EXPANDING EXPERIENCE THROUGH COLOR

EXPANDING EXPERIENCE WITH COLOR

Common Experience and Color.

Seeing more in our perceptions of the world around us is not a problem of innate visual acuity and skills. We all have natural ability to make very fine perceptual discriminations; we already make very fine discriminations on practical matters, although these discriminations are not made consciously. But we miss a lot; we miss a lot because we're not ready to see what's before us. We can begin by acknowledging the skills we do have in making fine visual discriminations and presenting ways to transform the unconscious perceptions to the conscious level. From this beginning we can experience our lives as dynamic and engaging, with common daily experience transformed, and we transformed in the process.

Knowledge, conditioning and culture leads us to perceive in certain ways, giving attention to some subjects, shaping how we see subjects, while overlooking other subjects. Practical daily needs require fine discriminations, the discriminations mixed in with other utilitarian input. Among the various subjects unconsciously processed is color. We may say that we don't understand much about color while, at the same time, very fine perceptual discriminations are made regularly at an unconscious level. Most often these color discriminations are practical, utilitarian, used in the act of recognition, without names for colors or any notion of color seen as color, i.e., color for its own sake. Color can be part of many visual clues that lead us to identify an object or simply identify relevant properties in a subject; this could be choosing fresh fruit, determining one's health by appearance, selecting home flooring or looking at the sky for weather. We may ask for help in choosing flooring, but we wouldn't say that color expertise is required to determine one's health or ripe fruit. These fine discriminations suggests the potential for expanded color intelligence with everyone. Working more consciously with color, exploring understandings of color theory and experiencing color in various contexts will lead to new ways of seeing color and the world around us, both in experiences with nature and with experiences with cultural subjects, viz., fine art paintings and design.

While making color decisions throughout the day, we seem only to become aware of color when color is not what we expect. Normally, every moment in our wakened hours, most colors are as we expect, so the colors are simply accepted – taken for granted – because there is no surprise. In a way, the colors in daily experience are invisible, as color; color is processed and discriminated unconsciously. Color is most often subordinated to things. The red stop sign, orange color of orange juice, the red tomato, red hair, a red fire extinguisher, or green paper money: each has the color subordinated to the thing, the thing having more importance than the color so we don't usually see the color. But, if the color of the milk in our cereal is not the creamy white we expect, we can become very conscious of the color. We're not thinking so much about the color; we're thinking about the taste and risk in drinking the milk. That is a fine color discrimination. However, if the colors of healthy and unhealthy milk are placed side-by-side, without the association with milk, we may notice little difference in the appearance, the color difference most subtle. Color is obviously very important in food, no matter this being a practical importance.

Another fine discrimination can be made with human flesh color. When a light skinned person is sea sick we can see their face as greenish, yet if the skin color would be isolated, away from the context of the face, it wouldn't look green at all. That's a very fine discrimination, and a discrimination that can be made by everyone. Here the discrimination is made in a utilitarian identification of seasickness, not in identifying the color green. Green can also be seen in the clouds during tornado warnings; it's a common perception, but if the green cloud color were isolated, it wouldn't look green at all. In both circumstances the green color is apart from the norm, what we expect.

As with skin tones, all natural colors are seen and experienced in complex circumstances, color depending on material medium and surface qualities. Artists are often led to recreate the look of a sunset, a mountain vista, a bird, a face, a flower or a deer, motivated by color in the subject; but color in each subject has a unique circumstance that produces the color effect. Atmospheric light, atmospheric perspective, a bird's feathers, flesh in the face, translucent flower petals and animal fur: each appearance is unique, producing a unique color effect.

Figure 2. Caroline Hairston rose

We can immerse ourselves in the colors in flowers, simply looking, for example, at the color variations within a rose. The color contained in soft and moist translucent rose petals is unique, and provides a very particular appearance in color. Whether a light source is directed on a rose or the light source comes through the petals – the rose backlit – the translucence and subtle color gradients are unique to this rose. Add to those qualities reflected light, in this rose the light suggesting other light sources within the rose. Here the colors are bright inside the translucent rose whereas if the petals were opaque the flower would be dark inside. The moisture in the material petals carries light like an infinite number of lenses.The material of the petals and the color appearance are inseparable; the complexity of the color effect in a rose petal could not be represented in a color swatch or a stroke of paint. This single example presents the limits of thought as the most thorough and skillful description of this rose cannot account for what can be seen in the observation, and observation that allows the phenomena of the rose to be experienced. Further, even the painting or the poem references the rose; they do not replicate the experience to be had in a pure perception without description, theory, analysis and judgment. Short of dramatic sunsets and rainbows, there are phenomena to be discovered simply by looking, looking more closely to what is there to be seen all the time. By giving attention to and exploring color, broader experience is opened to us.

Figure 3.

Like the rose, human flesh provides another circumstance where the material containing the color and the color appearance are inseparable. Whether the translucent skin layers are dark and rich ebony with blues reflecting from the sky or pale tints with pinks and subtle blues and greens: each skin color provides rich and captivating appearance, a motivating painting subjects for artists, this appearance not easily captured by pure objective representation. For artists to suggest the look of this translucence they must use various techniques, what could really be called tricks. Specifically, ultra smooth multicolored gradients and reflected lights may suggest the pearl-like reflective surface and deep translucence in skin. Further, the multicolored surface would be represented by using a variety of warm and cool pastel colors to capture the look of Figure 2. In fourth grade, when working on a poster with figures, I was trying to mix a flesh color with tempera. Moving the pastel color toward pink and then toward orange, back and forth, I didn't realize that no flat color could represent flesh, a flesh is multicolored, in addition to its translucence.

Although the appearance of flesh is incredibly complex, cultures have used the most simplistic descriptors for various skin colors, what are really simplistic and symbolic labels, labels bearing little relationship to actual appearance. The colors red, white, black and yellow have been used to label races of people, with these colors often used as stereotypes while, in fact, actual skin colors are richly diverse, made more complex by light sources – direct and reflected light. The label "colored," or even "people of color," implies there are people without color. This comes from thought processes and a need to label people who are different than the local majority, or sometimes to label ourselves, distinguishing ourselves from the other. These simplistic labels are certainly not the result of observation and actual appearance, not the result of looking at flesh critically and describing what is seen. A generous explanation is that white means "more white than", and black means "more black than".

Continuing thoughts about skin color indicating the state of one's health (beyond a temporary condition like sea sickness) we may notice someone's overall health is weak because of skin color, the color being different than a "normal" healthy person. Healthy people have abundant blood vessels in their flesh and appear healthy, whereas smokers with heart disease and diabetes have fewer blood vessels in the face and would appear less roses. But actual health is one thing and what appears to be healthy another. But different cultures have mores about skin color that provide a standard for a "good" appearance. Caucasian people in the United States value color on their naturally light skin supporting a big market for tanning lotions and tanning beds, this true among many people while skin cancer is a known danger – appearance trumping health. Having a tan used to look healthy and may still look healthy to some people; but now, with people more conscious of skin damage from the sun and skin cancer, a tan isn't necessarily a healthy look. Korea, however, values whiteness and facial features that are not natural from birth and has made cosmetic surgery more common than any other culture. Color here is culturally significant meaning, symbolic meaning, leading to color discriminations that are automatic and below consciousness.

We appreciate color in nature while not giving attention to color for the sake fo color. Walking in the woods will present interesting colors at every glance, the colors appearing on infinitely diverse surfaces, made dramatic by constantly changing lighting, all worth photographing or painting. In everything we see the color belonging to something, some object, some object with a name – even if we can't remember the name – therefore we expect the color to be a certain way and are usually not surprised by appearances, except in noticing surprising variations within expectations. We see the color as part of the object, usually inseparable from the object; the color is seen and experienced in a subject context like the color of milk is seen in a milk context. But this association of color with object is very complex. The rose petal is complicated enough, but let's consider a cultural object, a shiny blue Cadillac (Figure 4).

Figure 4. A 1958 Cadillac

We may think of the car as blue without noticing the myriad of blues and blue derivatives in the blue appearance of the car, all the result of reflections from various sources, the reflections altering the appearance of the local color – the local color being the particular color blue painted on the Cadillac.

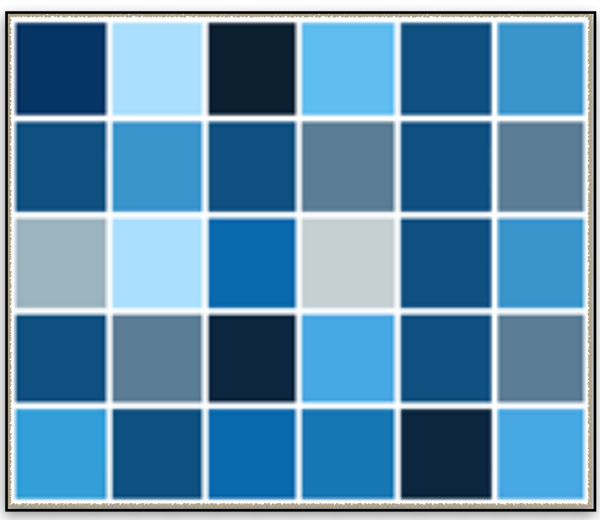

Figure 5. The appearance of a shiny blue Cadillac can include an infinite number of blues, including reflected colors in the deep mirror finish.

Again, we do not easily separate the color from the object; we see the color as belonging to the object. The deep blue shiny color of the car is integral with the car itself; it's part of the experience with the car (and cars generally) and perhaps part of the experience with the Cadillac, once the American standard for quality in an automobile. But the attractive look of the blue car is not the color as much as the surface quality of the painted car. The reflections in the blue car require a smooth polished surface; the smoother the paint surface, closer to the surface of a mirror, the deeper the reflections. The richest reflective surfaces are achieved by spraying many coats of paint (usually lacquer) and polishing each coat to its smoothest before the next layer is applied. One of the favorite deep colors for hot rods has been candy apple red, applied with as many as twenty coats of lacquer, each coat rubbed out smooth so the next layer and each successive layer will be applied to a mirror finish. The result is the deepest color, meaning that one sees deep into the paint surface, into the mirror finish, as though looking into a pool of deep water, or a colored mirror – with the Caddy, a blue mirror.

