

BASIC COLOR THEORY © 2005

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1. Chevreul—Theory of Opposites

When Newton demonstrated that white light contains all the colors of the spectrum and proceeded to arrange these colors in a circle he gave birth to modern color theory. The theory later gained practical implications for artists when Michel Eugene Chevreul, who supervised the production of dyes for Gobbelin Tapestries, discovered that intense dyes induced the appearance of color on surrounding areas of black, gray, white or weaker hues. The colors they induce are almost exactly opposite them on Newton’s color circle. (To experience opposites, stare fixedly for a minute at one point on a strong color. The edges of the color will begin to vibrate. After a full minute look at a grey surface. You will see a floating image of what you were staring at. The color of this ‘ghost’ will be opposite the original color.)

The French painter, Eugene Delacroix, was one of the first to realize the possibility of creating a more intense and convincing rendition of outdoor lighting with

this knowledge. The theory enabled him to draw observations such as: yellow skin has violet shadows, red fabric has greenish shadows, etc. He was thus able to intelligently introduce color into shadows and raise the chromatic intensity of an entire painting. It was awareness of these “Laws of Complementary Contrast” which caused him to exclaim, “I can turn the color of mud into the flesh of a beautiful woman by choosing the right colors to surround it...(paraphrased).” A warm gray surrounded by a strong blue will resemble Caucasian flesh.

Plein-aire painting became popular among artists studying in Rome in the eighteenth century. Corot was one of the artists who introduced this practice to France. A new generation of plein-aire painters, including Monet, Pissaro and Renoir, began applying the color practices of Delacroix to outdoor painting in an attempt to find color that more accurately reflected the variety and luminosity of natural lighting. In London, during the Franco-Prussian War, they encountered the radical chromatic and atmospheric effects of J.M.W. Turner’s paintings that encouraged them to push the contrasts of saturation and hue still further.

2. Seurat—Harmonics of the Color Circle

The Impressionists applied Chevreul’s principles intuitively. Seurat applied these principles rigorously. He created ‘Pointillism’ which was the most radically modern movement of its day. Like Cezanne, Seurat was an unlikely radical, deeply immersed the art of the past. He used the ‘Golden Proportions’ (**fig. 1, Illustration #1**) in his composition. This proportion was applied to art and architecture by the Classical Greeks and reintroduced in Renaissance as the ‘Divine Proportions’ by artists like Piero della Francesca.(For more information about the Golden Proportion see Appendix # 1)

Seurat applied the same rigor to the harmonics and application of color. His harmonic color principles were derived from Chevreul who declared the following relationships harmonic. (**See figures 5-8, Illustrations, page 1**)

1. The harmony of adjacent colors.
2. The harmony of opposite colors.
2. The harmony of split complements.
4. The harmony of triads.
5. The harmony of a dominant tint.

Each harmony has a different effect. The harmonies of adjacent colors feel natural and calm.

The harmony of opposites and split complements is more dramatic, sometimes a little difficult to resolve. Chevreul considered this the most agreeable harmony.

The harmony of triads offers four distinct possibilities:

The primaries, red, yellow, blue

The secondaries, orange, green, violet

Intermediates, red-orange, yellow-green, and blue-violet

Intermediates, yellow-orange, blue-green, and red-violet

Faber Birren observed that, “There is an oriental quality to the combination of yellow orange, blue green, and red-violet.”

The harmony of dominant tints refers to the practice of diluting all the colors to be used with one dominant color which will suggest a pleasing chromatic lighting.

Seurat is best known for the way he applied color. The small, closely applied dots of intense color were supposed to combine ‘additively’ in the eye. (The color on your computer screen is created additively. Red and green light combine to form yellow. When we mix pigments in the usual manner, we are working subtractively. Red and green pigments neutralize forming something close to black.) This method of application did enable him to transition from one hue to another in a way that is more natural than when we mix two hues in varying proportions. However, because he was using reflective pigments rather than light, the additive effect was not that intense. The small dots did create a vibration analogous to the vibration of light. But his method was too cumbersome for most artists.

The most original use of Seurat’s dots was Van Gogh’s expressionist adaptation of them to his later work in Arles and San Remy.

3. Cezanne—The Three Dimensions of Color

The ‘Post-Impressionists’, after mastering Impressionist theory, threw its strict application out of the window, except for Cezanne. He favored warm-cool contrasts and contrasts of color-saturation (degree of purity) as much or more than opposite hues. In so doing, he re-asserted structural qualities of painting, using high color, that were lost

in favoring the contrast of hues over the other two dimensions of color. His statement that the surfaces nearest our eye should have the purest color is an important hint on how he used saturation to build form.

