Figural Color in the Seattle Cityscape

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INTRODUCTION

The figural status of buildings in a cityscape is achieved by a number of factors, including their physical location in the city, their architectural form, and their color. Color has the ability to enhance or diminish architectural form as well as urban form, and if the city is viewed as a three-dimensional color field, some colors juxtaposed to this field will stand out as prominent, or figural. These figural colors are most often associated with buildings in the urban context and the figural status is often enhanced solely by their color. These are perceived colors and usually appear different from the actual or inherent color of the building.[1] Some of these colors create high visibility in the city only to be diminished in certain light and atmospheric conditions, while others maintain their status in all conditions. The relationship of color and urban form is the subject of this study, and although color is important to architectural form in individual buildings, the emphasis here is on color within the larger context of the city. The characteristics of these figural colors are the focus of this paper.

Historically, color has been used for ideological reasons in urban design to create unity, order, and diversity in the cityscape. It can also enhance the perception of significance of individual buildings by increasing their figural status. The nineteenth century in Europe was an era when color as a major conceptual tool was realized in practice on a grand scale. Italian and French Baroque architecture, and later Hausmann's heroic project in Paris, were the inspirational model for these interventions. In 1873, the Danish painter Constantin Hansen wrote in a letter that Rome was no longer congenial because all buildings had been painted yellow by decree. Paris was the great model for provincial Rome which wanted to become a metropolis. Rome could not imitate the uniform large-scale architecture of Paris, but sought instead a monumentality with the aid of a new road network and a monochrome color scheme.[2] Chicago, Washington, D.C., Philadelphia — all cities of the City Beautiful movement in the United States — were influenced, via the Columbia Exposition of 1893, by the straight boulevards of Paris, the focal architecture, and the unified pale gray color in the architecture along the boulevards. Even Seattle had a grand scheme for utilizing these planning principles in the Bogue Plan (1910-1912), but it was never realized.[3]

Today, Seattle is a city whose most visible structures are late twentieth century office towers representing private corporations. The public architecture of civic institutions is primarily low-rise and not easily distinguished from other low-rise buildings when the city is seen from a distance. Seattle has no guidelines which regulate color in commercial architecture. One of the towers is nearly black, a powerful color in the Seattle context, and is perceived as the most figural building in the city. Some low-rise commercial buildings have used high chroma colors in yellow, red and blue as a means for increasing their visibility within the context of the cityscape. Some of these colors are more successful than others in achieving figural status, and their success is often determined by the light and atmospheric conditions in which they are seen. Because of the lack of color regulation, the variety of color in the urban environment, and the many opportunities for viewing the city from a distance, Seattle is an ideal site to investigate color. This study focuses on two primary issues related to color in this city:

1. The characteristics of figural colors within the context of the Seattle cityscape as identified by hue, chroma, and lightness/darkness as measured by the Natural Color System (NCS).

2. The change in this color due to variations in natural light by climate and atmosphere.

Critical to this study is the identification of color fields, distinct areas of the city which have (1) sufficient variety of color to produce easily identified background and foreground colors; and (2) are typical of other parts of the city with similar building densities. These color fields are parts of the city that have clear boundaries and can be photographed in elevation from distances that allow both panorama and close up views of the color field.

THE CITY

Seattle is just above 47o 30' north latitude, similar to Budapest, Hungary, and north of Japan and most of China. A city at this latitude yields 16 hours of daylight in June and 16 hours of darkness in December. The Pacific Ocean is 100 miles to the west, and the Washington coast is the wettest spot on the continent with an average annual rainfall of 150 inches. The Olympic Mountains, between Seattle and the ocean, get most of this precipitation. Seattle's annual rainfall is 35 inches, less than all major eastern seaboard cities, but because it gets very little of its precipitation in snow or thunderstorms, it seems wetter after long periods of light rain. December and January account for one half of the annual rainfall. The climate is distinguished by a general cloudiness from late fall through early spring. It is this grayness that gives the feel of the climate and the color of the light.[4]

Seattle is a linear city bordered on the east by 22 mile long Lake Washington and on the west by the Puget Sound, an inland saltwater sea that leads out through the Strait of Juan de Fuca to the Pacific Ocean. Between these bodies of water are smaller lakes and canals that link Lake Washington to the Puget Sound.

