

Color:

Exploring the Spectrum

Lauren Grimm
AR695/Dave Dietemann
Fall 1995

Color

"Color is life; for a world without colors appears to us as dead...Nothing affects the human mind more dramatically than the apparition of a gigantic color corona in the heavens. Thunder and lightening frighten us; but the colors of the rainbow and the northern lights soothe and elevate the soul. The rainbow is accounted a symbol of peace."¹

Humans experience the world in a variety of ways; including sight, sound and touch. Through the sense of sight, we discover the realm of color. In the presence of color, we experience both visual satisfaction, and at times, a visual tension which awakens our senses. For example, when two complimentary colors of equal brightness are placed next to each other, they create a visual vibration or tension. [see fig. 1] While a colorist may often have an intuitive sense for the emotional effects of color, the scientific elements of color theory need to be learned. With a good foundation in color theory, a painter will be able to make quick color choices, and thus keep his/her painting alive and spontaneous.

Early developments of color theory were perhaps most indebted to the well known philosopher of the 17th century, Sir Isaac Newton. His scientific experiments proved that light is composed of separate wavelengths, which are seen as rays when refracted through a glass prism onto a surface - revealing the seven distinct colors, red, orange, yellow, green, blue, indigo and violet. [see fig. 2]

The process of combining the three primary colors of light (not pigment), red, green and blue to produce white light is known as the **additive theory** of color. Technically, the light rays themselves are not actually colored. Instead, color is conceived through the mechanisms of the human eye and brain.

When we identify a paint pigment as red, for example, the red paint is perceived as red because it absorbs all the other light rays of the spectrum, except red which it reflects. This process is known as the **subtractive theory** of color. White absorbs no color and reflects all the rays. Whereas, black results when the three primaries are mixed together, thus absorbing all the light rays and reflecting no color. For a painter, the importance of understanding the subtractive theory, as theorist David Lauer points out is that;

"Color is a product of light. Therefore as light changes, all color references will change. What color is grass? Green? Grass may be almost gray at dawn, bright green at noon, and nearly black at midnight. There is no one consistent color for any thing or object."²

Therefore, a painter interested in developing a strong foundation of painting from observation should attempt to paint in a variety of different lighting situations.

Newton along with successive color theorists developed the 12-hue color wheel. [see **fig. 3**] Within this wheel, the **primaries** form a triangle, with *yellow* at the top, *red* at the lower right, and *blue* at the lower left. The **secondary colors** are formed with the addition of two primary colors; yellow + red = *orange*, yellow + blue = *green*, and red + blue = *violet* (purple). The **tertiary colors** are created with the addition of a primary and secondary color, thus arriving at the 12-hue color wheel. For example, yellow + orange = yellow-orange, or red + violet = red-violet. The color hues which sit across from each other on the color wheel are **compliments** of each other. These **compliments** include: yellow - purple; red - green; blue - orange. When two compliments are combined the result is a **neutral** color, often called a tone. Thus when red and green are combined a gray appears. A reddish gray or a greenish gray can be created with the addition of more red or more green to the neutral gray.

In color theory, there are three separate terms which can be used to describe a color. These terms are: hue, luminosity (i.e., tone), and intensity (i.e., saturation). The term **hue** refers

to the common name of the color; for example: red, orange, yellow-green, blue-violet, etc. The term **luminosity** refers to the lightness or darkness of a color. For example a blue-violet can exhibit a low luminosity or dark value, a middle luminosity of middle value, or a high luminosity or a light value. A color's **intensity** refers to its brightness or dullness, also called chroma. A red-orange might be bright, or have a high intensity; or that same red-orange might exhibit a middle intensity; or the red-orange might be dull, exhibiting a low intensity.

