San Fernando Valley State College

The Effect Of Varying Light Intensities On Color And Form.

An abstract submitted in partial fullfillment of the requirements for the Master of Arts in Painting.

by

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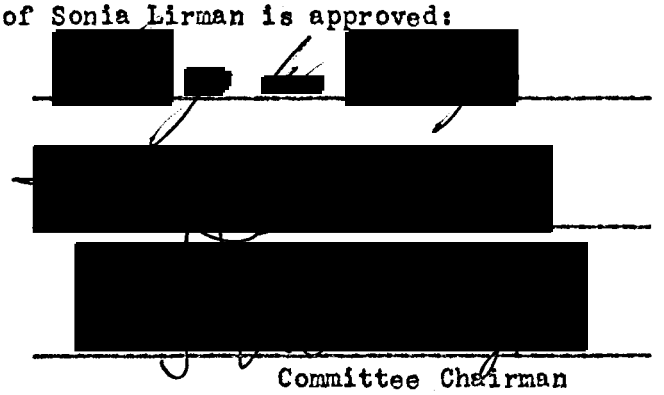

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A. Statement of Investigation.

The problem attempted was to demonstrate by appropriate paintings the effect of light on color and form. Figures on the beach were treated in a figurative and decorative manner in order to show how varying intensities of sunlight affect mood and atmosphere, as well as color and form.

Experimentation with light and atmosphere was accomplished by the use of flat areas of color and a decorative treatment of detail.

B. An exposition of the methods, procedures and experiments employed throughout performance.

The decision to use the subject matter came after months of leisurely observation of water and its environs from a sailboat. Unhurried traveling by sailboat gave the opportunity to observe the clouds, fog, mist and stark sunlight and their play on various surfaces. First impressions were almost an absence of color and a stark silhouette effect - a feeling of black and white pattern. Shapes became blurred with continued observance in intense sunlight and sometimes even disappeared. Intense concentration brought these shapes back into focus and both shape and color became clearly defined.

Certainly many famous artists have written about and experimented with light in their paintings. In support of activities much research was undertaken on impressionists, post impressionists and other outstanding men in the field, such as

Turner.[1]

Preliminary investigation was accomplished and sketches were begun. These first sketches dealt with only the figures and involved no environmental aspects. They were free of all detail and depicted oversimplified figurative shapes. Sharp exacting lines were used to separate areas from one another. Almost a hundred small sketches were completed before any painting was begun.

Acrylic polymers on canvas proved to be an ideal media for experimentation. These are a fairly recent development in paints and it was interesting to test the possibilities of their color and application. Much exploration was done with thick and thin pigmented areas, tints and shades, intensities and involvement with other materials. Combining acrylics with collage seemed unsuitable for the problem. The collage materials proved distracting in the paintings by being too textured or too important and were discarded.

New paintings were started and began to include environment and environmental detail. The eight paintings that had been done with flat color and black lines and shapes substituting for shadows were discarded. The figures that had been somewhat abstract and distorted were redrawn with more clarity. They were made anatomically correct, but somewhat simplified. Color was still applied in thin layers but followed scientific precepts, according to color theory, which will be explained.

Color is, after all, a sensation, a mental and emotional interpretation of what the eye records. Physics and chemistry are not concerned with color's spiritual, aesthetic, or psychic qualities. Color has three separate aspects; chemistry, light and sensation, each with its own unique laws and phenomena. The chemistry of color involves pigments and compounds. The physics of color involves light. The sensory or psychic aspect of color embraces feelings and reactions.[3]

The project attempted dealt with all three of these aspects. The pigments, acrylic polymers, were merely a mechanical means to an end. Much skill and practice was needed to achieve successful results. The light and sensation were of more consequence. Light in its many variations affects the sensation and atmosphere of everything around us. Color changes as illumination changes. No hue is monochromatic and flat, or influenced in its gradations solely by neutral light and shade. Sand has a local color of yellow. Yet it is changed by sunlight, by reflection from the sky, by atmosphere, by shadow, by after images produced in its environment.(FIG.III). Mood also changes with illumination. Bright sunny days and intense light are usually associated with cheer, gayety and excitement. (FIG.I,II,III,V). On the other hand, moods change to somber ones with gray dismal light.(FIG.IV).

