Juan Gris' Color Symmetries

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Abstract

Juan Gris, Spanish-born artist and contemporary of Picasso, brought to cubism a new compositional rigor grounded in geometry and a new vibrancy of color. Art historians and critics have commented upon the strength and uniqueness of Gris' color, yet little has been written about either the specific colors or the possible color strategies employed by the artist. Examining the color organizations in the artist's paintings and correlating these with the artist's writings, the author describes the properties of limited-color palettes employed by Gris. The color-symmetry palette is defined as a special type of limited-color palette and is proposed as the primary color organization developed and employed by Gris between 1918 and 1924. Building on the author's prior analyses of Gris' compositions, the color-symmetry palettes are shown to correlate with and to reinforce Gris' compositional symmetries.

Introduction

Juan Gris (1887-1927) was born José Victoriano Carmel Carlos González-Pérez in Madrid. In 1902 Gris began studies in mathematics, physics, engineering, and science at the Escuela de Artes y Manufacturas. In 1904 he abandoned those studies to train as an artist and subsequently began making a modest living as a magazine and newspaper illustrator in Madrid. He adopted the pseudonym Juan Gris ("John Gray"), moved to Paris in 1906, and took up residence in the Montmartre studio apartment building where Pablo Picasso (1881-1973) lived and worked. Picasso, six years older than Gris and living in Paris since 1904, was at that time already embarked upon a new kind of painting that would revolutionize modern art. In 1907, Picasso produced his groundbreaking proto-cubist painting *Les demoiselles d'Avignon* and in the next few years, together with Georges Braque (1882-1963), would develop cubism, arguably the most important movement in 20th century painting. Gris witnessed cubism's birth, absorbed its principles, and by 1911 began producing his own highly original cubist paintings. Gris' early paintings, while unmistakably cubist in their abstractness and spatial inventions, were distinct from Picasso's and Braque's paintings in their geometric regularity and rich color.

Art historians and critics have long remarked upon Gris' color, describing it as "brilliant," "sensuous," "rich and complex" [7], "sweetened and sensual" [3], as well as "daring" and "fearless and vivid" [8]. Despite these superlatives, there appears very little in-depth analysis of Gris' color strategies in the scholarly record. Even Kahnweiler, who championed Gris' paintings and wrote the definitive monograph on the artist, declines to explain Gris' color and instead refers his readers to Gris' own statements about his color, which are few [4]. A close analysis of Gris' paintings reveals a color order at work, a larger structure that binds the individual colors together as a coherent whole, which we will refer to as a *limited-color palette*. It should not come as a surprise that Gris employed a limited-color palette, since a structured approach to color is consistent with his structured handling of composition throughout his career. What is surprising, however, is the depth of Gris' color order, the innovative development of symmetrical relationships among his colors, and the ways in which those color symmetries are integrated with his compositional symmetries.

Preliminaries for the Color Analyses

We should acknowledge at the outset that an academic inquiry into color poses some challenges. First, the color relationships under discussion cannot be properly understood in words and diagrams alone, but must be experienced as colors, so the reader is strongly encouraged to consult the full-color electronic version of this paper [9]. Second, while the author has studied most of Gris' original paintings in exhibitions and collections, we are necessarily limited in this examination to printed reproductions. The color fidelity of reproductions varies considerably, so the author has consulted multiple reproductions of the same paintings in an effort to average the color similarities and differences and thus arrive at accurate conclusions. The definitions and explanations below will assist the reader in the color analyses to follow.

Limited-Color Palette. *Limited-color palette* has been defined differently by authors and artists over the years. For many artists, it is simply a limited set of paints from which nearly unlimited color variations may be mixed; under this definition, the aesthetic possibilities of "limits" are effectively nullified. Instead, when we speak of a limited-color palette in Gris' paintings, we shall assume the following as necessary features: (1) the palette is limited to a small ensemble of colors, usually no more than 9 total; (2) each color has a distinct identity by virtue of its unique combination of value, hue, and intensity (see definitions of these below); (3) each color is "tuned" to the others by some measured increment of hue, value, and/or intensity; (4) each color maintains its distinct identity in the painting because there is minimal intermixing. Importantly, the above-mentioned color qualities and relationships are visible and appreciable in the final paintings, making limited-color palettes as much a part of the aesthetic experience of Gris' art as the geometric compositions and the abstracted subject matters.