White is known by many artists for its ability to lighten color. However, it also has a tendency to deaden color. In his text How to See Color and Paint It, colorist Arthur Stern, identifies the six colors most susceptible to this deadening, and offers one solution to correct this process:

"When you add white to red, red-orange, orange, yellow-orange, green, and yellow-green, you change not only their luminosity, but also their hue and intensity. They all tend to become slightly duller and bluer. So when you lighten these six colors, you must also add a speck of yellow to restore their original hue and intensity."³

In the same way that white tends to dull colors, black also deadens color. Rather than using black, many artists feel that darks are better created through various combinations of dark compliments; pthalo green, and alizarin crimson, dioxazine purple and lemon yellow and a touch of pthalo blue. Blacks can be warmed or cooled down with the addition of a warmer or cooler color.

A painting which demonstrates an exciting use of palette, often does so through the use of color contrasts. Hence, the success of any one artistic composition may often depend on the use of contrasting elements. As color theorist, Itten notes;

"Our sense organs can function only by means of comparison. The eye accepts a line as long when a shorter line is presented for comparison. The same line is taken as short when the line compared with it is longer. Color effects are similarly intensified or weakened by a contrast."⁴

Some of the most commonly used forms of color contrast include; light-dark contrast, cold-warm contrast, and complimentary contrast.

Light-dark contrast refers to the range of color values from light to dark. By devising a chromatic value scale which corresponds to an achromatic value scale of black and white, it is possible to understand the inherent values of individual colors. For example, a pure yellow (i.e. lemon yellow, or hansa yellow) maintains the lightest value of the spectrum. Whereas, a pure purple (dioxazine purple) is the darkest in value. The well known artist Edward Hopper composed his paintings using the dramatic effects of light-dark contrast. [see fig. 4] In general, a color's value is dependent on the existing values of surrounding hues. For example, in David Lauer's blue value scale illustrates this point. [see fig. 5] The same middle value blue is placed in the center of square of a varying degree of blue. The same middle value blue which appears luminous against the dark blue square, appears dark against the light tint of blue at the other end of the value scale.⁵

As a result of childhood conditioning, most people associate certain colors with specific senses. For example, red and orange are often connected with the warmth from a fire. Blue might be associated with the coolness of water, etc. While yellows, reds and oranges tend to be identified as warm colors, while blues, greens and purples are identified as cool colors, there is still a great deal of variation between warm and cool colors within **both** the warm and cool groupings. Many reds are actually cool, for example alizarin crimson, or rose madder. There are blues and greens which are warmer; cerulean blue, or cadmium green. In addition to a pure hue's warmth or coolness, an artist can change the temperature of a color by adding either a cool or warm analogous color. The best way to judge a colors' coolness or warmth is to identify the color in relation to that color to surrounding colors. In **figure 6**, notice that the green in the

center of the blue square looks warmer than the same green in the orange square which looks cooler. Another trick to identifying a color's warmth or coolness, is to look at the light source which is illuminating the color. Colorist Jackie Simmonds differentiates between various light sources and their effects in her color theory writings:

"Afternoon or evening sunlight is generally richer, warmer and more orangey-pink than early morning sunlight, and it will 'warm' the colours it touches, while casting cool blue or purple shadows. Weak sun, or an overcast sky, often provide cool, bluish light, with subtler contrasts and gentler shifts of colour and tone. Artificial light varies too: table lamps and spotlights often throw warm, golden light, whereas a fluorescent light is usually cooler and greener.."6

Many artists utilize warm/cool contrast as part of their compositional structure as seen in the work of 20th century French painter, Pierre Bonnard. In *The Open Window* (1921), Bonnard conveys the warmth of a summer afternoon in France using a contrasting warm and cool palette.

[see fig. 7]

Another defining characteristic of warm/cool color contrast is that warm colors appear to advance on the picture plane, while cool colors appear to recede. With this knowledge, an artist can utilize certain warm and cool colors to create the illusion of depth.

