turin is the first Italian city that put the colourscape planning into the urban planning. Since 1800 (City needs colourscape planning); they established a special committee in order to develop and use yellow 'Turin', a colour of local characteristic, in the urban planning of the whole city. 'Planning emphasizes the environmental specifications, and there is sophisticated colour

\(^3\) In colorimetry, the Munsell color system is a colour space that specifies colors based on three color dimensions: hue, value (lightness), and chroma (color purity or colorfulness). It was created by Professor Albert H. Munsell in the first decade of the 20th century and adopted by the USDA as the official color system for soil research in the 1930's.
illumination. All the streets and some of the squares use a colour system; Minor streets should use a richer tone' (Jin Lei, 1992:32). With research in 50 years, the Commitee put forward urban colour atlas that becomes the colour characterizing in Turin; it is considered by the future generations. But a century later, because the colour is too monotonous in Turin, 'Yellow Turin' becomes a derogatory term. In 1978, Professor Iovanm Brion of Polytechnic University(Turin Politechico Di Torino) presided over the restoration of the urban colour in Turin, and the city has a new life (Figure 6) (Michael Lancaster, 1996: 82-85).

In addition, people in areas which are adjacent to Korea are studying residential colour design of urban landscape. They not only put forward a series of colourscape planning concepts concerning urban development, but also establish different construction guidances for the colourscape planning so as to ensure the coordination between the surface colour of the architecture and urban comprehensive planning.

These examples show that: the urban landscape colour in developed countries has been incorporated into the overall urban planning. The developed countries put the sustainable development as a social responsibility, and actively import advanced colour concepts, and try every means to eliminate the phenomena of colour pollution and colour convergence in urban development.

Understanding and application of colourscape is changing with every country's urban environmental development and improvement. Urban colourscape planning is changing from the microscopic decoration in a single building to microscopic colourscape planning and application research in a city. Taking current ideas of urban environment planning and design all over the world into consideration, urban colourscape planning is developing toward humanization, regionalism, functionality and logos.

First, great attachment to and respect for environment, and the awareness of the
importance of returning to nature the environment and understanding the return to the nature make people rethink and relocate a series of urban colourscape plannings. To protect the natural environment, urban colourscape planning should follow the principles of sustainable development, non-pollution, and reuse. Different climatic conditions, geographical conditions and other factors should also be considered as important factors in urban colourscape planning. In the view of humanity, attaching importance to cultural identity, geographical features and traditional character should be the most significant factors and be studied to depth.

Second, the most important trend in current planning is the respect for human beings, and that means 'people-oriented'. Respect for human beings includes a lot of aspects, specially the visual factors. Exaggerated colours will result in restlessness, uncertainty and dazzle, and it will add burden to people mentally and emotionally.

In the urban colourscape, many developed western countries formed their own unique characteristics. Boston's main tone is dark red brick carrying forward the history; New York's bizarre neon lights stand out as the highlight; Washington's gray white granite against blue sky constitutes the capital chromatography; Chicago will give People impressions of calmness and elegance through a gray tone. In contrast, Chinese cities are centuries-old, but the majority of cities are lacking of personality and charm of colourscape because of late start.

1.6.3 Chinese urban colourscape situation

At present, Chinese urban colourscape planning and research drop behind that of the developed countries, especially the theoretical research and the practical application. Overall, Chinese colourscape research has a late start. Chinese planners cite and draw lessons from the western scientific colourscape theories; on the basis of study, they do researches more often on basic colourscape theory, colourscape measurement and practicable colourscape. For example, colourscape Standardization Technical Committee of China was established in 1988, and completed "Chinese colourscape
System Research" in 1993; it formulated the the national standards of Chinese colourscape system and thus China has had its own standard system in colourscape measurement among all the colour researches, Architecture colour research are mainly two types.

One is about the colour standard study and there are two major results. First, "Architecture colourscape System and Architecture colour Card" which is set down by the Chinese Architecture Institute of Science established the Chinese architecture colourscape system and colour card which provides help to architects and construction workers. The second is about the colour research of Chinese ancient architectures, which is carried out by the Chinese Institute of Science and Technology Physics Building, State Cultural Relics Bureau, the National Palace Museum, Chinese Institute of Science and Technology Optical Metrology Department, Chinese Heritage and Archeology Department, Chinese Academy of Social Sciences. They carry out comprehensive and systematic research on the colours of existing classical architectures nationwide; meanwhile as the main research objects, Beijing Ming and Qing Forbidden City palace nationwide. On the one hand, researchers explored the research methods when they try to discover the colour standards of classical Chinese architecture; on the other hand, they proposed a set of standard colour models of typical Chinese architecture. The study is significant for the protection and restoration of the Chinese architecture; they created colour database of the Chinese classical architecture which provides a scientific basis for the protection of ancient architecture.

The other kind of research is on colourscape planning in a single building. As we do in the exposition of building space, modeling, we should study architecture colourscape as the design language which expatiates how to use colourscape theory to better realize the design. These studies focused on the individual building and interior building areas, but the exposition of the colourscape planning from the angle of the external environment and urban landscape is limited or even not mentioned.

Other cities’ about colour research is also on the way. For example, Professor Zhang
Hongyan of Nanjing University presides over '21st century a new image and countermeasures in Nanjing', and puts the urban concepts and main colours into it. Wuhan also submitted "colour management prescript about Wuhan urban construction" and "Technical Guidelines of the Colour control in Wuhan's urban architecture", and they are waiting for the expert opinions. In recent years, the colour consulting industry in Beijing and other cities contributes to Chinese urban construction. At the same time, Chinese Fashion Colour Association actively promotes the concept of colour-China, and to some degrees explains that colour is playing a positive role and has an important role in the modern life.

By the end of 2004, a summit about the colour and urban life was held in Beijing. Thirty world well-known colour experts from eighteen member countries attended the meeting; the aim was to shape Chinese cities’ image and urban environmental colour condition.

