

# The Use of Color in Three Chamber Works of the Twentieth Century

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Color is an element whose surface characteristics are readily perceived. It is an element to which we are most easily attracted and to which we have an immediate response. In the music of our century, color has become important for its own properties and has come to play a role equal to that of rhythm, harmony, melody, and form. Traditional timbres continue to be used along with acoustically and electronically manipulated sounds.

A musical tone can be visually understood as a wave shape which repeats at least twenty times per second in order to be perceived as a single sound. This frequency may be accompanied by a complex of simple tones, or harmonic overtones. A tone which does not meet these conditions is regarded as noise. All instruments produce unique and distinctive timbres which are greatly influenced by the harmonics present; the dominance of certain harmonics and/or the absence of others is largely responsible for these characteristic timbres. The tone quality of any pitch depends on its relationship to the formant(s) of the sound-producing mechanism. The formant is stationary. No matter what fundamental is being produced, the same partials will tend to dominate. If the pitch does not contain the partials present in the formant, the timbre of that pitch will be less resonant than a pitch containing strong overtones which fall within the formant. Therefore, in one pitch, the fifth and seventh partials may be emphasized, while in another, the tenth to the fourteenth partials may be

stressed. For instance, the trombone has a formant region at 500-800 Hertz. When the fundamental is 100 Hertz, the resonant partials will be the sixth, seventh, and eighth; when the fundamental is 200 Hertz, the prominent partials will be the third and fourth.<sup>1</sup>

Timbre cannot, however, be discussed strictly in terms of components. The same set of harmonics will produce different tone colors, depending on other properties of the instrument. The beginning, the middle, and the end of a tone do not have identical timbres. Besides the distinctions in tone inherent in different vibrating bodies, each partial will reach its maximum volume at a different rate of speed. The maximum volume attainable, which is determined by the maximum amplitude from peak to peak of the wave form, also varies, as does the rate and manner of decay.

In addition, each instrument has certain physical properties which create non-musical as well as musical sounds included in that instrument's characteristic color. The sound of air rushing through the instrument, the scraping of the bow hair on the strings, the clicking of the keys, the bubbling of saliva, the whisper of valve- and slide-action all contribute to the overall aural presentation. They are usually overshadowed by the musical sounds produced, but are always present to some degree and may be subconsciously acknowledged in the listener's assessment of the timbre.

The traditional musician has an impressive stock of devices to be used in altering the basic timbre of his instrument. Dynamics, mutes, registral differences, glissandi, harmonics, and a wide range of articulations are a few common techniques in many instrument families. In addition to the already colorful palette of individual sounds, even more possibilities exist in the use of combinations of instruments from the same families, from similar families, or from contrasting families.

In the evolution of Western music, no tone color has ever been considered standard for long. Broken consorts, like-instrument consorts, trio-sonata ensembles, and the orchestras of Haydn, Berlioz, and Schoenberg all were standard for a particular period or style of music, but no grouping of instruments has remained stable. Trends in ensemble size and make-up and in desirable tone qualities are never constant, as musicians strive to explore the meaning inherent in sound and satisfy their curiosity about the

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<sup>1</sup>John Backus, The Acoustical Foundations of Music, 2nd ed. (New York: W. W. Norton, 1977). Chapter Six contains detailed information about tone quality and formants as well as a good bibliography.

limits of their art.

Color has emerged as a major factor in the music of the twentieth century. New ways of playing existing instruments and the use of new instruments have contributed to the rich spectrum available to contemporary composers. In addition, traditional techniques have been expanded. Contemporary composers are free to explore every means of creating aural color. Instruments can produce extremes of range, volume, and tone quality when played in modo ordinario; all instruments can be used percussively and resonantly to produce extraordinary colors as well.<sup>2</sup>

The works examined here are by Anton Webern, George Crumb, and Igor Stravinsky. The scores were chosen because of qualities which they had in common: all are chamber works, all use clarinet and violin, two use piano, two use voice, and two use alto flute. The analysis will take into account the units of timbre available, techniques employed by each instrument, how the instruments are used in combination, how contrast or homogeneity is achieved, how timbres are ordered (serialized, free, repeated, varied), and the structural importance of color. Timbre in this paper has thus far been discussed in terms of the instruments which produce it. With different performers and different performances, timbre will vary somewhat. The composer's indications of instruments specify a range within which actual performances will exist.