When placed next to each other, complimentary colors seem to vibrate and energize each other. The group of 20th century artists known as the Fauves adopted complimentary color contrast as their signature as seen in Derain's *The Pool of London*, utilizing broad areas of color compliments. [see fig. 8] Thus, the use of opposing compliments in a select area of a painting can help to place emphasis on a compositional focal point. In addition, when representing the shadow of a colored object, a painter might utilize that color's compliment, as discovered by French painter, Eugene Delacroix;

"Delacroix was particularly interested in observing how color was modified in natural light, away from the limitations of the studio. He noticed that there was real color in shade--that it was not just a darker tone of the same color in light,

but that the reflected shadow contained the opposite complementary color of the color in light." ⁷

When we are able to properly understand and use colors, our paintings will begin to come to life through their luminosity, hue and intensity. One of the reasons I have chosen to be a painter is so that I can explore the endless possibilities of color in my own paintings. I hope to create paintings which through the use of color and form, will not only impact the viewer visually, but may also provoke them to feel as well.

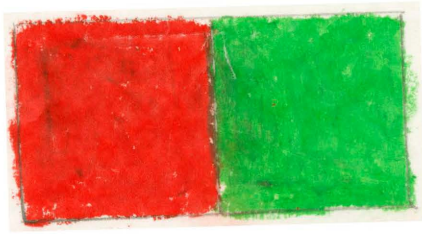


Figure 1: Complimentary colors placed side by side, create a visual tension

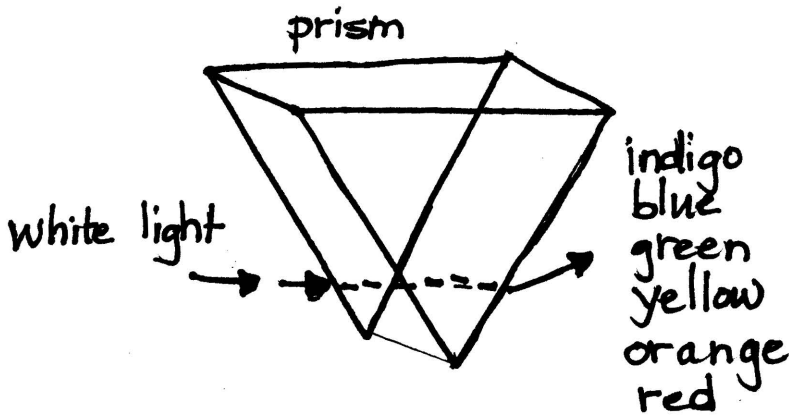


Figure 2: White light projected through a prism to create 7 separate hues (violet, indigo, blue, green, yellow, orange, and red).

