Color Music: Visual Color Notation for Musical Expression

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Color Music is a notation system composed of painted colors and shapes to provoke musical responses: it is a complex representation of my musical composition ideas in a visually fixed form. The system is based on the idea that color sensations can trigger correlations to musical sound in a performer who is sensitive to visual experience. By combining visual and aural stimuli, the system and its use can result in an extremely powerful form of expression.

The use of color as an element in musical notation came to me while in Mexico, where I was painting and composing. Before this working vacation, I had already begun to question the relationship of color and sound by using colored pencils to designate the notes of standard notation in my string quartet of that period. These colored-in notes imbued the music with intense mood qualities. For example, in an ascending musical line ending on the “C” note above the treble staff, I found that if this note were colored in, it would add to the punch of the ascending line. This addition is more than an accent—it is an indication of the mood sensation that is inherent in the color and perceived by the performer and audience. In the words of the Russian painter Wassily Kandinsky (1866–1944), “the same inner sound can be rendered at the same moment by different arts...” Each art will display that extra element which is essential and particular to itself, thereby adding to that inner sound which they have in common a richness and power that cannot be attained by one art alone” [1]. At this time, my perceptions of color were sharpened by the intense tropical sunlight of Mexico; my painting became more color-saturated, and I realized a heightened sense of reality through color.

One hot, quiet afternoon in my room in Tecolutla, I began to paint directly with paintbrush and watercolors on musical manuscript paper, using colors I had in mind for the music notes. I dispensed with the standard notation system and applied free use of color in certain areas of the staves to express the musical sound I was hearing in my mind. This was a freeing experience. With this new approach, I could notate my musical ideas as quickly as they appeared in my mind’s ear. By painting directly on the musical staves, I became unified with my compositional ideas and could paint whole ideas of sound-images in an instant (see Fig. 1). As I am also a visual artist, this process seemed true to my sensitivities and techniques. The years I had previously spent painting gave me the visual vocabulary in color to make the correlation to an equivalent in sound. Since I already possessed a strong classical music background, with experience composing for, performing in and conducting orchestras and ensembles in New York City, this epiphany led me to paint with colors on all my musical manuscripts, opening up a new and profound way to express my ideas in musical sound composition.

Color Music notation expresses extra-musical characteristics that are part of its whole process and perception. The “extra elements” in a combined work of art that Kandinsky referred to are the extra-musical traits I also refer to in Color Music. Color notation evokes sensations beyond the scope of one art form and takes us past the limits of a strictly musical or visual experience.

In performances of my works, I insist on the projection of these scores or other ways of conveying their visual aspect to the audience and to the performers. These visual scores are intended to be used as optical patterns to be equated with musical sound notation and to trigger production of sound by the performers. If one studies and immerses oneself in this...
color notation, one will find it reveals a most precise, valid language for expressing my musical ideas.

**MUSICAL MEANING OF COLOR**

In the physical world, we are bombarded by different colored light waves. As we perceive these with our eyes, they stimulate mental processes and arouse particular emotions associated with them. These waves range from long, red frequency waves through short, blue ones. Virtually all the colors we see are mixtures that take on the appearance of the brightest color in the mixture. Colors that are mixed or shaped into complex patterns tend to convey greater, more complex meanings. When referring to dark or bright colors, we describe their value or the quantity of light they reflect. Dark colors reflect less light than bright ones. Colors not only have the characteristic of hue, but also of value. With a simplified approach we can draw some conclusions. Kandinsky states that “the sound of colours is so definite that it would be hard to find anyone who would try to express bright yellow in the bass notes, or dark lake in the treble” [2]. Color experiments have shown that color affects us physically. Max Luscher in his book *The Luscher Color Test*, observes from experiments that when individuals are required to contemplate pure red for varying lengths of time, [the experiments] have shown that this color decidedly has a stimulating effect on the nervous system, blood pressure increases, respiration rate and heartbeat speed up... [Pure blue on the other hand, has the reverse effect, blood pressure falls, heart beat and breathing both slow down [3].