Anton Webern's Quartet, Opus 22, was composed in 1930 for violin, clarinet, tenor saxophone, and piano. The combination alone is a departure from the chamber ensembles of the nineteenth century, when the word "quartet" implied two violins, a viola, and a cello. The grouping used here combines timbres in a manner reminiscent of the Renaissance broken consort or a Medieval "pick-up" group. The potential for contrast is great considering the effects available to the violin, the distinctive and potentially piercing tone quality of the clarinet, the extremes of volume and timbre available to the saxophone, and the mass, volume, and range of traditional piano techniques, in addition to the new ones introduced in Henry Cowell's 1925 piece, The Banshee. However, Webern utilizes a conservative style, writing within the bounds of conventional playing methods, not exploring the extremes of the instruments.

In general, the instruments stay within a moderate range. Large skips are frequent, creating in the winds rapid changes of timbre within a single voice; the same effect is

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<sup>2</sup>David Cope, New Directions in Music, 2nd ed. (Dubuque, Iowa: W. C. Brown, 1976). This book contains a wealth of information on the new instruments and playing techniques.

produced in the violin by alternating arco and pizzicato. The violin also uses a mute for much of the first movement. The saxophone can imitate any other instrument in the ensemble with the right combination of volume and register. While a soft, low tone is a distinctive saxophone timbre, with a slight increase in volume it blends with the low piano. The middle and high registers played softly can mesh very well with a low or medium-low violin register, and the middle to high range played piano or mezzo-piano blends well with the clarinet. The other instruments have similar abilities; in addition to asserting their own distinctive colors, this particular combination of instruments can become very homogeneous. The instruments are not deployed serially; nevertheless, each has approximately equal play.

In the first movement, Webern uses several techniques to achieve a smoothly changing stream of color; sharp contrasts are rare, and gentle blending is the norm. The soft dynamic levels, which activate relatively fewer harmonics than the louder ones, predominate, allowing for the blending of tone qualities and the blurring of boundaries. Timbre modulation is another method of integrating the colors; it involves establishing one timbre, blending it with another one, then removing the first so that the second one emerges alone. In Webern's style, timbre modulations, like every other aspect of his writing, are very concentrated. They are usually executed within three or four notes; one instrument sounds the first note, a second joins in on the second or third, and the second instrument emerges alone on the last in m. 4 (Example 1). For further examples, see mm. 2, 9, 13, 16, 17, 25, 38, and 40.

Webern uses a similar technique for linking timbres. Timbre linking is so closely related to melody that the two may be inseparable. One voice begins a line and the next continues it. The point of exchange pivots on timbre: the first ends with a range and a dynamic level which match those of the second. This has the effect of timbre modulation with simultaneous tone, as shown in Example 2. See also mm. 27-28, 30, and 33-34.

Hocket, in Webern's usage, is a way of mixing colors without combining them. He keeps the timbres separated vertically, but intertwines them so thoroughly horizontally that the ear cannot keep up with the changes, thus creating a kind of non-simultaneous color. Mm. 7, 11, 27, 29, and 35 demonstrate this procedure. (See Example 3.) The blending achieved by these methods produces the Klangfarbenmelodie for which Webern is known. The color melody moves at a smoother, slower pace than the pitch melody, which moves in fast, disjunct notes. The effect is a compound melody. An analogy can be made to a pair of gears, one large and slow, the other small and quick, but both operating simultaneously and interdependently.

Example 1. Webern, Quartet, Mvt. I, m. 4.

Musical score for Example 1, showing three staves: Vln., Cl. in C, and Ten. Sax. in C. The Vln. staff has a treble clef and a single note with a flat sign (B $\flat$ ) and a slur above it. The Cl. in C staff has a treble clef and a single note with a sharp sign (F $\sharp$ ) and a slur above it. The Ten. Sax. in C staff has a bass clef and a single note with a flat sign (B $\flat$ ) and a slur above it.

Example 2. Webern, Quartet, Mvt. I, mm. 27-28.

