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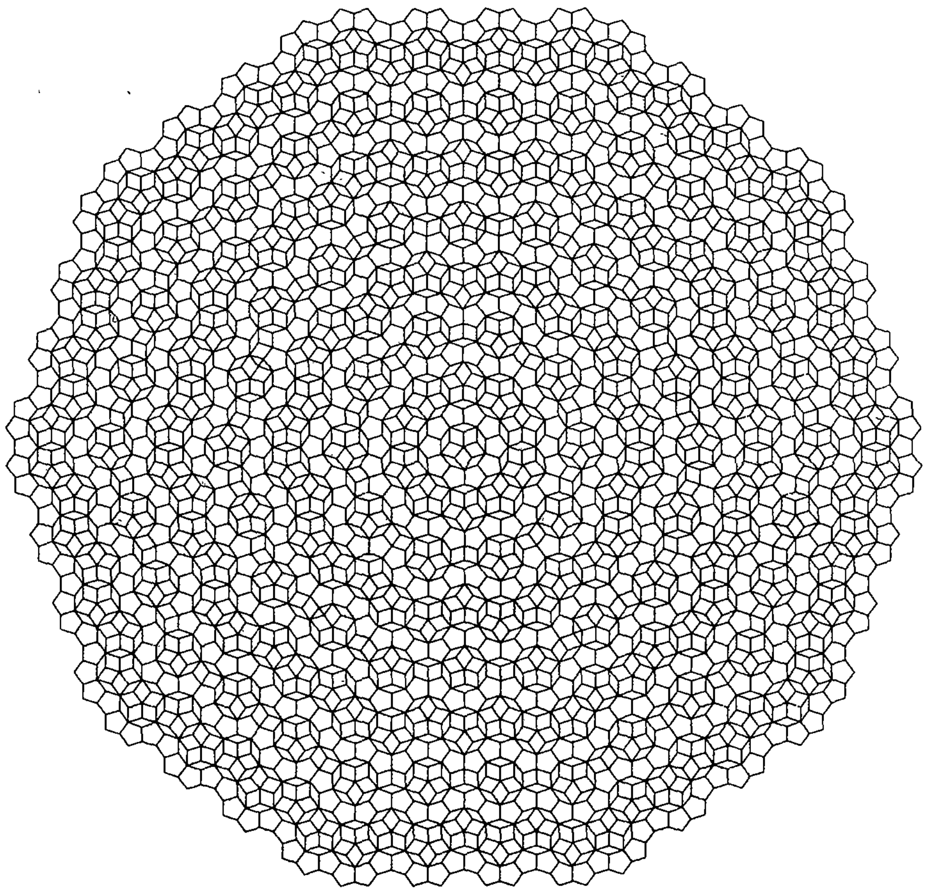

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THE DORIAN MIRROR

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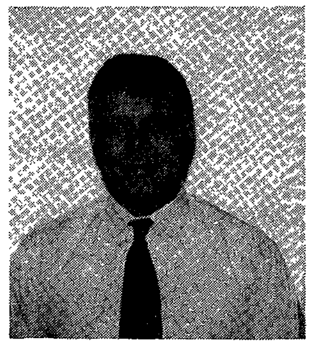


Abstract: *As a model of the color spectrum, the rainbow clarifies the thought that human beings imitate nature. A natural model for the sound spectrum is not obvious. Musical instruments evolved as a man-made attempt to imitate nature and to communicate musi-cally. Most people identify specific color more easily than specific pitch. However, linking the sound spectrum with the color and light spectrum is intuitive. Artists and scientists have attempted to relate musical pitch with color. The conventional piano keyboard is functionally a man-made model that identifies with, reaches for and imitates the sound spectrum. This provides a basis on which to build a model from a traditional and theoretical perspective linking the spectra of sound with light.*

1. INTRODUCTION

Humans consider phenomena by what is natural, supernatural and supranatural, visible and invisible, and temporal and intemporal. Countless gifts are received, given graciously. The sound spectrum and light or color spectrum (audible-invisible and visible-inaudible) are natural phenomena human beings share and explore. The piano, for example, demonstrates this. We may consider the piano man-made. However, it is our imitation of the sound spectrum that we identify with, reach for and imitate. The work-in-process model I call the Dorian Mirror considers sound and color spectra by showing a symmetrical basis on which to form an image of a relationship.