To understand what Cezanne was doing it is important to keep in mind the three dimensions of color and four forms of contrast that they make available. The three dimensions are:

- 1) **Value** (light-dark). **See diagram 1 on Illustrations, page two**
- 2) **Hue** (the wavelengths: green, red, yellow, etc.). **See diagram 2**
- 3) **Saturation** (purity of color); **See lower arrow on diagram 4**

These dimensions can be placed in a three-dimensional model. **See diagram 3.** Note that the color circle is angled relative to the vertical value scale so that the pure hues are placed opposite their matching values.

Each of these dimensions provides a form of contrast:

- **Value: light vs. dark**
- **Hue: color vs. its opposite**
- **Saturation: neutralized color vs. pure color**

Each of these contrasts, separately or together, can be used to build space and form and to intensify lighting effects. The final contrast available is the warm-cool contrast. A warm-cool contrast is actually a function of hue rather than a separate dimension.

Every color that exists can be placed within the three dimensional space that we have created. **Diagram 4** shows two hues, orange and blue, spread over some of their possible variations

Earle Loran, who published the definitive work, “Cezanne’s Compositions” asserted that the paintings could be analyzed on the basis of black and white (value) illustrations. His analysis of the paintings on these grounds is brilliant. But it is incomplete because he overlooked the fact that Cezanne was composing with a sophisticated synthesis of value, hue and saturation.

4. Van Gogh—Color and Meaning

Van Gogh absorbed Chevreul’s theories and Seurat’s practices, but he proceeded to become what he called ‘an arbitrary colorist.’ He sought an emotional and philosophical understanding of the meaning of colors. Deep blue was the color of

spiritual rest. Combined with its complement, the 'aspiring' yellow, he felt he could represent deep and profound religious aspiration. Red and green on the other hand, symbolized "those terrible things—the human passions."

Note that a color circle usually has yellow near the top, blue near the bottom and blood red and deep foliage-green—the colors of life, hemoglobin and chlorophyll—are equidistant on either side. Since the time of Van Gogh, scientists have established that the color receptors in our eyes are sensitive to red, blue and green. Yellow, which is much brighter in its pure form than other colors on the circle, is perceived when red and green receptors are simultaneously stimulated. If he were alive today Van Gogh might see in this fact evidence of a 'mystical union' between the receptive, green and the fiery, red.

The physiology and psychology of color represent a vast realm that is still poorly understood. Let me give two examples:

In the 1950's Edwin Land, who is famous for his invention of the Polaroid camera, demonstrated that he could create the illusion of the full spectrum using just white and red light. Later he discovered that he could do the same thing using just two wavelengths of yellow light. More than fifty years later we still have no satisfactory explanation for these experiments.

There is disagreement on the 'correct' color circle since the spacing of colors depends on how many primaries you believe there to be. Most painters will state categorically that red, yellow and blue are the primaries because we can mix all hues from them. This is inaccurate because 'painter's primaries' are actually cyan, magenta and lemon yellow. Many scientists will maintain that the true primaries are red, blue and green because these are the hues our color receptors perceive. Psychologists correctly observe that we experience four primaries. There is a red, a yellow, a green and a blue each of which appears to the eye as pure and has nothing in common with the other.

The color circles referred to earlier in the text (Illustrations page one) showing Chevreul's color harmonies were created by Faber Birren who favors an equal spacing of red, blue and yellow around the color circle because this gives more space to warm colors which are favored by most artists. Our eyes can distinguish the most variations of color in the warm region. The color circles on Illustrations page two, on the other hand, are based on Munsell's color system which uses four primaries and more accurately represents the opposites that are induced by complementary contrast

Faber Birren made some interesting observations regarding the psychological effects of color:

“Good smelling colors are pink, lilac, orchid, cool green, aqua blue. Good tasting colors are vermilion, orange, warm yellow, pale cool green, tan – not purple, yellow green, grey. Red colors are “loud” like the blare of a trumpet. Violin tones are like tints. The sound of the oboe is violet. Bass notes are brown, percussion notes are orange.”