Musical score for Example 2, showing two staves: Cl. in C and Ten. Sax. in C. The Cl. in C staff has a treble clef and a single note with a sharp sign (F $\sharp$ ) and a slur above it. The Ten. Sax. in C staff has a bass clef and a single note with a flat sign (B $\flat$ ) and a slur above it.

Example 3. Webern, Quartet, Mvt. I, m.7.

The image shows two staves of musical notation. The top staff is labeled 'Vln.' and the bottom staff is labeled 'Cl. in C'. Both staves have a treble clef. The Vln. staff has a 'pizz' marking above the first note. The Cl. in C staff has a 'pizz' marking below the first note. Both staves show two notes: a quarter note followed by a half note. The Vln. notes are G4 and B4. The Cl. in C notes are G4 and B4.

Distinction among timbres is employed subtly in the first movement and is achieved in a number of ways. Complete spatial separation is rare, but it does occur in the introduction with the piano in m. 3 and the clarinet in m. 4. Other clear spatial divisions are at m. 35 and 36 (a and b). Throughout the piece, the piano tends to be isolated from the other instruments because of its proportionally greater number of notes, and because it interacts motivically, right hand with left hand, and not as a single unit, with the other voices. Similarly, the saxophone has a dominant role in mm. 6-15. The mere fact that it is heard almost continuously sets it apart and keeps its timbre distinct. Spatial separation is combined with timbre modulation or linking in some places. At mm. 16-17, the violin is set distinctly apart before it combines with the clarinet. (See Example 4.) The louder dynamic levels used in places also distinguish timbres by making overtones more active (mm. 17, 19, 20-23). Webern also combines instruments to achieve new colors. In mm. 20-23, the new color is a sum of the parts: the louder dynamic prevents the kind of blending which occurs at mm. 24 and 37b. Both of these small moments contrast significantly with the established colors because of the totally new timbre which emerges. Structurally, these are significant; one follows the climax and the other precedes the coda.

At any given moment within this movement, contradictions in color manipulation may be in effect. For instance, on a fairly broad level, the focus at mm. 6-15 is on the saxophone. On a more detailed level, the motivic idea is heard as an echo in the other three voices. On a still

Example 4. Webern, Quartet, Mvt. I, m. 16.

finer plane, the hocket between the clarinet and the violin is operating, as well as timbre modulation between the violin and clarinet and timbre linking between the violin and piano. These disparate effects keep the listener from focusing on any one color and, therefore, prevent any color from being too important.

The formal shape of the movement is largely defined by color:

Introduction (mm. 1-5) - All instruments are heard individually; little overlap.

A (mm. 6-15) - Saxophone dominates; blending is by timbre modulation, linking, and hocket among violin, clarinet, and piano, sometimes saxophone.

B (mm. 15-36b) - Texture is more equally distributed. Form within B is ternary (aba).

a (mm. 16-20) - Separation, links, modulation.

b (mm. 20-23) - Composite sound.

a (mm. 24-37)

Coda (m. 37 to end) - Each instrument is heard separately and in combination with the others.

Movement II, on the whole, contrasts with Movement I, even though Webern uses basically the same kinds of techniques:

Spatial separation (mm. 1, 2, 7, 28-32, 98, 112, 183, 185, etc.)

Timbre modulation (mm. 24-5, 27, 35-6, 115-116, 118, etc.)

Hocket (mm. 21-22, 60-61, 75-78, 114, 125-6, 189-90, etc.)

Linking (mm. 6-7, 39, 62, 112-113, 162, 164, etc.)

Combinations (mm. 91, 96, 99, 102-3, 108, 110, etc.)

The instrumental timbres alternate about equally, apparently without serialization. Overlapping and combining colors without special preparation to facilitate blending are common.

Tempo is the primary cause of the contrasting characters of these movements. Although the movements take about the same amount of time to perform, the second requires three times the space to notate. Obviously, the changes in color are going to be much more concentrated, occur much more rapidly. The sounds at times are kaleidoscopic, each moving into place precisely but quickly, as a part of the overall pattern. At another moment, they may blur as if they were hues on a spinning color wheel. Thus, even though many of the techniques which created that smooth shifting of timbres in the first movement are used here, they are presented so quickly that the ear cannot take in each detail.