Color-Symmetry Palette. We shall consider a *color-symmetry palette* to be a special case of a limited-color palette. In this examination, *color symmetry* does not denote symmetrical distribution on the surface of the painting (although some of Gris' compositions exhibit such organizations), but instead refers to symmetrical color relationships in "color space" as plotted on color charts. In addition to the characteristics of limited-color palettes listed above, color-symmetry palettes also possess the following features: (1) both warm and cold hues are present in equal or nearly equal quantities ("warm" and "cold" are explained below); (2) colors differ from each other by equal increments of value, hue, or intensity; (3) some colors are similar to other colors by equivalences of value, hue, or intensity; (4) when visualized in charts or diagrams, the positions of colors display some symmetrical correspondence.

Juan Gris does not employ the terms *limited-color palette* or *color-symmetry palette* in his essays or his letters; neither does he leave us with any color charts, such as those we will use in our analyses (e.g., Figure 2). As a writer, Gris was erudite and articulate; his statements on cubism are still referred to today as definitive of the movement. Yet, he does not explain or even describe in his writings the compositional symmetries or the color organizations that are evident in his paintings. The fact that Gris does not write about such matters should not surprise us, since he gave every indication during his lifetime that the paintings should stand on their own, without additional verbal or visual explanations from the artist. A dramatic indication of this comes from Kahnweiler's own recounting of Gris' actions in his final days. Gris died prematurely at the age of 40, and among the artist's last instructions to his wife Josette and to Kahnweiler was that upon his death they should burn all of the preparatory drawings he used for making his paintings [4]. Destroying the preparatory drawings may not have been intended to preserve "creative secrets" but to preserve the integrity of the viewer's experience of Gris' paintings, the impact of which might be diluted or compromised by the drawings. Gris' paintings must be our primary sources, so we shall endeavor to examine carefully and interpret faithfully the color evidence in the art works themselves.

Gris' Compositional Symmetry. Juan Gris stands out among the cubists for the rigorous geometry and symmetry he employed in his compositions. Geometry in Gris' compositions has been variously acknowledged by art historians. While many have remarked upon the important role of geometry in Gris' paintings, including his use of the golden ratio (e.g., [1]), others do not recognize systematic geometry in

his compositions (e.g., [2]). In contrast to the latter, the author is convinced that Gris did employ regular geometric methods, sometimes including the golden ratio, and it is clear that Gris employed systematic symmetry transformations from 1913 to the end of his life. For an overview of Gris' symmetry transformations and analyses of some selected paintings, the reader is encouraged to see [5], as some of Gris' compositional symmetries are integral to the color-symmetry palettes discussed below. In summary, Gris' compositional symmetries developed in the following chronology: rotational symmetries were employed between 1913 and 1918 in his synthetic cubist collages and paintings; glide-reflections were employed between 1917 and 1919; reflection-with-dilation symmetries (the enlargement/ reduction of one side of the reflection) were employed between 1921 and 1924; and diagonal-axis, reflection-with-proportional distortion symmetries (one-dimensional "stretching" or two-dimensional "warping" of one side of the reflection) were employed from 1924 to the end of his life in 1927. We can see Gris' limited-color palettes emerge in 1916, during the development of his rotational symmetry compositions. The color-symmetry palettes, which will be the focus of our examination, emerge as early as 1918 and continue throughout the period of reflection-with-dilation symmetries until 1924.

Color Variables and Diagrams. Color is described by the following three variables, all of which are simultaneously present in any given instance of a color: (1) *Hue* is probably the most obvious feature of color, corresponding approximately to the wavelength of light and describing the qualities of yellowness, redness, blueness, etc. (2) *Intensity* describes the brightness or dullness of a color; at the highest extreme are pure, brilliant colors, such as seen in a rainbow, and at the lowest extreme is gray, or *neutral* as we shall refer to it, such as seen in lead, slate, or concrete. (3) *Value* denotes the lightness or darkness of a color, as for instance one might find in comparing a pink carnation to a red rose—both are red in hue and of high intensity, but the carnation is lighter in value than the rose. Hue, intensity, and value comprise the "dimensions" of each color we see; the myriad variations and combinations of these dimensions account for the rich and complex possibilities of color for the artist.