Looking at the blue Caddy we may actually be looking at the color as color for a very short time, particularly with this unique fifties icon. This is a lot to look at for the car enthusiast, the importance of the car and the condition of the car is an "attention-getter", and it's not easy to look past the symbolism and meanings – the Caddy once a status symbol – of the car to consider the car for pure visual qualities. For the car buff the metallic blue may cause the thought process to interrupt the looking at the color, questioning whether the mint blue is an authentic factory blue and whether the mint look is the result of a repaint. To the car buff, suspecting a wrong color, even a wrong variation of the color, could kill the experience for the colors available in each year of production was fixed and known. But questioning the color is still not looking at the color; it's identifying the blue for its authenticity. Rather than looking at the car and its visual properties we are thinking about what we are seeing, with the thinking taking us into our memory bank of cars, Cadillacs or '50s deluxe automobiles and so on. All this takes away from the looking and the act of looking becomes short-circuited by this thinking. To label the car as blue is certainly helpful – "it's a blue '58 Cadillac" – but this doesn't help to know the actual paint color nor does it tell us how the car color appears with the broad range of blues, or help us to see and experience the range of blues. But there is a unique experience with color to be had in looking at the automobile bodies.

When isolating and looking at any one of the blue squares in Figure 4, the hue is seen quite clearly; when looking at the same hue on the Caddy it's part of the same painted blue, the local color blue, no matter how the reflections and lighting alter the hue. We have a concept of the local color that we extrapolate from all the various blues, seeing the car as one color, not a collage of different blues. Further obfuscating the local color is the deepness of the color; we can easily see the depth of the reflection – the reflection actually three-dimensional – and look past the surface into the reflection.

What is the actual color? There is no answer unless we know the manufacturer's paint name and color code number, and even knowing the exact color, the experience with the color depends on the surroundings and how the surroundings influence what is seen, this most true with a reflective surface. One logical answer would be a medium metallic blue for a 58 Caddy; that information can lead us to the right color in a paint shop. With make and year of a car, exact colors are retrievable.

Since the common black and gray cars before the forties, automobile colors have varied for product uniqueness and planned obsolescence. When design changes are limited, new models often have unique colors to suggest change. It's a cheap form of planned obsolescence. The unique colors used through the history of cars are memorable as they were attached to specific cars, and the colors often added splash to new models. Colors have been identified with manufacturers, and influenced by fads, colors used in other products before being used on cars. Pink and gray were fashion colors in the early '50s and also used on cars. Designer colors have also been applied to cars with the designer names, beginning in the 1970s. Using the designers' palettes produced additional associations beyond the actual appearance of the colors, the associations potentially adding value to a product.

In most instances the appearance of colors requires particular material properties in the subject, as in the color effect of rose petals. Trying to imitate the look of leaf colors in nature or the color of the blue Cadillac is problematic because most often colors are not flat surface colors, not flat or matte, like the color swatches in a paint store. Natural colors usually exist below the surface of the object, with the surface textured or translucent – or both – creating an appearance beyond the craft of the experienced painter. Painters are limited by painting media – whether oil, acrylic, watercolor, gouache, colored pencil or encaustic; they must address over all color effects with various painting devices, the actual appearance of color in nature beyond what is possible. A color that can be mimicked with artist's media, like a flat color, a color that "sits" on the surface of an object, is not that common in nature, or in many man-made objects. Natural colors are usually integrated into a material surface, as is the case with a translucent flower petal.

In presenting color, the medium and paint surface displays the color and determines the appearance of color in various ways. This is a factor with all media; watercolor, acrylic, gouache, oil, and lacquer, all have various looks, the looks influenced by the paint surface and the nature of the medium. The paint surface – its density, texture or smoothness, absorbency, and reflective properties – contributes to the appearance of color. Question: What is the hardest color to match on an older car for an automobile paint shop? The answer is black. The appearance of black depends on surface qualities more than other colors because a glossy black surface can be more mirror-like than other colors. Having gone through many car washes with brushes and with the painted surface impacted on the highway by small particles of sand and dirt, the older black car has an altered paint surface. An old windshield in direct sunlight can reveal similar microscopic pitting. These microscopic marks change the glassy smooth surface of a new car to a surface that is imperceptibly irregular, the irregularity only apparent as it changes the look of the car's color – or with a magnifying glass.

Figure 6. Black is the most difficult color to match an automobile. Over time the smooth surface develops microscopic pitting that creates highlights and shadows, thereby weakening the pure black appearance.

The surface of any older car would appear smooth, but its surface is not smooth. A billiard ball, smooth and glassy, if enlarged exponentially to the size of the earth – it is said – would have deeper oceans and higher mountains; Mount Everest would be .045 millimeters. The weathering of the paint causes reflections on the edges of the pitting and shadows off the sides of the pitting – fine reflective edges and lines – causing the black to look less black, more like charcoal. The weathered and worn old black color looks like there is a film on top of the black. This is an impossible color to match because the body shop would have to replicate not just the black color but replicate the surface texture. Of course, a charcoal color could be used to somewhat match an old black, but it would not appear the same given a critical look. The TV Mythbusters staff polished a hunk of animal dung until it was shiny – shiny smooth, just to see if it was possible. They had a gadget for measuring reflective properties, the main characteristic of a smooth surface. To understand the look of color is to understand how surface quality effects the look of color, translucent, flat or "deep", as in reflective.

As our utilitarian tactile sense is used to discriminate physical texture, its potential is generally underestimated, although people who sand cars in automobile body shops well understand that what can't be so easily seen may be felt with touch. When sanding primed surfaces in body shops with the best lighting, sanders often depend on touch more than sight to check for smoothness. They are frequently seen brushing the surface with their fingers tips after sanding.

Figure 7. Foliage in sunlight contains a range of greens from warm to cool.

Further considering color in nature, building on the writing about translucent rose petals, we may discover a range of color variations that we may not think about, owing to sunlight and reflected light. We can consider what makes the range of greens so different when the local color of individual leaves are not that different. Foliage is easily considered green, with the weekend landscape painter maybe feeling a single tube of green is sufficient for grass or foliage, making adjustments for light or dark with black and white. However, this is a symbolic use of green, the generic green standing for grass and foliage, but not representing the appearance of grass. A symbolic green may be enough for a child or the inexperienced eye of a novice painter. But the appearance of green is quite varied in leaves or grass on a sunny day. Blues and blue greens to green, olive green, yellow green and yellow, with white highlights: all may be seen in green foliage (Figure 5). Understanding that the local colors of green foliage can vary from blues, yellows, oranges and even reds, backlit by the sun foliage will be yellow, while a leaf in shadow facing blue sky – reflecting the sky – will appear blue green to blue. On a cloudy day, or away from backlighting or sky reflections, olive greens may be more apparent, olive green containing orange – or the mixture that makes orange, red and yellow. The cloudy day doesn't have the influences of sky blue and light passing through the translucent leaves, and the local color is stronger.

Colors are brighter when transparent on a white surface. A bright color effect is produced when light penetrates the paint or ink and reflects back through the color. Magazines and computer printers require white paper for color to work because printing inks are transparent; applied to dark paper, printing inks would be barely visible. Printer inks and ink systems on inexpensive printers are transparent and limited to the primary colors and black, or CMYK (C for cyan, M for magenta, Y for yellow and K for black). Smoother bright papers, designed for ink on a particular printers, provide the best results, printing papers having a chemical substrate that interacts with the printing inks, amplifying color. Printing color on normal white paper has colors flat and dull. On the other hand, artist oil and acrylic paint is usually worked as opaque, but like printing inks, they can be brighter when applied transparently. To create a bright red in the painting of a fire truck for example, the artist may paint the red area bright as white first, insuring the surface is smooth as well (texture creates shadows and limits brightness), then a transparent red can be applied for brightness. The problem is in laying the paint on evenly; the slightest paint build up can produce opacity, not allowing the light to reflect off the white surface.

Most surfaces have the potential to reflect. The least reflective surface is black velvet; it absorbs light rather than reflects light. Essentially black velvet provides no flat surface to reflect light and black absorbs light; it doesn't reflect light as does white paper. We expect shiny surfaces to reflect, but we don't so much expect other surfaces to reflect, but they do. Shadows most often contain cool light while lighted surfaces tend to be warmer; this is true out of doors on a sunny day because of the influence of the blue sky. Artists often use cool reflected lights in shadows to build the volume in faces and to add a broader range of flesh colors. One very unusual source of reflected light can be observed in Utah above the desert; an orange color appears on the bottom of clouds, a reflection from the orange desert floor, above the red orange rocky surface, this more apparent with a blue sky.

Luminosity and translucence are seen when lighting our fingers in darkness from behind with a strong flashlight; the fingers appear pink, and luminous, because flesh is translucent, the light coming through the flesh, carried by the liquid density, as with the flower petal. The lighting of the subject depends on the location of light sources, including reflected light, and the color temperature of light sources. Lighting and color.

Often we are looking at color indoors, where lighting is more manageable, but often neglected. When planning and working with any color field, the circumstances under which the color will eventually be seen must be considered. Professional art galleries must have consistent lighting – usually slightly warm – everywhere in the gallery, all places where people may be looking at paintings; this insures the artwork will be seen in consistently favorable conditions. Weak or cool lighting can steal the life from a painting. Working with strong light, and both warm and cool light, helps to understand the properties of colors – how they interact. Paint stores have warm or cool lights to view colors; this allows the paint swatches to be viewed as they would be viewed with daylight as well as with artificial lighting. with proper lighting the human eye can discriminate among over 200 values and about 10 million colors. Limited lighting limits perception, and undermining the quality of the work if it's to be seen in different or stronger lighting.