In short, Chinese current social development and urban construction have significantly reflected that Chinese people have an urgent need to improve the aesthetic quality of their living environment. On the other hand, it has fully exposed the deficiency in urban colourscape planning. Studies of Chinese urban planning theory have already begun in the 80's, but the development of the cities is much faster than the implementation of urban design directions. Urban colourscape planning is a fundamental part of urban planning, but it did not receive enough attention for a long time; thus by now there is no treatise about systemic methodology of the urban colourscape planning. Beijing took the lead in launching the advocacy and practice of "Building urban main colours", and it is a positive meaning on starting point; it means that people's understanding of urban construction and management has reached a new height.
Therefore, in order to make up for the blank and shortage in the field of urban colour landscape research in China and learn from the international advanced colourscape planning, it will be vital to investigate and analyze the colourscape usage and theoretical studies in China and other countries and to set up a series of urban planning theories and the operation of the system for the urban planning and management department. In order to achieve a harmonious unity, beauty and pleasant urban landscape and to be able to properly reflect the local culture and good traditions, we should carry out scientific research and feasibility studies as the theoretical foundation, and we need strong urban landscape laws and regulations.

Chinese study of urban landscape colour is still in the initial stage, but it has a good start. As more architects, planners and designers put importance upon colour, we believe that there will be relatively good results (Zuo, Zhugong).
2. The characteristics of urban colourscape

2.1 The problems of urban colourscape

2.1.1 Commercial tendency of urban colourscape

At present, there is a tendency of commercialization in urban colourscape design and planning. It is very obvious in treating the city as a place for advertisements. Large-scale, light boxes of full chroma are put on buildings' roofs, facades or street squares arbitrarily. Even some landmark buildings are tied with some colourful advertisements which makes the entire city disordered. In particular, stores have colourful advertisements and light boxes. That does not only destroy the original colour of buildings, but also causes colour pollution, making the city noisy and strenuous. The pedestrians may feel dizzy. Therefore, the government should pass laws to restrict colourful advertisements. Shops should replace the old signs with new ones of taste.

2.1.2 Hegemonic tendency of urban colourscape

Because colour itself can be a language, people can get information from it. Many new buildings are fighting for the hegemony with new colours. Some powerful units and enterprises paint their buildings with many colours. They do not consider urban colourscape coordination, but significant hegemony. They may use the most fashionable materials and the brightest colour to decorate the buildings. Thus, people can see buildings with gold glass wall standing in a group of gray buildings. Many businessmen want to stand unique in urban city to show their style, so they paint the buildings with bright colours. These buildings usually are of a large size so that they may cause serious consequences. Therefore, legislation is needed.

2.1.3 The Fashionable tendency of urban colourscape

Because of the lack of research, advocacy and planning on urban coloursape, people
have the problem of using the fashionable colour. In most cases, people who are in charge of the urban construction, architects and building owners may not have commercial purposes or powerful motivation, but they usually want to catch up with fashion which makes a mess of colour. Fashion does not mean beauty, and strong economy does not mean cultural development. Different buildings have different construction dates. People can't follow fashion trends blindly without considering that their actions might be in contravention of the aesthetics and cultural heritage of the building itself.

### 2.2 The composition of urban colourscape

The basic colour of a city is not only one colour, but certain lightness, purity within the scope of its tone or colour system. Basic hue occupies the proportion of 75% in order to play a leading role; auxiliary colour occupies 20%; decorative colour occupies only 5% in order to form a stable and overall colour environment (Urban colourscape).

1. Basic colour: The walls outside show the main colour, and they have the largest area and the longest observation time from people.

2. Auxiliary colour: Another kind of objects outside the walls should coordinate with the basic colour and allow certain changes in the hue, brightness and high degree of colours.

3. Decorative colour: Architecture needs to be decorated by some colours, such as in the building's entrances, signs, roofs, cornices and other decorative details. The area of the decorative colour should be no larger than that of the auxiliary colour; however it can have a great change in the hue, brightness and richness against the basic colour.

Any kind of colours are available through a variety ways of a colour modulation, which is called colour mode. International standard colours use CMYK mode which is composed of four colours—Cyan, Magenta, Yellow and Black. By adjusting The
proportions of the four colours, you can get a variety of colours. Once the proportions of four colours are clear, the corresponding colour could be found in the international standard colour standard. There is no need of complex considerations of the hue, saturation and brightness, and other factors.

2.3 The principles and significance of urban colourscape planning

2.3.1 The principles of urban colourscape planning

Successful implementation of urban colourscape planning should not only depend on personal feeling, but also adhere to the following principles of urban colourscape planning (Ming, Yi).

2.3.1.1 The principle of outstanding natural and human beauty

Colour beauty of humanity is from natural temperament to people. For humanity, nature's original colour is always easy to accept. Therefore, the urban colour should try to reflect the outstanding natural colour especially the natural colour of trees, grasslands and rivers rather than competing with natural colour.

Heraclitus⁴ said that the most beautiful monkey is also ugly to humans, because man-made aesthetic objects are always human. Therefore, in urban colourscape planning, it is necessary to make large areas of colour that do not exaggerate in order to highlight the beauty of human. The most beautiful sceneries in Paris streets are the girls who wear fashionable clothes. While the ground and the walls are elegant gray and beige in Paris, it highlights the beauty of flowing crowd colours (Ming, Yi).

2.3.1.2 The principle of continuing urban colourscape history

⁴ A western philosopher from Ancient Greece, 540BC - 480BC.
Because of the social and natural conditions, every city in the development process will form a special and local favorite colour. In urban colourscape planning, local colour must be taken into account to adapt local climate and environment while also respecting people's traditional colours and paying attention to local history of continuity. The use of colour reflects an urban colourscape style and cultural temperament. Urban colour accumulates history of a city.