Color is often diagrammed in a circle; however, we will employ a different schema (see Figure 2) that is more appropriate to Gris' ideas about color, as evidenced in his paintings and his writings. Gris' writings about color are brief. Perhaps his most specific statements about color can be found in a lecture he gave at the Sorbonne in 1924, *On the Possibilities of Painting* [4]: "…a colour also has two basic properties: quality and intensity; that is to say, red, green or blue, and the degree of such colour which it has. Blue is always blue, whether it be pale or dark. There is the hue and its shade." Further in his lecture, "…some colours are warm, some are cold. Those going towards cadmium yellow are warmer than those going away towards cobalt blue." Gris addresses the three variables of color, hue ("quality"), intensity ("the degree of such color"), and value ("shade"), but he also acknowledges a fourth aspect in dividing hues into "cold" and "warm" categories, a contrast that appears repeatedly in his paintings. Gris mentions neither a color circle nor any color relationships requiring a circular model. Instead, Gris seems to have considered the warm-cold distinction as the most important aspect of hue, and that distinction lends itself to a side-by-side contrast rather than a circular arrangement. We will assume this for our examination and adopt a schema that accords with Gris' statements and paintings.

The limited-color palette chart that we will employ (Figure 2) may be thought of as a color "tree," with a central vertical "trunk" that is a neutral value scale (light at the top to dark at the bottom) and horizontal "branches" extending left and right from the trunk that are intensity scales (low intensity at the center to high intensity at the right and left). Left of the center column are warm hues, and right of center are cold hues. Although similar in organization to the Munsell "color tree" [6], the charts employed below are unique to this paper and emphasize the three color relationships that are most important to Gris' limited palettes: (1) warm vs. cold hues (the numbers and distributions of each are easily compared left and right); (2) neutral colors vs. intense colors (easily discerned by comparing the colors in the center column to those left and right); and (3) specific value positions of each hue (incremental differences may be assessed vertically, and the relative values of warm and cold colors can be compared horizontally). Perhaps the main advantage of our chart is that the symmetries of color dimensions (hue, value, intensity) are graphically translated into symmetries in the planar dimension (positions in chart).

Limited-Color Palettes in Gris' Synthetic Cubist Paintings

The first phase of cubism, called analytic cubism, is characterized by muted colors. The colors of Picasso's and Braque's analytic cubist paintings are nearly monochromatic browns and grays; Gris' paintings are somewhat more colorful, but still generally neutralized. In the second phase, synthetic cubism, Gris' colors become more intense and the range of hues expands considerably during the years after 1913, although the earliest synthetic works do not yet evidence limited-color palettes. Gris began using limited-color palettes around 1916, when the bright and expansive colors of synthetic cubism were more deliberately modulated and related to one another. Compared to his preceding synthetic cubist works, the limited-color palette paintings employ fewer colors, and those colors maintain their individual identities more clearly because there are fewer instances of color blending. That is, Gris' synthetic cubist paintings consist chiefly of uniformly colored shapes with clear and distinct edges.

The painting, *Still Life (Bottle and Fruit Dish)* of 1917 (Figure 1) is made with only six colors, of which three are neutrals and three are near to high intensity. The six colors in our chart (Figure 2) are: White (*Wt*), Gray (*Gy*), Black (*Bk*), Orange (*Or*), Red-orange (*Ro*), and Blue-violet (*Bv*). Each color maintains its identity within the composition because of the restrained intermixing; when mixtures of two colors occur, they do not establish a new third color but instead create a blended transition between the original two, such as found at the upper left (White-to-Red-orange) and at the upper right (Black-to-Gray and Black-to-Orange). While we would not characterize this limited palette as a symmetrical palette, it is noteworthy that each color occupies a different value position, that half of the colors are low intensity and half are nearly high intensity, and that there are both warm and cold hues (although not an equal number of each). These qualities suggest that Gris planned the color relationships (especially the distinct values), much as he planned his compositions, with an overall structure in mind prior to executing the painting. Many other paintings from this period evidence a similar approach to colors, some of which show a more equalized balance between warm and cold colors, anticipating the color-symmetry palettes to come.