<u>The Physical Properties of Color.</u>

The various looks of color in subjects result from the myriad of material properties in the subjects. As the rose petal has material properties that determine the color effect, other organic subjects also have their appearance determined by material properties as well. Notice the display of red fruit in Figure 6: plum, raspberry, strawberry, apple, cherry and grape. They are all red, and here they are the same size. At the store we would ask for red plums, red raspberries, etc. But the actual appearances of the six red fruit is quite different, more different from what these photos can represent. We know the look of each of these fruits quite well and would not mistake a small apple for a plum or a cherry for a grape, even though we'd be hard put to describe each fruit with clarity. Visually we make very fine discriminations with these fruits. The beaded surface pattern of the raspberry is the most translucent with these fruits. The beaded surface pattern of the raspberry is the most translucent with light seeming to come from inside, while the dense skin of the apple has the least translucence. The differences result from the surface qualities, the quality of the red, its warmness or coolness, the texture (which we would know by feel) and its translucence. There is a particular warmness or coolness in each red, the warmness or coolness having its own look – the plum a warm red and the apple a cool red. We know these surface qualities well, for the look helps identify the ripeness and likely tastiness of the fruit. We make a judgment for ripeness in the subtle appearance. We know the look unconsciously without having to describe the look; this is real knowledge we put into action every day.

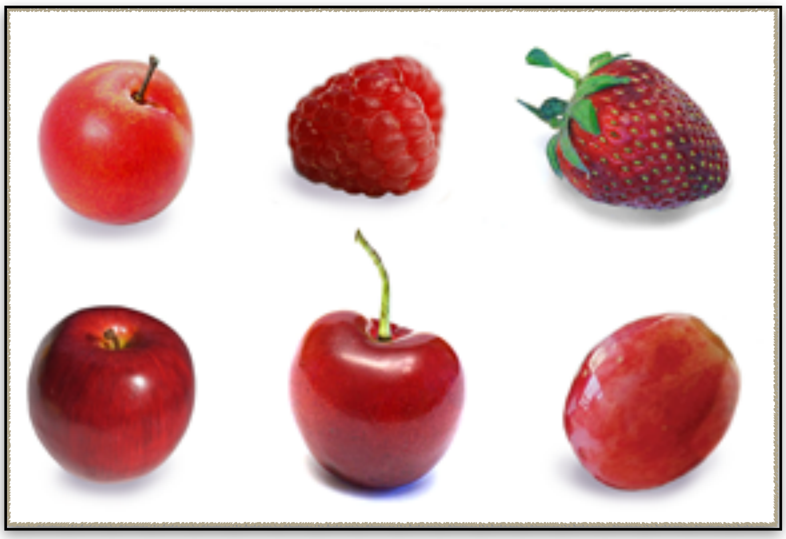

Figure 8. These fruit, all red in color, include plum, raspberry, strawberry, cherry and grape.

Most of our discriminations happen unconsciously, below conscious thought. Beyond visual input, we anticipate the taste and texture through appearance, short of an actual taste, although taste and smell are important evidence for our choice. The appearance of these photographic images may well trigger the salivary glands, but that response is not the result of the fruit appearing as real fruit; that is the action of the brain memories that trigger the salivary glands, triggered by the image.

Looking at each fruit example, we are not looking at a shapes that are simply red, although we may think that the word red is sufficient; we are looking at redness in a unique and richly complex material and an appearance that's not really describable. Although we may think about the qualities of the fruit, our glandular response is irrational. We don't really understand sensory experience very well, anyway; we don't understand the components of experience – sight, taste, sound, smell, tactility mixed with memory – and how the various components work together to give us the experience with the thing. The senses are really quite deceptive in addition to what thought and memory bring to experience. We can't realize how much smell determines taste, because the senses overlap; what may be thought to be exclusively smell, sight or taste, can be deceptive as these senses can't be isolated. For example, holding one's nose while biting into a ripe strawberry will undermine the taste experience. A realist rendering of a food subject may cause us to recall the taste, triggering the salivary glands, having us to believe the painting captures the subject, capturing the essence of the subject, when, in fact, the painting image is functioning symbolically, triggering the memory, leading us to think the painting is doing more than it is. The effective realist painting can be a strong stimulus to our memory, leading us to think the painting captures the thing, when the painted image is more of a stimulus. As thought can recall phenomena, thought can rekindle old experiences, leading us to think we are experiencing when we are really thinking about phenomena – thought leading to feeling and a "sense" of phenomena – "phenomenal thought." It can seem quite real. But realist imagery in photography is a language we've learned before we talk as infants, and we process photographic imagery unconsciously, the photo being the standard for the way the world appears – albeit on a flat surface.

In confronting the illusions before us, how the brain conjures the experience through thought, there's no accounting for how memory leads us to re:experience our past as thought, when we are actually experiencing an image in a photograph – a proxy for the original experience. The brain can lead us away from direct experience to illusory experience. Thinking of unpleasant memories, dwelling on the memory, for example, can have our brain conjure associated feelings that are very close to the original experience, with the accompanying emotional pain very intense. With careful consideration of experience we can learn to account for its components more objectively and, as a result, communicate and share thoughts more effectively. We can learn to take language beyond signs and symbols, beyond the symbols of association and recognition which lead memory to fill in the gaps with incomplete and erroneous descriptions, this having us experience less of the imagery and more of our personal history. We can learn how unconscious our experiences actually are, and then learn to experience more in what is before us, using the study of color as a springboard for new understanding and new experience. Color talk is most often superficial and symbolic without accounting for the fine discriminations made on the unconscious level. Just as the fruit is experienced on a subconscious level, with very limited discriminations on a conscious level, practical color discriminations are very fine on a subconscious level, while conscious understandings are often simplistic and symbolic.

Color and Media.

As with the blue Caddy, painted surfaces have their own look, apart from natural objects. The color samples in paint stores represent flat colors with opacity, no reflection, no material beyond the thin layer of paint. This look would be achieved with an opaque application of tempera or gouache with a fine flat brush, loading the brush and making one stroke on a prepared paint surface. (The paint swatches are actually screened for smoothness and they are opaque; they aren't made with printer's inks, which are transparent.) To create the illusion of a rose petal or blue car surface with paint requires various techniques, not so much to suggest the color but, the color effect, imitating the overall appearance, with it's variations in color, light and shadow, and showing the reflective properties by representing the shapes and patterns. The illusion of the appearance of things is not achieved by creating the actual surface – of the rose petal or the car fender – but to capture the look of the surface. Any imitation imitation can only fall short, no matter the paintings of trompe l'oeil (fool the eye) artists.

Color in dyed fabric has unique potential to show color with unique intensity. When white fabric is dyed with transparent pigment the color is brighter than when the most intense hue in oil or acrylic applied opaque; much like water color, dyed white fabric reflects light back through the transparent color. The fine weave becomes reflective, picking up adjacent colors and light sources, with a rich matte, yet sometimes glistening surface quality, the threads in the weaving taking on highlights. When spraying white canvas with thin acrylic the colors are quite bright until the fabric is saturated and the light reflecting off the light canvas can't come through the paint; once saturated the colors become heavy and physical, without the illusion of light.

Symbolic Imagery.

Let's consider further the interference to sensory input in looking at the language of symbols, this important because symbols can keep us from seeing the perceptual field, from seeing color fully. We too easily associate symbols with the thing represented, without looking past the symbol. Our lives are replete with symbols that inform us and help us make it through the day. And symbols can be so strong that we connect them directly to the thing represented, often confusing the symbol with the thing represented.

Figure 9. Lilium Pink Mist

But the symbol is not the thing. Even the symbol that refers to the thing analogically (Figure 7), as in this photograph of a lily, is not the thing. The photograph is a facsimile absent many of the qualities we experience when a lily is in front of us. Rather the photography is a reference, a representation, an indicator of the subject that can have us totally accepting the symbol for the thing. Now the world is full of imitations: wood, marble, leather, wood siding for houses, metal, various knock-off products, artificial flavoring, etc. I once referred to the gas gauge on my car and a perceptive mechanic corrected me, saying "It's not a gas gauge, it's a gas indicator." Similar insight is shown in the wisdom declaring, "The finger pointing to the moon is not the moon." Our lives have become replete with good fakes. Should we not accept material fakes, wanting the real thing, we would often need wealth. As quality products have become more expensive, the market for the good fake expands, and we acquiesce.

Consider the words and images in Figure 8. The apple is clearly the reference in the words with some of the fonts building a stronger connection to the thing through shape and color. In all cases the symbols work to some degree, but we're quite unaware of the role of memory in completing what the symbol doesn't. Perhaps a 3D wax apple could be the best symbol, or look-alike. However, each word or image is a symbol, and the symbol is not the thing. Consider the actual experience of seeing

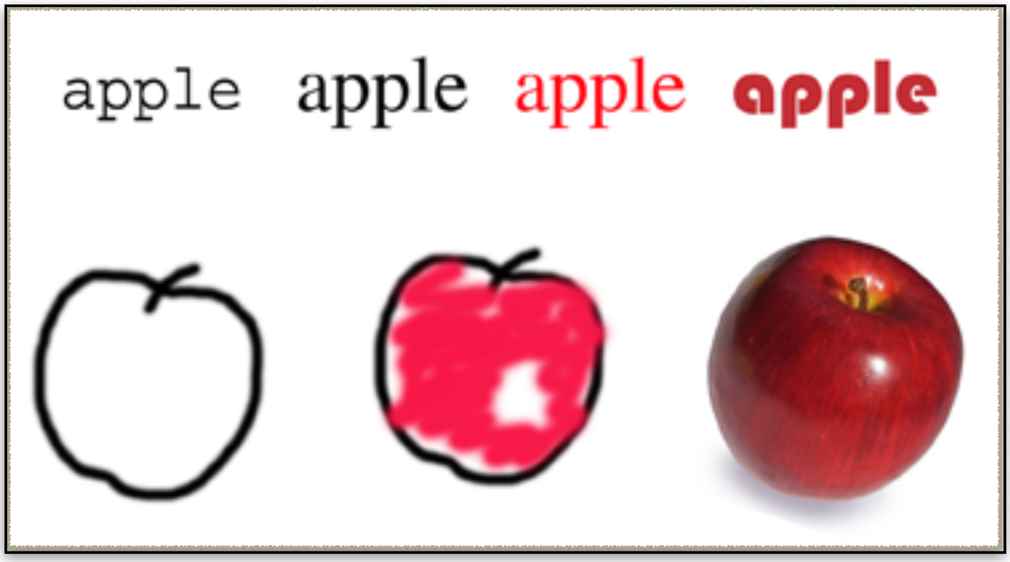

Figure 10. The word "apple" has its verbal meaning. Fonts and color can add to the apple reference. The outline drawing has a slight and logical reference; adding red builds the reference with the photograph the best analogical symbol of an apple.