The model perspective is intuitive and theoretical. Initially, chant and the music modes are discussed followed by the particular significance of the conventional piano keyboard. The thrust of this effort illustrates music and sound then sound and color underpinnings with respect to conventional music analysis and colorimetry. Finally, the link between sound and color spectra is inferred, determined by linking sound and color attributes.

1.1 Chant and the Modes

Students of Western Music quickly discover the Gregorian Chant of the Middle Ages and its "system" of modes. Thought to be derived from Ancient Greece, the Church Modes have seven common names: Aeolian, Locrian, Ionian, Dorian, Phrygian, Lydian, and Mixolydian. While the term Dorian represents the first 'authentic' Church Mode, the term also relates to antiquity, to an ancient Greek people or region. While the name Dorian implies one mode, little evidence exists that conveys the actual sounds of antiquity. Evidence of the Dorian mode of Greek antiquity is more theoretical while the Church Mode sonorities are better known.

Various modes of operation (modus operandi) are part of human thought and endeavor. Styles evolve (i.e., grow), change, and culturally share much in common. While the functionality of the modes invites further research, one may consider what is actual (i.e., in practice) and theoretical (i.e., systematic, reduced). For example, it may be said that modes may typically begin or, more appropriately, end on a "finalis" versus the "confinalis". The finalis is an ending pitch, the confinalis seems more dominant. However, besides human descriptors, the spectra provide a marvelous continuity, a basic commonality, occurring through the ages.

Evidence from antiquity and mythology suggests that intuitions based on the rainbow's occurrences existed yesterday as well as today. Likewise, human beings identify with, reach for, and imitate the sound spectrum. Evolved and evolving organizations of music and sound show this. Human beings continue to imitate these natural spectra. While human views describing music and light may evolve, essentially, the spectra (i.e., given their dynamics) remain unchanged.

It appears possible to presume (i.e., as a precept) that a "function" reduces "form", that form reduces (i.e., becomes) "image". It is respectfully noted that an emphasis on a scale can undermine modality. Simply put, modes are not scales. However, the slightly more redeeming phrase "modal scale", in context, conveys the Dorian Mirror as a "chromatic" (i.e., sound and color) formation. Initially by considering the conventional piano keyboard as one man-made model, one may identify with, reach for and imitate (i.e., relate) phenomena.

1.2 The Piano

The piano is functionally a discrete relational map. Its surface is aesthetic and kinesthetic but also provides an evolutional view of music and sound organization allowing much latitude in sonority. Pythagoras' twelve-pitch (i.e., the chromatic octave), twelve-key system is evident at the conventional piano keyboard. As a systematic, limited reduction, a white key "modal scale" can present the modes: A to A for Aeolian, B to B for Locrian, C to C for Ionian, D to D for Dorian, etc.

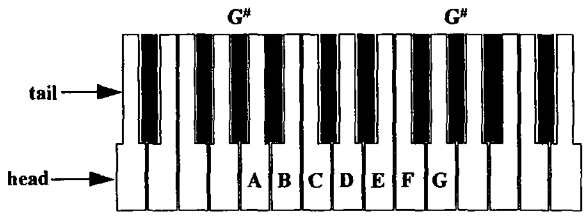
2. CONVENTIONAL PIANO KEYBOARD SYMMETRY

2.1 Symmetry at the Piano

The piano keyboard contains two mirror formations. Both are Dorian and decidedly symmetrical. The white key axis of symmetry is D. The black key axis of symmetry is $G^{\#}$. There are two Dorian Mirrors, one centered at each axis. One may immediately suspect a duality.