Most surfaces owe their color to the fact that they absorb part of the spectrum colors and reflect the remainder. In a moderately bright light these surfaces are able to selectively absorb larger proportions of those rays for which they have an

affinity. The others are reflected and are fairly pure. Thus a red object has absorbed almost all of the rays directed at it except for the red. When the illumination becomes intense the absorptive capacities of objects are overtaxed and they can no longer take up all the rays of any single color. The amount of reflected light becomes so great that the eye receives not only the rays characteristic of the object, but of many others beside. The local color of the object will still be visible, but it will be mingled with other rays and the purity of the color will be less. The surface will be more brilliant because it reflects a greater amount of light than in low illumination, but any one color will be less pure because it is submerged in the white light. (FIG.II,III,VI).

"If high illumination strikes the surface at an oblique angle, so much of the light will glance off in specular reflection that no one color will predominate. Any surface, however colored, may then appear white. We see this effect when we look at leaves which catch the sunshine at an angle such that light is almost totally reflected, and green paint can no longer represent them. They are more nearly recorded by strokes of white."[5]

Intricacies of vision entered into the project. Optical peculiarities of the eye may be responsible for many illusions and interpretations dealing with color. Some of these seemed pertinent to the problem and therefore are included.

The advancing and retiring qualities of hues have their basis in optical laws. The eyes focus normally to white and also to warm yellow and red violet, both of these latter colors occupying points on the spectrum that lie on borderlines between hot and cold regions in the color circle. Brightness, as well, influences judgments of size and nearness. A fringe will form about the image of the light area and cause it to seem to "swell." (FIG. III). W. Allen Wallis reports that yellow is seen as the largest of colors, then progressively smaller are red, green, blue and finally black.[4]

Colors mixed by the eye may seem brilliant in one arrangement and somber in another. Areas of red and green placed next to one another produce great contrast. When these colors are broken into small areas they seem to join and appear to be darker and more somber in hue.[6] This principle was one often used by the impressionist painters and was avoided in the problem undertaken.

The ability of the eye to see the world of color as normal under widely varying illumination is called color-constancy. "A gray hen standing in the sunlight and a white hen standing in the shadow of a barn will look respectively gray and white even though the gray feathers may actually reflect a greater intensity and volume of light to the eye." Even in chromatic light the eye senses the quality of illumination and continues to see a white object as white. A red light on the white object may distort its color but the eye continues to see the red as white.[6]

In very dim light, however, all colors undergo odd changes. The colors of the world fade out of vision as illumination is decreased. Under normal light, yellow has the brightest visibility,(FIG. II), while yellow-green is seen first under dim light. In fact, dim light seems to increase the values of the cool colors and to decrease the values of the warm. (FIG. IV). Twilight seems to make blue and green seem fairly light as compared with the red hues. Colors in dim light also tend to be filmy, to lack structure and texture. (FIG. IV). This is also true at times of things seen in the distance or through mist.

Colors remain fairly constant to the eye under widely different conditions of illumination, but changes in backgrounds of these objects modify their appearance to the eye.

When viewing highlights, shadows and luster, another phenomena appears. Highlights as colors generally seem to be opaque and to cover the object on which they appear. They seem stronger than any brightness around them. (FIG. III) Unlike highlights, shadows are transparent and filmy in aspect. They take on a color tinge that is directly opposite to the hue of the light source; for example, yellow casts a violet shadow and orange a bluish shadow. (FIG.III,V). Luster of objects remains in both bright light and shadow. Other occurrences manifest themselves but are of lesser importance to the project undertaken.

C. A statement of findings resulting from artistic performance.

As mentioned previously, under procedures, most of the

sketches done at the beginning of the study had been discarded or changed in favor of more anatomically correct figures. Photographs and live models were used for additional reference. The photographs proved ideal for the analyzing of simplified contour and shade. From these photos and sketches, decisions were made to use the color which would suit the mood and light of the day.

Shadows and shades were determined by the type of sunlight directed at the figures and objects and by their own intrinsic color. Intensity of color became a critical problem. One color could not be changed without changing all adjacent areas. Flesh tones proved to be highly affected by varying intensities of light or the lack of it. In dim light the shades had to be soft with barely visible divisions of planes. Only small differences in value was tolerated. In bright sunlight it seemed as if the intensity of shades had to become increasingly vibrant and vivid.[2] In the most intense light of all, colors became almost faded in appearance.

Oversimplification of feature details such as the nose and eyes did not work well. The same was true of too much detail. There was need for individualizing shadows in order to give character to a face without giving expression to it.