a real apple, anticipating the first taste, the feel of its skin, its weight and firmness, the feel of the apple volume in the hand, the tactile feel of its surface and shape – the smooth spherical shape of the Granny Smith compared to the wavy surface of a Macintosh. The words do lead the brain into thoughts about apples and apple sensory memories. Too easily we begin to take the proxy as the thing, assigning meaning uncritically. As we recall experience with the thing, it's as though the symbol is more powerful than it really is. Over time and with consensus, symbols can take on more and more meaning, standing for beliefs that elicit strong emotions. National flags and religious symbols are among the best examples. A single flag can evoke love and nationhood to some while the same flag to others emotes hate and fear. These reactions, of course, are not the result of the imagery in the flag; the meanings are learned, from experience and from "teaching." The swastika appeared in ancient civilizations and it appears in Native American designs. It has been used for spiritual purposes as well. The shape of the swastika can occur quite naturally in the weaving process used in rugs and baskets, a consequence of common weaving patterns, among other weaving methods. However, it will never again be just a design.

The challenge for the study of color is in the strong tendency to interpret color symbolically, the grass is green, the sky is blue and the apple is red. Color is used as a label, for recognition and to make reference, so red is red and that's enough. This isn't to say that people think the symbol really is the thing; they simply don't have the tools to look beyond the symbol, their lives operating with symbols and the accompanying beliefs and assumptions. We don't look deeply into perceptual input to fully experience the nature of things, because perception tends to stay at the recognition and symbolic level, and this allows us to be more accepting of proxies. We aren't really looking.

There was a classic demonstration of symbolic thinking on an episode of the 70s TV show *All in the Family.* The Archie Bunker family house was vandalized by a hate crime, resulting in a swastika painted on their front door. Archie, a stereotypical "working class" guy who preferred to see the world in outdated and conventional terms, showed the painted image to his sweet innocent wife Edith, who always had the capacity for a thought from the blue. Looking at the swastika, Edith then asked Archie, with a genuine tone of wonder in her voice, "I wonder why they call it a swastika?" Abruptly, with little patience for the question, Archie retorts, "Well, Edith, LOOK AT IT !!" For Archie the meaning and the appearance were one. Looking at the swastika you should understand what it meant, he thought. But Edith saw the shape and wondered; she wasn't totally locked in to the symbolic meaning. Edith separated the symbol from the word. But Archie couldn't separate the symbol from the culturally ascribed meaning; he couldn't wonder. Of course, the swastika is unique; it became the most powerful symbol of the 20th century, and its power endures. It's decorative shape and history of symbolic meanings make the shape out of bounds, at least in Western culture. As already stated color assignments to race and skin color are used to label people for political, social and ideological purposes; although sometimes benign, these color assignments have nothing to do with actual color, and have nothing to do with appearance in skin color. Political parties in the USA use red and blue, because they are the two colors in the national flag; red and blue have come to stand for particular parties, with green having a party also (In this case an obvious meaning to those in the green party, but a negative connotation to many not supportive of the green party and environmental issues). While red is used widely to stand for a party that has a history of social and fiscal conservatism, ironically it the bulwark for anti-communism in the fifties, with campaigns to interrupt careers and sometimes jail those associated with communism. With the color red then associated with communist ideology, communists were called "Reds." The red scare and the red menace were terms used to labels the communists and the communist movement. The Cincinnati Reds baseball team changed its name to the Redlegs in 1953; with the anti-communist fervor subsiding in the late fifites, the team reverted to the name Reds in 1959. Pinko and red were words with strong symbolic meanings carried through the sixties with the "anti-communist" war in Southeast Asia.

This example of color used symbolically, can easily be elaborated – as with pink and light blue representing gender with infants – but for the purposes of this consideration of color, these example can simply underscore how our belief system can support symbolic meanings in color with large emotional content and self defining content, this short circuiting perceptions and objectivity about color while sustaining symbolic meaning. This is a strong example how thinking short circuits looking in visual perception.

But for the study of critical perception and color, the challenge is in looking beyond the assigned meanings either in symbols (stops signs, fire plugs or taxi cabs) or in objects like fruit or automobiles. The recognition factor interferes with perception – actually looking – preventing us from experiencing the phenomena all around us. Utilitarian perception, with its recognition, has us repeat our encounters with the world around us – repeating "experience" from memory – responding to things today like we did yesterday, subscribing to the assigned meanings we've been taught. Can today and now – this moment – be a new and fresh look, or will it be a rerun, experiencing as we have in the past, not experiencing at all but a regurgitation of old thoughts, the thinking leading the thinker to believe that the act of thinking is experiencing, while the thinking derails the potential experience before us?

Figure 11. This illustration demonstrates active thought interfering with perception. this conflict is felt as we observe a color that contradicted by the meaning of the word. Here is the conflict between thought and perception that addressed throughout my writing.

As rose petals and automobile surfaces have unique qualities in the medium and the surface quality, many man-made objects and natural forms have unique material properties that produce unique visual effects. One such cultural form is the Amber Room in the Summer Palace outside St. Petersburg. The medium of the wall surfaces is amber, certified tree sap. The color phenomena is most unique as light passes through the colored but translucent and transparent amber. Miraculously, the room was duplicated from scratch as the original room was stolen by the Nazis during WW II (Figure 12). Another spectacular interior is found in the Church of the Savior on Spilt Blood, in St. Petersburg. This magnificent church is replete with mosaics with biblical content in grand proportions (Figure 13). The Lake Powell area of Arizona produces dramatic lighting in spacious landscape including sunsets of constantly changing color and lighting (Figures 14 and 15). Another original phenomena is created on a bridge of the Delaware Chesapeake Canal near Wilmington Delaware. The cable-stayed bridge has cable sheathes painted taxi cab yellow (what is really a yellow with some red), but from any distance they appear like gold threads against blue sky. Driving over the bridge it becomes a kinetic sculpture, the angles of the cables changing and the color changing from shadow to bright reflected sunlight (Figure 16).

Figure 12. The Amber Room

Figure 13. Mosaics in St. Petersburg Church

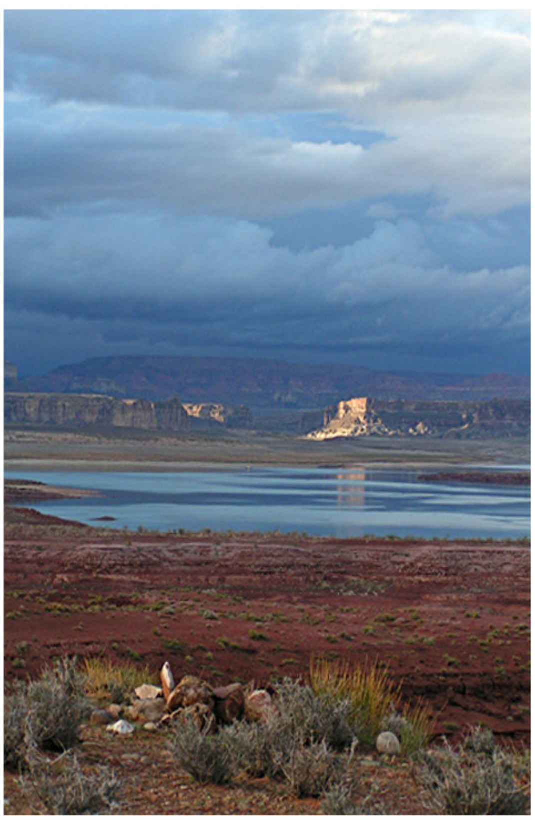

Figure 14. Lake Powell

Figure 15. Sunset on Lake Powell

Figure 16. The cable -stayed bridge over the Delaware Chesapeake Canal has the cable sheathing as a taxi cab yellow that from a little distance appear as gold threads agains blue sky.

Figure 17. An Everglades' swamp provides a dense canopy of foliage with only occasion breaks for sunlight. As a result the limited sunlight is dramatic.

Color and Water.

Blue sky makes water blue, this most obvious on a cloudy day, as water turns gray; when the sky isn't blue, the water has more of its own color look, more neutral but picking up color from the bottom of the stream or lake. When trees block a sky's reflection, the trees are reflected but we also can see down into the water in front of us. In shallow water the sun's light can reflect off the bottom of the water body, creating its own color. Figures 18 shows light on water in the Everglades, the sunlight penetrating the reflection revealing the muddy water resulting from walking on the swamp floor. Where the light comes through – like a spot light – the reflection is eliminated.

Water is complicated to see and understand because there is reflection and transparency simultaneously. Further, the surface of the water has one depth of field and the reflection another depth of field, a depth of field with much greater distance – like a mirror. This is revealed in photos of the quiet surface of a pond or stream: when the water's surface is in focus the reflection is out of focus; when the reflection is in focus the water's surface is out of focus. Water can also concentrate lights rays like a magnifying glass creating spotlighting in the water.

Figures 18 and 19. Shallow fresh water over rocky lake bed in Lake Powell.