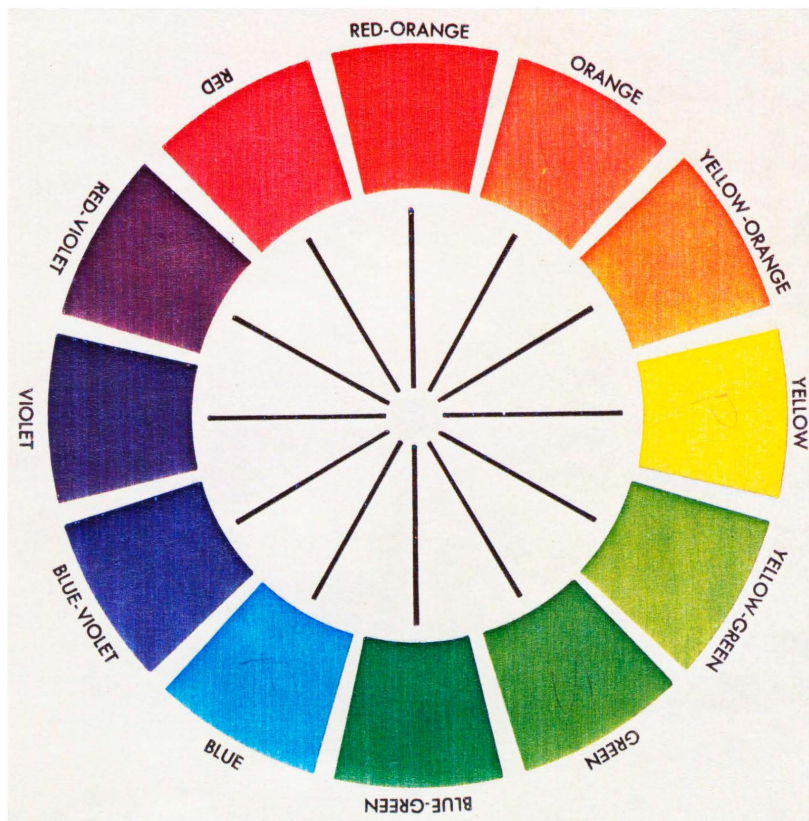


Figure 3: 12 Hue Color Wheel

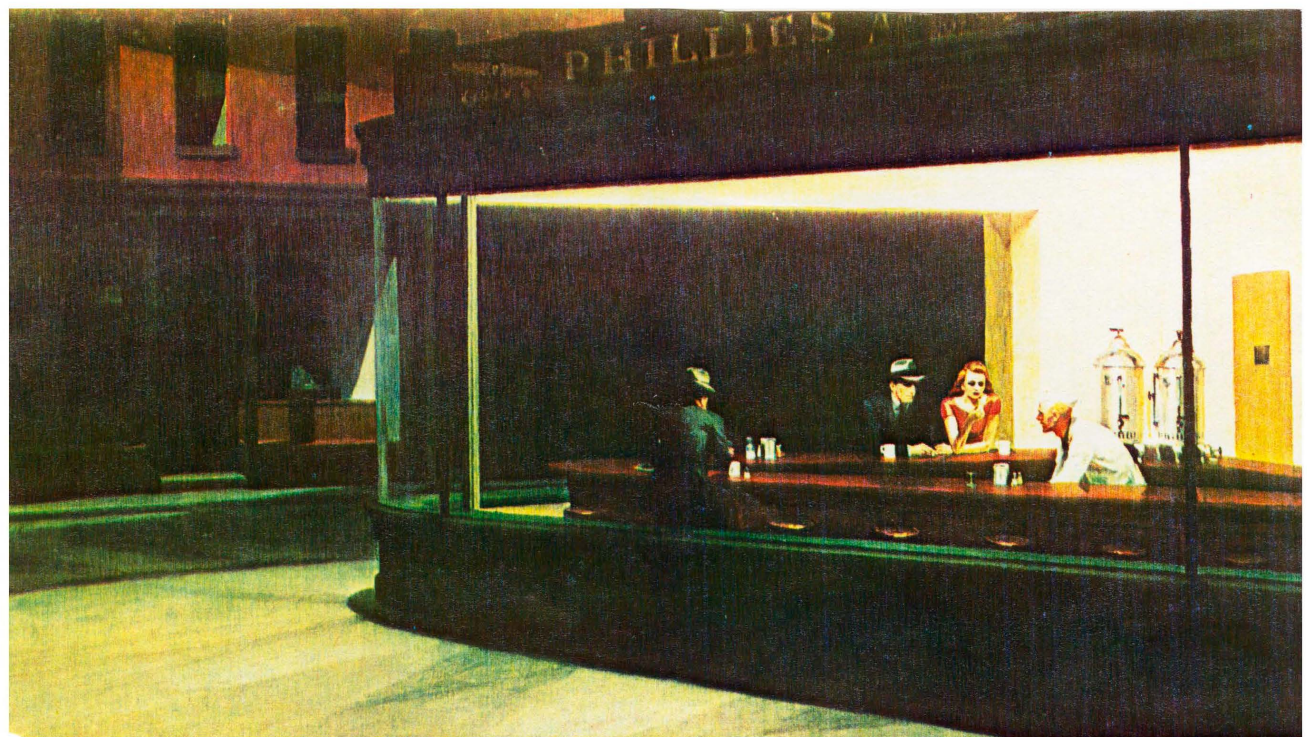


Figure 4: *Nighthawks*, Edward Hopper (1942) *Example of artist who is known for his dramatic use of color luminosity.