Figure 1: *Juan Gris, "Still Life (Bottle and Fruit Dish)" 1917*

Still Life (Bottle and Fruit Dish), 1917										
	Warm Intens.				N	Cold Intens.				
	e	d	c	b	a	b	c	d	e	
1					Wt					1
2										2
3										3
4					Gy					4
5		Or								5
6										6
7								Bv		7
8		Ro								8
9					Bk					9

Figure 2: *Limited-color palette used in Figure 1.*

Color-Symmetry Palettes

Within just a year of *Still Life (Bottle and Fruit Dish)* (Figure 1), we see a symmetrical color palette used in *Fruit Dish and Playing Cards* of 1918 (Figure 3). Like the previously-discussed palette (Figure 2), this palette also employs only six colors (Figure 4), but their positions are now in multiple paired

relationships: (1) Black and White are the only neutral colors in the palette, which establish the upper and lower limits of the value scale and create in our chart the neutral vertical axis that divides warm colors from cold colors; (2) there are equal numbers of warm colors (Orange and Red-orange) and cold colors (Green and Blue-violet); (3) the warm colors and cold colors are two pairs of complementary hues (Green and Red-orange, and Blue-violet and Orange); (4) the non-complementary warm-cold pairs are the same values (Orange and Green are *#3*, and Blue-violet and Red-orange are *#7*); (5) the four warm and cold colors are of approximately equal intensity (intensity-step *d*). Our chart shows this palette as a hexagonal array of colors, and the aforementioned paired relationships imply four axes crossing the center of the hexagon. The vertical axis divides warm from cold hues, and the equidistance of the hues from the vertical axis shows the equal intensities of all four of these colors. The horizontal axis divides three lighter colors from three darker colors, showing the equidistant positions of each trio from the middle value and emphasizing the equal values of the cold and warm hues. The two diagonal axes divide each pair of complementary warm and cold hues.

Figure 3: *Juan Gris, "Fruit Dish and Playing Cards" 1918.*

Fruit Dish and Playing Cards, 1918										
	Warm Intens.				N	Cold Intens.				
	e	d	c	b	a	b	c	d	e	
1					Wt					1
2										2
3		Or						Gr		3
4										4
5										5
6										6
7		Ro						Bv		7
8										8
9					Bk					9

Figure 4: *Color-symmetry palette used in Figure 3.*

This minimal palette of only six colors possesses a remarkably layered order, although that order is probably more visible in the chart than in the painting. That is, it requires an experienced eye for color, or a diagrammatic analysis such as Figure 4, to recognize the symmetrical organization of these colors. One contributing reason for this is that the compositional symmetry may be at odds with the color symmetry: the composition is based upon rotational symmetry, while the color palette is based upon reflections, and there may be no clear way to make these two symmetries fully reinforce each other in a painting. This short paper will not permit a complete compositional analysis of *Fruit Dish and Playing Cards*, but the viewer might recognize 180-degree rotation in the relationship between the grapes at the top of the still life and the playing card at the bottom, or between the "stair-step" shape in the bottle at upper left and the same shape in the base of the glass at lower right. There are color exchanges of blue-violet and green in these locations, which assist the viewer in recognizing fragments of symmetry, but the center of the composition is complicated and such color correspondences are either not possible or not recognizable. To some extent, this competition between the need for coloration to acknowledge figurative subjects and coloration to acknowledge the symmetry pattern will persist throughout his work. However, when Gris shifts his compositional symmetries to reflection-with-dilation, the correspondences between shape symmetry and color symmetry become more consistent and more recognizable.

Gris began developing reflection-with-dilation symmetry in his compositions at least as early as 1920. In the earlier paintings of this type, the symmetry was complicated and difficult to recognize, but by 1921 he had brought a new simplicity and clarity to the compositions. Color contributed much to that clarity because the symmetrical color relationships were often placed in spatially symmetrical locations in the compositions—the symmetries reinforced each other. It should be stressed that Gris did not, even in the later paintings, distribute these symmetrical colors in a completely regular pattern. Gris was not pursuing an abstract, decorative effect; instead, he was integrating and balancing at least three competing objectives: geometric symmetry, color symmetry, and figurative subject matter—and the last of these often extended to a fourth objective, symbolism or metaphor, as when the still-life objects alluded to the five senses or to the other arts. These are complex requirements, and the "art" of Gris' painting is in how he integrates and balances the multiple levels of order. Compositional and color symmetries serve to establish an overall structure of predictability and stability, within which are revealed local exceptions and surprises.