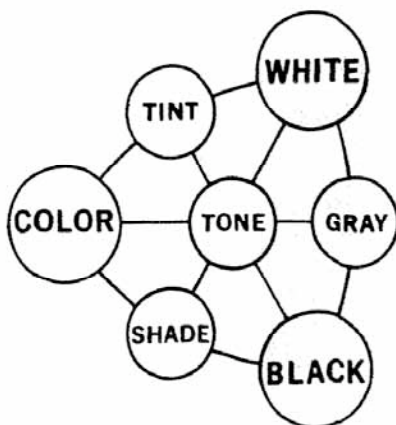
He goes on to write that Newton ascribed the following colors to musical notes.

Red – C. Orange – D, Yellow – E, Green – F, Blue – G, Indigo – A, Violet – B.

5. Birren—A new system of Harmonics

Fauvism marked the demise of sensitive color experimentation. The Fauves adopted Impressionist theory but they applied raw color where the Impressionists would have diluted it with grey or white. The result was original and shocking but the movement had no staying power except in the hands of Matisse, who ultimately reintroduced grey and brown and black into most of his figurative work. Modern movements have favored the ‘freedom’ bequeathed by the Impressionists and Post-Impressionists but relied on intuition to govern the actual use of color.

A few modern theorists have objected to this, among them Faber Birren who evolved a new system of harmonies. It is based on the different methods of diluting color. A pure color mixed with white is called a **Tint**. A pure color mixed with gray is called a **Tone**. A pure color mixed with black is called a **Shade**. Birren creates the following diagram:



He asserts that any combination of the above qualities which can be linked by a fairly straight line will be harmonic. Thus, color-shade-black is harmonic: whereas color-tone-tint is not. Birren proceeds to demonstrate how various important movements 'unconsciously' used one of these systems: the chiaroscuro of Leonardo: tint-tone-shade; the chiaroscuro of Rembrandt: color-shade-black; the mature work of J.M.W. Turner: tint-tone-black; most Impressionist work (as well as much modern color): color-tint-white

6. Some Practical Uses

If you wish to create a convincing illusion of light, contrast of **Hues** and contrast of **Saturation** must be exaggerated to enhance **Value** contrast because ***we cannot reproduce the range of light and dark that exists in nature with pigment.*** (The easiest way to illustrate this is to hold a white business card with black text in front of a bright light. The white card will appear dark and the writing will disappear indicating how small a range of light and dark we are actually working with.) If we try too hard to extend the value range of our colors, the blacks and whites will dilute and muddy our color. As the Impressionists discovered, an effective illusion of bright light can be created by increasing contrasts of saturation and hue. High saturation suggests luminosity and contrasts of opposite hues imply light and shadow.

To make full use of the dimension of hue, we ascribe a hue to light. The color of sunlight can be represented by anything from tints of lemon yellow to tints of red depending on the time of day. Whatever the color of sunlight, shadows will take on tones (or shades) of the complement. Lemon-yellow light will induce blue-violet shadows. Red light will induce green shadows.

Imagine that you are representing the light and shadow on a lawn. A brightly lit area such as a green lawn might pick up tints of yellow sunlight. It would also cast the complement of itself into the shadow. So, the shadow on a green lawn contains a deep tone of green (the actual or 'local' color), the complement of the sunlight (blue-violet) and the complement of the lit green grass (red-purple).

Complements impart tension and depth to a painting. Thus, if you are going to paint a picture mostly in blue, you would be well advised to mix a little yellow orange into some of your color to create resonantly contrasting warm grays.

The key to describing form, space and light with color is the intelligent use of the contrasts available to us. To get a feel for these contrasts, eliminate one at a time.

- a) We can eliminate the dimension of hue by taking a single hue and mixing it with white, grey and black to create a painting.
- a) We can eliminate the value dimension by mixing up colors that are of matching value (they would all look the same gray to a camera). To do this, we pick a color of medium value, yellow ochre, for example. We mix the other hues with white or black until they match this color in value. These prepared colors become our palette. They can be mixed with each other or a matching value gray to extend the range of saturation.
- a) The dimension of saturation may be limited by preparing tints, tones and shades of four hues so that they are all of the same saturation. The prepared colors may be used to create a painting.

These exercises are explored in depth in the next section.

7.COLOR EXERCISES

These exercises are designed to expand your understanding of color. You are unlikely to create a 'work of art' by adhering to them, but you will: 1) be jolted out of your usual habits and 2) begin to become aware of the three dimensions of color in a functional, rather than an intellectual way.

To absorb these exercises, you must maintain an organized palette. Before we begin, let's consider a system of organization that contributes to our understanding. As much as possible we will reflect the three dimensional nature of color in the way we organize and mix our pigments.