The tempo is a limiting factor on some other elements. The articulation is more pronounced, thus emphasizing timbre. If all other things were equal, players could prepare smoother attacks at a slower tempo. Dynamics change so fast that they are very difficult to execute.

In addition to the fast tempo, the large leaps emphasize articulations and timbral differences and create a faster linear movement of color. The dynamics indicated are generally louder than in the first movement: f or ff as opposed to p or pp. The piano plays a greater role in this movement; it is almost always present, and again, the composer seems to have conceived of the right hand and left hand as separate voices. No voice ever dominates the texture as the saxophone did in Movement I.

In this work, Webern has used well-established instruments and conventional playing techniques to create a new kind of music, his Klangfarbenmelodie. Using a few simple approaches for combining and alternating instruments, he has, by altering chiefly tempo and dynamics, succeeded in creating, within his own highly defined style, various degrees of contrast and similarity. Not only the techniques, but also the instrumentation used by Webern evidence the new



interest in color. The mere presence of a tenor saxophone in a chamber ensemble signals expansion in the use of that instrument, as well as in the attitudes of composers regarding appropriate combinations of timbre for "serious" music. In general, this work reflects an interest in experimentation with instrumental timbres and foreshadows the freedom exhibited by later composers in exploring and exploiting a wide variety of sounds for their sensuous value.

Igor Stravinsky scored his serial work Abraham and Isaac (1962-63) for baritone and chamber orchestra.<sup>3</sup> Compared with the performing forces of Webern's Quartet, this is a very large ensemble; however, Stravinsky's treatment of timbre and texture reveal Webern's influence on Stravinsky's late style. Stravinsky uses the concept of color which Webern espoused to interpret the Biblical text.

The orchestra and the baritone have very separate functions. The baritone is a narrator; the voice color remains essentially the same throughout the piece. The orchestra is changeable and non-narrative. Except for use of soli strings, which dramatically appear to emphasize the force of God, the instruments interpret the text by manipulation of timbre for emotional impact, not by aural or intellectual association of certain sounds with particular characters or situations. Unlike the Webern Quartet, this piece features a dominant color, the baritone, which is present in most of the piece. The instrumental writing, though, is very much in the manner of Webern, producing a Klangfarbenmelodie, Stravinsky-style. Stravinsky calls for traditional playing techniques; the only unusual color in his vocabulary is the sul ponticello in the strings.<sup>4</sup> (See mm. 16-17 and 69-72.) Rather than manipulating each available timbre for variety, Stravinsky uses each one in a conservative way and achieves variety by changing and adding or subtracting instruments. He uses combinations within families for subtle degrees of color change. For instance, in mm. 19-24 (see Example 5) the double reeds collaborate on a linear passage, creating a pattern of colors as well as one of pitches. (For other examples, see mm. 24-26, 41-45, 47-49 and 91-95.) This is similar to the timbre linking employed by Webern in the Quartet. In Abraham and Isaac, however, Stravinsky uses the technique both for blending and for contrast. Links produce

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<sup>3</sup>The orchestra consists of two flutes, alto flute, oboe, English horn, clarinet, bass clarinet, two bassoons, horn, two trumpets, tenor and bass trombone, tuba, and strings.

<sup>4</sup>Claudio Spies, "Notes on Stravinsky's Abraham and Isaac." Perspectives of New Music, Vol. 3, n. 2, Spr.-, Sum., 1965, pp. 104-26. According to Spies, this is Stravinsky's first such usage.

Example 5. Stravinsky, Abraham and Isaac, mm. 19-24.

Ob. *mf* 4 for 3

Eng. Horn in C *marc.* 5/16 3/8 3/16 2/8 3/16 2/8

Bsn. *marc.* (4)

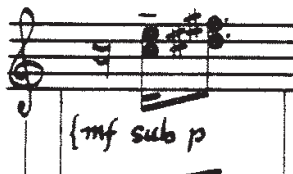
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gradations depending on whether they are between like instruments (strings, woodwinds, brass), within one family (double reeds, clarinets), or between contrasting instruments (strings-brass, high-low). The same kind of idea is used with groups of instruments. As the texture becomes thicker, the attention is drawn to vertical aspects more than horizontal ones, and so the link may function as a juxtaposition; nevertheless, the same characteristics of contrast or similarity which affect links of solo lines apply to adjacent masses of sound. See mm. 182-183 (Example 6) and 195-196. Timbre modulation is used in the manner of Webern: a brief preparation, a common tone, and the new color emerges. (See mm. 12, 23, and 25.) Hocket, a favorite device of Webern, is a frequent occurrence. Alternations between two colors are frequent; see mm. 41-43 (Example 7) and 56-68. Of course, this is the kind of linking which simply returns to the original sound. Some passages have rhythmic closure between each change, and sometimes a rhythmic pattern encompasses several changes. All of these techniques involve juxtaposition of single or composite colors.


As in the Quartet, the colors help to define the structure of the work, which can be divided into ten parts.

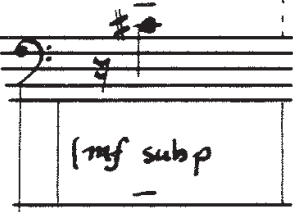
I (mm. 1-50) - The first section of the piece presents the situation. The color is rapidly shifting among many instruments; links and timbre


Example 6. Stravinsky, Abraham and Isaac, mm. 182-183.


Fl. gr. I. II. 


Fl. alto  
(in C) 


Cl. (in C) 


Trbn. ten. 


Trbn. bas. 

Vln. I 

Vln. II 

Vla. 

Vc. 

Cb. 

2/8

Example 7. Stravinsky, Abraham and Isaac, mm. 41-43.

Cor (in C)

Trbn. ten.

Trbn. bas.

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modulations occur. Timbral differences are emphasized by the use of sf, marcato, and the mf dynamic. All take place within one line, so that each change is readily apparent. The emotion of Abraham, who has been asked by God to sacrifice his only son, is clearly conveyed in the nervousness, vacillation, and surprise of the musical colors. The force of God is here presented for the first time by the sul ponticello string tremolo at mm. 16-17. The detached cluster is an emphatic punctuation which later reappears in the work.

The silence and instrumental interlude at the end of this section reinforce the mood and allow time for comprehension of this stunning situation.

- II (mm. 52-72) - As Abraham prepares for his journey, the musical texture becomes more varied. At mm. 56-68, three separate groups of two instruments each proceed in a hoquet-like pattern. The repetitive nature of the complete pattern suggests a resolute obedience on the part of Abraham; the correctness of his actions is verified by the string "God motif."
- III (mm. 72-88) - As Abraham nears his destination, some of the characteristics of the first section

return. The texture is reduced to the baritone and one instrumental line with timbre links and modulations present, but with fewer instruments. The violin and bassoon alternate in passages which increase in length, until the time when Abraham and the boy go alone to worship. The agitated line of the solo cello precedes the "God motif" which again confirms Abraham's actions.

- IV (mm. 89-104) - Instrumental interlude. The vacillating and unpredictable flute line is punctuated by the strings, possibly presenting a wavering Abraham and an emphatic God. The clarinets, bassoons, and low brass alternate in plodding duets, later joined by the alto flute in long legato syncopations. The colors change slowly and predictably here.
- V (mm. 105-135) - The dramatic effect of this section is emphasized by the fact that the baritone is heard as a solo describing the father and son taking wood and fire to the appointed place. The instrumental colors change, but not in a significant way. They are heard only in isolated chords emphasizing the words of the narrator. As Abraham and Isaac speak, duets of similar instruments again are used as occasional accompaniment, leaving the dialogue bare. When Abraham reassures his son that God will provide his own sacrifice, the tuba and trumpet enter on slow moving, sustained pitches.
- VI (mm. 135-64) - After a silence, the two bassoons represent Abraham and Isaac building the altar. No linking, timbre modulation, or hocket are used here. Changes are separated by space; the mood is of inevitability. The lines begin to become marcato and agitated as Abraham binds his child, lays him on the altar and extends his knife. Rhythmic and timbral alternations increase in complexity until the angel intervenes.
- VII (mm. 163-81) - The flute and tuba heard with the angel's pronouncement seem to represent the polarity of the power of the heavenly being and the humility of the earthly one. Once again, the strings add vigorous sff chords to emphasize the angel's message.
- VIII (mm. 184-94) - The four-note motive comprised of all the strings precedes Abraham's discovery of a

ram caught in a thicket. The fast notes and changing colors convey the struggle of the beast; the sacrifice of the ram is heard with the same timbres, with one additional line in simultaneous slower notes.