An example of this more integrated approach to compositional and color symmetry is *Guitar and Fruit Dish* of 1921 (Figure 5). This painting belongs to the aforementioned reflection-with-dilation period of 1921-24. Although a short-lived period in Gris' career, it is also one of the most prolific and creative. No other artist of the time had taken the language of synthetic cubism to such rigorous ends, either in composition or in color. The compositional symmetry in *Guitar and Fruit Dish* may be recognized by comparing the shapes of the cup and pipe at lower right with similar but enlarged shapes of the fruit dish and the dark curved portion of the guitar at the center of the canvas. The tablecloth displays the same effect: the blue portion at bottom right is reflected and enlarged to produce the yellow portion to the left. The bottle and its label at lower right are reflected and enlarged in the window shutter at the left of the composition. These are not approximated or "free-handed" symmetry relationships, but instead are designed on a precise symmetrical geometry. The vertical axis of reflection may be seen in the blue-yellow division of the tablecloth and extending upwards through the gutter of the book; those shapes to the right are smaller, and those to the left larger. There are many more shape relationships like these to be discovered by the viewer, and color plays an important role in recognizing the compositional symmetry.

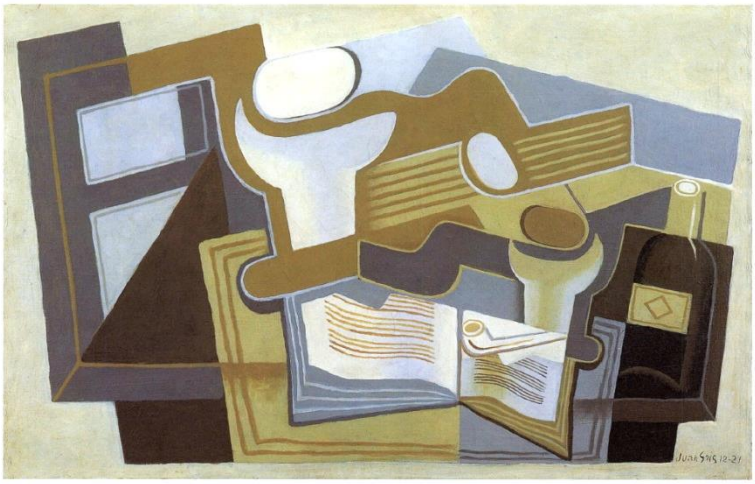

Figure 5: *Juan Gris, "Guitar and Fruit Dish" 1921.*

Guitar and Fruit Dish, 1921										
	Warm Intens.				N	Cold Intens.				
	e	d	c	b	a	b	c	d	e	
1					Wt					1
2			Ye							2
3							Bl			3
4			Ye							4
5							Bl			5
6			Yo							6
7							Bv			7
8			Ro							8
9					Bk					9

Figure 6: *Color-symmetry palette used in Figure 5.*

The limited palette employed in this painting is constituted of nine colors (Figure 6). As we have seen in previous palettes, Gris includes White and Black, which establish both the high and low limits of value, as well as the lowest limit of intensity for the palette. As before, we see a clear warm-cold division of hues, although in this instance there are four warm hues and three cold hues. Each of the nine colors of the palette occupies a unique value position; White and Black occupy *#1* and *#9* values respectively, and the remaining seven intermediate values alternate between warm and cold hues. We can see both

horizontal and vertical symmetry here. The horizontal axis (Figure 6, dashed line), located across value-row *#5*, divides the palette into a reflective symmetry of lighter and darker values (with the single middle value situated on the axis) and a reflective symmetry of warm and cold hues (with a single cold hue situated on the axis). The vertical axis (Figure 6, dashed line) located on the neutral column does not, of course, mark a simple reflection symmetry, because the there are four warm and three cold hues, all in staggered value positions, but we can see this as a reflective symmetry with vertical translation—a glide-reflection symmetry of values and hues. However, perhaps the most intriguing interpretation here is that the color-symmetry palette mimics the compositional symmetry of reflection-with-dilation in "quantitative" terms. The unequal numbers of warm and cold colors across the vertical axis are, in some sense, equivalent to the scale differences of the right and left sides of the compositional symmetry. Gris appears to have found a "resonance" between the structures of composition and color in *Guitar and Fruit Dish*.