Some colours reflect political, economic and cultural trends. For instance, in Beijing Imperial City where golden roofs contrast with residential gray roofs, it is Chinese feudal society's portrayal of imperial supremacy. Some colours of buildings are the result of natural result. For example, southern cities in China use gray tiles and white walls, and German cities use red tiles and yellow walls. Whether white walls or yellow walls, they contribute to the area's aesthetics. It is not only the results of aesthetic from different nationality, but also forms different cultural traditions.

If you only observe churches in European cities, they seem the same. However, if you observe residential areas, there are many differences between Venice and Amsterdam. Although some walls' paints are new, their colours are in history. Once the urban colourscape is molded, it will become the carrier of urban culture and stand for a historical process. Therefore, cities should not change traditional colours; doing so, then it means cutting off the urban history.

2.3.1.3 The principle of obeying urban function districts.

Urban colourscape should obey functional requirements. The first requirement is a city's overall function. Second, it is the function of city districts. Colour differences between a commercial city and a cultural city should be distinguished; the colour between a major city and a small city should also be distinguished.

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5 We had study trips to these two cities. Venice's basic colour is soil red. The basic colours of Amsterdam are brown, wine red, and brown-orange.
In commercial metropolis such as Hong Kong, urban colour obeys the commercial purpose. Although there are some confusing colours, people can tolerate this. For some cultural cities such as Paris and Vienna, if their urban colour is confused, it can majorly damage the urban image. Milan, Italian's first financial centre, has a very dignified tone in the old city, but Venice, as a tourist city, has livelier colour than Milan. The coloured of two cities cannot be exchanged.

Because of the different functions of modern cities, colour tone should be different. The colour of City Administrative Center (or square) should be grave in general; the colour of industrial areas should be simple and sprightly; the colour of business districts is generally eye-catching, bright to attract people's attention in order to boost consumption; cultural districts require elegant and subtle colours in order to display the cultural heritage; entertainment districts require lively and clear colour, and this kind of colour is able to mobilize the optimistic mood; residential areas generally use bright, warm, soft tones to satisfy the environmental requirement; office areas trend to have neutral or cool colours in order to embody a rational and cool work attitude.

2.3.1.4 The principle of harmony of urban colourscape

Harmony is not only the core principle of using colour, and it is also the main principle of urban colourscape. It includes all kinds of urban colourscape composition factors, such as natural, artificial, fixed, flow, permanent and temporary colour, and so on. Harmony requires that urban colourscape can be unify and coordinate differences. If there is no change in colour, there is no harmony. But if the change is too large, there will be also no harmony. There are two aspects of the coordination of urban colourscape. One is coordination between the artificial colour and natural colour or urban natural environmental colour; the other one is coordination between the artificial colour and artificial colour or urban building's environmental colour.

Urban colourscape should harmonize with natural environmental colour. A city embraced by green forest or blue ocean, its colour should be distinguished from an
inland city or a mega-city. If a small green city uses too intense colours, it would no undermine the harmony of the urban colourscape. In small European cities which attract many tourists like Innsbruck and Salzburg, they use bright colours on the buildings. The reasons are as follows: Small cities outside are often surrounded by large green mountains and rivers, or pure white snow in winter. If city streetscape is warm red, it is easier to find a balance in the whole. If the colour is too gray in the Ocean cities, it will lose vitality. Therefore, the main tune of Venice is warm red, but it does not give a disorderly feeling, but it is vibrant. In the condition of existing natural colour, we should try to make it constitute an urban background, and the cultural colours obey the natural colours; that is a shortcut to make the urban colourscape harmonious. The Chinese city of Qingdao is a good example of using colour. The whole urban colour is "red tiles, green trees, blue water, blue sky"; the only artificial colour is "red", and the rest are natural colours. The natural colour is not unique in Qingdao, but is shared by all the coastal cities. How can Qingdao have that colour impression? It is because it cleverly uses its natural colour in order to achieve a harmonious unity of artificial colour and natural colour in Qingdao old urban planning.

In the big cities or new urban areas which lack natural colour, the main tone should be a neutral if there is no specific traditional colour. Then, the functional areas and building's structure should use colour that compliment the main tone. Under normal circumstances, large-scale building's facade colour should be near the main tone, giving the opportunity to change colour such as windows and sights. Buildings of huge capacity and complex structure in particular should have a uniform colour to make it soluble in the overall structure of urban colourscape; buildings of small capacity and the same structure should be changed by the balconies, doors and windows colour design in order to make the entire group a vision of rhythm. New buildings in the city must take care of surrounding environmental colour. If the original building's colour is very discordant, new buildings should use colour that calm down the colour conflict or form the transitive colour. But no matter what the urban colour tone is, the colour of ground paving must be close to natural colours, or the colour of the stone and brick.
We should avoid using colours in large-area that leads to the urban colourscape structure being unbalance and destroying the colour harmony.

2.3.2 The significance of urban colourscape planning

Urban colourscape directly reflects the urban history and overall style. It is an urban feature and an important component of urban charm, and is also a symbol of urban character. Some people think every city should be a "garden", and that it is fundamental that every city should select a colour which can reflect its characteristics. Nowadays, urban colourscape has caused wide concern by all sectors of the community. Urban colourscape is not only related to the urban external image, but also affects the environmental quality of public space. It fully reflects the social civilization and development. Why should historical and cultural cities pay attention to urban colourscape planning? To answer this, there are three points below:

1. **Urban colourscape is an important component of life quality.**
   According to Marx's point of view, colour is the most popular form of beauty. Therefore, colour is an important part of the urban beauty, and it is an important factor which affects urban life quality. Psychological research has already been aware that colour could affect human mental health, and there are many new cases that prove urban colourscape impact on the residents' mentality. For example, there are "colour riots" in Tokyo, and many people feel dizzy and fidgety when they face the colourful, high-saturation traffic, colourful advertisement, and the glare of glass walls. So residents have cited it severely and Tokyo municipal authorities have to correct the colour deviation in order to eliminate the public the mood of restlessness and anxiety. There is also an interesting case in England. There was a black bridge where many people kill themselves every year; but later, when the bridge is painted blue, the number of suicide attempts was significantly reduced. Then the bridge is painted pink, and there is no suicide anymore. By these two examples, urban colourscape is very important for human psychological.
Today, in Germany, Austria, France, the Netherlands and other countries, this instance is becoming a reality. Both their villages and their cities are like poetry. Despite their cities have a long history, and most architecture have a general quality, but the cities still give the elegant, warm, comfortable and cultural feelings. This is directly related to the environmental colourscape planning control. When people are walking in the urban streets, they will not feel the dazzling medley of colour, and even no huge advertisement block people's sight. Concise and harmonious colour gives people a slightly feeling and that itself constitutes elegant part of their civilized life. So we must pay a great attention to urban colourscape like noise control and air pollution in order to constantly beautify and optimize the urban living environmental quality.

2. Urban colourscape is an important carrier of urban history and culture.

Colour itself is an urban historical heritage. Urban politics, economy and culture are reflected by some kinds of colour. Therefore, if an urban traditional colour is destroyed at discretion, that equals to the destruction of history. Historical and cultural urban features need to be protected as the same as cultural heritage in order to continue its history.

3. Urban colourscape is the embodiment of modern civilization.

Urban colourscape has existed for a long time, but urban colourscape planning is a modern subject. Why did this happen? Traditional cities were developed in a closed way with low productivity growth. Urban colourscape was limited by building materials and construction techniques. People could not use expensive materials only for colour. Therefore, the majority of urban colour is reflected by the inherent colour of building’s materials, such as the red brick or decided by the materials which are cheap and easy to find, such as yellow or white paint. The local people often do not know that the buildings have an alternative colour in other nations or regions. In such a passive selection, the aesthetic rules potentially play a role, but they are not conscious
reflections of human civilization. It is different in modern urban construction. People can easily control the architecture and the equipment's colour, because there is a strong economy to support construction and also because the new materials, new technology and new technique were invented, made affordable and popularized. Meanwhile modern media and convenient travel have broken cultural barriers and people can influence each other. Indeed, there is a fashionable tendency in architecture. With this background, the a question is that how people control their urban colourscape. Today, it is not difficult to make a city covered by a new luxury coat, but it is not easy to try to create a harmonious and elegant tone. That requires a high cultural training of urban leaders, architects and buildings' owners (Urban colourscape planning).

2.4 The function of urban colourscape planning

The first function is to promote the urban systematic management. Because the urban functions have became more refined, urban management has become more complicated. In order to enhance efficiency of management, the use of colour is more often instrumentality.

The second function is to highlight the local flavor. The impression of the urban overall colourscape is mainly from the architecture. The colour of the traditional architecture often plays a leading role. For example, red walls and glazed tile in Beijing, red roofs, white house in Qingdao, and white walls and black tiles in Suzhou, they formed because of the specific historical background, specific local cultures and the specific geographical environment.

The third one is to beautify the urban landscape. The charm of colour is endless. It can express rich feelings, and it has a strong artistic appeal. The arts activities from ancient times to today cannot be separated from the artists' use of colour. Well-designed urban colourscape can affect people's emotions and environmental atmosphere to a certain extent, and it could add charm to the urban landscape.
2.5 Local characteristics of urban colourscape

There are four aspects of urban local characteristics.

First: Locality, which includes topography, climate, and products and so on. The combination of design and nature is one of the basic principles of design; the geographical environmental conditions have effects on the urban colourscape, and it cannot be underestimated.

Second: Folklore. Each region has its own customs and their own colour preferences, which are cultural markers and are the main elements of national culture.

Third: Systematicness. Systematicness is the main characteristic of modern cities, and where the urban colourscape reflects the comprehensive planning and coordination of the whole city.

Fourth: Dynamicity. Everything in the world, change is eternal, and no change is relative (LHYHXY-4).
3. Analyse colourscape of different cities

3.1 Colourscape planning in Copenhagen

3.1.1 Architecture evolution in history

The Renaissance

Copenhagen had been through five main colour change periods. These are the Renaissance, Baroque, Rococo, Neo-classicism and Historicism. During each period, there are some typical colours that represent the certain historical period. 'The changing colours of Copenhagen's facades are a mirror of the building materials and pigments available, combined with architectural fashions from abroad, adapted to local conditions' (Bente Lange, 1997: 15). Only a few Renaissance buildings are left in Copenhagen from 17th century. In the earlier time, the Renaissance buildings usually...
appeared two kinds of colours—gold and cool grey which were made from brick and sandstone. In the Renaissance, the technique was developed where people usually washed facade with red colour, it was probably to make the masonry evener that before. 'The fashion of painting even new masonry presumably originated from German and Dutch master builders, and was imitated by Danish craftsmen returning home after working abroad'(Bente Lange, 1997: 16). To some extent, the decoration is more dependence on bricks. At that time, bricks had two colours—red and yellow. This character can make buildings more attractive. And people usually had yellow painting to decorate the facade.

**Baroque**

'The power centre of the Baroque movement was Rome. Copenhagen's Baroque era was influenced by the migration of the architectural ideal up through Europe, with Holland as a way station'(Bente Lange, 1997: 21). The first Baroque building in Copenhagen was Charlottenborg Juel's Mansion at Kongens Nytorv built for the monarch. (Figure 7) The bricks 'presumably washed with lime glaze to achieve greater uniformity'(Bente Lange, 1997: 22). Around Kongens Nytorv area, there is a building from 1686 with dark-red brick and light pilasters. In the 1690's, it had been washed with light grey. Then, in the 1740's, ashlar and white were painted on pilasters and pointing. There is another early Baroque building at No.9 Nyharv which has a light yellow facade. (Figure 8)

In Baroque period, there were still some buildings with facades that remain people the Renaissance period, because of using red and yellow. 'In contrast, an invoice for paint from 1725 show that the facade towards the canal was painted in reddish hues, with
sandstone colour sculptures and pearl-coloured widows.’ (Figure 9)

In 1728 there was a big fire in Copenhagen. Because of the fire, the rebuilt buildings used less flammable material instead of half-timbered. The late Baroque buildings used red-brick masonry, so the facades appeared red. Then, people gave these buildings warm white coat of wash (Bente Lange, 1997: 25).