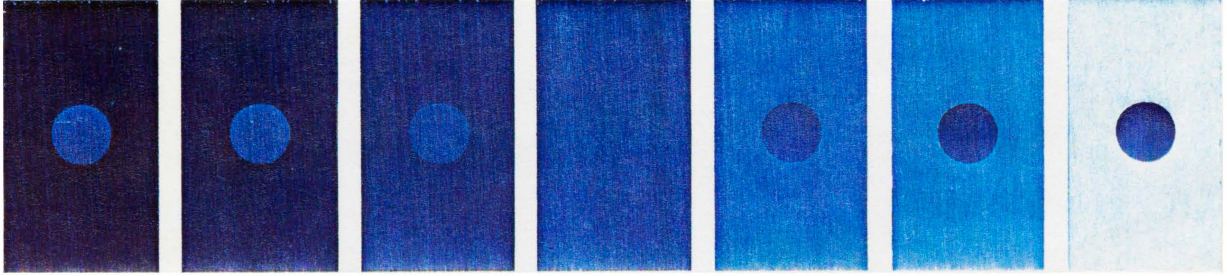


Figure 5: Reproduction of David Lauer's Blue Value Scale *(see endnote 8)⁸

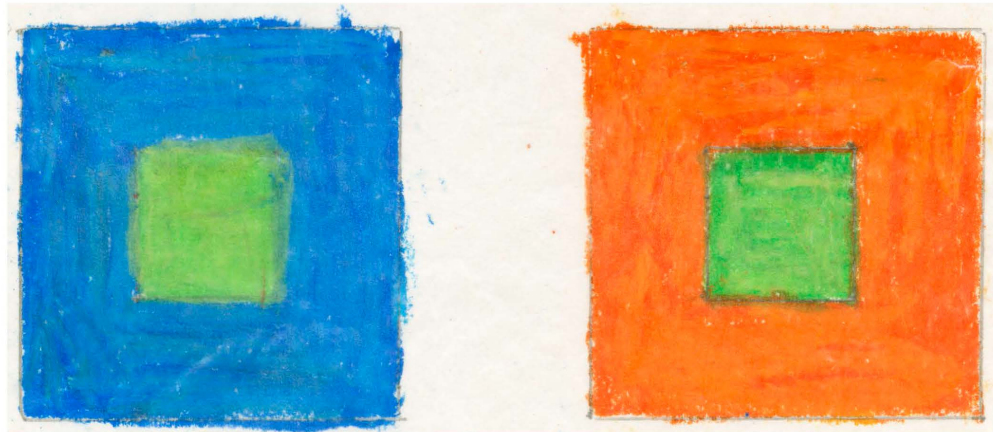


Figure 6: Green in blue square warmer than green in orange square; as based on Itten's suggested exercise.