Seattle is built on hills with few flat areas. The highest elevation in the city is the top of Queen Anne Hill at 457 feet above sea level. The city can be seen in many ways from viewpoints on these hills. It can also be seen by boat from the lakes and Sound in and around the city. The central business district is spread out along the western waterfront and most of this district is sited on a west-facing hillside.

A ferry to Bainbridge Island, seven miles to the west across Puget Sound, departs from the central business district and provides the best means for viewing the city from the water.

Seattle has a population of around 600,000, and has the highest percentage of home ownership in the nation. The city, therefore, is made up of numerous residential neighborhoods. Most of these are single family dwellings, but denser neighborhoods of two to five story apartment buildings are located closer to the center of the city. A university district containing many large institutional buildings is located within the city limits and is easily visible from Capitol Hill. Because of the hilly topography, buildings in Seattle are seen in layers against the hillsides. The background color in these residential districts is a combination of colors of buildings, trees, and roads. This color field changes throughout the seasons due to changes in tree color, dark greens and browns in winter become a lighter, high chroma green in summer.

The central business district contains the majority of buildings over five stories. Most are less than ten stories, but many are over thirty stories, and a few over fifty stories. The district is clearly defined in its western elevation by views from the Puget Sound, and buildings can be seen in layers against the background of other buildings, roads, and overpasses. There are few trees in this district. The high-rise buildings are seen primarily against the sky, and sky color becomes an important variable in their figural status.

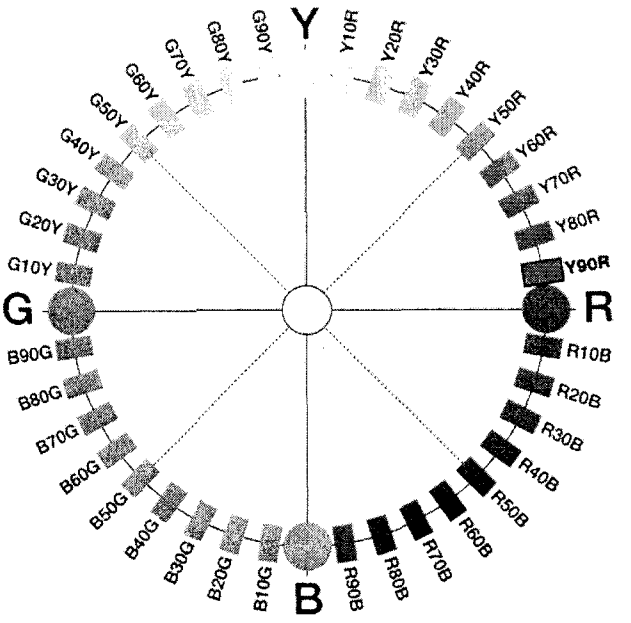
THE NATURAL COLOR SYSTEM (NCS)

All color sampling and recording in this study is based on the Natural Color System (NCS). NCS was first developed in Sweden in 1952 by Professor Sven Hesselgren, and was completed in 1979 as the Standard for Color Notation. It is built on two fundamental postulates: 1) that people with normal color vision can perceive colors similarly, and 2) that there are six unitary colors whose appearance can only be described by themselves. These are called elementary colors and they are pure yellow (Y), red (R), blue (B), green (G), white (W), and black (S). All colors can be described by their smaller or larger degree of resemblance to these elementary colors.

There are four chromatic elementary colors; yellow, red, blue, and green. These are represented in a circle with the elementary colors being four equidistant points on this circle. Yellow (Y) is at the top, red (R) is on the right, blue (B) is on the bottom, and green (G) is on the left. Between yellow and red, a scale can be built with colors of increasing redness and decreasing yellowness. In the same way, scales are built between red and blue, blue and green, and green and yellow.

The hue of a color (0) is the ratio of the two chromatic attributes involved. (ie. G70Y is located at 70% of the distance from green (G) to yellow (Y) and will be more yellow than green.) In the achromatic elementary colors white and black, a scale can be built where blackness increases and whiteness decreases; the gray scale. Chromatic colors can also be related to white and black respectively. These scales illustrate the variations in whiteness (w), blackness (s), and chromaticness (c). These attributes are represented in an equilateral triangle in which the left side is vertical with white at the top, black at the bottom, and the pure chromatic color to the right. Most colors have whiteness, blackness and chromaticness, and hold a position somewhere inside the triangle. These attributes are called the nuance of a color, and the nuance is noted by a point in the triangle.