The conclusion follows that red is an exciting color, and dark blue is calming. Victoria Ball states in *The Aesthetics of Color* that “dark colours appear heavier than light ones. Hue will support the impression of weight. For example, red or black objects are judged heavier than yellow or blue.” Ball also cites tests associating color with sound, reported by the psychologist D.M. Howells, in which the results led to the conclusion that “where colors and sounds obtained the same feeling, the subjects associated them in an unforgettable manner” [4].

If we apply this test data to a general framework for the performance of Color Music, we find that musicians interpret color scores similarly each time. These studies indicate that intense, light lemon-yellow is associated with high pitch, piercing sound and loud dynamics. Light colors ascend, initiating high-pitch production from the musician. Yellow is a highly reflective color, and the more a color reflects, the more it advances. This imparts its piercing sound quality. The expansive feeling of yellow also gives the sound the quality of loud dynamics [5]. Cadmium red would be played in the mid-range of an instrument, with intense sound and steady rhythmic pulsations. R.M. Hanes, in his article “The Long and Short of Color Distance,” places red between yellow and blue in an ascending order on the Hanes chart, devised from tests done at Johns Hopkins University [6]. Intensity of sound relates to the stimulating quality of red and its effect of raising our blood pressure. Red’s steady pulsation of rhythm reflects our heightened heartbeat when we perceive it. Dark blue, a serene color, evokes the feeling of low, sustained tones and slow rhythms. If dark colors appear heavier, then dark blue recedes in space and descends by weight and, hence, will be low in pitch. Color meaning associated to sound meaning can be altered by different shades of the same color. For example, light blue evokes more flowing rhythms, higher pitch and faster tempos than dark blue. The subtle gradations of color relationships in a musical score thus regulate the nuances of musical interpretation.

Psychological effects of color are directly related to optical principles. In the dark, a red light will seem nearer to us than it really is, and a blue light will seem farther away. The eye adjusts its focus in a different way for the long, red waves of light than for the short, blue waves. Blue waves make the eye react quickly, and the eye compensates by relaxing, giving the impression of blue receding in space. Musically, blue would indicate calmer tempos and flowing musical lines. Red, on the other hand, with its long waves of light, rivets the eye. In this holding pattern, it establishes an intense building of steady pulsations of rhythm.

This is an initial approach to a color score, within this framework of color sensations. The performers’ creative forces and abilities both to immerse themselves in color notation and to interpret the composer’s vision are necessary ingredients to realize these Color Music pieces.

Within this context of colors and their musical equivalents, it is impossible to establish a one-color/one-note chart for the performers. Color is relative. As the painter Josef Albers (1888–1976) stated, “Colors present themselves in continuous flux, constantly related to changing neighbors and changing conditions” [7]. As I compose, color relations are in flux, but once I complete the composing process, the scores are painted in a fixed form. In this process I paint—on manuscript paper, on three-dimensional (3D) cut-out shapes or on other surfaces—with my inspiration being the flow of music as I hear it in my mind as well as the visual impact. The colors and shapes symbolize harmony, counterpoint, musical line, tempos and so forth.
just as in standard notation. Furthermore, the combination of the physical reality of the colors with the sound brings a total sensory experience to the performers and audience. This is a very important part of the expression of Color Music. The visual and aural production creates an enhanced, interrelated, intensified work of art.

**HISTORY OF VISUAL COLOR NOTATION**

Aristotle (384–322 B.C.) noted the connection between color and sound in his *De Sensu*. In it, he states, “we may regard all colours as analogous to the sounds that enter into music” [8]. Color was part of the beginning of our notational system and was used as a guide to represent music. In early notation, for instance, about 900 A.D., a thin red line was ruled above the text and called “F.” Every neuma above this red line was a higher pitch and each one below the line was a lower pitch. Years later, a yellow line was ruled a little higher and called “C.” Color played an important part in this process; red, black and white notes, among others, indicated a change in range of pitch above or below these lines of color was general and relative.