Keyboard symmetry appears clearly in a two octave view of the conventional piano keyboard. Beginning with black keys, starting from the right or left, notice the 1-3-2-3-1 black key formation. Based on the octave from D to D, two identical 1-3-1 black key formations are present.

Figure 1:
Keyboard Symmetry and The Dorian Mirror



Focus on $G^{\#}$, the black key axis of symmetry. Proceed outward from $G^{\#}$. Notice continuous white or black key pairs, specifically G and A then $F^{\#}$and $A^{\#}$, then a white pair, another white pair, a black pair, etc. Focus now on D, the white key axis of symmetry. Likewise, black or white pairs continue outward infinitely. Testing outward from any other key besides $G^{\#}$ and A yields a black-white or white-black pair.

Consider the seven common musical pitch names labeled: A, B, C, D, E, F, G. White keys symmetrically surround D in the middle. This is a fundamental view of the D Dorian Mirror. Note that this mirror spans seven pitches, not eight (i.e., an octave).

Geometrically, white key tail locations specify symmetry. While the D axis is itself unique, G and A are unique reflectors (i.e., without other reflectors or duplicates). All other white keys are reflectors with duplicates (i.e., C reflects B and E. C duplicates F).

Musically, children at the piano often mirror right and left hands. One view of the D Dorian Mirror begins with thumbs on D. Fingers then press keys outward. Ascending right: DEFG (i.e., *re, mi, fa, sol*) builds the first tetrachord. Descending left: DCBA (i.e., *re, do, ti, la*) builds the second and mirrors the first. Chromatically, the octave occurs at $G^{\#}$. Likewise, the Dorian Mirror also builds outwardly from $G^{\#}$.

2.2 The Dorian Mirror in Black and White

The dual Dorian Mirror formation involves two one octave views at the piano showing one mirror on each axis. The Dorian modal scale usage or theoretical reduction describes a chromatic balance. In perspective, the D Dorian Mirror and $G^{\#}$ Dorian modal scale will together form a crux that begins a transition to color. The important aspect of this section is to note that both Dorian Mirrors appear contained by reciprocal Dorian modal scales. The result is one full chromatic octave per axis.

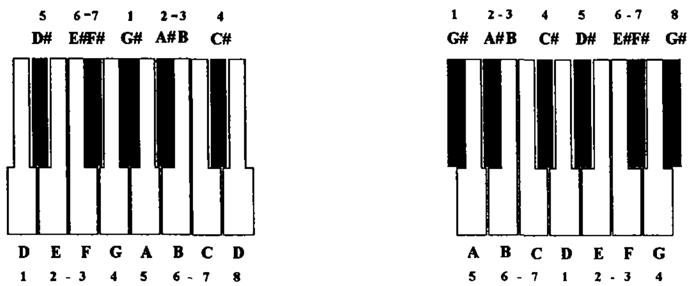


Figure 2: Dorian Mirror Duality

First focus on the left bottom view showing the D Dorian modal scale white key symmetry from D to D. At the piano, Gregorian Modes can be viewed within an octave as two tetrachords. With respect to the D Dorian modal scale, DEFG is the first, ABCD the second. Below pitch names, degrees labeled one through eight represent an octave. Hyphens between degrees two-three and six-seven specify semitones (i.e., two keys in succession). Notice that each semitone is central to each tetrachord. Theoretically, this describes what is characteristically Dorian. Now consider the right bottom view showing the D Dorian Mirror. Only seven degrees appear because tetrachords are mirrored. The semitones appear consistent but D is implied as the first and eighth degree. Likewise, this occurs in the $G^{\#}$ Dorian Mirror.