A color can have at most two chromatic elementary attributes and the sum of these is 100. Whiteness, blackness, and chromaticness constitute the nuance of the color, and since the nuance is determined by only two of these attributes, whiteness is deleted from the NCS notation. The whiteness is what is left up to 100. (ie. s=40 is located 40% of the distance from white to black and is more white than black.) In a similar manner, chromaticness ranges from 0 to 100, with 0 having no chroma, and 100 the most chroma. (ie. c= 20 is 20% of the distance from the white-black axis to the right hand point of the triangle which represents maximum chroma.)



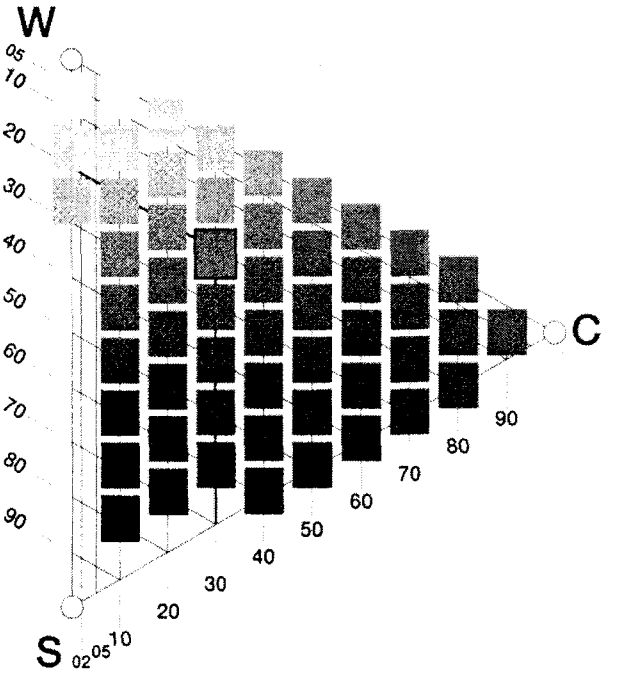


Fig. 1. NCS color circle and color triangle.

In the NCS color notation the first two digits indicate blackness, the third and fourth digits represent chromaticness, each varying from 0 - 100. These are followed by a letter code indicating the two chromatic attributes involved and the ratio of them, which is the hue of the color. (ie.4020-G70Y as described above.)[4]

EXPERIMENT

Several color fields (study areas) were selected and photographed with Kodak E100S slide film in varying light and atmospheric conditions, and at varying distances with a 35mm to 110mm

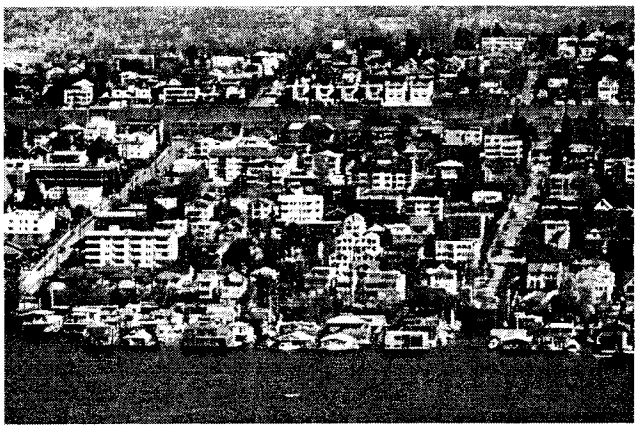


Fig. 2.Urban residential area.

zoom lens and a 200mm lens. Within each study area, structures which were figural due to their color were identified. These figural colors were observed in varying light and atmospheric conditions and changes in figural status were noted. In the color fields, inherent building colors were identified and recorded using the Natural Color System (NCS) color index.

A two-dimensional model of the color field was made using NCS color samples. This showed the hues within the color field without the color distortions from atmosphere. Changes in hue due to aerial perspective were noted. The approximate proportion of the various color areas within the color field were represented by areas of color from NCS color samples. These models were then photographed in varying light conditions. Colors with high figural status were then substituted with samples of a similar hue but different chroma (c) and blackness (s) to see which characteristics changed their figural status. Those colors identified as figural were photographed separately, and in combination with other colors, in sun and overcast sky, to see what nuances responded to the varying light both within and outside of the context of the color field.