**Eigtved and the Rococo period**

Nicolai Eigtved was the designer of Denmark Palace who went abroad and returned from his journey in 1735. The new ideas he brought back to, had a big influence on Danish architecture (Figure 10). The whole palace was painted almost grey, but the entrances were painted yellow. Eigtved put his new ideas on the Prince’s Mansion which was designed like a French hotel. It was not long after the mansion was finished, 'Race and Eegberg reproduced the yellow-washed facades with grey-blue windows surrounds and cornice, perhaps in imitation of Gotland sandstone; the widowss were pearl grey, according to the colour sampling carried out by the National
Sandstone and brick masonry are the good Rococo facade we can still see in Copenhagen. Some people would like to give buildings a coat of oil paint. The colours of this period do not have very obvious character compared with other period. For example, some buildings have pearl grey coats which were very popular during Baroque period. People would like to choose muted colours where the framed were also pearl grey. The door was painted yellow with white moulding.

**Neo-classicism**

Neo-classicism is very different from the Baroque and Rococo style. “Neo-classicism retained and even reinforced the Rococo emphasis on horizontal lines in the façade” (Bente Lange, 1997: 39).

Early classicism in Denmark was brought by the French architect Nicolas-Henri Jardin. He put many different elements on buildings from the inspiration of French art. When it comes to painting, he did not make decorative elements more outstanding, but painted windows with different colours.

In 1795, Copenhagen burned again. ‘Nine hundred and fifty buildings—one fifth of the city of Copenhagen—burned to the ground’ (Bente Lange, 1997: 47). This time was just like the last time in 1728: the city had to rebuild again. Streets became wider than before. The typical octagonal intersections appeared in Copenhagen (Figure 11). C.F Harsforff had a big influence on many of the buildings, because he had taught lots of...
master craftmen his style.

'Harsdoff's residence marked the introduction of a classical temple motif in bourgeois Copenhagen'(Bente Lange, 1997: 58). A temple called Hercules Pavilion which had a great influence on buildings in Copenhagen was built according to Harsdorff's drawing. 'The colour sampling is ambiguous. However, there is substantial evidence that the colouring of the facade played on two sandstone shades, with the masonry a rose-grey and the sculpted and decorative elements a light grey colour'(Bente Lange, 1997: 58).

Exposed brick masonry facades were widely used in early Neo-classicism. Although stucco could have easily been used, it was not dominant. Maybe later, facades had stucco painted and simply white-washed, but it was still not widely used. The facade colour usually had grey colour that imitated from two types of sandstone. After the fire of 1795, a new colour appeared on facades :white. But this colour did not get any praise; it damaged people's eyes when the sun shined its light on the facades. In the Neo-classic period, windows were also white-grey; doors were always grey as windows.

Copenhagen was bombarded in 1807. It brought on a third big fire during its history. A twelfth of the city burned. There were two squares which had significant changes, because of hard hit. The first square was in front of the Copenhagen's cathedral near Vor Frue Kirke. The second one is Hauser Plads(Bente Lange, 1997: 71).

After the bombardment, buildings turned dark and exposed. C.F. H
Anser who was in charge of rebuilding had some ideas that cut clean lines in the building structure. “His facades are reduced to one plane of continuous dark colour with light-coloured, applied decorative elements” (Bente Lange, 1997: 71). No.36 Fiolstræde is a good example of late-classicism after the English bombardment. (Figure 12) The lower facade of this building turned grey; upper facade turned dark-brown; entrance and the windows were grey (Bente Lange, 1997: 72).

“C.F. Hansen and his contemporaries were very much concerned with taste” (Bente Lange, 1997: 79). Danish people wanted to enact measures to deal with tasteless facades. Then, an organization concerned facades style was established. If you want to paint the facade of certain building, you should not use too strong colour to breach the public taste. First, you need to have a drawing propose. Second, money should be paid to the Royal Academy of Fine Art which was cost from three to ten rigsdater for each drawing of facade.

In 1826, a medical officer called Andreas Lund thought white and light yellow were damaging on neighbours which should be prevented. But C.F Hansen thought dark colours would break the balance of the whole city. Hansen had controlled all the newspapers with his power when he alive. After C.F. Hansen was dead, many young architects were liberated. Even the newspapers had lots of unkind articles about his architecture. One newspaper in 1880 written like this: ‘Despite its impressive proportions, C.F. Hansen's heavy and unadorned style has never had many admirers’ (Bente Lange, 1997: 80).

Figure 13: Source: Bente Lange, 1997
Late classicism period had many great architects. G.F. Hetsch was the most important one who came to Denmark in 1815. ‘He despised any architecture that made a wooden ceiling look like a brick one arch’ (Bente Lange, 1997: 82). So, in his opinion, every material should totally appear its own character. Hetsch designed the synagogue at No.12 Krystalgada, which was completed in 1833. Hetsch’s interest in the Near East is reflected in the form of the building (Figure 13)." The facade is almost yellow; the lower part of facade appears rose stucco; the windows were dark painted. “However, colour sampling indicates that the original masonry had a beaded pointing and a layer of yellow stucco” (Bente Lange, 1997: 83). Hetsch wrote something about the colour of the windows that 'the exterior of walls, pillars, columns etc. may be of light colours, while the openings or holes in between must be dark' (Bente Lange, 1997: 84).