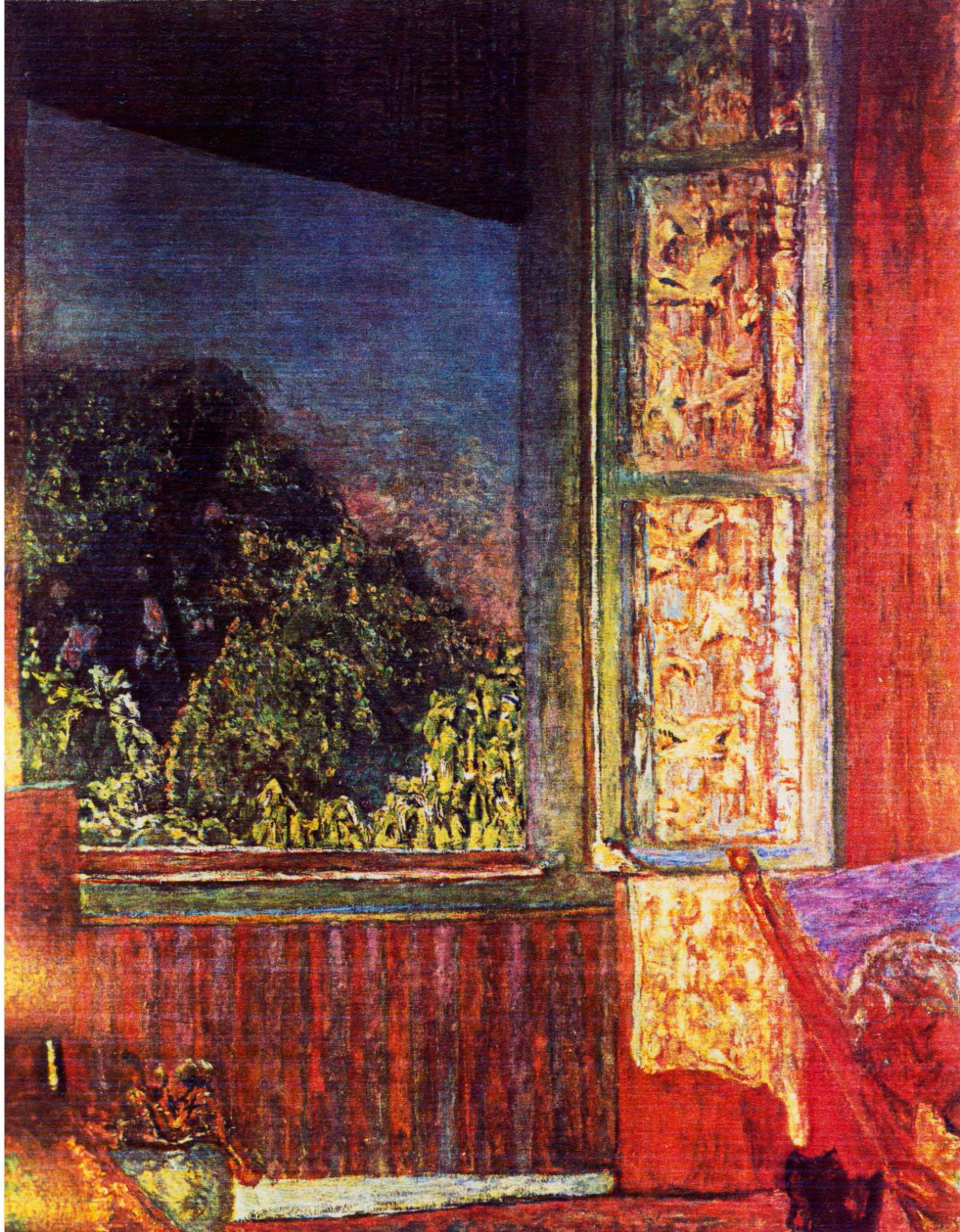


Figure 7: *The Open Window*, Pierre Bonnard, (1921) *Example of artist using warm/cool contrast in broad areas of flat color.