RESULTS

Two color fields are represented in this study; an urban residential area and the *central business district*. In each field, figural colors were 1) identified by light-dark contrasts, and hue-chroma contrasts, and 2) changes in figural status were observed in different light and weather conditions.

Urban Residential Area

Approximate Areas of blackness (s) for all hues: s=5 or below (5% nearly white); s=5 to 20 (30%); s=20 to 70 (63%); s=70 or above (2% nearly black).

Approximate Areas of chromaticness (c) for all hues: c=20 or below (90%); c=20 to 50 (8%); c=50 or above (2% intense chroma).

Figural Status

(*Light-Dark*) Colors which achieved figural status by light-dark contrast were primarily whites and hues of s=5 or below, surrounded by larger areas of hues of s=50 and above. Black and colors of s=70 and above did not become figural unless contrasted to a white background. Structures in this color field were not seen against the sky and were usually contrasted to a background of shade, shadow, and dark hues in roofs, roads, and trees, which reduced their figural status. Dark red brick facades accounted for most of the dark hues in building facades.

Figural status was changed little by sun or overcast conditions in this color field. In fog, whites and hues of low (s) retained their figural status. Black and hues of high (s) appeared lighter and their figural status was lessened.

(*Hue-Chroma*) The majority of hues in this color field had low chroma of c=20 or below. Variations in hue had little effect on the figural status of these hues. For hues above c=20 a significant elevation in their figural status occurred as (c) increased relative to their background. This was due to contrast of extension (a hue appears more chromatic because it is surrounded by a large area of contrasting hue) and contrast of saturation (a hue appears more chromatic when surrounded by similar hues of lower chroma).[6] Hues with the highest (c) became the most figural as a rule. With figural colors in high (c), the hue made a difference. As a general rule, hues with low (s) (more white) and high (c) (more chroma) were most figural. Yellow (Y) was dominant, followed by yellow-red (YR), yellow-green (YG), red (R), blue (B), blue-green (BG), green (G), and red-blue (RB).

In sunlight all colors of high chroma were luminescent (appearing to glow), causing them to advance spatially. The spatial effect in color made some colors appear closer to the viewer than adjacent contrasting colors. Warm colors advanced when juxtaposed with cool colors. Small areas of light color advanced against a dark background, and small areas of dark colors advanced on a light background.[7] Hues with high chroma (c) relative to their background advanced spatially due to atmospheric perspective which made chroma appear duller in the distance. Colors appearing high in chroma in the same color field were perceived closer to the eye.[8]

In overcast conditions the luminescence of all high chroma figural colors was reduced, especially red (R), making darker brick buildings appear dull; however pink (S0530 R) maintained its figural status. Blue (B) was an exception and remained luminescent in these conditions. Yellow (Y) lost its luminescence, but remained figurally dominant in all conditions. High chroma green (G) was rare in the urban field, except for road signs, and competed with the abundance of green in trees and foliage.

Central Business District

Approximate Areas of blackness (s) for all hues: s=20 or below (60%); s=20 to 50 (30%);s=50 to 70 (8%); s=70 and above (2%).

Approximate Areas for chromaticness (c) for all hues: c=20 or below (80%); c=20 to 50 (15%); c=50 or above (5%).

Figural status — (*Light-Dark*) Black and hues of s=70 and above were figural when seen in tall buildings against the sky. In lower buildings, darks competed with shade, shadow, dark windows, streets, and other dark structures for figural status. Whites and hues of s=5 or below were figural in large single areas, or surrounded by a darker background. These colors were also figural when seen against a blue sky, but their status was diminished against a gray sky in overcast conditions.

In sunshine, shade and shadow competed with dark figural colors (except for tall buildings), but enhanced the status of light structures. In overcast conditions white was not as figural against the sky. In fog or from a distance, black and high (s) hues appeared lighter and their figural status was reduced.

(*Hue-Chroma*) Although 60% of hues in the CBD were in the yellow-red (YR) and red (R) ranges, there was a wide range of hue variation. Hue variations in chroma of c=20 and below had little effect on figural status. As in the residential areas, when chroma (c) increased relative to the background, the figural status increased. When several figural colors of similar chroma were observed, figural status depended upon hue. Yellow (Y) was dominant, followed by yellow-red (YR). Yellow-green (YG) was not evident in this field. Red (R) and blue (B) hues depended upon the type of light present, and blue-green (BG) and green (G) in high (c) were not observed.