Water bends light, both in its reflections and in its transparency, at times having a prismatic effect, concentrating light like a magnifying glass, in Figures 19 and 20 the light appearing like twisted ribbons of light beneath the surface of the water. In the shallow water the color of the sand and rocks appear bent by the water. As the water gets deeper, as in the top area of Figure 19, reflections of blue appear.

Figures 20 and 21. Water patterns can appear and a perspective grid.

Water can appear as a grid in perspective, albeit an informal grid defining the receding plane of the water. Looking closely at Figure 11 one can see the pattern receding front to back as well as a diagonal organization. The dark reflection show the planes of the water titled toward the viewer while the light blues are planes titled away from the viewer, reflecting the sky.

<u>Toward a Theory of Color.</u>

As we seek to take in more from our environment, being more attentive to what's before us, we allow primary input from perceptual fields, not input that is processed by thought. So learning to see more requires taking the brain out of the pure recognition function – "seeing" color from thought – as the brain tries to short circuit visual perception. This has been discussed throughout my writing and it is the critical strategy for attentiveness and being fully conscious. Now the text turns to seeing color in the visual field applying finer discriminations, both for describing color and experiencing color, seeing color as we haven't seen color before.

Experiencing color is engaging in its phenomena as color exists within a larger context, a color field, with all elements of the field relational. Finding the portal to broader visual experience is not a problem of innate visual skills (as has been said), although clearly some people are more sensitive to color than others. As stated, we all have sufficient natural ability to make very fine perceptual discriminations; we already make very fine discriminations on practical matters, although these discriminations are not made consciously. Still we do miss a lot because we aren't attentive. Preparing to enlarge visual experience can begin in acknowledging the extant skills in making fine visual discriminations and presenting ways to transform the unconscious discriminating to the conscious level.

As most often our color discriminations are practical, utilitarian, used in the act of recognition, not just recognition of objects but recognition of conditions in objects, like ripe fruit, healthy skin color and safe beverages, this recognition performed without names for colors or any notion of color seen as color, i.e., color for its own sake. From these fine discriminations color intelligence can be expanded with everyone, through working more consciously with color and media, exploring understandings of theories about color and experiencing color in various contexts, natural or cultural. And color is subordinated to things; the red stop sign, orange juice with its normal local color of orange, red hair, a red fire extinguisher, or green paper money (Figure 13) : each has the color subordinated to the thing. With automatic recognition we instantly see glass of juice, highway sign, young girl with red hair, fire extinguisher and five dollar bill – subordinated color. But there is color to be experienced everywhere, color to be seen and experienced as color, and from there we can begin to experience color anew, making fine discriminations we've never made before and experiencing color and visual phenomena as never before.

Figure 22. Color is most often subordinated to recognizable objects. We naturally recognize things without conscious thought: glass of juice, traffic sign, five dollar bill, young red head girl and fire extinguisher. Our familiarity with such subjects has us recognizing from memory, as a reflex; we are not looking at the subject beyond recognition. The act of recognition tends to shut down observation as we see things as we've always seen them.

The Color Wheel: Color Theory and Practice.

We've all seen the color wheel and most people have a basic understanding of primary and secondary colors as well as complementary colors, those colors opposite each other on the wheel. How we think about color – creative color thinking – can alter our perceptions of color and help us see fresh similarities and differences among colors. The starting point is to consider how we classify color using the common color wheel. Initially this can be done on a purely theoretical level, but this theoretical approach will alter our perceptions of color; this investigation will change the way we think about color, and thus change the way we see and experience color. This approach will have us making finer discriminations with color, increasing what we may call "color intelligence." Intelligence, after all, is simply making fine discriminations with similarities and differences. From this approach to color a model is presented for broadening and enriching experience generally: a thoughtful investigation changes how we see, and opens new experience. *When we change the way we look at things, the things we look at change.*

Fundamental to color perception is relativity. There are no absolutes in seeing color; no hue has a quality that stays with it no matter adjacent colors. Moreover, color is clarified, its qualities more stable (if that's the goal), when its placed in an articulated context. Assumptions are easily made about color when color names and color terms are used, our memory and experience telling us what to expect and even directing what we see. However, what we know can get in the way of phenomena, having us think about what we are looking at rather that experiencing the phenomena that's there to be had in the present. While investigations lead to more objective knowledge – here about color – at some point knowledge is only useful when it adds to or changes perception, knowledge transformed from thought experience. The new discriminations made intellectually must influence and change experience to be of use; when that happens the knowledge has done its job and it has no standing. Experience is real and all there is, and thoughts are utilitarian.

COLOR WHEEL ILLUSTRATING THE SIX PRIMARY SYSTEM AND THE POWER OF THE PRIMARY

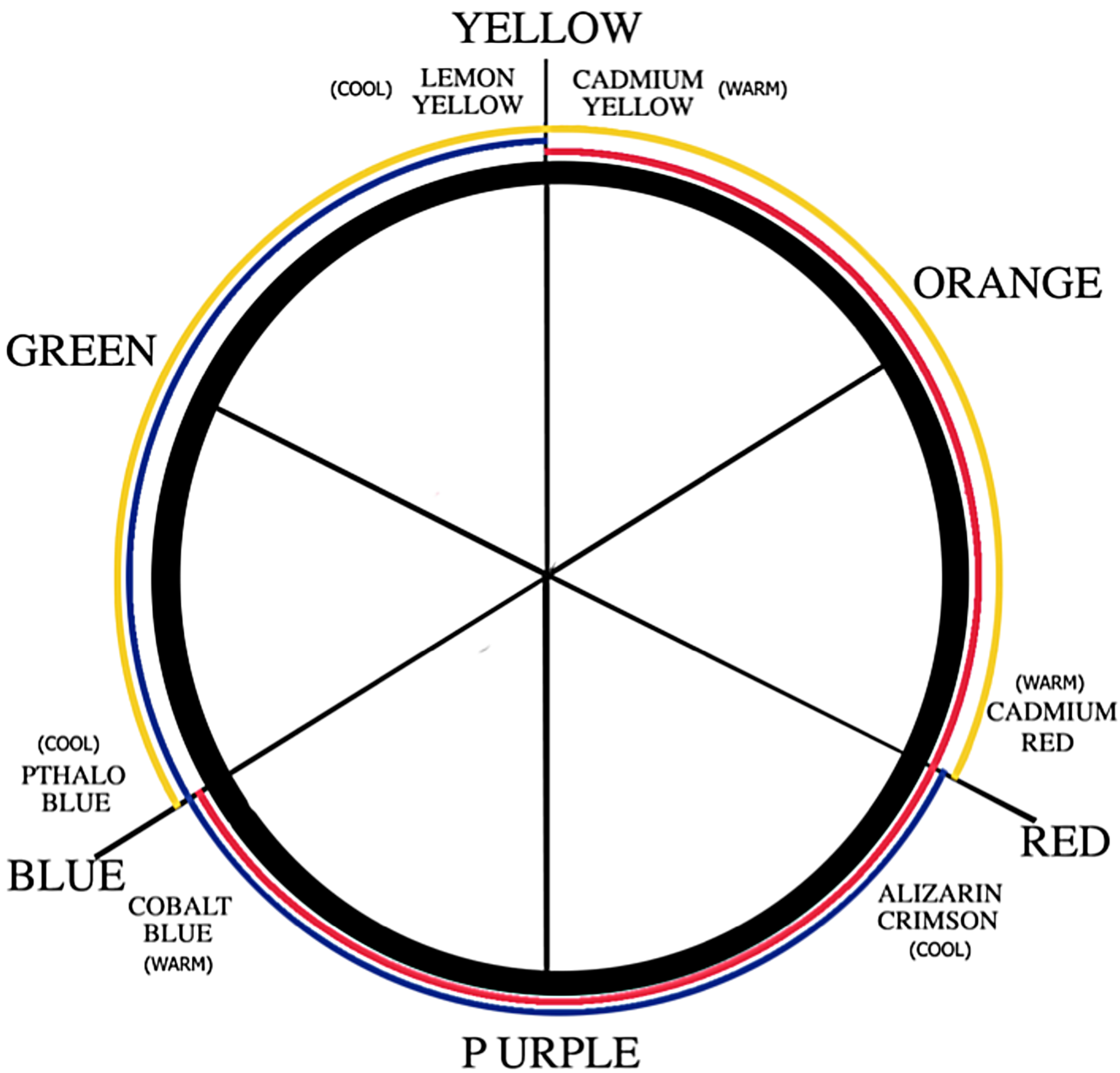

Figure 23. Color wheel with temperature. The color wheel can be used to explain color on many levels: 1) the primary and secondary colors, 2) complementary colors opposite reach other, 3) primary colors cover two thirds of the wheel and 4) each primary has both warm and cool positions on the wheel, this representing six primary colors.