The left top view is the $G^{\#}$ Dorian Mirror. Hyphens and degrees (i.e., semitones and tetrachords) are consistent. Notice the 1-3-1 black key formation. This formation is $F^{\#}$ pentatonic, built using perfect fifths starting from $F^{\#}$. The resulting $F^{\#}$ pentatonic scale (i.e., $F^{\#}C^{\#}G^{\#}D^{\#}A^{\#}$) appears: $D^{\#}\_F^{\#}G^{\#}A^{\#}\_C^{\#}$. This black-key-only pentatonic formation is unique at the keyboard. The right top view shows the $G^{\#}$ Dorian modal scale. Again, hyphens and degrees (i.e., semitones and tetrachords) are consistent. $G^{\#}$ appears twice to form an octave. Therefore, the $G^{\#}$ Dorian Mirror 1-3-1 black key pentatonic forma- tion shifts to become 2-2-2 (i.e., $G^{\#}A^{\#}\_C^{\#}D^{\#}\_F^{\#}G^{\#}$). The D Dorian shift from 1-3-1 (i.e., mirror) to 2-2-2 (i.e., modal scale) white-key-only pentatonic formation is indistinct at the piano. Yet a reciprocal pentatonic formation does exist.

2.3 A Transition to Color

While the 1-3-1 $F^{\#}$ pentatonic formation clearly exists in the $G^{\#}$ Dorian Mirror, the reciprocal C pentatonic formation in the D Dorian Mirror seems "invisible" given exclusive white key (i.e., ABCDEFG) symmetry.

The computer color environment helps clarify the unique theoretical structure and integrity of Dorian Mirror symmetry. In terms of music, it becomes increasing apparent that the computing color environment and color itself provides an opportunity for exploring the model with respect to colorimetry.

$G^{\#}$ $A^{\#}$ - B $C^{\#}$ $D^{\#}$ $E^{\#}$ - $F^{\#}$ $G^{\#}$

A	**B**	**C**	**D**	**E**	**F**	**G**
T	**s**	**T**	**T**	**T**	**s**	**T**
V	**I**	**B**	**G**	**Y**	**O**	**R**

Figure 3:
The D Dorian Mirror Primary Crux

Dorian Mirror relationships are substantially reinforced (i.e., become more visual) through color. 'T' and 's' music symbols point to color. 'T-units' numerically define solid color and 's-units' numerically define partial color. These correspond to Dorian Mirror 'T' and 's' music symbols.

Beginning with the $G^{\#}$ Dorian modal scale, notice semitones in place represented by hyphens and, more conventionally, the small-case 's.' 'T' symbols imply $G^{\#}$ Dorian wholetones (i.e., two semitones in succession). While the 'T-s' configuration specifies (i.e., theoretically describes) the $G^{\#}$ Dorian modal scale, two D Dorian specific formations are apparent, one pentatonic, the other a tritone.

With respect to the D Dorian Mirror (i.e., ABCDEFG), notice the aligning 1-3-1 (i.e., T_TTT_T) formation. While the 'T' formation describes the $G^{\#}$ Dorian modal-scale configuration, it also specifies a D Dorian Mirror pentatonic formation. This D Dorian Mirror 'T' formation is C pentatonic, built using perfect fifths starting from C. The resulting C pentatonic scale (i.e., CGDAE) appears: A_CDE_G, showing a 1-3-1 white-key-only pattern. This is the reciprocal of the previously described $F^{\#}$ black-key-only pentatonic scale.

Unlike the $F^{\#}$ pentatonic formation, the C pentatonic 1-3-1 white-key-only formation is not unique at the keyboard. Two other white-key-only pentatonic scales will build using perfect fifths (i.e., from F or G). However, with respect to the $G^{\#}$ Dorian configuration, F and G pentatonic scales involve pitches that align with semitone symbols (i.e., 's'). The 's' formation (i.e., -s --s-), known as the tritone (i.e., three consecutive wholetones) or 'Diabolus in Musica' is common to both D and $G^{\#}$ Dorian views. D Dorian shows B and F (i.e., a diminished fifth). $G^{\#}$ Dorian shows B and $E^{\#}$ (i.e., an augmented fourth). Enharmonically, F and $E^{\#}$ are equivalent. The VIBGYOR pattern fits the Dorian Mirror schema with respect to the computing color environment.