In sun, high chroma hues (c) appeared luminescent which increased their figural status, causing them to advance spatially. In overcast conditions, luminescence was reduced in all hues except blue (B) which maintained its brilliance and increased in figural

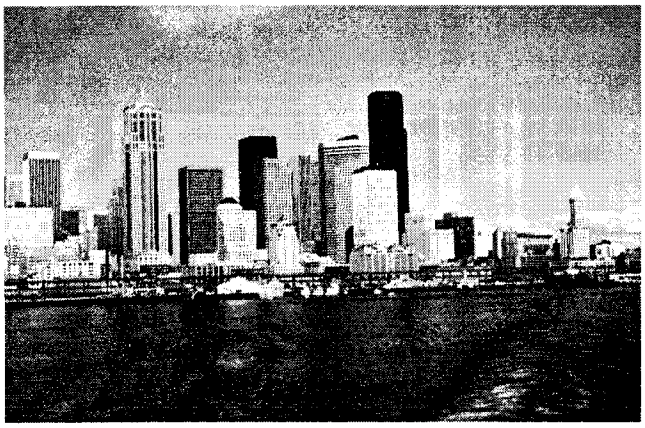


Fig. 3. Figural black in the central business district (sunshine).

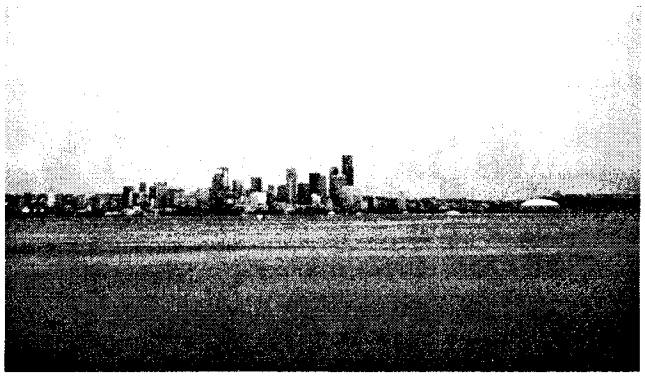


Fig. 4. Figural white in the central business district (cloudy).

status. Red (R) became dull in this light and its figural status was reduced. Yellow (Y) and hues with a (Y) component were dominant. As a rule, hues in which chroma (c) is similar but blackness (s) varies, the figural status of the lighter hue is dominant. In fog, yellow (Y) in high chroma (c) maintained its dominance. Many pastel low chroma hues did not appear dull in overcast conditions, adding a luster to the city in this light. These were primarily blues and pink, but also hues in red blue (RB), blue green (BG), green (G), yellow green (YG), and yellow (Y).

CONCLUSION

Figural color in the urban context of Seattle is defined by its prominence when juxtaposed to other colors in this environment. This prominence will sometimes change in varying light conditions. The figural quality is governed more by the perception of color than the actual or inherent color of the objects.[9] Inherent color is modified by aerial perspective in which darks get lighter and the chroma of some hues is diminished. Colors seen as separate and distinct on individual buildings blend at a distance and change in hue.[10] Other color effects become pronounced. When hues are separated spatially they group by proximity warm to warm, cools together, and oppose one another in clusters, warms against cools. This propensity to constellate occurs despite their actual location in a field.[11] Buildings with high chroma appear exaggerated in this context, most often by spatial effect (colors appear to advance) and by contrast of saturation (a hue appears more chromatic when surrounded by similar hues of low chroma).[12] In clear atmosphere and sunshine, any hue of high chroma becomes figural (c above 40), with yellow the most dominant. Red is more dominant than blue due to spatial effect. In overcast conditions and fog, yellow is still the most dominant hue, but blue maintains its brilliance in this light and becomes more figural than red, which appears dull. Pink is an exception and is usually figural in overcast conditions.

In the urban residential study areas, most buildings are low-rise and are seen in juxtaposition to other buildings and landscape but not to the sky.. The majority of these colors are in mid-range blackness (s=20 to 70), and there are fewer examples of colors of high chroma. Dark building hues are usually dark brick facades, and black roofs. The urban residential areas are interspersed with many non-deciduous trees. In most seasons of the year these greens are darker than most buildings and punctuate the color field, creating patterns of light and dark which accentuate the residential architectural scale. It is this pattern of buildings in low chroma hues, mid-range in blackness, and interspersed with dark trees that characterize the city beyond the central business district. Buildings which have large surfaces and are white are most figural. These buildings will appear more figural in overcast conditions as white increases in contrast when the background darkens.