The environmental objects such as hats and umbrellas and the figures on the beach now needed embellishment and enrichment. Various patterns and designs were tried on blankets and clothing.

These were painted with some perspective at first. This did not seem successful because it resulted in a cluttered appearance. This approach was abandoned and precisely drawn or stenciled patterns were substituted. All aspects of perspective were eliminated except for the size and placement of figures. Planes remained flat thin areas of color separated from one another by rather hard edge definitions and were determined by light.

Form was defined by the use of flat planes that were varied in color and shape. This was done in order to show contour. The brighter the sunlight was portrayed, the stronger the contrasts became. Lack of sunlight or cloudiness called for soft nuances between flat planes. In extremely intense sunlight planes and form sometimes disappeared completely. Not all attempts were successful and revisions were made until the desired results were achieved. Trial and error, photographs, observation, research and sketches were all employed in carrying out the project.

Each painting presented a new problem to solve. Each one dealt with a different intensity of sunlight. Explanation for each painting follows:

FIGURE I. In this painting the sun was almost directly overhead and a little to the right. There is little shade and few shadows are cast. The pattern on the blanket has been changed from a large flowered pattern to one of precisely stenciled forms. The colors are intense, but with no great contrasts in intensity.

FIGURE II. In this painting the sunlight is of greater strength

and is high and to the left. Longer shadows are cast and there is greater contrast of light and shade. Contour is shown by division of planes and the use of strong contrast of values on the forms.

FIGURE III. Here the sunlight becomes even stronger. It is cast from the right and the shadows become even longer. These shadows clearly show their violet character, the complement of the yellow sunlight, even when cast on a green striped blanket. Illumination is so great that a "halo" seems to form about some of the figures. The values of skin tones are strong with color. The intensified illumination has the effect of fading the colors of the distant figure.

FIGURE IV. Heavy overcast skies in this painting are shown by the use of cool colors and very soft contrasts. Only on the blanket at the closest point of the picture is there any relatively strong color or contrast. Any forms with atmosphere between them and the observer appears with soft division of planes and low intensity of color. Very few shadows are cast and they are relatively unobtrusive.

FIGURE V. Two figures are seen in very strong sunlight, which comes from above and directly behind the boys. Contrast is so strong that features are heavily shadowed or completely eliminated by highlights. Skin tones are very intense in value and there are strong contrasts in contour and color. The shadows cast are of strong violet to complement the yellow sunlight.

FIGURE VI. In this painting the illumination is so strong that the

colors appear to be bleached. The only strong contrast is that caused by the casting of the shadows. Here is an example of strong light which diminishes the intensity of colors upon which it falls.

D. Conclusions:

A lifetime could easily be spent in experimentation with light and color. Many famous men of the past have done this. Books have been written on the same subject. The problem and investigations undertaken here were only a miniscule attempt to work with some of the principles involved and on a subject chosen by the artist.

The figures on the beach were greatly influenced by the light and color employed. It was impossible to separate one from the other. Color gave life and contour to the composition and light influenced the color and style. More work will be done to continue the experimentation that was only begun in these paintings.

Footnotes

1. John Rewald. History of Impressionism.
New York, 1946

2. Walter Sargent. The Enjoyment and Use of Color.
New York, 1964. pp.61-127.

3. Faber Birren. Color, A Survey in Words and Pictures.
New York, 1963. p.84.

4. Faber Birren. World of Color.
Westport, Conn., 1941. pp.278-283.

5. Walter Sargent, op. cit., p.79.

6. Ibid., p. 143.

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2. Birren, Faber. The Story of Color. Westport, Conn.: The Crimson Press, 1941.

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7. Rewald, John. Seurat. Paris, France: Les Beaux Arts, 1959.

8. Sargent, Walter. The Enjoyment and Use of Color. New York: Dover Publications, Inc., 1964.

9. World Book Encyclopedia. Volumes 3, 11, 14, 16. Chicago, Illinois: Field Enterprises, 1963.

Figure I

YELLOW HAS BRIGHTEST VISIBILITY UNDER NORMAL LIGHT - page 6

HIGH ILLUMINATION - page 4

Figure II


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OPAQUE HIGHLIGHT - page 6
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Figure III

COLOR SEEMS FILMY - page 6

INCREASED VALUE IN DIM LIGHT
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Figure IV

Figure V

COMPLEMENTARY SHADOW - page 6

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Figure VI