“The Italian Renaissance was the model for late classicism” (Bente Lange, 1997: 85). Some characteristics can be found on the windows. The late classical style has always been uniform contoured frames on one story; in the earlier classical period, architects always accentuated side sections to make a symmetrical building. In Copenhagen there is a good example for late classicism: A.N Hansen’s mansion which is called "the white mansion" (Figure 14). The facade was originally whitewashed; the windows were painted dark.

**Historicism**

There was no obvious transition in Copenhagen from Neo-classicism to historicism. At that time, architects had a big question about the leading model between the
European and the Nordic.'In the beginning of the period, the two schools lived side by side, but from about 1870, the 'European' faction took the lead'(Bente Lange, 1997: 94). Johan Daniel Herholdt who designed the University Library used the National romanticism style. The construction used a large number of bricks that had far-reaching effects on Denmark architecture. There is another typical National romanticism building at No.23 Havnegade which was built in 1864-1865.(Figure 1) The facade colour was gold; the windows were painted with the colour of graphite, and the double doors were dark green in order to keep the original design as an antique bronze door.

'A cholera epidemic in 1853, during which 5,000 of Copenhagen's residents died, put focus on the unhealthy living conditions of the crowded city' (Bente Lange, 1997: 97). Between 1853-1857, houses with good conditions were built on the East Commons. At first, the facade was almost painted on ochre, but the lower facade was whitewashed; the windows were white-grey; and the door got the green colour. Later, at the beginning of 20th century, the facade was yellow-washed. 'In 1856, the gates to the city were torn down, and Copenhagen was no longer a fortified city. Outside the ramparts, new neighbourhoods grew up in the spirit of historicis' (Bente Lange, 1997: 97). However, all the facades' style got the roots from Italian Renaissance.

Meldahl was the consultant and director of the building society in Copenhagen. "What we lack in Copenhagen', said Meldahl in 1878, 'is relief in our facades; something that can bring light and shadow effects, and a development of types of moulding "(Bente Lange, 1997: 99). His discourse was a criticism of the late classicism's boring and
smooth facades. He initiated to change the regulations which had been banned since 1680's. 'Projecting windows bays, called shoemaker windows, had been banned since the 1680's, and by 1800 had completely disappeared from the Copenhagen street scene' (Bente Lange, 1997: 99). “After the fire at Frederiksborg Castle in 1859, the Dutch Renaissance enjoyed a second rebirth” (Bente Lange, 1997: 101). Ferdinand Jensen designed the building at No. 63-65 Bredgade. He used red brick for surfaces, dark umber for windows which were made of sandstone.

In the late 19th century, a new architect style turned up called art nouveau style. The decorations of the building were not just limited to plants and animals. The architects who supported the art nouveau style were trying to break from historicism (Bente Lange, 1997: 104).

**Conclusion**

<table>
<thead>
<tr>
<th>Period</th>
<th>Renaissance&amp;Baroque</th>
<th>Rococo</th>
<th>Classicism</th>
<th>Historicism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facade</td>
<td>Lively colour</td>
<td>Muted colour</td>
<td>Light colour</td>
<td>Dark colour</td>
</tr>
</tbody>
</table>

Colour table of Copenhagen

In different times, Copenhagen has different facades. (Figure 16) This is undoubtedly a valuable asset of the city. Nowadays, when the architects choose colours to paint the wall, they should refer to the colours from different historical periods in order to make Copenhagen more harmonious and beautiful.

![Figure 16: Source: Bente Lange, 1997](image)

**3.1.2 Urban colourscape planning in Copenhagen**

Hetch wrote in 1863 that external colour schemes are often left "to crude and ignorant artisans, or decided in concert between the mason and one client or another with poor
taste." He uses the same opportunity to complain about the abandonment of "control and censorship with respect to the colouring of buildings." (Bente Lange, 1997: 143).

Nowadays, the colourescape planning has been becoming a part of the comprehensive planning. From 1973-1993, the artist and architect Elvy Engelbrektson who was working for the Stockholm's urban building office drew up the colourescape planning for the urban centre. In connection to the project, she also designed posters that explain the colour and character of historical facades during various periods. Engelbrektson has been the leader of a project for the city of Stockholm's research council. It was called 'Colour planning of city environments'. The three-point objective of one project, in Solna on the outskirts of Stockholm, is to determine how the façade colours of the street picture are observed at a distance and in relation to each other; the inherent colours of the facades, or the colours they are now; and the original colours' (Bente Lange, 1997: 143). Engelbrektson shows how to accommodate a new colour and how to improve the disjointed impression of a street or a square, and how to create a coherent spaciousness. Based on the historical research, the colour scheme will be seasoned with the current situation (Bente Lange, 1997: 143). In the beginning of this century, Jens Møller Jensen was an artist who carried out a total colour plan for Gråbrødretorv square in cooperation with the Association for the Beautification of Copenhagen (Bente Lange, 1997: 145).

**The function of facade colours**

The function of a façade colour can be both protective and decorative. The function of colour is used to imitate the building material. *In earlier times, façade colours often referred to an expensive building material*.

![Figure 17: Source: Bente Lange, 1997: 146](image)
that one couldn’t afford, or idealized a building material: red for roof tiles and grey for natural stone. Imitation stucco was thus coloured to resemble the stone it was meant to imitate’(Figure 17) (Bente Lange, 1997: 146).

The dark green doors and gates in Copenhagen give an historically fascinating air of antique bronze doors. Using a particular colour scheme for the smaller houses which are near a manor can be called symbolic or even political, and the facade colours were often used to show the relationship in the countryside. From the colour choice, we could get the information about the owner of the building or it could reflect what the building is used for. 'Behind the grey or white facades of Højbro square, Sankt Annæ square or Amaliegade are banks, firms of attorneys and pension funds' (Bente Lange, 1997: 147).