Throughout history, composers have been fascinated by the use of color to notate sound. The music historian H.H. Stuckenschmit writes, “Eye music, or the use of compositional techniques which the ear cannot (or cannot immediately) register, is nothing new. From the canons of Netherland Renaissance polyphony to the time of J.S. Bach, the composer’s eye was always an adjunct to his ear” [10]. Wolfgang A. Mozart (1756–1791), in his Horn Concerto No. 4, wrote musical notes on the original manuscript with red, green, blue and black inks [11]. In the second movement, the horn line is notated in red, then green (the complement of red), then black and finally blue, with the orchestral parts all in red above the blue horn line.

The idea of the color organ goes back to 1734, when Louis-Bernard Castel first attempted to build one [12]. The instrument was played by pressing a keyboard, which threw onto a screen any desired combination of colored lights. The composer Alexander Scriabin (1872–1915), in his tone poem *Prometheus* (1910), used a color organ to project colored lights during the performance of his music. He included the notation for these lights as part of the score, written on the top stave marked “lumina” [13]. Arnold Schoenberg (1874–1951), who was both a painter and a composer, was also aware of the associations between color and sound. In his *Die glückliche Hand* (1910–1913), he included specific indications of colors to be projected onto an on-stage screen and made very detailed color sketches for this production [14]. Schoenberg and Kandinsky knew each other and had a lively correspondence concerning their art and the relationship between various art forms [15]. Kandinsky composed a stage production called *Der gelbe Klang* (The Yellow Sound), incorporating music, movement and light [16].

The contemporary Polish composer Krzysztof Penderecki (b. 1933) wrote with colored markers on his sketches for works including the opera *Die Schwarze Maske* (1984–1986), *Utrenja* (1969–1971), for chorus and orchestra, and *Kosmogonia* (1970), for soloists, chorus and orchestra [17]. Paul Schiavo writes that the French composer Olivier Messiaen (1908–1992) described his *Piace for Piano and String Quartet* (1991) as “a perceived correspondence between sound and color, which the composer experienced as something close to synesthesia (he claimed to see colors when hearing music and, conversely, felt that certain colors suggested harmonies to him)” [18]. Messiaen included names of colors in his score *Couleurs de la cite Celeste* (1963), such as “rouge,” “orange,” “topaze,” “emeraude” and so forth. Messiaen stated, “I try to translate colours into music; for me certain complexes of sound and certain sonorities are linked to complexes of colour, and I use them in full knowledge of this” [19].

György Ligeti, another contemporary composer (b. 1923), says, “I am inclined to synesthetic perception. I associate sounds with colours and shapes” [20]. His electronic piece *Artikulation* (1958) has an accompanying colored score devised in 1970 by the painter Reiner Wehinger.

The composer John Cage (1912–1992) used color in his score for *Aria* (1958): pitch was notated by the vertical position of colored lines and the layout of the lines defined 10 styles of singing [21]. The artist Alexander Calder (1898–1976) has been referred to as a composer as well as a visual artist. As an artist, he experimented with different art forms and produced more than 12 interdisciplinary works, which included choreography and stage-sets. In his stage production *Socrate* (1957), with music by Eric Satie, he used shapes and colors as performers and dramatic elements, bringing together the elements of time, space and sound. Calder’s influence has been acknowledged by the composer Earle Brown (b. 1926), who says, “In the mobiles of Calder I found the organizational precision which I wanted, but more important, I discovered the possibility of a work of art never being the same twice yet always being the same.”

**Fig. 3. Page 8 of the score of Color Music: Toccata and Fugue, watercolor and ink on music paper, 10 × 17 in, 1995. Second movement. The Fugue subject, a red triangular shape, is altered in purple, oranges and yellows, designating mood changes and various voices. (Photo: © Michael Poast)**
Brown also speaks of the influence of “new, intensified spontaneity” as coming from the painter Jackson Pollock (1912–1956) [22]. Brown used Calder’s mobiles in performance; as the bright, multicolored mobiles turned in the wind, the element of time created a link to the improvised sounds produced by the musicians.

In the 1960s and 1970s such influences as electronic music, “happenings,” concrete poetry and the work of the Fluxus group created a rich and fertile environment for the composition and performance of many types of visual scores. Besides those mentioned, such composers as Karlheinz Stockhausen, Morton Feldman, George Crumb, Cornelius Cardew, Dick Higgins, Allan Kaprow and many others added to the avant-garde landscape that led to our current installation and multimedia art forms. Color Music is a logical outgrowth from this historical timeline that emphasizes the inter-relatedness of art forms. The rich possibilities in considering notations with new properties, such as Color Music, opens up new territories of exploration for expressive power.

**COLOR MUSIC INTERPRETATION**

Through the use of color stimuli, I note my scores to describe sound and inspire the musician. As director of the InterMedia Ensemble, I present specific sound ideas for the colors and shapes in the score and listen to the participants’ reactions to them. We then discuss the qualities of the different hues and their relationships to one another and their placement on the page, drawing conclusions about the specific colors and the sounds associated with them. We come to a consensus and, within this experimental and imaginative atmosphere, the color score unfolds into time and sound. Some performers have a natural affinity for Color Music. Beth Bailis, for example, a seasoned Color Music performer and painter, states, 

When I see a lemon yellow in the score, there is no doubt in my mind what to play, it is a high pitch[ed], piercing, shrill sound. Clues to playing the color score are embedded in the application of paint and density of the colors, providing more than enough information to guide my interpretation [23].

This is similar to the process involved in rehearsing and performing a theatrical production. Actors learn their parts and find their characters through study and calculation, so that the characters can be reconstructed in performance. In Color Music, sensitivity to the visual, tactile and aural elements of these scores is necessary. Although the musical expression is contained in a fixed form within the piece, each musician must find their own elucidation through the color notation.

When other groups such as the New York New Music Ensemble have performed my works, they have rehearsed at first without my presence and have developed clear ideas about playing the color scores. Jayn Rosenfeld, flutist for the ensemble, explains, “the scores of this color/shape intensity music were very specific—we didn’t make anything up, it seemed to all be there” [24]. When I attended later rehearsals, it was revealed that their interpretations closely coincided with my ideas for the

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**Fig. 4.** Costume/score of Color Music Opera, Part 1, acrylic paint on construction paper and cardboard, 5 × 4 1⁄2 × 3 1⁄2 ft, 1992. (Dancer: Taysha Oglesby) This example of 3D Color Music is a costume for a dancer that also functions as the music score. As the dancer bases the choreography on the costume score and turns in space, the musicians follow the tempo of the dance and play each side of the score, creating an interrelated performance. (Photo: © Manny Patino)

**Fig. 5.** Color Music Opera, Part 1, costume/score, 1992. This section was produced in video format for cable television, with a running time of 30 minutes. (Photo: © Manny Patino)
piece. The clarinetist, Jean Kopperud, recalled about rehearsing my music, “a lot was there (in the colors and shapes on the score), I could play it without the composer being present,” and further, “There was a consensus about the colors and shapes among the group . . . blue, red, black, yellow and dark green are universal colors” [25].

The following program notes describe the premiere of my Color Music: Toccata and Fugue (1995) by the New York New Music Ensemble. This was performed in November 1995 at the Sonic Boom Festival, Columbia University, New York (see Fig. 2).

Color Music: Toccata and Fugue (1995): Toccata is a free style, as seen in the bright, sharp red, implying intense activity, at the beginning of page one, played by all four performers. The bluegreens in the piano add a supportive and subdued mid-range sound. The high pitched musical lines in the clarinet and flute are reflected in the oranges, yellows and red in forceful rhythms. High and low pitches are stacked on top of each other in vertical lines bending in momentum with the piano’s low greens, leading into a calm blue horizontal shape and relaxed tempo.

The subject of the Fugue (Movement Two) is a red triangle with a curved gestural brushmark. It implies an intense, tapering sound in low to mid-range tones. Counterpoint is added by an up and down orange stroke that propels the tempo. After an episode and development comprised of colors being tossed in various voices, building to a wash of combined colors, the main subject reappears in the piano.

The final statements are altered in purples, oranges and yellows [see Fig. 3], designating mood changes of the subject. The final exposition leads to a huge tonic red triangular form intensifying and crescendoing to a brilliant climax [26].

FORM, SPACE, TEXTURE, TEMPO
I translate standard Western musical forms, such as fugue, sonata-allegro, theme and variation and so forth into Color Music scores and use them as structural devices. I use these forms in liberal fashion, sometimes truncating or augmenting them or following the visual field instead of using strict forms. Development of visual and aural motifs evolves in color and shape relationships, such as those of similar or contrasting colors, establishing a conflict, and therefore a drama, in the building of sound. Shapes, such as vertical lines in succession, each bending or changing from thick to thin, represent stacked chords on the page. These thick bands of color connote heavier chords of sound and longer durations.

Music is sculpted space in time. It shares some of the same properties as sculpture, such as mass, density, opacity, shifting forms, lines, textures and colors. The American sculptor George Sugarman (1912–1999) is recognized for his brightly painted sculptures with cascading shapes, extending in space and having the quality of unfolding, much as in music. He admitted the influence of musical structures on his works, in the pacing and in how they seem to change in time. The addition of color to the works changes the weight and presence of the object and evokes sound qualities. He explained, “Red might evoke clash—cymbals. Yellow is joyous—strong.” When asked about tempo, he admitted, “Blue has movement in it, red would stop you, yellow might stop you, black is the slowest and strongest, but a lot depends on the form” [27]. The music of Edgar Varese (1885–1965), in addition, has been described as “music in space” [28].

Because I actively make sculpture, 3D Color Music has been an instinctive development for me. I lifted the painted shapes off the manuscript, so to speak, and re-created them in three dimensions, thereby constructing a sculptural color music score. I have created 3D Color Music pieces in many forms, including 3D moveable shapes, costume/scores, stage-set scores, sculptural scores and installation scores. In my sculptural scores, the space in which the shapes are arranged during the performance is relative to their placement on music paper. The sections in the score for 3D Color Music are divided into high and low sections for various instruments, so the performers know where their parts are located. The musicians perform all sides of the sculpted score, as it is either turned in space by dancers (who “wear” the score) or viewed from different angles (see Figs 4 and 5). Musical lines correspond to the contours of the shapes. The upper edges of the sculpture are treble lines and the lower edges are bass lines. Two musicians may work together to realize a large shape.

Color affects space. In Rudolf Arnheim’s Art and Visual Perception, Arnheim quotes a neurologist, Dr. Kurt Goldstein: “the colors corresponding to long wave lengths [in the color spectrum], go with an expansive reaction, whereas the short wave lengths make for constriction” [29]. Therefore blue, with short wavelengths, constricts space while yellow expands space. The abstract-ex-

Fig. 6. Color Music: American Symphony for Orchestra, acrylic on music paper, 12 x 20 in, 1994. This shows tutti passages of the score, where instruments play vertical chords, to be attacked and released together, in accordance with the shapes on the paper. (Photo: © Michael Poast)
Pressionist painter Richard Posette-Dart said, “Space is the spirit of time” [30]. In Albert Einstein’s special theory of relativity, he states that natural laws “assume mathematical forms, in which the time coordinate plays exactly the same role as the three space coordinates. . . . The world in which we live is a four-dimensional space-time continuum” [31]. In other words, Einstein asserts that we live in a four-dimensional world with space making up three dimensions and time as the fourth dimension. If time and space converge in this view of the real world, then I assert that color and sound would converge as well, because color affects space and sound unfolds in time. At this juncture, we might claim that color is sound. In 3D Color Music, bringing time and space together into the same artwork liberates us to simultaneously absorb related visual and aural sensations, and leads us to an elevated experience of transported sensibilities.

Texture on the painted surface consists of brushwork, layering of colors or the quality of different paint media. In the context of Color Music, these physical, tactile intermixtures of paint, such as rough brushstrokes, would inform the performer to play a rough sound. Smooth, fluid texture would equal smooth production of tone. Agitated application of media would tell the musician to play staccato or more accented articulation. Heavier texture would indicate marcato.

Tempo is inherent in colors themselves, due to the advancing and receding qualities in hue, lightness and saturation [32]. A deep, heavy blue would be slower in tempo than a light blue. As cited earlier, Hanes found that heavier values of color recede in space, and Goldstein stated that short wavelengths of color have a constricting nature. Continuing from these findings, I posit that deep blue would constrict or slow the tempo, lighter values would expand or speed up tempo. Hue also affects tempo. For example, red, with its longer waves and expansive quality, would be faster in tempo than blue. Yellow would have an even greater expansive quality, speeding the tempo further.

Multiple tempi exist. For example, within a green shape, extending over many staves, different performers may vary in their tempo realizations. Shape plays a crucial role in keeping the musicians together. The musicians must observe strict adherence to the shapes, their size and their relationship to one another on the page. Certain areas in the score can be chosen as markers so all can keep pace together.

Green has a melodic feeling and spatial physicality. When playing green, one performer may feel a pull into its depth, instead of just keeping pace from left to right across the page. The first performer would then slow down the tempo. The second performer, relating more to the flow of the melodic material across the page, would realize a faster tempo, causing the dual tempi within the green. This can be compensated for, while allowing both interpretations to co-exist. Using shapes as markers serves as a “meeting place” for the two performers to come together before moving on to the next shape, next color, etc. Great sensitivity to each other’s interpretation is necessary.

There are examples in the scores where shape and color should be executed absolutely in unison. In tutti passages where all the instruments are playing a vertical chord, indicated by a band of color in vertical position, this band of color is to be played, attacked and released simultaneously by all the musicians (see Fig. 6). The performer should be faithful to the idea implied by the shape. The width of the band represents the duration of the chord, color and saturation influence duration and tempo, dark colors are heavier and indicate longer durations, while light colors convey faster rhythmic ideas.

General tempo markings are indicated at the beginnings of movements, but the eb and flow of tempo must also be observed in the colors as they are presented on the score. Soft, veiled colors in light saturation could evoke a slow tempo. Conversely, heavy, dark colors in a flowing brushmark could give a feeling of a fast tempo. It is hard to isolate these examples, since all color is relative to the context in which it exists, and each Color Music score must be studied to reveal its meaning.

**CONCLUSION**

Bringing together various means of expression, such as color, shape and sound, combines energies to form the distinct language for musical notation that I call Color Music. The physical reality of this visual and aural production, which I compose by painting a musical score, creates an enhanced, interrelated and visceral “total work of art” [33].

Joan Truckenbrod, in her article, “Integrated Creativity,” reflects on the writings of Marshall McLuhan, who argued that the invention of the printing press channeled our modern consciousness into separate, linear paths of thinking and feeling. Truckenbrod observes that “the use of interdisciplinary technology can re-establish a humanistic ratio or balance between the senses” [34].

In our current era, we are weaving together complex expressions of our world. Our thinking and perceiving has broadened. In this increasingly visual society and intersensorial culture, it is a timely moment for the redefinition of notational systems. We need Color Music to express and explore a fresh concept of musical notation and to expand the envelope of new music.

**References and Notes**

6. Hanes [5].
13. A. Scriabin, Prometheus, op. 60, tone-poem for orchestra and projected color lights (1910) p. 22a of original score in British Museum Library.
14. These were shown in Notable Notes, an exhibition that included Schoenberg’s original manuscripts, Joseph Helman Gallery, 20 W. 57th Street, New York, NY, U.S.A., December 1997–January 1998.
17. K. Penderecki, sketches in full color for his opera and orchestral pieces with chorus. Cited in text.
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23. Author’s conversation with Beth Ballis, March 1999.
25. Author’s interview with Jean Kopperud, March 1999.
26. Michael Poast, program notes, Color Music: Toccata and Fugue (1995), performed by the New York New Music Ensemble at the Sonic Boom Festival, Miller Theatre, Columbia University, NY, November 1995. The performers were Jayn Rosenfeld, flute and piccolo; Jean Kopperud, clarinet and bass clarinet; Daniel Druckman, percussion; and James Winn, piano.
27. Author’s interview with George Sugarman, May 1994.

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