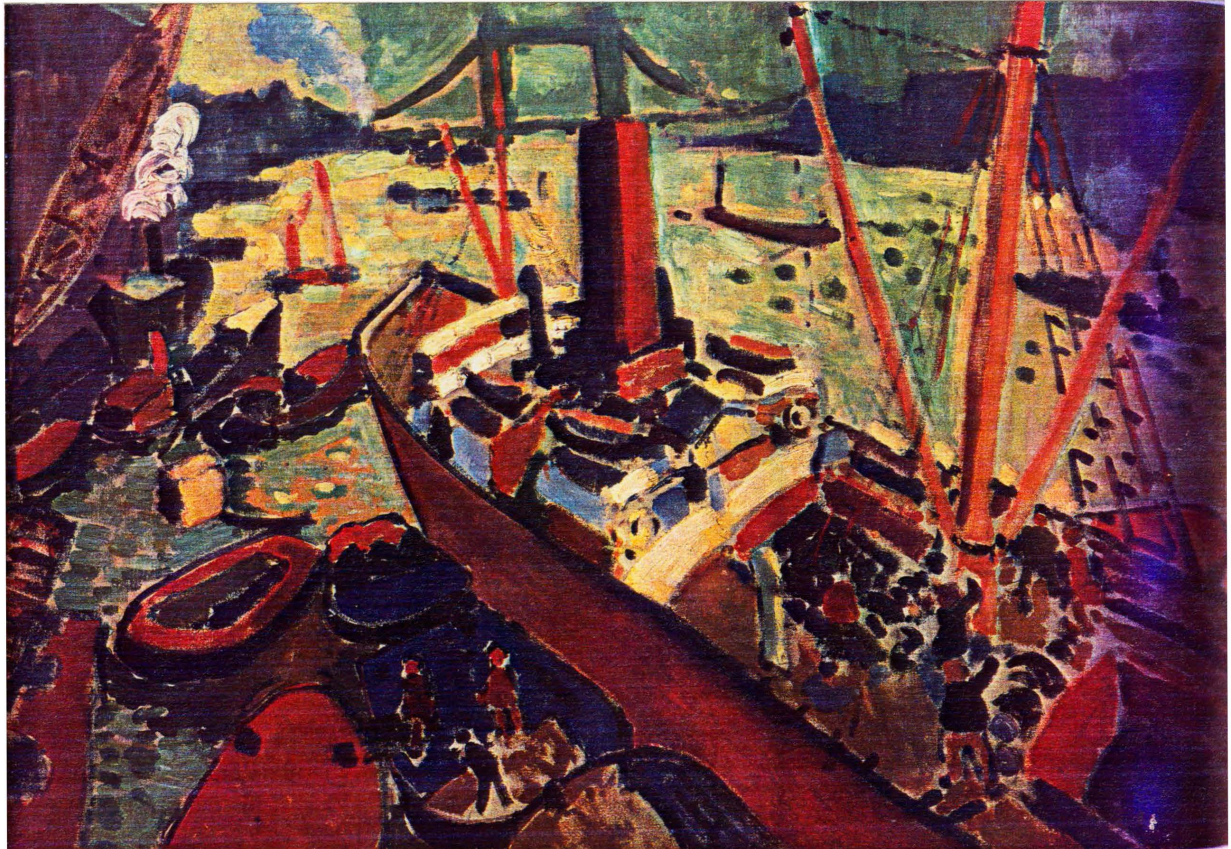
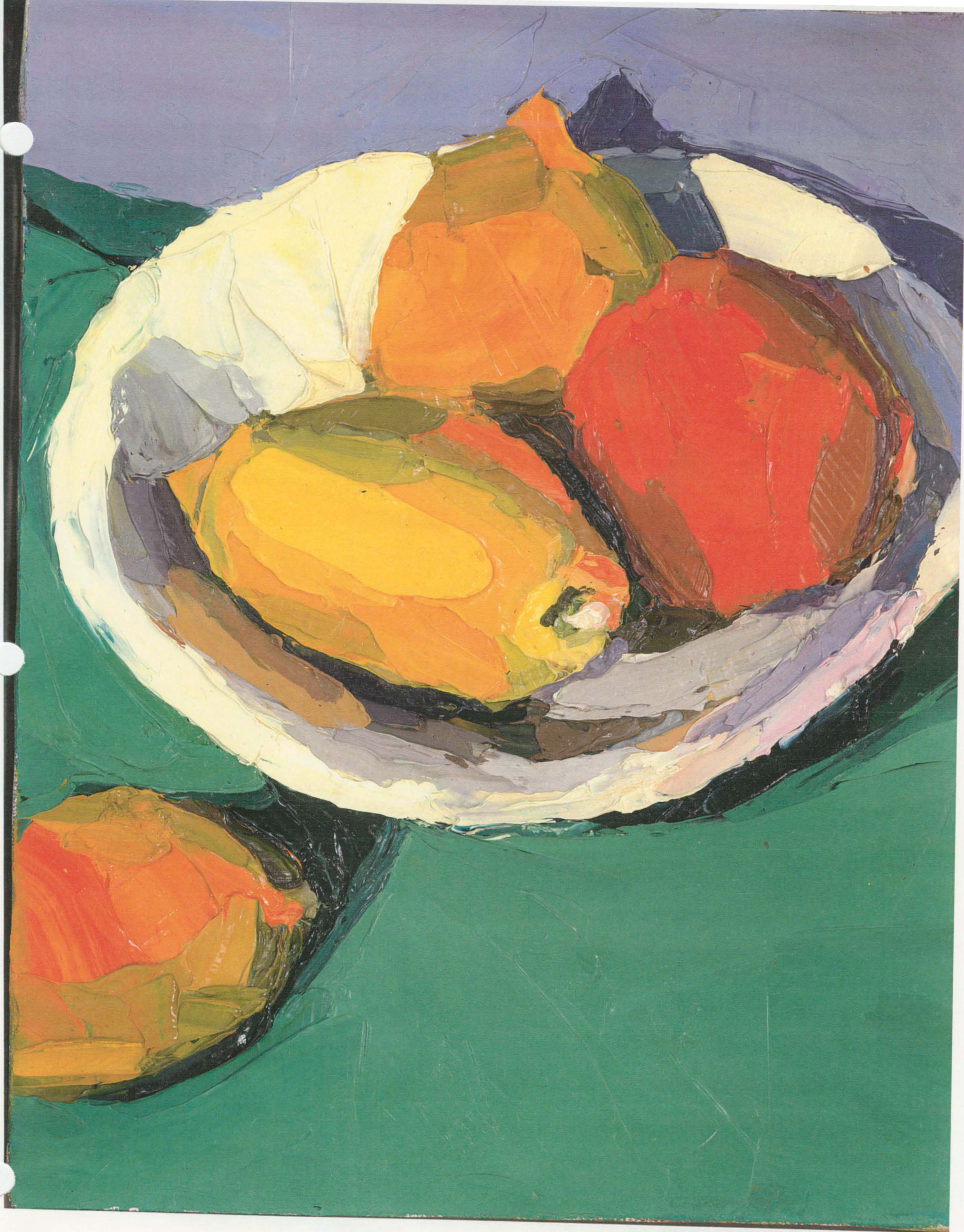


Figure 8: *The Pool of London*, Andre Derain (1906) *Example of artist using complimentary contrast.

Endnotes

1. Johannes Itten, The Art of Color (New York: Reinhold Publishing, 1973), p. 13.
2. Lauer, David, Design Basics (Fort Worth, Texas: Holt, Rinehart and Winston, Inc., 1990), p. 229.
3. Arthur Stern, How to See Color and Paint It (New York: Watson-Guption Publications, 1988), p. 22.
4. Itten, The Art of Color, p. 36.
5. Lauer, Design Basics, p. 232.
6. Simmonds, Jackie, "Seeing the Light: Brights and Darks of Colours," The Artist, Vol. 111 No. 7, p. 34-36.
7. Frayling, Christopher and Helen Frayling and Ron Ban Der Meer, The Art Pack (New York: Knopf, Inc., 1992), p. 7.
8. Lauer, Design Basics, p. 233.



Four Color Studies
by Lauren Grimm