- Arrange pigments around the edge of your palette. You need all the space you can get for mixing and organizing colors. Place colored pigments in the order of the spectrum: R O Y G B I V along the top edge of the palette. Brown, ochre other earth colors and all less saturated hues are placed where they belong in terms of their hue. In other words Venetian red goes next to cadmium red light, yellow ochre next to cadmium yellow medium etc.
- Arrange white, middle gray and black along the bottom edge of the palette; you will be diluting almost all of your pigments with one of them.
- Mix colors at all times with your palette knife, a smooth clean one. An 'Italian painting knife', with it's spade shaped blade, is the most versatile mixing and painting tool. You will learn nothing about color if you are mucking it up with a dirty brush.
- Mix sufficient quantity of all your principle colors so that you can experiment with them and still have some in reserve.
- Except when you are forming value scales (from light to dark) keep 'tints' (colors mixed with white, separate from 'tones' (colors mixed with gray), and 'shades' (colors mixed with black). Remember that many pigments are already naturally occurring tints, tones or shades. Venetian red is a deep and fairly saturated shade of orange. Yellow ochre is a saturated tone of yellow and Payne's Grey is a weak shade of blue.

- Once you have established your principle colors derive all other colors, as much as possible, from intermixtures of these. In other words, avoid using the original pigments. If you do use the original pigments, try to understand why you need them.

In many of the following exercises, we will limit ourselves to a few hues. I encourage you to experiment and to occasionally use hues other than those in the example palett . The palettes are designed to serve a guide, not to be imitated slavishly. It is instructive if two of your hues are opposites. Remember when a pigment is diluted with white, gray or black, it will shift slightly in hue and lose saturation. Thus, to mix up a tint, a tone and a shade of one hue, you may have to use several pigments. For example: cadmium yellow medium will form a bright saturated tint, but for a tone you will have to substitute yellow ochre, and for a shade, you may need to add some brown (Venetian red or burnt Sienna) to the yellow ochre to offset the shift in hue caused by mixing it with black. If you are mixing a red-orange you might need to a supplement it with Venetian red as you move into the shades, a blue might require the addition of Payne's grey.

Remember the three dimensions of color are:

- **hue (the color circle or spectrum),**
- **value (how dark or light a color is)**
- **saturation (how pure a color is)**

a. Single Hue

Sounds boring, doesn't it? "I've done that!" some of you will say. Well, you probably haven't done it this way. The key to this exercise is the use of a Birren color scale that is essentially an equilateral triangle with white at one corner black at the opposite corner and our single hue at the third. A grey scale is mixed between the black and white.. The pure hue is diluted with varying amounts of white, varying amounts of black and varying

amounts of the different grays. The most saturated tints, tones and shades of our hue are nearest to it in this triangle and diminish in intensity as they approach the neutral white, grey and black. We are reproducing, in elementary form, the gradation of one hue within the color solid.

In creating this scale for one hue, you may need to use more than one pigment. Suppose you are using orange. That will make a fine tint, but when you mix it with a black or dark gray, it will shift hue on you, so, at some point, you will have to add some Venetian red to your orange. **(Refer to Palette 1. Illustrations, page 3)**

1. Choose a hue. You will discover that reds and oranges and yellow oranges yield a much wider variety of colors than blues or greens, because the eye is more sensitive in the warm region of the spectrum.
2. Establish an equilateral triangle with hue, white and black at each corner.
3. Mix up a middle value grey between the black and the white.
4. Mix up three gradations between your hue and white. These are your Tints.
5. Do the same from your hue to black. These are your Shades. Remember, you may need to use other pigments to maintain your hue and some of its saturation as you dilute it like this.
6. Take the gray and develop three gradations between it and your hue. These are your Tones
7. This is your 'palette'. Create your painting using it. Remember, saturated color advances relative to less pure color and vibrates against grays. Which means that it can be used both to advance form and suggest light.

When this painting is complete you will observe that many of the grey areas no longer appear neutral. They seem to contain the complement of whatever hue you have used in this exercise. This is an example of Complementary Contrast.

b. Equal Value

This is the most difficult exercise; thereby establishing the nearly essential role of value in painting. I say 'nearly' because in art there are no absolutes. Most strong paintings have a strong value structure, but a gifted colorist can make a stunning painting that looks bland in black and white. Some of Turner's and Monet's late works have very little value contrast. This exercise sheds some light on what they were doing in these radical works.