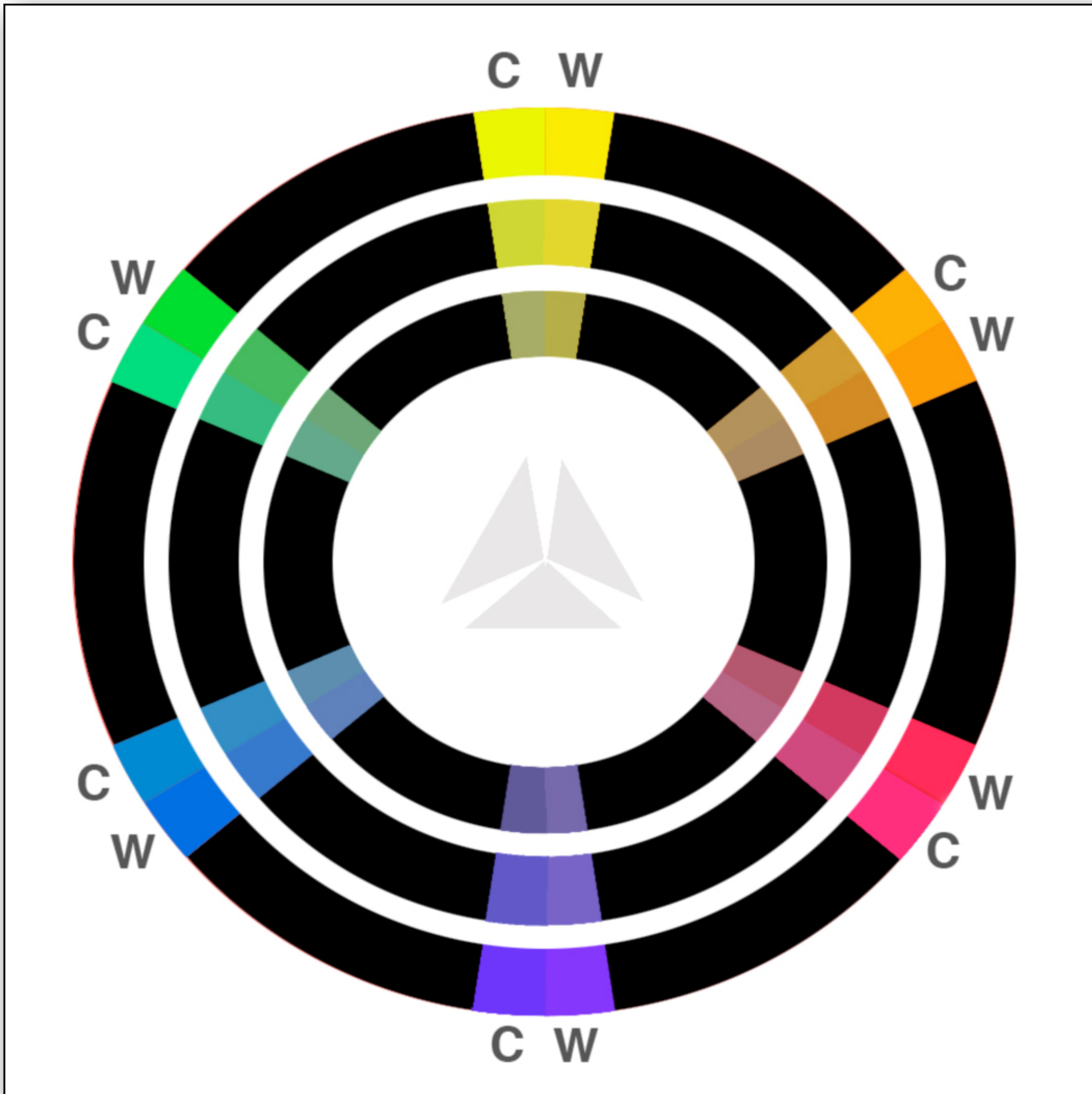

Figure 24. This six primary color wheel shows the actual warm and cool variations of each primary as well as suggesting the relative warm and cool variations of secondary hues.

The color wheel remains quite relevant and practical in this investigation. (Additionally, Adobe Photoshop software also helps us to define and work color; its common usage makes it an additional tool in classifying and understanding color, as it assigns numerical values to hue, brightness [value], and saturation. But its perceptible hues are limited.) Using the color wheel to identify primary and secondary hues as well as complementary hues is quite important, given that experiencing color is "driven by" comparisons, polarities or opposition; the color wheel helps to locate opposite colors and, more importantly, to think in terms of opposition. The term "complement" is an important term as it suggests one color complementing the other, the complementing being mutual and simultaneous – thus the art term "simultaneous contrast." Cutting to the chase, we can look at the late paintings of Vincent van Gogh for one of the best example of the use of complementary colors; he consistently embedded complementary colors in local color – green, for example, embedded in a painting of an apple – to amplify color. However, simultaneous contrast exists through our experience as well as in our thinking, as we experience everything in a real or implied field of contrasting possibilities.

As Figure 23 shows some of what we already know about color wheels, it adds two important dimension to color principles: a six-primary concept and the "power of the primary." It must be noted that the color wheel is theoretical and when mixing colors we are confronted with the limits of physical pigments, the limits of particular pigments. Primary colors on the color wheel theoretically can mix toward both adjacent secondaries, but that's not the case with pigments. That's the reason for the six-primary system.

> The Six-primary System. The six-primary system requires that we understand that no pure primary mixes well – is compatible – with its adjacent secondaries, as any primary pigment is usually warm or cool and it can't mix well with both warm and cool colors. Mixing a cobalt blue with yellow to get green will produce a murky version of green; a petal blue, however, will explode with intensity when lemon yellow is added. Cool blues, therefore are necessary to mix toward green and warm blues (cobalt blue) are necessary to mix with reds for a good purple. Of course, we can buy green or purple, but in working with complex color fields this knowledge can make a huge difference when seeking color intensity. Most important to appreciate is that this knowledge must be moved from knowledge to experience to be applied; this can only happen by working with color and mixing color over time and studying color in design and painting.
>
> The Power of the Primary. The second principle demonstrated in Figure 14 is the power of the primary; for the purpose of mixing color, primaries extend around 2/3rd of the color wheel with secondaries covering but 1/3 of

the wheel. The importance in this understanding is that lemon yellow is a blue as is alizarin crimson; in proximity both hues can support a complementary relationship with the complement of orange. However, covering but 1/3rd of the color wheel, secondary colors have limited possibilities for complementary relationships. When experimenting with complementary relationships with blue and orange, the range of blue can include all blues from lemon yellow to alizarin crimson. Here lemon yellow is both a blue and a yellow; alizarin crimson is both a blue and a red. When identifying a hue we would state the obvious, lemon yellow obviously a yellow. But we could qualify the hue by saying it's a blue yellow or a yellow toward blue. (Of course, it's a green but green doesn't help the discourse on the dynamic of the particular hue.)

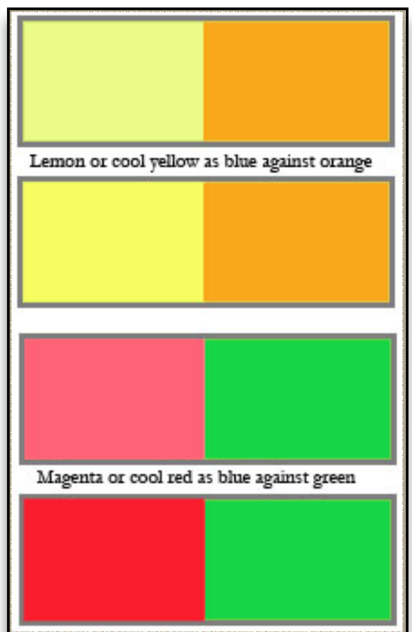

Figure 25. In the yellow orange relationship above there's subtle difference in the two yellows. The top yellow is a blue. Blue is also perceivable in the magenta against the green.

So describing any color we can begin with the primary and talk of temperature; that says the most in few words. Then perhaps the second and third hue could be identified. Lemon yellow is a cool yellow, blueish yellow or yellow toward blue. If the secondary is dominant, a near balance of primaries, we can talk of the secondary and add its tendency; a green, for example may lean toward blue or yellow. Most often there's a third hue, although this may be barely noticeable. Olive green is an obvious amalgam of two secondary hues, green and orange. Thinking carefully about olive green, however, we can see blue (cool) and yellow (cool) with red (warm), olive green simply a proportional mix of primaries. In Figure 26 the top green is an olive green; the orange in the olive green is sufficient to sustain a complementary relationship with the blue.

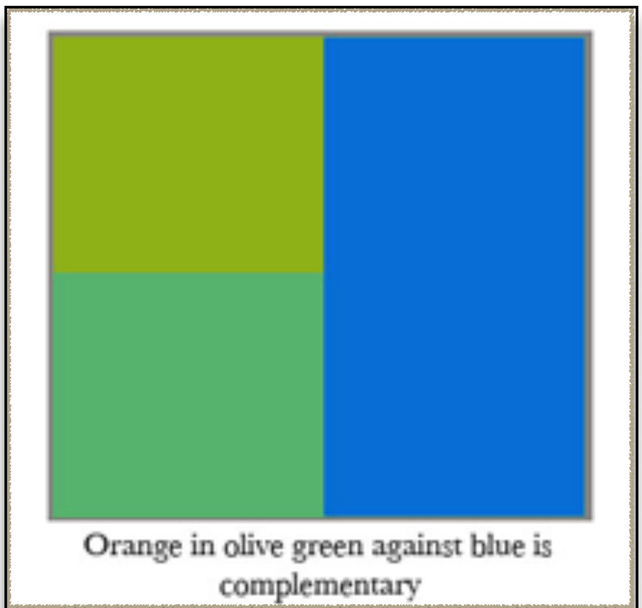

Figure 26. The top green is olive green, a green with orange. The subtle presence of orange is enough to create a complementary relationship with the blue. Here, the olive green is an orange.

The Principle of Opposition.

The principle of opposition is demonstrated in the physiological functioning of the eye: when staring at a shape with a pure hue for several seconds, and then looking at a blank white page, the complement of the pure hue appears, because the rods and cones used to perceive the original pure hue are fatigued, the active, unfatigued rods and cones – the opposite hues – then active. Staring at the center white square in the colored design below (Figure 26) for several seconds and then looking at a blank white page will show the opposite colors – generally – in the form of a familiar flag.

