

The Actual Secrets of the Old Masters, part II

Optical Colour Separation – Tad Spurgeon

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Transparent, Translucent, Opaque

Older painting consistently uses a system of enhanced optical contrast based on transparent darks, translucent midtones, and opaque highlights. This method was later codified and taught in the European academies, but begins to change in the early 19th century as more emphasis is placed on naturalism. Impressionism discarded the use of transparency, and, in the 20th century, the opacity of titanium white made it both counter-intuitive and difficult to achieve. The original system exploits the fact that darker transparent colours made with a viscous medium have a physical recessive depth, while lighter opaque colours, often featuring impasto, appear closer to the viewer. Older paintings were often begun in warm, transparent paint, with opaque higher values then placed on top of transparent darker ones. Further layers begin transparently, lowering the value structure, before move towards opacity again in the lighter values.

In the work of painters who used calcium carbonate – chalk, calcite, or marble dust – another level occurs. By making lighter values using calcium carbonate instead of white, many different translucent values can be obtained that are different both optically and chromatically than the same value made with white. This method allows even a limited earth colour palette to generate a system of highly evolved value and temperature relationships by mixing colour with an awareness of the opposite optical effects of transparency and the various degrees of opacity created by white. In this situation, both the sense of colour, and the sense of dimension, are enhanced using a minimum number of pigments to accentuate an overall chromatic unity.

This system, moving from transparent to translucent to opaque as the values go from dark to light, and also within a given value itself, creates a maximum illusion of depth with a minimum number of colours by organizing the painting around the great optical warmth of transparent paint relative to the optical coolness of any paint mixed with white. This way of working typically also involves the use of cool and warm grays as intermediaries. Subsequent layers of the painting continue in the same manner, often working from an overall warmth towards light which is cool. A simple way to begin to work with this type of painting is to concentrate the use of white into the upper quarter or so of the value scale, and to use a combination of calcium carbonate and a second triad of primaries that are lighter and at least somewhat opaque to make temperature shifts in the midtones. This method is not required to make either light or art, but an understanding of it allows another technical dimension: the logical manipulation of the optical qualities of the paint. The apogee of this technique historically occurs in the later work of Rembrandt.

Traditional Axes of Colour Behavior

Partly in response to a need to conserve costly materials, partly as a way of organizing complex compositions in an underpainting, and partly because the effect was pleasing to the period, older painters made use of value, temperature, and the optical qualities of the paint more fully than is typical with 20th century painting. Exploration of the effects made possible via the optical condition of the paint – transparent, translucent, opaque – is often eradicated in modern painting practice by the use of uncut titanium white. The white of older painting was lead white, and this could be cut with chalk or calcite for even more transparency. It requires more finesse to control an optical system with titanium white – which is ten times more opaque than lead white – and especially when it is used in a spontaneous mixing system. The approach of modern painting to colour may have been determined, to a large extent unconsciously, by the strength of titanium white, and the need for brilliant pigments that can stand up to it.

In the later work of Titian, and more famously in later Rembrandt paintings, another axis comes into play as well, that of organized, low-relief impasto. This is typically used with incredible skill to delineate the architecture of the human face, but paintings such as *The Jewish Bride* (c.1665), show it being used with a unique, bravura forethought to depict clothing as well. This gives four axes, or dimensions, which tend to act in parallel in older painting:

- **Dark to light**
- **Transparent to opaque**
- **Warm to cool (with possible shifts within each value)**
- **Smooth to broken (impastoed) paint**

These axes can be accessed most readily using the traditional materials, lead white and chalk or calcite, but the behavior of titanium white can be altered enough with *The Putty Medium* (section 5.25) to be effective as well. *Optical Colour Separation* (section 6.15) and *The Predimensional Palette* (section 6.175) are helpful for developing this more physically active look in the paint.

Optical Colour Separation

Paintings from the 17th century often exhibit a technique for maximizing the chromatic contrast available from a palette composed simply of relatively low chroma earth colours, black, and white. This technique can be seen in an especially evolved way in close-ups of later Rembrandt portraits. It involves using optically different types of colour in specific areas of each value to augment the painting's sense of dimension while maintaining a limited palette. This creates more of a sense of dimension in all values, but is especially useful for keeping higher values from losing depth and becoming visually flat or pasty.

In the first pass, the colours – typically a low chroma palette such as yellow ochre, raw sienna, Venetian or Mars red, burnt sienna, and black – are used without white. The lighter values of these colours are made by simply adding the bodied but translucent chalk putty medium. The first pass is somewhat darker than the ultimate goal, acknowledging that some lightening will occur from subsequent values mixed with white. This is then followed, after drying or wet-in-wet if the medium permits, by a cool, thin, more or less opaque layer. The cool layer may be initially made using only black and white, although at first this gives the painting the somewhat jarring effect of sudden dimensionality where it has been placed. This appears to be the general method, for example, used in a painting such as Rembrandt's *Stormy Landscape* (c.1638), which may be an example of a general Dutch method for beginning work during the period: the complex pattern of warm-cool interaction is established with a minimum number of colours, creating a convincing three-dimensional atmosphere for the local colour to follow. If used wet-in-wet, the rheology of the chalk putty medium allows a significant degree of control over how much these distinct warm and cool layers remain separate or blend together through different levels of pressure with the brush. As such, a great deal of development can occur in one extended layer of paint while keeping colour, value, and temperature relatively clean or discrete. The third pass on the painting again returns to warm and transparent colour, the fourth pass to cool and opaque, this time using colours other than black with white.

A good image for how this method operates is again a pendulum that moves back and forth between the poles of dark, warm, and transparent, and light, cool, and opaque. The method juxtaposes opposite types of colour: warm-transparent, and cool-opaque. Balancing these in the dimensional envelope is the fundamental technical goal of the painting. Bright midtone areas of colour are typically downplayed, even sacrificed, for the greater physical and psychological presence possible from more closely orchestrated value and temperature relationships. It is interesting to note the differences created by layering and impasto technique in this case. The earlier *Portrait of Jan Six* (1654) uses a bold red, gold, and black colour scheme similar to *The Jewish Bride* (c.1665), but the later painting features brighter, yet also much more texturally and chromatically detailed colour and an overall calligraphic technique based on the many layers, coupled with Rembrandt's advanced ability to accentuate temperature within a limited palette.

The eye perceives greater chroma and distinction between warm and cool tones as a result of this technique. This is especially true in the

higher values, where light colours made with putty contrast both optically and in terms of temperature with light colours made with white. Yet, in spite of the strong colour dynamics available using this method, unusual chromatic harmony can be achieved because the palette is kept as simple as possible.

Optical Colour Exercises

These exercises are designed to develop facility with the putty medium, and provide a way to understand the basic principle often found in older painting: colour deployed with awareness of the optical temperature shift between a given value of a colour made with, or without, white.

Black & White: The Paradox of Optical Colour

This method illustrates how to manipulate the movement from transparent dark paint to opaque light paint that is so basic to 17th century painting practice. A limited palette develops more variety of chromatic expression through this method by capitalizing on optical shifts in temperature as the values change. If the logic of arranging optical temperature within value to enhance dimension is understood, the addition of colour to the system does not cause confusion. The eye has a reference for how the system appears at each stage as it develops on the canvas.