3. COMPUTING COLOR

3.1 The Computing Color Environment

Applying color to the Dorian Mirror exhibits a fundamental correlation. Music pitches (i.e., ABCDEFG) relate with rainbow colors (e.g., VIBGYOR). Each has seven. Pitch names match D Dorian Mirror symmetry showing D and green at the middle.

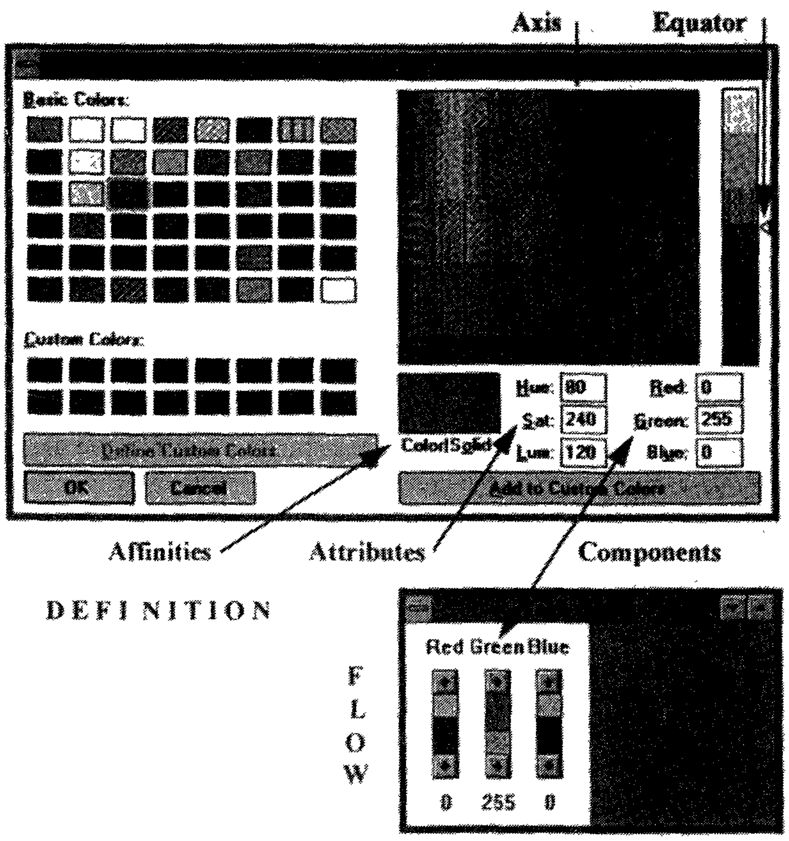


Figure 4: Color Windows

The development and testing environment presently involves GUI (i.e., Graphical User Interface) using eight-bit (i.e., 256) color. Two related common dialog boxes (i.e., windows) provide visual correspondence. One applies to definition, the other to flow. The definition window displays a global view of color, allowing associations such as "axis" (i.e., north edge) and "equator" (i.e., middle). While components (i.e., Red, Green, and Blue) are based on the primary colors of light, color attributes (i.e., Hue, Saturation, and Luminance) appear to relate to sound attributes (i.e., pitch and timbre).

The "axis" involves a hue orbit (i.e., range 0...239) at maximum saturation or color purity (i.e., constant at 240). The "equator" luminance or light source is median (i.e., constant at 120). One can numerically pin-point (i.e., reference or specify) a color by determining its global position and staging and comparing select color sequences on a blank palette. Solid colors or 'T-units' fully occupy the small rectangular area beneath the globe (i.e., shown captioned "color/solid"). 's-units' split the rectangle and occupy the left half showing its relative solid 'T-unit.' Therefore, an 's-unit' shows one affinity for a specific 'T-unit.'

The flow window relies on components. Each numeric red, green, blue value (i.e., from 0...255) scrolls separately. Component combinations reflect color appearance. Scrolling one lever at a time from "critical point" to "critical point" can exhibit a baseline cycle showing Dorian Mirror chromatic color flow.