The distribution of these colors across the canvas reinforces the compositional symmetry and contributes to the perceptual recognition of the symmetrical shape relationships. The symmetrical shapes are, in most locations, alternately filled with warm and cold colors, and in many of those instances the warm and cold colors are adjacent in the value scale. For example, the left side of the tablecloth is Yellow *#4* and the right side is Blue *#5*—an adjacent relationship of values and a contrast of warm and cold. The same is true of the three colors used on the larger fruit dish at left and the three colors on the smaller goblet at right: Yellow *#2* on the fruit dish (acting as light falling upon the surface) corresponds to Blue *#3* on the goblet; Blue *#3* on the fruit dish corresponds to Yellow *#4* on the goblet; Yellow-orange *#6* (the dark left edge) on the fruit dish corresponds to Blue-violet *#7* on the goblet. The warm-cold and lighter-darker pairings assist in the recognition of shape pairings and compositional symmetry. This perceptual "symbiosis" between shape and color can also be experienced in the opposite direction: compositional symmetry enhances the recognition of the symmetry of colors.

Figure 7: *Juan Gris, "Pierrot" 1921.*

Book of Music, 1922										
	Warm Intens.				N	Cold Intens.				
	e	d	c	b	a	b	c	d	e	
1					Wt					1
2		Y								2
3										3
4					Gy					4
5		Yo								5
6										6
7					Gy					7
8		Or								8
9										9
10					Bk					10

Figure 8: *Color-symmetry palette used in Figure 7.*

Gris' *Pierrot* of 1922 (Figure 7) also employs a "staggered," glide-reflection palette, but with seven colors instead of nine (Figure 8). (To accommodate the equal spacing of values, we have divided the value scale by ten steps instead of nine.) Four neutral colors are evenly distributed vertically from White to Black; three warm colors correspond in value to the upper three neutrals, but are displaced (translated)

one value-step darker. There is an important new development in this palette in that there are no cold hues However, the neutrals effectively take on that role in the absence of the cold colors themselves. This is in part due to the subtle effects of simultaneous color contrast, whereby colors shift their appearance in response to the context of their surrounding colors; in this case the neutrals become "colder" in appearance because they are surrounded by the warmer Yellow, Orange, and Red-orange, and because there are no colder colors with which to compare the neutrals. In the chart, this means that the vertical axis of the glide-reflection (Figure 7, dashed line) is located to the left of the central neutral column, on the line between intensity-steps *a* and *b*. Once again, we can find parallels to the compositional reflection-with-dilation symmetry in that the axis of reflection in these paintings is always located left or right of the center of the canvas—a perceptual shift-of-axis in both shape and color.

Conclusion

One of the most illuminating statements made by Gris about his process can be found in a 1924 essay:

> I try to make concrete that which is abstract. I proceed from the general to the particular, by which I mean that I start with an abstraction in order to arrive at a true fact. Mine is an art of synthesis, of deduction….I want to arrive at a new specification; starting from a general type I want to make something particular and individual. I consider that the architectural element in painting is mathematics, the abstract side; I want to humanize it….Cezanne tends towards architecture, I tend away from it….This painting is to the other what poetry is to prose [4].

Juan Gris' composition symmetries and color symmetries spring from the same creative method, which proceeds from the whole towards the parts. In composition, that whole is the larger geometric and symmetric pattern, which is transformed into still-lifes and figures; in color, the whole is the larger matrix of potential hues, values, and intensities, within which he selects and relates a particular ensemble of colors.

It is somewhat mysterious why Gris abandoned color-symmetry palettes in his final years, since Gris' last paintings are among his most daring symmetrical compositions. A possible explanation is that in the last phase of his painting, Gris began to move away from the "open" forms of synthetic cubism, where (as we have seen in the paintings above) figurative subjects are made from multiple, overlapping abstract shapes. From 1924 to the end of his life, Gris composed with more "closed" forms, where the figurative subjects are self-contained, complete, and outlined. It may be that Gris simply needed more time to reconcile this shift from open to closed forms with his color symmetries, which could not be achieved before his death in 1927. Conjectures aside, Juan Gris' limited-color palettes and color-symmetry palettes are unique achievements in modern art, giving us ample and specific evidence for the historians' and critics' general intuitions that Gris was the great colorist among the cubists.

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