**Facade colour and logic**

Colour can also be used to emphasize the cautious functions of a facade. Many Copenhagen facades, particularly from the last half of the 1700's and onward, are built as antique temple fronts or classic mansion facades, with a clear division between carrying and supporting elements. The system that makes up the design and colour scheme of a facade can be called the facade's logic or grammar. The different elements of the facade have different functions. Some colours that are in the facade are used to carry the elements or accentuate architectural elements. Carrying elements are usually stone blocks. Sandstones which are near doors, windows and entrances combine the two functions of being both decorative and protective. The natural stone is usually used in the key elements, and the rest used stucco to decrease expenses. But in order to fulfill their intended purpose, all the colours must be the same. There is a rule for the colour facade that a façade only has two colours, and the one is used in the wall surface and the other one, a stone colour, is used for the decorative elements. (Bente Lange, 1997: 148).
Hue

In the beginning of the restoration process, value is more important than hue. This means that the first thing one should consider is the facade colour's relation to its neighbors. The grey scale is able to sure the colour value of neighboring buildings. Lange advises to look at the facades one at a time at a distance and squint a little, while holding up the grey scale at the edge of your field of vision (Bente Lange, 1997: 148). Then it is not difficult to see which grey colour has the same weight or value as the colour of your facade. All the hues were divided unevenly on a grey scale. For example, a very light blue has a much darker value than a totally light yellow. This is particularly evident with a row of housed where different coloured facades can appear to be on different planes (Figure 18).

Choice of hue

Tradition could influence facade colour. If we just look at part of the facade colour, the inherent colour is weaker and less clear than we imagined. That is the reason why people always surprised at the difference between what they saw when they chose colour from a small square and what they saw when they painted on an entire facade. If we analyze the traditional facade

Figure 18: Source: Bente Lange, 1997:149

Figure 19: Source: Bente Lange, 1997:150
colours with the NCS system, we find in a yellow circle, the most of the colour circle is white and less black. If we use artist Kaspar Heiberg's definition, we could call the traditional facade colours concave or hollow, that is, receding and transparent in contrast to the aggression of convex colours. The white colour of a daisy is convex, while the white colour of a rose is concave (Figure 19). Put another way: convex colour is a colour substance or concentrate, while concave colours have depth (Bente Lange, 1997: 149-150).

**Traditional colour schemes**

Facade colours usually follow a certain traditional colour. The most common example is that an ochre-yellow house has white windows and green doors or gates. Oddly, the original combinations are also successful: golden facades with cool grey woodwork, a grey-blue door in a house washed in intense Mars yellow, or a rose-pink facade with chalk-coloured windows and a green door. The possibilities are endless, and, of course, largely a matter of personal choice. Successful colour schemes for wall surfaces and woodwork are often a combination of a warm and cold colour. In classical facades, warm grey was an application for the architectural elements which was made of stone, while the wall surfaces were painted with negative colours. Nowadays, almost all of Copenhagen's windows are white, but they used to be pearl grey or coloured (Bente Lange, 1997: 150-151).

### 3.2 Analysis the existing urban colourscape of Karlskrona

#### 3.2.1 Geographical location

Karlskrona is the capital city of the province of Blekinge in the south-eastern part of Sweden. Karlskrona is called Sweden's only baroque city and it is only extant naval base and also the Headquarters of the Swedish Coast Guard. The population of Karlskrona is about 32,600 and the total is 62,000 including the circumjacent municipality. The
urban centre is on the island of Trossö. The island of Stumholmen was formerly the naval wealth and now it is collected by the National Naval Museum (Marinmuseum).

3.2.2 History and culture

The city of Karlskrona was founded in 1680 when the Royal Swedish Navy was moved from the mainland to the island which formally had been a farm. At the time Sweden was the dominant military power in the Baltic Sea region. The island was in a very strategic position because it was short sailing distances to the German and Baltic provinces. Its name is to commemorate King Karl XI of Sweden, and the name is influenced by the name of the city Landskrona. Karlskrona grew very quickly and it had been about 10,000 inhabitants until 1750. At that time, it was then one of the biggest cities in the country.

At the same time as the city foundation, the shipyard in Karlskrona was also established. It was a necessity because the Swedish navy came up against heavy losses in 1689. In 1711, it was the largest industrial employer in Sweden with 1,100 workers in the shipyard. The oldest dock is in cliff is still in use. The name is from Christopher Polhem ('The Swedish DaVinci', a famous scientist with several inventions still in use).

The street structure in Karlskrona has kept its original design. Because of the street structure, the sea winds can blow freely from the ocean into the heart of the city. The naval installations have been announced as a World Heritage Site by United Nations Educational Scientific and Cultural Organization. Another interesting fact about Karlskrona is the Soviet submarine U137 stopped in the archipelago outside of Karlskrona. So at the time, it touched off a serious situation between Sweden and the Soviet Union (Wikipedia).

3.2.3 Architecture

Most of the Baroque buildings which were built in this era are still standing and this is
why the urban centre is architecturally uniform. There are three important churches in Karlskrona, the first one being Fredrikskyrkan (The Frederick church); it was designed by Nicodemus Tessin who was influenced by European architecture. The foundation of the church was in 1720, and finished in 1744. Its yellow colour and adornment was different from usual Swedish churches.

The church Heliga Trefaldighetskykan (Church of Holy Trinity), well known as The German Church, was built in 1697 and finished in 1709, following Tessin’s drawings. It is also in the centre square of the city. The dome-shaped roof is influenced by the Italian architecture and is rarely seen in Swedish architecture especially churches.

The third city church is the Karlskrona Admiralty Church (Amiralitetskyrkan). It was built in 1685 and the architectural material was wood with painted red colour. Outside of the church, there is a well-known wooden statue which is called Rosebom.
4. The colourscape research of Karlskrona

4.1 The formulated process of analyzing urban colourscape

A set of urban colourscape planning program generally has the following process.