3.2 The RGB Identity and Solid Array

Computers use the primary colors of light (i.e., Red, Green, and Blue) as a basis for color appearance. Given this identity, three distinct solid complements (i.e., Cyan, Violet, and Yellow) appear. Remaining colors appear based on or partial to these six solids. Solid colors (i.e., 'T-units') relate to Dorian Mirror 'T' symbols (i.e., $G^{\#}$ Dorian modal scale wholetones and the resulting 'T' formation).

Consider a matrix of the red, green, blue components. The diagonal forms an identity. In the eight-bit per component (i.e., 256 color) color environment, where each component ranges from 0...255, 255 is all of that component. In the sixteen-bit (i.e., 65 thousand) color environment, 65535 is all of it, etc. Ones and zeroes provide an environment-independent, shorthand view of color.

Notice the arrangement of ones and zeroes. For instance primary green (i.e., RGB: 010) contains no red, all of green, no blue (i.e., Red = 0, Green = 255, Blue = 0. With respect to the binary system, notice the chart showing six possible solids. RGB: 111 is white, RGB: 000 is black. Binary 111 is 7 decimal, 000 binary is 0 decimal. Given eight combinations of ones and zeroes in three bits and omitting white (i.e., all color together) and black (i.e., all color absent) boundaries, six possible solids appear.

Identity

	r	g	b
Red	255	0	0
Green	0	255	0
Blue	0	0	255

	R	G	B
R	1	0	0
G	0	1	0
B	0	0	1

R, G, B Primaries, C, M, Y Complements

	RGB
R	1 0 0
Cyan	0 1 1

	RGB
G	0 1 0
V	1 0 1

	RGB
B	0 0 1
Y	1 1 0

Possible Solids

	binary B	binary G	binary R	decimal
white	1	1	1	7
cyan	1	1	0	6
violet	1	0	1	5
blue	1	0	0	4
yellow	0	1	1	3
green	0	1	0	2
red	0	0	1	1
black	0	0	0	0

Figure 5: Color Solids

Consider primary solid values (i.e., one or zero) that switch (i.e., on to off or off to on) to show primary complements. Interestingly, the Dorian Mirror uses primary red's solid complement (i.e., cyan) only indirectly. Notably, given saturation and luminance constants, violet (i.e., green's complement) appears purple or magenta (i.e., 'M').

3.3 Affinities

The computing color environment functionally establishes a unit measurement system that (i.e., except for solid cyan) matches Dorian Mirror symmetry. Invariably, 'T-units' (i.e., solids) contain only "all or it or none of it" values. While coordinate attribute constants establish the axis (i.e., orbit), RGB components effectively describe 'T-units' (i.e., solids) and 's-units' (i.e., partials).

Actually, Dorian Mirror color components reduce to: 1, ½, ¼, or 0. While all colors include 1, and 0, Dorian Mirror 's-units' involves one fraction (i.e., ¼ or ½) in one RGB component. Partial colors (i.e., affinities) seemingly relate to music functionality where *ti* (i.e., in fixed *do*) resolves to *do*. While not fully explored, they appear somewhat consistent.

Consider the three-ellipse illustration recalling that the computing color definition window shows partial color appearance based on a particular solid. Also recall that symmetrically, G and A piano keys are unique reflectors. Between solids red (i.e., G) and violet (i.e., A) is red-violet (i.e., G#). Red-violet reflects red and violet.

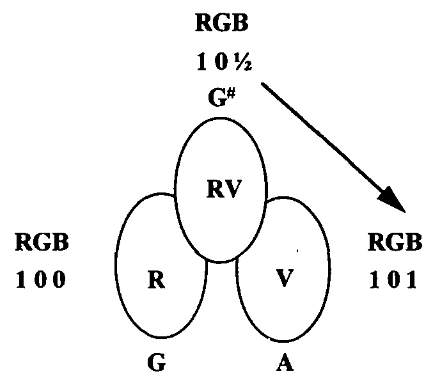


Figure 6: Color Partials

Numerically ½ (i.e., the blue component) wants to go to 1. Red-violet is partial to and has an affinity for violet. This formation is significant because it establishes a basis for locating partial colors (i.e., the tritone) in the chromatic scale. More importantly it establishes a chromatic (i.e., sound and color) cycle.