You will create a painting that would appear grey on black and white film, or in a moderately dark room where the color receptors in our eyes cease to function. The challenge is to **suggest form and light utilizing only the contrasts of hue and saturation**. Note that warm colors and saturated colors seem to be more suggestive of light. Saturated (purer) colors advance, and even glow, among less saturated colors. **(Refer to Palette 2)**

1. Choose four pigments. One should represent light and one should represent shadow. The other two may be used to represent some of the 'local color'.

2. Mix up a fairly large quantity of a middle valued gray so that it matches in value the hue that you have chosen to represent light. Yellow ochre is an ideal candidate.

3. Mix your other three pigments with either white or black until they are the same value as your gray. If one of these pigments is already the same value, leave it alone until the next step. To judge the value of your mixtures accurately squint while you are holding a sample of the mixture directly over the grey.

4. Create a scale for each of your four prepared colors from its most pure (saturated) form to pure gray. Mix each of your bands with a generous amount of paint and make sure that you really have created a complete gradation from color to gray.

5. This is your 'palette'. You may intermix colors. Use your palette knife for all mixing on the palette, always keep some of your original 'palette' in reserve or mix up more.

You will probably have to do this exercise a few times to get the hang of it. When you have done it successfully you will observe an iridescent or florescent quality to your colors. By eliminating value you have liberated hue and saturation so that we perceive them with added intensity.

c. Equal Saturation

In this exercise, we restrict saturation. When any one dimension of color is restricted, we gain a greater understanding of that particular dimension and the remaining two dimensions become more prominent. It is generally agreed that harmonies based on equal saturation are some of the most pleasing. What do you think? **(Refer to Palette 3)**

1. Choose four hues. Mix up a tint, a tone and a shade of each. Decide on a particular saturation for all of the mixtures and try to keep them the same. This requires some practice because we are not trained to see saturation. Remember, you will probably need to use more than one pigment to create equally intense tints, tones and shades of any particular hue.

2. Work exclusively from the twelve colors that you have prepared. Intermediate values may be made by mixing tints with tones or tones with shades of the same

hue. Remember to always keep some of your original colors in reserve. Mix more if you run out.

3. You may intermix different hues, but do this sparingly because when you mix different hues, you lower your saturation. The results of this exercise will be less obvious if there is too much difference in saturation.

If you have done this exercise correctly your entire image will glow. It is similar to the glow that was achieved in many chiarosuro paintings.

8. PERCEPTIONISM

The exercises in this section are adapted, with major changes and additions, from Faber Birren's Creative Color (Reinholt, 1961; Library of Congress Cat. Card # 61-6947).

Perceptionism is a term used by Birren to denote his most significant contribution to color theory. Perceptionism is the use of certain restricted palettes in conjunction with the principle of "field size" to produce life-like color effects such as 'luster' or 'iridescence'. The principle of field size is elementary. Because it is elementary, it is frequently overlooked. **The largest areas of a canvas must establish a field that keys the smaller elements. Generally speaking, this field is of lower saturation than the smaller, active areas.** Consider Chiaroscuro: a dark brown, often approaching black, creates a warm shade against which the purer, lighter colors sing. This was one of Leonardo a Vinci's major contributions to painting. It is very close to Birren's description of luster, except that glazes are not needed, and the ground may be any hue. Impressionism gave the world a whitish-gray field where tints and tones of complementary colors create a distinct luminosity. This is very similar to Birren's 'luminous effect' except that his does not depend on the Impressionist technique, simply on the underlying principle. None of these effects, in and of themselves, create art, but they broaden the artist's understanding of color and suggest innumerable possibilities. **None of these effects depend on realism, because Birren is observing the essential color effect that is independent of any particular object.**

Three of these effects—luster, iridescence and luminosity—depend, to some degree, on the same principle: a field area of low saturation is used to set off smaller, active areas of higher saturation. They differ in the degree of value contrast that is employed.

- **Luster is predominantly dark.**
- **Luminosity occupies the upper range of values.**
- **Iridescence inhabits a gray nether region in between.**

Interestingly it is possible to locate these palettes by isolating sections of the three-dimensional color solid:

- **Fig 5, Illustrations, page 2:** indicates how the lower portion of the color solid can be isolated to create a lustrous or chiaroscuro palette. Other hues could have been selected but we would remain in the lower half of the color solid.
- **Fig 6, Illustrations, page 2:** by eliminating the upper and lower portions of the color solid we obtain an iridescent palette favored by Turner.
- **Fig 7, Illustrations, page 2:** looking down on the upper portion of the color solid we locate the luminous palette preferred by the impressionists.

a. Luster

The illusion of luster depends on achieving the effect of light on silk, or some other lustrous surface. The brightly lit areas on silk appear brighter and more intense than normal. If pure colors are set against a dominant ground that is darker and less intense, luster will be perceived. **(Refer to Palette 4)**

1. Choose three hues. Set out the colors you need to create these hues.
2. Take white and mix a scale of tints from pure color stopping before you get half way to white.

3. Mix up tone and shade scales using grey and black, but in this case begin with the grey and black and stop half way from the neutral to the pure color. You should now have a very saturated scale of tints and unsaturated scales of tones and shades.
4. Work up most of your painting in the less saturated portions of your tones and shades.
5. Create the partially lit areas that surround the lustrous highlights with colors that move in three or four steps of increasing saturation from the surrounding field to the highlight.
6. Paint the parts that you wish to appear lustrous with pure color or saturated tints.

b. Iridescence

Iridescence, which is related to the equal value exercise, is one of the most difficult effects to achieve. Variations of this exercise can be used to create florescent and other unusual lighting effects. It is the key to the late works of both Turner and Monet. Saturated tints are arranged in chromatic sequence (the order they appear on a color circle) against a slightly darker, neutral field. It helps to examine or copy an iridescent object like an abalone shell when you undertake this exercise. **(Refer to Palette 5)**

1. Choose four hues, fairly evenly spaced around the color circle, that will retain saturation as they are diluted with white.
2. Mix white with each hue to create a scale of tints beginning with pure colors and stopping before you get half way to white.

3. Take your pure hues and mix them with light grey to create a scale of tone that stops before it reaches the pure color.
4. Mix your pure hues with a middle grey to create a scale of tone which stops before it gets a third of the way toward pure color.
5. Create your field, which will be most of your painting, using the middle and light greys . These greys may contain some color, but the most saturated notes of both tones should be reserved for the next step..
6. The areas that you wish to appear iridescent should proceed inward from their edges thru the most saturated middle tones to the most saturated light tones to saturated tints. This progression should incorporate a chromatic hue shift as it moves towards the purest and brightest hues in that particular area.

c. Luminosity

Once more the 'law of field size' is essential. The field establishes a normal lighting. If an object appears brighter or more saturated than is normal under these circumstances, it will appear luminous. For luminosity to pervade the canvas, black must be avoided.

We are working in tints and tones. We will dilute our darkest colors with some white

(Refer to Palette 6)

Imagine a sunset, or sunrise, over snow or water where the great opposites—the deep blue of our sky and the blazing gold, or orange or red of our sun—vie for our attention. These are examples of luminosity, and this is how it is achieved:

1. Two of your principle hues should be opposites. These two hues will represent light and shadow

2. Make scales from white to pure color (the darkest hues will not reach purity because their dark value will destroy the illusion). Continue from this point towards a middle grey.
3. Paint the areas of least luminosity, which should cover a majority of the canvas, with your less saturated Tones (color diluted with grey)
4. Create the luminous areas with more saturated tints and saturated light tones.
5. Remember: luminous areas will be more saturated and lighter than the surrounding field that must resonate with the same colors in a more muted form. Thus, the whole scene becomes bathed in light.

d. Chromatic Lighting

Chromatic Lighting is Birren's update of Chevreul's 'Dominant Tints'. He recommends observing the colors you wish to modify through a colored filter. Work through this filter to create a palette. This palette will more accurately reflect our experience of chromatic light than the subtractive mixing method favored by Chevreul.

Appendix # 1

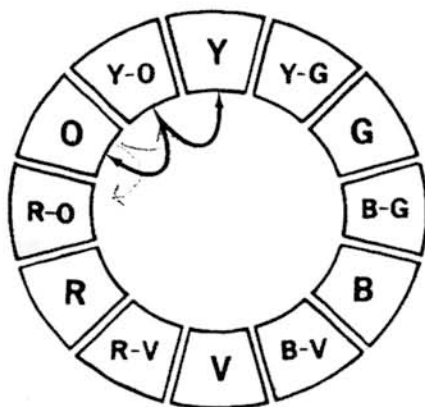
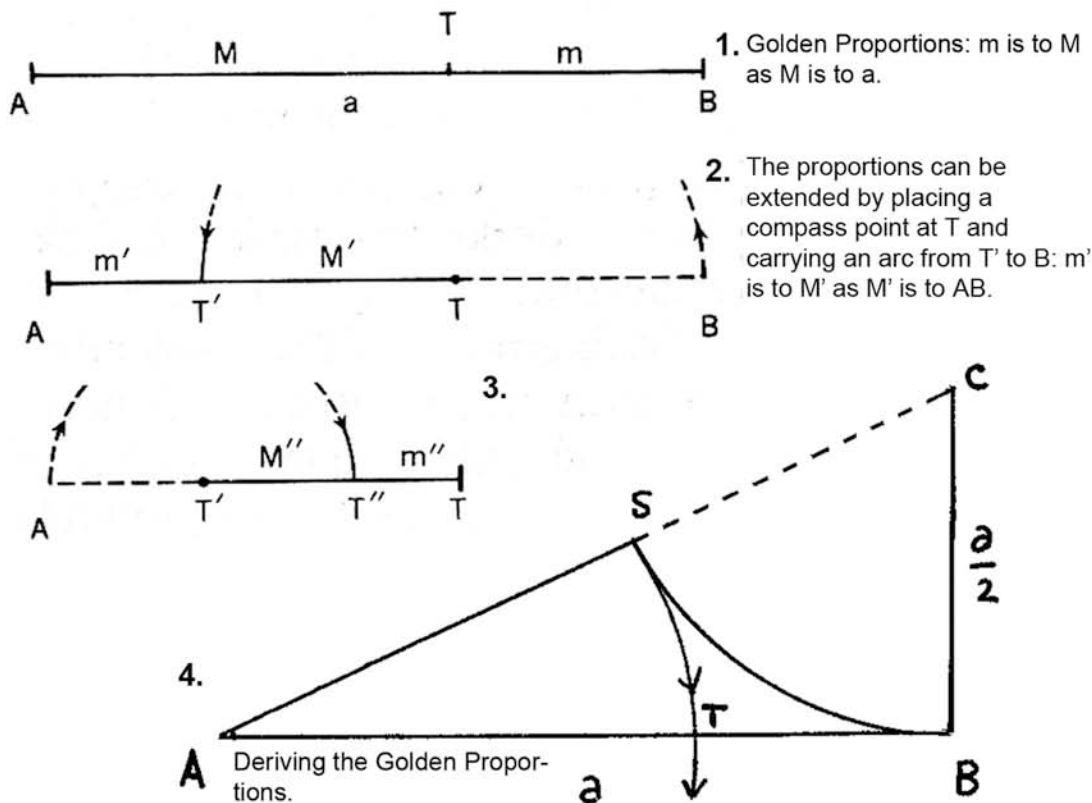
The Golden Proportion can be derived using a compass and a straight edge (**fig. 4, Illustrations page 1**). The actual measurement is an irrational number, but it is approximated by $5/8$. It is a harmonic proportion (**fig.1**) meaning that the smaller section, **m'**, is to the larger section, as the larger section, **M'**, is to a new section, **AB**, created by extending **AT** by **M'** (**fig.3**). Just as the proportion can grow infinitely, it is infinitely divisible into itself. Nature uses it as proportion for growth which is probably why it is pleasing to the eye. Artists most often use the proportions for the two sides of a rectangular composition that grows or diminishes harmonically.

Special Thanks:

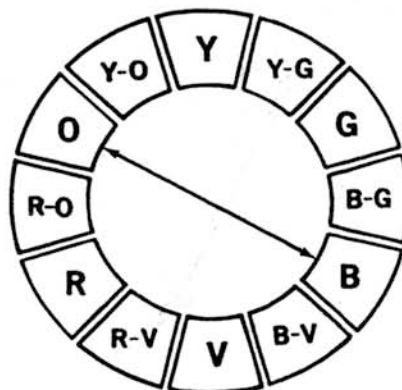
My thanks to Sally Stewart, Don Farnsworth at 'Magnolia Editions', my son Mario

Landau-Holdsworth, and my wife Beryl Landau who all contributed to the creation of this document.

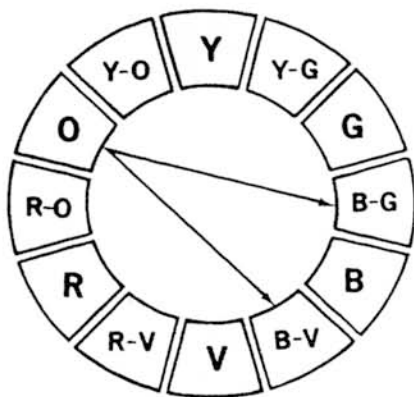
ILLUSTRATIONS



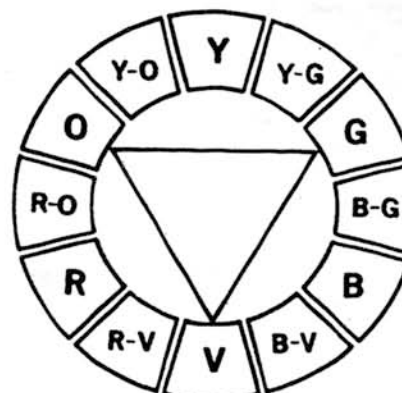
5. Harmony of Adjacents



6. Harmony of Opposites



7. Harmony of Split-complements



8. Harmony of Triads

ILLUSTRATIONS

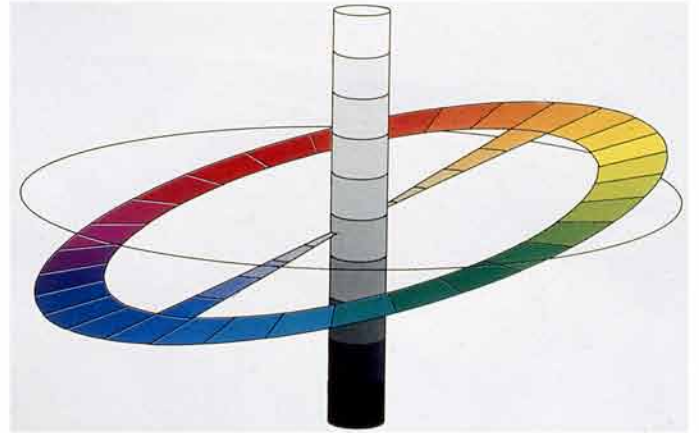
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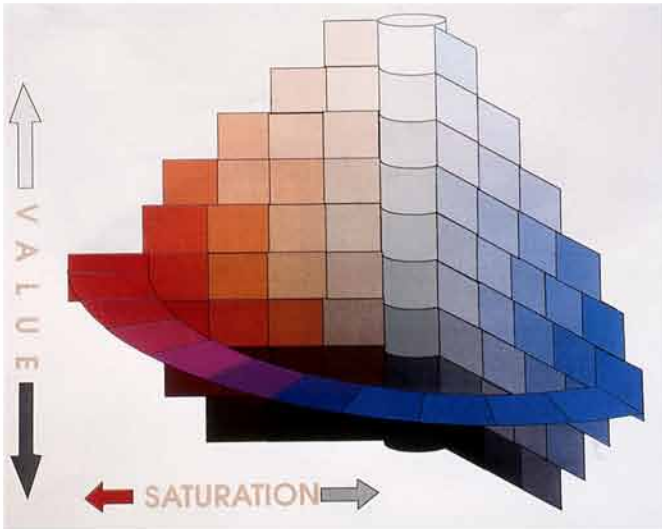
1.



2.



3.



4.



5.



5.



6.

ILLUSTRATIONS

3



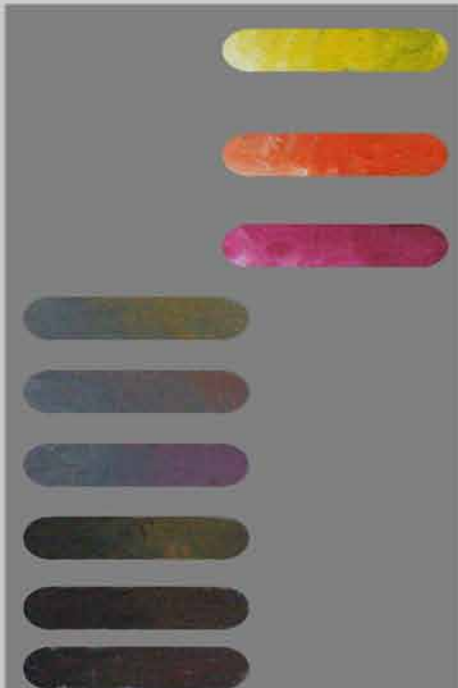
1. Single Hue



2. Equal Value



3. Equal Saturation



4. Luster



5. Iridescence



6. Luminosity