One begins with the investigations. This includes the colour conscious survey that is associated with urban colourscape, a literature investigation, an urban scene investigation and an urban architecture colour investigation. About the colour conscious investigation, it is mainly through the investigating the urban planning experts, residents and visitors, and we should know the persons’ understanding, views and expectations about the urban colourscape. Meanwhile, we should also read literature such the related urban architecture and environmental historical data and local history. One might also communicate with the competent authorities to understanding the development of the cities. The aim of urban colourscape scene investigation is to fully understand the city is natural resources and climatic conditions and analyze the relationship between the urban creative and the natural environment. One might also understand the relationship between the characteristics of urban landscape and urban colourscape theme. Urban architecture colour investigation not only includes the survey of the current buildings, but also contains the survey of urban historical architectures.

Secondly is analyzing the job. This is analyzing the investigation material from the perspective of chromatology, and neatening the urban colourscape system. We distinguish urban colourscape elements between the internal type and external type, reasonable type and indecent type. The problems of the urban colourscape will surface through this process. We should eliminate the elements which are unreasonable and obstruction of the urban colourscape coordination; and we will classify the remaining elements that could represent the he characteristics of urban colourscape, and set up an
urban colourscape comprehensive planning pedigree (chromatography and the system of atlas).

Thirdly is the planning. According to the urban zoning layout, we should have an overall colourscape layout in the old city, the ancient city and the new city. We not only establish the development patterns of urban colourscape theme, and make sure the main tone in all the regions in the city, but we should also classify the type of the architecture and its colour, and give the countermeasure to the problems which is from the investigation. Thus, we should establish the guidelines and methods of urban colourscape planning and design.

Also, the old building colour correction should be based on the urban colourscape planning, not just like some "exercise" that is constantly changing the appearance of the architecture. There should be a reasonable layout for those long historical architectures whose appearances need to be refurbished, and landscape which is facing to be reconstructed. That not only focuses the reconstruction, but also pays attention to the protection of the original buildings and landscape. As for the new buildings and the new landscape, we should do our best to arrange the colourscape according to the planning, and we should also pay attention to be in accordance with other urban colourscape layout (LHYHXY-4).

With the help of our supervisor, we have study Karlskrona and have found a lot of architecture which was built in different periods, using the NCS to test the architecture colour and produced Karlskrona's chromatogram. The following three pictures present the Karlskrona's chromatogram.
### The Colour Study of Karlskrona

#### Baroque
**1600-1700**

- **Facade**: S2030-Y40R
- **Door**: S6020-B70G

#### Neo-classicism
**1790-1820**

- **Facade**: S2040-Y10R
- **Window**: S5030-Y70R
- **Door**: S5030-Y70R
- **Window**: S7020-B90G

#### Karl-Johan Empire
**1820-1850**

- **Facade**: S2020-Y20R
- **Window**: S6010-G70Y
- **Door**: S2502-B
- **Window & Door**: S4010-G30R

#### Eclecticism
**1850-1900**

- **Facade**: S5040-Y70R
- **Door**: S5020-G30Y
- **Facade**: S4030-Y50R
- **Door**: S5020-G30Y
### The colour study of Karlskrona

**Art Nouveau**  
1900-1915

<table>
<thead>
<tr>
<th>Facade</th>
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<tr>
<td>$S1020-Y20R$</td>
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<tr>
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<tr>
<td>$S2005-G80Y$</td>
<td></td>
</tr>
<tr>
<td>$S5020-B90G$</td>
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**The Swedish Grace**  
1915-1930

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<td>$S0505-Y30R$</td>
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<th>Door</th>
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<tr>
<td>$S5040-Y70R$</td>
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**Early Modernism**  
1930-1945

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**After-war Modernism**  
1945-1960

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The colour study of Karlskrona

International Style
1960-1975

Post-modernism 1
1975-1990

Post-modernism 2
1990-2010?
5. Conclusion

The issues of urban colourscape is a very complex subject, and it is a subject between the natural sciences and social sciences. The requirements of the academic and technical content is very high, therefore it is necessary for the rational design and planning management. Whether the quality of the urban colourscape is good or not will not only be directly related to an urban image, but also enhance the self-confidence of residents, and it also will become an important tourist attraction.

In the process of doing our research, we found that some of the research was just perceptual studies, not in the view of urban and macro-perspective to study the urban colourscape or the planning and design. This also caused a certain degree of misunderstanding and problems in practicing the urban colourscape planning and design. Because of the lack of theoretical guidance in Karlskrona, we could not complete the systematic and effective colour control and management.

In the view of that, our thesis first sorts out the relevant concepts and analysis, and clearly puts forward the concept of urban colourscape planning, and the research scope and purpose. Through the research and analysis of many related theories, we analyzed the aesthetic value of colour and the problem of the urban colourscape. On this basis, from a scientific, systematic and rational view, we sum up the principles and significance of urban colourscape planning. Finally, we analyzed the examples of Copenhagen's urban colourscape planning, and put forward our proposal and suggestion about the colourscape planning in Karlskrona.

Through the thesis writing, we recognize that the urban colourscape planning as both multi-disciplinary and a new area which still is need of further study and exploration in Karlskrona. Our article is a preliminary attempt on the subject of urban colourscape planning, and there is much more work left to do in order to further improve the
research system and effectively put the urban colourscape planning into practice. Our hope is that our article plays a role in starting this process, and that more and more people pay attention to the area of urban colourscape planning.
6. Acknowledgement

This thesis owes its existence to the help, support, and inspiration of many people. First of all, we would like to express my sincere appreciation to our supervisor Katinka Schartau who has given us a lot of support and valuable comments on our thesis. Katinka was tremendously patient in helping us to deal with various difficulties through the whole process. Under her guidance, we were able to finish every step of this research.

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We attribute the quality of our thesis to the valuable conversation we have had with Karin Svensson who is working in Ronneby and Agneta Ericsson who is working in Blekinge museum. They have provided us some valuable information and points of view.

Finally, we wish to thank our family and friends who helped us by giving us strength and support to be able to face the highs and lows of this experience. Always having this support encouraged us to go on and to produce this thesis.
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Electronic sources:


