Bernard Valeur

The colors of WINE

An exquisite palette

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Ode to wine

Day-colored wine,
night-colored wine,
wine with purple feet
or wine with topaz blood,
wine, starry child of earth,
wine, smooth as a golden sword,
soft as lascivious velvet,
[...]
I like on the table,
when we're speaking,
the light of a bottle of intelligent wine.
Drink it, and remember
in every drop of gold,
in every topaz glass,
in every purple ladle,
that autumn labored
to fill the vessel with wine;

Pablo Neruda
Excerpt from Odi Elementari (1954)

Source: https://hellopoetry.com/poem/9940/ode-to-wine/



Preface

Wine tasting is a privileged moment of discovery and emotion. Sight is the first sense to be called upon, for a wine is first tasted with the eyes, when the light reveals its color, brightness and limpidity... Then come two other senses: smell and taste, to appreciate the subtleties of aromas and flavor.

The color of a wine deserves to be examined from every angle. First and foremost, the color, as wines offer an astonishingly rich palette. It depends on the polyphenols initially present in the grapes, whose nature and distribution are a function of grape variety, native terroir, grape maturity and vintage. Other factors then come into play: winemaking method, aging and cellaring, all of which are accompanied by changes in color.

How can we characterize the color of wine? Semantic description, however evocative, is insufficient. Comparison with a color chart, as in painting and dyeing, offers a more rational approach. As for spectrophotometry and colorimetry, which are quantitative scientific methods of characterization, they are used by oenologists to make comparisons and monitor trends.

In addition to color, other characteristics of the wine robe are also important: brightness, limpidity, fluidity and possible effervescence. They contribute to the seduction of wine, and also provide a wealth of information.

The color palette is not limited to the shades of white, red and rosé wines – which will be the subject of dedicated chapters. Many wines display surprising colors: orange, mahogany, brown and even almost black. These wines deserve a closer look at their specific winemaking operations and aging conditions. And what can we say about so-called blue wines? A feat or an artifice? And the color green? No wine is really green. Even Portuguese vinho verde is green in name only. However, young white wines sometimes reveal green glints, the origin of which is still poorly understood.

Illuminated by an ultraviolet (UV) torch, a glass of white wine emits a beautiful turquoise light. This fluorescence is a little-known property of wines, never mentioned in books on wine, but only in some specialized articles. It deserves to be explained.

Let's get back to tasting and its multi-sensory nature. Color, aroma and flavor are perceived by our sensory organs, which send signals to the brain. The brain interprets these signals, providing us with sensations. It should be stressed that the senses involved are not independent. In particular, it is well established that the perception of a wine's color has an influence on the olfactory and gustatory perceptions that follow. Not to mention the fact that our previous personal experiences, education and culture condition the "expectation" that the prior color vision has aroused. Then, what about tasting in dark glasses or blind tasting?

The final point that deserves attention is the alteration of a wine's color – along with its flavor and aromas – as a result of excessive light, which justifies the use of tinted glass bottles for preservation.

What colors are all about

What is color? The answer to this difficult question depends on who you ask. Neuroscientists will say that color is a perceptual phenomenon: it is the sensation the brain produces when light hits the retina of our eyes. Physicists and chemists, looking further upstream than perception, will explain that colors arise from the interaction of light with matter, but matter itself may be the source of colored light. Then there is the point of view of the human and social sciences, where colors have a cultural value: they carry codes and are attributed a symbolic character that varies according to society and changes with the times.

Whatever the case, no one can imagine a world without colors. They are omnipresent in our environment and in all sectors of human activity: paint, textile dyeing, printing, art, photography, architecture, urban planning, design, fashion, advertising, cosmetics, and agri-food. More specifically, in the field of wine, color is of great importance to oenologists and wine tasters, who deduce a great deal of information from it.

Today's conception of color is the fruit of a long history, and a few milestones along the way are worth recalling. In addition, thinking about how we perceive colors is a prerequisite to their characterization, which, in the field of wine, is particularly difficult.

A bit of history

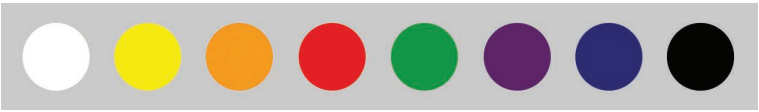
The history of colors is inseparable from that of light, not only because colors cannot exist without light, but also because the observation and interpretation of colored luminous phenomena have contributed greatly to our understanding of the nature of light.

From Aristotle to Newton

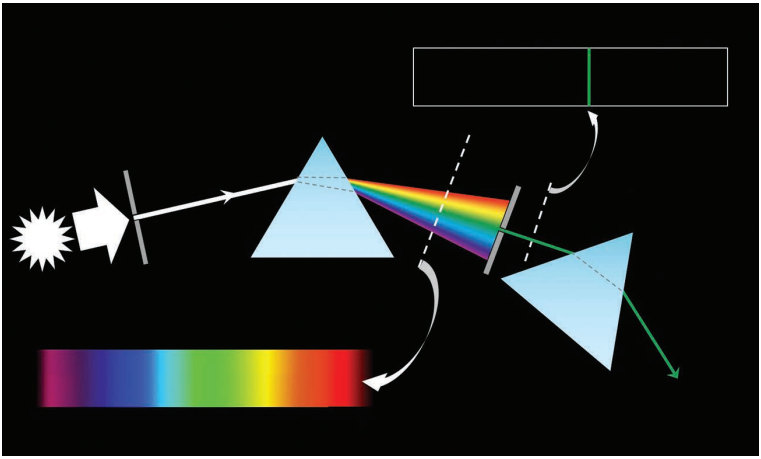
Since ancient times, the delicate question of the origin of colors has preoccupied scientists, philosophers and artists. Aristotle (384-322 B.C.), having observed that "the Sun appears white by itself and red through a cloud or smoke", considered that the colors of transparent media resulted from

mixtures of light and darkness. As for the colors of opaque bodies, they were, according to him, subtle mixtures of white and black in the right proportions. Aristotle thus classified colors according to their degree of brightness: white, yellow, orange, red, green, violet, blue, and black (Figure 1).

This conception, in which black and white figured prominently, lasted until the 17th century. Then, thanks to various experiments with prisms from 1666 onwards, Isaac Newton (1642-1727) revolutionized the concept of color by demonstrating that white light was not homogeneous but made up of rays of different colors (Figure 2). According to him, white and black were not colors: white appeared as the superposition of all colors, and black as the absence of color.



■ **Figure 1.** Aristotle's color classification.



■ **Figure 2.** The decomposition of white light (from the Sun, for example) by a prism results in a spectrum made up of a continuous sequence of colors, from violet to red. Newton's crucial experiment (*Experimentum crucis*), carried out in 1672, consisted in placing a thin slit at the prism's exit, which enabled a ray of a so-called pure color to be selected, since it was not decomposed by a second prism.

Newton believed that light was made up of corpuscles. When they reached the back of the eye, they generated vibrations which, when transmitted to the brain, produced various color sensations linked to their size: red for the largest, violet for the smallest, and the other colors of the rainbow for intermediate sizes.

This corpuscular conception of light opposed that of Dutch physicist Christiaan Huygens (1629-1695), who considered light to be a vibratory phenomenon propagating in waves, like sound. Certain light phenomena (the colors of thin glass slides or soap bubbles, light diffraction...) could not be interpreted by a corpuscular theory, but Newton's fame was such that the vast majority of 18th-century physicists adhered to the scientist's conception and unjustly ignored the wave hypothesis.

The triumph of wave theory

It was not until the 19th century that the wave theory of light triumphed. In 1801, the Englishman Thomas Young (1773-1829) challenged Newton's corpuscular theory with a famous experiment demonstrating interference between light waves. In 1802, he was also the first to calculate the frequencies corresponding to each color.

A decade later, the Frenchman Augustin Fresnel (1788-1827) developed a remarkable theory of wave optics. Then came a major event in the history of light: in 1865, the Scotsman James Clerk Maxwell (1831-1879) predicted the existence of electromagnetic waves, later produced in 1887 by the German physicist Heinrich Rudolf Hertz (1857-1894). It turns out that the light detectable by the human eye represents only a tiny fraction of these waves.

However, the wave theory of light was unable to describe certain phenomena, such as the photoelectric effect. That's why, in 1905, Albert Einstein (1879-1955) proposed that light should also be considered as a beam of energy grains, later called photons. He thus succeeded in interpreting the photoelectric effect, for which he was awarded the Nobel Prize in 1921.

In short, light, like Janus, has two faces: it is both a wave and a beam of grains of energy.