IX (mm. 195-440.) - The texture becomes gradually thicker and more stable; the alternations are between bodies of sounds for the most part. Linear alternations between horn and tuba are slow; some word painting occurs: emphasis on the word blessing, and many fast notes in five successive timbres depict "multiply." The thickest texture of the piece is heard in the detached chords accompanying the angel's pronouncement.

X (mm. 440-end.) - The texture is very much like the beginning: the baritone is accompanied by a thin texture which is changed in character from the opening by Stravinsky's use of mp dynamic and a cantabile, legato line. Timbre changes are subtle: cello to viola to bass clarinet and clarinet. The tempo is slow, the mood is tranquil as Abraham and his son return to their home.

It is difficult to isolate timbre from the other parameters operating in this work; at times, in the last section, for example, other parameters, especially articulation, tempo and dynamic, affect color significantly, as was also true in the Webern Quartet. The influence of Webern's techniques on Stravinsky's serial works is evident. Color in serial music is often a binding force on melody; the abandonment of tonality has been in some ways compensated for by attention to color, or perhaps attention to color has been elevated by the absence of tonality.

George Crumb completed Eleven Echoes of Autumn, 1965, in 1966, three years after Abraham and Isaac was published. The attention to color which is so vital to the Quartet and Abraham and Isaac becomes the overriding consideration in Crumb's music. Whereas Webern and Stravinsky contented themselves with the manipulation of existing sounds, Crumb, along with his contemporaries, developed a new sonorous vocabulary. He goes beyond the extension of traditional techniques and regards the entire instrument as a tool for producing sound.

In his notes for the recording of this work, Crumb states that "each of the echi exploits certain timbral pos-

sibilities of the instruments."<sup>5</sup>

The first echo, marked "Fantastico," is given entirely to the piano in the exploitation of the fifth partial of eight fundamentals. The resultant sound is a bell-like repeated tone; the repeated striking of the hammer sounds as if it were bouncing on the string. This motive is heard throughout the piece.

"Eco 2" is marked "Languidamente, quasi lontano (hauntingly)." The piano begins, followed immediately by the violin. Both are using high harmonics, the piano sound reinforced by the pianist's whistling the pitch of the seventh partial. This produces a pair of eerie, distant, whistling sounds, somewhat like the whistling of the wind in an open place. The flute and clarinet reinforce this effect with their "wind music;" as Crumb indicates, it is quasi-unvoiced, breathy, an overlapping arpeggiated figure with some tones bent down quarter tone at the end. The violin introduces glissandi at the beginning of this echo, and continues them throughout. The last sound is a long, slow (10 second) glissando bowed behind the left hand, near the pegs. The glissando is another important motive which recurs frequently.

"Eco 3" again begins with the sound of the piano. The white and black keys in the lower part of the keyboard are unstopped so that the strings reverberate sympathetically during the entire movement. The pianist makes rapid, staccato darts at the higher keys and also knocks fz on the crossbeam, the loudest sound thus far in the work. During most of this movement the violinist holds the instrument like a mandolin and strums a rapid tremolo on the G string. The flute and clarinet interject rapid ppp tongued repeated notes, and sound nervous, as the composer has indicated. In addition to the fz knocking, the clarinet and flute have dynamic markings of f.

In "Eco 4" ("Con bravura"), rapid and accelerating articulations and extreme dynamic contrasts are featured in all instruments. The winds have flutter-tonguing followed by rapid quintuplets, a reminder of the "bell-motive" of the first echo. The violin uses sul ponticello tremolando increasing in speed, rising in pitch, and ending in a glissando, while executing a crescendo from pppp to fff. The piano is using fffz in the right hand, ppppp in the left hand; the pedal is depressed throughout and the winds are playing into the piano box in order to activate sympathetic vibrations of the strings.

"Eco 5," "Eco 6" and "Eco 7" each use one instrument in a cadenza - the flute, violin, and clarinet respectively -

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<sup>5</sup>Composer's Recordings, Inc., CRI 233.

while the other instruments play "circle-music." The cadenzas are technically demanding, with extreme contrasts in dynamics. The flute overblows to produce "shrill wind sounds" and the violin must alternate between pizzicato, arco, sul ponticello, sul tasto and throwing the bow, must use left hand pizzicato and right hand bowing, and perform fz in a context of ppp. The clarinet has extreme dynamic changes: fpp subito, p to f, but no extraordinary feats to perform other than very fast disjunct notes, which are also required by the flute and violin cadenzas. The violinist, flautist, and clarinetist are each asked to whisper portions of the text. The piano begins each of the echi with rapid glissando on the strings.

"Eco 8" ("Feroce, violento") contains the dynamic pinnacle which has been prepared in the preceding three echi. All instruments are played modo ordinario at fff. Crumb has marked "shrill, screaming" on the violin, clarinet, and flute parts and directed the clarinetist to hold the bell in the air. The winds are again directed to play close to the piano strings and play rapidly on very high repeated notes while the violin plays an equally high, loud, glissando. The intensity is tremendous and cannot be sustained for long. All instruments decrescendo, the violin and flute fade out, and the clarinet and piano end the echo, the pianist knocking on the crossbeam, the clarinet playing a very high glissando, and ending with a 1/4 tone bend down.

In "Eco 9" ("Serenate, quasi lontano (hauntingly)") the violinist is creating an effect somewhat like the "whistling wind" in "Eco 2" by whistling pitches parallel to bowed glissandi on high partials. The effect again is eerie, and totally unrelated to any traditional sound produced by the violin. The violin introduces snap pizzicato, and the flute and clarinet play trills and quarter-tone bends into the piano. The moment is very quiet and understated until the end of the echo when Crumb produces a shocking effect by requiring the pianist to "strike the board with fingertips through circular opening in the metal frame."

"Eco 10" ("Senza misura (gently undulating)") returns the sound of the wind, this time by unvoiced blowing through the wind instruments during fingered arpeggios. The violin reinforces that effect by playing with the wood of the bow. The pianist whispers part of the text and the flautist whispers the entire text over the flute mouthpiece. The dynamic level has returned to ppppp.

In "Eco 11" ("Adagio; like a prayer"), the violinist produces a colorless, almost imperceptible sound as the piano returns to the bell-tones produced at the fifth partial. Eventually, the violin moves to sul ponticello and dies away, leaving the piano to finish the work. Crumb asks for the reverberation of the harmonic played ppppp to be sustained until it fades into silence.



These descriptions of the techniques required by Crumb may begin to communicate the extraordinary quality of this music. Color has reached a peak of importance here. The composer is obviously revelling in the sensuous capabilities of acoustic instruments and, in the process, has created a style unmatched in emotional impact. It is highly compelling music and the tone colors are largely responsible. To say that George Crumb concentrates on the effects obtainable by the use of reverberations, harmonics, glissandi, and extremely soft sounds set off by sudden contrasts and subtle nuances is to be technically accurate but aesthetically inadequate. The spectrum of colors which seems rich in the music of Webern and Stravinsky is exponentially multiplied in the case of Crumb.

In their compositions, Webern and Stravinsky utilized color in important structural and expressive ways. They explored the full range of color available in traditional playing methods and employed it effectively and consciously. Crumb has gone beyond that point to invent new techniques, new instruments, and new sounds, thus creating a style in which timbral interests are the raison d'etre. The music cannot be understood intellectually; the techniques used by Crumb command intellectual respect and interest, but the sound itself is a compelling force which cannot be ignored. It alone conveys the meaning of Crumb's composition.

The role of color in music has paralleled that of color in painting and even in everyday life. It has ceased to be a secondary element of sensuous expression, spilling over traditional boundaries and opening new possibilities for artistic expression and aesthetic experience.