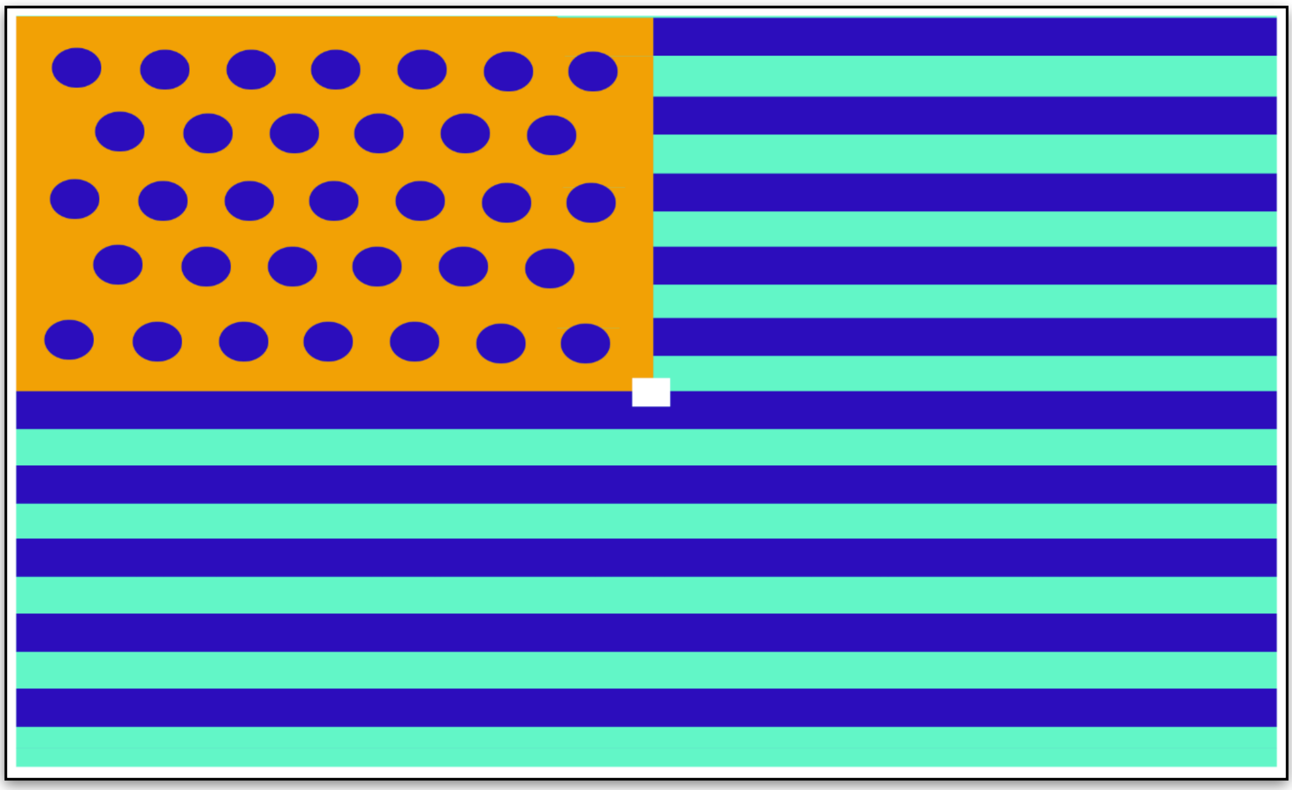

Figure 27.

Color and Temperature.

Color descriptions translate most quickly with temperature designation. Describing a hue temperature – the comparative temperature – helps identify the actual location on the color wheel from the pure theoretical hue, yellow (warm) toward red (Yw) or blue (cool) toward yellow (Bc), for example. When someone refers to a blue, yellow or red, the color should be further qualified with the temperature (warm or cool) and the second and potentially third hue; we need to know the additional color(s) in the primary color beyond the generic primary label, beyond mere primary recognition – red, blue or yellow. Pthalocyanine blue, a cool blue, is in the family of blues, but it is also a yellow, and a green. Saying pthalo blue is cool implies yellow and green to the knowledgable. The pthalo blue pigment can be used in color relationships as a blue, green or yellow. To the knowledgeable, the label "pthalo" blue describes the particular blue, its ingredients and its mixing potential. Cobalt blue, on the other hand, is a warm blue, with an amount of red; cobalt blue is blue, purple and red. Much more can be said about describing color beyond the obvious dominant hue including value (lightness and darkness) and saturation (concentration of pigment). There is no substitute for actually mixing various hues with paint to experience what happens when specific colors are mixed. The experience of trying to make green with cobalt blue and yellow can be frustrating until the principles at work are understood: cobalt blue is warm and contains red; using this blue with yellow to get green will result in a murky green because the red is a complement, and moves the mixture toward gray.

Effective use of the principle of contrast – complement, opposition or polarity – gives character and identity to what we perceive. Hot/cold, sharp dull, smooth/textured, and light/dark are examples of perceptual contrast, how we think of and experience perceptual properties. So it is with color. Opposition complements the nature of a hue, thus opposite colors are called complementary colors, one color complementing the other, the complementing being mutual and simultaneous – thus the art term *simultaneous contrast*. How we think about color can alter our perceptions of color and help us see fresh similarities and differences among colors. The color wheel remains quite relevant and practical in this investigation as the color wheel provides easy identification of complements.

In addressing temperature, white and black need consideration. White and black from the paint tube do not associate easily – or at all – with a field of color. Blacks made with dark complements are more effective than straight black; they can complement surrounding hues and engage with other hues. Black and white can look separate, disconnecting from the color field. For example, white clouds with an imperceptible amount of orange will provide a strong dynamic with a blue sky, while a straight white may not engage the blue. Another example, a poster design with one color and black, with the one color green, will have greater intensity if the black is slightly warm. A cool black, made with alizarin crimson and pthalo green with slightly more green, will appear blacker than black when near warm colors, creating a subtle but real complementary relationship, with the source of the contrast unapparent to the viewer. Providing a specific application of this principle to landscape painting, a dark area on a tree trunk or branch, surrounded with green leaves, will appear darker as a warm dark, using alizarin crimson and phthalo green with the balance slightly toward the crimson.

On the creative end, temperature in tints and shades can be a catalyst in building color intensity in a color field. A cool off-white in a warm color field or a cool near black in a warm color field can add energy to an image and avoid the emptiness of white or black in a color field; as already stated, black and white don't easily associate with colors because they are easily seen without color – without a temperature for association or contrast.

<u>Expanding Thinking About the Color Wheel.</u>

The custom color wheel in Figure 24 represents the conventional arrangement of primary and secondary colors, but it goes further. As in Figure 23, it shows warm and cool primary pigments necessary for effective mixing, here showing the actual appearance of each warm and cool primary; warm and cool versions of secondaries are shown as well. (These examples are exaggerated to show a warm and cool versions of each secondary and to show the secondaries can be discussed in terms of temperature.) All blues have a coolness when considered in the context of the entire color wheel, but in relation to each other, blues will have different relative temperatures. A warm blue, as in cobalt blue, may be considered a cool hue, as blues are generally cool; but in the context of pthalo blue, cobalt blue is warm. Additionally, reds are generally warm, but crimson red is cool in relation to a cadmium red. There are no absolutes in the appearance of color, with temperature hue or value, all appearances are relative. Isolated, a hue has limited character; still our expectations will provide some relationship. Applied to a color context, color is given an identity with particular observable properties. A context of pthalo blue gives the cobalt blue an identity, an identity that works only in that context. Change the context and the identity and the appearance shifts.

Individual hues within clusters of colors have leverage, simultaneous leverage with each other, each influencing the other, the mutual influence creating a color equation in the color field. Intelligent and creative use of color requires an understanding of color relationships and using contexts to manipulate the appearance and expressive character of individual hues. To alter the look of a color in a field of color often requires adjusting the context – the field of color – not just the hue under consideration. Conversely the individual hue added to a field of color can work like a catalyst, triggering shifts in the appearances of all the colors and amplifying the intensity of certain hues.

The possibilities for complementary relationships are much broader than commonly thought. We understand the complements of green/red, orange/blue and yellow/purple, but the color wheel can help us further identify less common complementary relationships. A blue/green hue (BG), for example, has an opposite of orange/red (OR), the orange/red directly across the color wheel from blue green. Further, BGB is opposite ORO. Looking more deeply at a complementary relationship we will find that the primary in a complementary relationship doesn't have to be a pure primary; a primary blue can have other hues mixed with the blue and still be a blue/orange complementary relationship. For example, a green blue green (GBG, two parts green to one part blue) can still provide a complementary relationship with orange. And the complementary relationship can be stretched much further. As mentioned, lemon yellow, a cool yellow, has blue in it, even though we may be inclined to think of the cool as green, it's really a blue, as well as a yellow; this small presence of blue is enough to create a complement with orange, even an orange with reduced saturation, more of a brown.

This may not seem viable, however, when working a field of color – with several hues – a magenta may be the particular hue that completes the chemistry, triggering a particular color phenomena, perhaps both the blue and the red complementing the larger color field, magenta as a catalyst as both a blue and the red, simultaneously. When working with a field of color, the color chemistry becomes quite complicated, beyond what theories can explain, but not beyond what talent, creativity, play and a keen eye operating through the unconscious can produce. The expansion of experience with color begins with a theoretical understanding and the experience follows, in time.

Figure 28. Mixing orange with a warm blue (cobalt), a cool blue (pthalo) and purple (dioxazine) produces quite different results. The purple creates a rich russet color. With red in cobalt, it's more effect than pthalo, as the green in pthalo reduces hue intensity. Using a gradient blend allows a range of mixtures to be seen at once, revealing the best color – and its proportional mixture.

Searching for Color with Gradient Mixing.

Discovering compound colors often happens in the manipulation of paint media – with paint play. Theories can only go so far in helping us to discover ways of seeing and thinking about color. True discovery happens in the doing. (Thought takes on importance when put into action.) When many colors are out in front of us, and the active mixing and application to color fields causes infinite color relationships to pass before us, only needing to be observed and seized.