In the central business district, where few trees are visible, the color field consists almost entirely of buildings, infrastructure, and sky. as viewed from the Puget Sound. There are more examples of high chroma colors and larger areas of a single hue in this area. Dark high-rise towers are dominant in this color field and are strongly figural due to the contrast of the lighter sky. This figural status will change in cloudy or hazy conditions or in fog when these dark towers appear lighter in color. Almost all buildings of high chroma are related to water activities; port buildings, pier sheds, giant dock cranes, and shipping containers. These colors are always seen against the background of a cityscape of light hues in low chroma. Some of these structures are so high in chroma that they maintain their brilliance in all atmospheric conditions. From this view one would conclude that Seattle is a light city with a variety of pastel (low chroma) hues, punctuated by some powerful figural colors: black, and hues high in chroma.

COLOR DESIGN IN SEATTLE

When European Modernism was imported to the United States, the influence of Le Corbusier and the International Style discouraged the use of color in architecture and urban design, except for white, some primary colors, and the natural color of building materials. The experimentation with color in architecture in De Stijl, Russian Constructivism, Expressionism, and the interest in color theory in painting during the 1940's and 50's, had little influence on architectural design until the 1960's with the advent of Postmodernism. Color began to be used symbolically and ornamentally in individual buildings, but rarely as a conceptual tool for urban design.

The idea of creating uniformity in cities through the use of color is counter to some Postmodern attitudes which have rejected the total design and reductive aesthetic of modernism in favor of the expression of inclusion and diversity.[13] These attitudes combined with marketing strategies which require high visibility for some commercial and public buildings, cities' reluctance to legislate guidelines for color use, and a lack of interest in color education in most schools of architecture and urban design in the United States are some of the influences which determine the use of color in late 20th century American cities. Seattle is typical of these attitudes which account for the appearance of its central business district.

Despite its strong figural colors, Seattle's downtown is remarkably united in its coloration. The majority of buildings are light and pastel in a rich variety of hues. The exceptions are, as stated, buildings in high chroma, and dark high-rise towers. If low-rise buildings were restricted to hues in a range of c=40 or less, exaggerated color would not occur; and if high-rise buildings used hues which were closer to the lightness of sky, they would still maintain their figural status by their size but would not dominate the cityscape as powerful figural objects. These restrictions would achieve unity in color, not uniformity, in which the city could contain a rich variety

of hues that do not exaggerate the figural status of individual buildings yet allow the expression of color through hues that maintain their chroma in sun and overcast conditions. Figural colors could then be used for buildings which are truly significant to the city and deserve figural status.

NOTES

[1] Karin Anter, "Inherent and Perceived Color in Exterior Architecture" (Tokyo, 8th Color Congress, AIC 97, Color Association of Japan, 1997), pp. 897-900.
[2] Bente Lange, *I Colori di Roma* (Rome: Edizioni d'Europa, 1990), pp. 4-5.
[3] Virgil Bogue, "The Bogue Plan," (Seattle: University of Washington Libraries, Special Collection Division, UW 15082, 1910).
[4] Roger Sale, *Seattle Past to Present* (Seattle: University of Washington Press, 1976), p. 5.
[5] Tomas Hard, "The Natural Color System," *Proceedings:ECCA Congress*, (Stockholm, 1989), pp. 1-3.
[6] Michel Chevreul, *The Principles of Harmony and Contrast of Colors* (New York: Van Nostrand Reinhold, 1967), pp. 57-82.
[7] Johannes Itten, *The Elements of Color* (New York: Van Nostrand Reinhold, 1970), pp. 77-78.
[8] M.Luckiesh, *Visual Illusions* (New York: Dover Publications, 1965), pp. 102-113.
[9] Karin Anter, p.899.
[10] David Katz, *The World of Color*, (London, Kegan, Paul, 1935), pp. 82-91.
[11] Swirnoff, Lois, *Dimensional Color* (Boston: Basel, Birkhauser, 1988), p. 97.
[12] Michel Chevreul, *The Principles of Harmony and Contrast of Colors* (New York: Van Nostrand Reinhold, 1967), pp. 57-82.
[13] Irving Sandler, *Art of the Postmodern Era* (New York: Icon Editions, 1996), p. 554.