Begin by placing a small amount of both black and white paint on the palette. Take most of each and cut it with putty, 1:1. Then take half of each of these, and again cut with putty, 1:1. Do this three more times, so that there are six dilutions of both black and white, ranging from full strength to a ratio of 1:32. Place extra putty on the palette for further dilution. Begin the image first in the lightest black (a translucent gray) using no white. Continue through the values in the transparent blacks from light to dark, allowing the study to become somewhat darker in overall value than ultimately intended. Then clean the brush, or select a new one, and add the most dilute white. This is logical at the beginning of the cool midtones, or for cool reflections in the darker shadows. Even this dilute white creates a dramatic optical “jump” in context with the relatively warm, transparent grays. The pressure of the brush also makes a difference in terms of the temperature shift, more pressure meaning more blending and less shift. Slowly move up through the white dilutions from weak to strong, integrating warm (transparent) and cool (opaque) values through neutral (translucent) ones. Three distinct “colours” of gray can be differentiated. Integrating these is the first step towards augmenting colour via the optical quality of the paint. Note the way the eye reads transparency as shadow, and the way any value containing white comes forward relative to its proportion of white. The principle of optical colour separation is not necessary to make paintings, but does offer maximum colour perception within the inherent harmony of a limited palette.

Perennial Triad & White (The Tetrachromatikón)

The above exercise can be extended to colour using the ancient combination of yellow ochre and red earth with black and white. This illustrates how much apparent colour a limited palette is capable of generating when used with the putty medium. The point is to create alternative higher chroma areas by making them using the putty medium instead of white, and alternative lower chroma areas by including a very small amount of white. This method gives access to greater control of temperature in any value, but is especially apparent in higher values, through juxtaposing transparent or translucent application – warmer, no white – with more opaque application – cooler, with white.

Modifying Colour

A given colour can be modified five basic ways:

Colour mixed with colour: An uncut colour is called a **hue**. This is hue-to-hue mixing. As a type, hues are relatively warm even if made with cool colours. Colours that are less than ninety degrees apart make more vivid hues than colours that are more than ninety degrees

apart. As colours approach one hundred eighty degrees apart, they begin to make a chromatic neutral hue. Hues advance in the picture plane unless they are relatively neutral.

Colour mixed with white: These are technically called **tints**, sometimes **pastels**, and are the coolest colour type. Tints advance in the picture plane.

Colour mixed with black: Technically **shades**, these are surprisingly warm even though approaching neutral. Shades recede in the picture plane.

Colour mixed with gray: Technically **tones**, these are cool relative to hues, but less than colours mixed with white. Tones can advance or recede depending on value and context.

Colour mixed with medium: If the pigment is transparent, this creates a glaze. Transparent or translucent colour is the warmest type, advancing or receding according to value.

Modern colour mixing tends to follow the spontaneous Impressionist model. In this system, there are two options, or chromatic types of mixing: colours are mixed with one another, making both brighter colours and neutrals, or colours are mixed with white. Painters in the 17th Century tended to follow a more complex model incorporating all five options listed above. This model creates an extremely subtle dimensional illusion from a minimum number of pigments, as we see in the work of Rembrandt, Murillo, and Velázquez. Historically, there are also painters who used certain aspects of the complete system in order to emphasize midtone colour more effectively. This is the system of painters as various as Van Eyck, Fra Angelico, Lotto, Manet, Sargent, and Degas. A period of conscious exploration of all five options – which are much easier to see than to think about – quickly opens the doorway to achieving more apparent colour from fewer pigments on the palette once the relative temperature of the various modifications – their logical place in the value structure – becomes intuitive.

The Natural Neutral

Because any daylight scene is composed of relationships between red, yellow, and blue, with a single light-shadow axis, each scene also contains a natural neutral tone – the gray of the day – that can be used alone or to modify the other colours on the palette. The natural neutral is made from a combination of red, yellow, and blue keyed to the subject matter, and is most versatile if it is transparent. It can be made from the colour of the light mixed with the colour of the shadows, but can also be chosen based on what the painter sees, or can be exactly neutral. This introduces a specific or key neutral tint, and is helpful in situations where more detailed premixing is precluded. This approach is also helpful for beginning students, who find it difficult to be patient with premixing, but appreciate that the natural neutral makes midtone colour appear more vivid and unified. Exaggerating the natural neutral, either through more chroma or simply more presence, leads to the Mancini or Bouguereau style of midtone integration in a matrix of noticeable or stylish grays.

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