A particularly interesting compound color is russet, a kind of rich dark orange that may be called brown. Like olive green, russet is a secondary color modified by a primary, orange modified by blue. As olive green may be thought about and seen as a red, so russet may be considered and seen as a blue (Figure 28). Finding a color in the russet territory is best done by mixing a thick gradient of paint using several inches of paint surface from a cadmium orange to cobalt blue or dioxazine purple; within the gradient blend can be found various russets, some with more blue that others. A gradient of orange to purple provides russets with a little more red, some may say a richer russet. Using pthalo blue – a green blue – compromises the red [in the orange] and undermines the russet appearance. This mixing approach is much more effective than mixing toward a specific color target, either in one's imagination or in matching a russet swatch. Remixing singular mixtures over and over until the sought after russet is materialized is not efficient. In the gradient mixture there will be many russets within the gradient not anticipated. Although theories are important and can lead us to make finer discriminations, when working a field of color, it is likely that a deliberate analytical choice may not produce the best results; rather, working with fields of color requires experimentation, intuition (coming from play) and trial and error, all dynamic methods that open possibilities and expands our color sense.

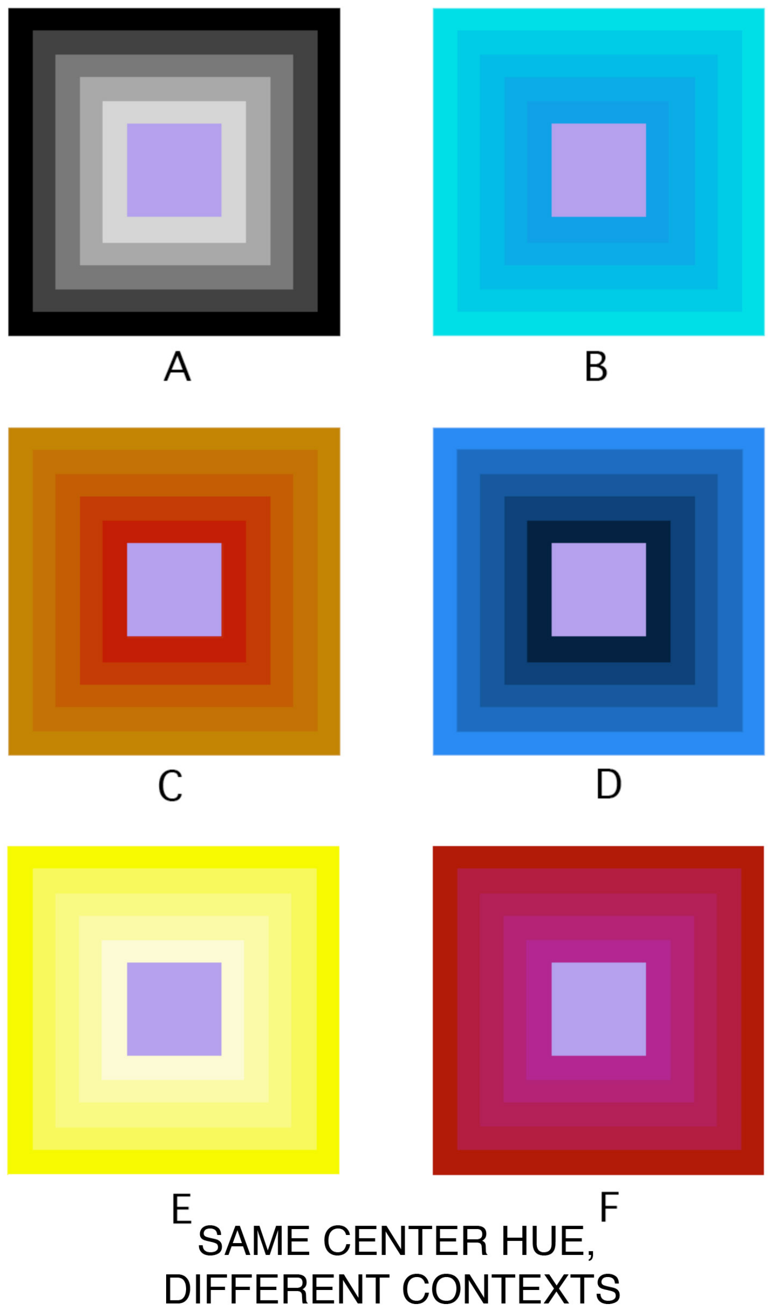

Figure 29. Each of the above squares of color contains the same purple center square, however each purple has its own appearance. Some squares appear larger than others, some square are darker than others and some squares have greater intensity of purple.

The Relativity of Color.

There are no absolutes with color. All appearances are relative. That is, we experience color based on relationships to the larger color field. Figure 29 presents various color fields behind each identical purple square, altering the appearance of the purple in each case. A single hue does not exist in isolation. We always relate a color, even allowing memory and expectations to influence appearance.

Figure 29 has the purple square presented with changeable size, color intensity and color temperature, this as well as forward or backward. Examples B and D have the purple square receding while Example A has the square more forward. Example E shows the square smaller than Example F. Example C appears with great hue intensity, although B has a complementary relationship – red and green – the amplifies both the blue green context and the purple square.

Again, when working a color field one can change the object color or the context. Understanding the properties sought in an object color the context can be adjusted to promote desired color effects.

Restating the Material on Color Theory and Practice.

Color theory is very important in expanding thinking and expectations for experiencing color, but theory has its limits. The pure positions of the primaries on the color wheel are theoretical and do not address the nature of pigments. Theoretically, blue, red and yellow on the color wheel can go warm or cool to mixing fully saturated secondary colors. But in reality – with pigment – both a warm and a cool primary are needed to insure full saturation in mixing toward secondaries. As most fields of study require both theoretical and practical approaches, color requires intense study from both theoretical and practical study. The thinking can lead the way to expanded perception and sensing. Here we can begin to think about pigments, what they can and can't do. While practice tells the story best, we can develop understandings that will help with the practice.

There is no blue that will mix to both a clear green and a clear purple; if we use phthalo blue to make a green, it's greenish nature when mixed with lemon yellow will explode into a rich green. On the other hand, phthalo blue when mixed with red to make purple, will result in compromised intensity in the purple because the green in the phthalo – or really the yellow in the blue – will weaken the red, and not allow a purple with full saturation; using blues to make both green and purple requires two blues, a cool blue (phthalo) to go to green and a warm blue (cobalt) to go to purple. Working color with pigment, then, requires a six-primary approach, two hues for each primary, allowing each primary to go both directions from its theoretical position on the color wheel. For yellow to mix to both orange and green, a cool yellow is needed to make the green and a warm yellow to make the orange. Similarly, a cool and a warm red, like magenta and cadmium red, are necessary for red to go to both purple and orange, respectively. This approach allows the mixed primary hues to hues to attain full saturation. All pigments used need to be understood for their temperature and potential compatibility with other hues. All hues have temperature characteristics that are revealed best in various color contexts.

We can clarify how we locate and describe specific hues on the color wheel. Understanding that blue extends across 2/3rds of the color wheel means that the lemon yellow, a cool yellow (Yc) is also a blue (a cool blue) and magenta, a cool red (Rc) is simultaneously a blue (a warm blue). So when someone refers to a blue, yellow or red, the color should be further qualified with temperature and the second and potentially third hue; we need to know the additional colors in the primary color. Phthalo blue is in the family of blues, but it is also a yellow, and a green; perhaps identifying the yellow in the blue explains enough without necessarily having to say green. The phtalo blue pigment can be used as a blue, a green or a yellow.

Observing temperature in color provides quick access to color properties, as has been done above. It helps the conversation in the beginning if we simply say a cool blue, referring to the temperature as well as the hue; here the word cool clearly informs us of the yellow and green in the blue. Temperature is particularly useful when dealing with tints and shades with little saturation. Describing off-whites with a temperature reference quickly categorizes the off-white without even mentioning a hue. Further clarity in off-whites is achieved by comparison, the comparison revealing that one it warmer or cooler – or at least relatively cooler or warmer – than the other. With off-whites with little hue, it may be actually easier to discriminate temperature than hue. Comparisons of off-whites among hardware store paint swatches will show the differences in temperature as well as showing the infinite possibilities in off-whites. Using warm and cool saturated hues against off-whites will reveal complementary relationships – the colors realizing full saturation in complementary relationships and help locate the particular hue in the off-white.

Temperature, through comparisons with warm and cool tints, can be a compass that will direct the subtle presence of the actual hues. Shades may also be more easily discriminated with the temperature criteria, using the same strategies used for tints. Shades, or near-blacks, like tints, require consideration of temperature.

When describing and discussing color, the terms hue, value (or brightness) and intensity (or saturation, or concentration of pigment) are commonly used to describe the characteristics of a particular color. The term temperature should be added to these terms. Describing a hue temperature – or really the comparative temperature – helps locate subtle variations from the pure theoretical hue – yellow "leaning" toward red (Yw) or blue leaning toward yellow (Bc), for example.

Enormously important – in mixing color – is using temperature to identify shifts in the appearance of a hue. For example, the target hue for which the colors are being mixed, may be warmer or cooler than the hue of the paint being mixed, leading us to close the temperature gap between the target color and the extant mixture more easily. As colors are mixed, temperature can inform and lead the decisions about whether the color should be warmer and cooler and whether the paint added to the mixture should be warmer or cooler.

As already described, temperature is most important in considering primaries, as warms can move easily in a warm direction and cools in a cool direction and identifying a primary as warm or cool explains the hue and much of its potential. Using temperature to describe secondary colors has less value but can still be used to discriminate among oranges, greens or purples; olive green is a warm green, compared to straight pthalo green.

However, in the process of painting, moving the paint from palette to paint surface, temperature is important and even elusive; the appearance of a mixed color can shift as the color is moved from palette to canvas, for lighting of course, but also because the color applied to the painting is seen in the context of a color field. Color depends on context, no matter the careful mixing, with the lighting factor aside. All hues, except for the most saturated hues, have the potential to be seen as warm or cool. To understand color – the relational nature of color – is to understand that most hues have the potential to be warm or cool, depending on the context. There are no absolutes in the appearance of color. The appearance of color is relational.

In the end, working with and understanding color is much like our broader experience: it's phenomenal. By exploring color we open new possibilities for experience, for all experience. And we may begin to realize that in experience we experience consciousness – presence – that needs no explanation or justification because the infinite richness of being conscious as we engage in the phenomenal world is its own reward.

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