The D Dorian Mirror pitch A (i.e., alpha) is violet, pitch G (i.e., omega) is red, pitch G# is red-violet. Recall that G# appears twice to form the octave. The enharmonic equivalent of G# is A♭ (i.e., alpha and omega). Essentially, this establishes the D Dorian Mirror primary (i.e., as the primary rainbow) and the G# Dorian Mirror secondary (i.e., as the secondary rainbow). Further, it suggests that the rainbow itself is a mirror.

4. BUILDING THE PRIMARY TEMPLATE

4.1 The Primary Solid 'T' Formation

The G$^{\#}$ Dorian modal scale, containing the D Dorian Mirror, establishes a unique C pentatonic scale. Given VIBGYOR, violet and yellow align with red, green, blue. Sound and color 'T' symbols correlate to the modal scale wholetone configuration, the mirror 'T' formation, and to computing color environment. Notice that 1's and 0's values fully describe D Dorian Mirror solid color RGB components. Notice that the 'T' formation (i.e., T_TTT_T) is occupied by pitch and color names showing C pentatonic (i.e., A_CDE_G). C 12345, CDEFG to G, 12345, GABCD to D, to A, to E makes five. Adding a sixth member would yield B (i.e., indigo, an 's-unit'). Adding a sixth member to F$^{\#}$ pentatonic (i.e., G$^{\#}$A$^{\#}$_C$^{\#}$D$^{\#}$_F$^{\#}$G$^{\#}$) would yield semitone E$^{\#}$ (i.e., enharmonically F, orange, an 's-unit').

	V			B		G		Y			R	
R	1			0		0		1			1	
G	0			0		1		1			0	
B	1			1		0		0			0	
G$^{\#}$		A$^{\#}$			C$^{\#}$		D$^{\#}$			F$^{\#}$		G$^{\#}$
			b						f			
	A			C		D		E			G	
	T		s	T		T		T	s		T	

Figure 7: Solid Pentatonic

4.2 The Primary Modal Formation

The primary modal formation adds the B and F tritone to the D Dorian Mirror C pentatonic formation. The resulting D Dorian Mirror formation involves seven rainbow color names and seven pitch names. These 's', pitches represent the common or embedded tritone known in music as "'Diabolus in Musica' or the 'Devil in Music.'" 'Diabolus' (i.e., -s—s-) includes three wholetones: BC$^{\#}$, C$^{\#}$D$^{\#}$, D$^{\#}$E$^{\#}$. Interestingly, at the piano, 'Diabolus' alone occupies two white keys. Others involve black-white. Notably, the tritone's reputation reflects in color. This interval presents a problem for modal music, but less so for chromatic. Its function is pivotal, its nature uneven, unsettled. In the chromatic environment 'Diabolus' appears to balance the reciprocal Dorian Mirror pentatonic formations.

	V		I	B		G		Y	O		R	
R	1		¼	0		0		1	1		1	
G	0		0	0		1		1	½		0	
B	1		1	1		0		0	0		0	
G$^{\#}$		A$^{\#}$			C$^{\#}$		D$^{\#}$			F$^{\#}$		G$^{\#}$
			b						f			
	A			C		D		E			G	
	T		s	T		T		T	s		T	

Figure 8: A Modal Reflection

Consider pitch B, and indigo's RGB component ¼. In the computing color environment, ¼ wants to go to 0. Indigo is partial to or has an affinity for blue where *ti* wants to resolve to *do*. Consider orange or pitch F (i.e., f). Notice orange's RGB component ½. In the color environment, ½ wants to go to 1. Orange is partial to, has an affinity for yellow where *fa* wants to resolve to *mi*.

4.3 Modal to Chromatic Expansion

Overlaying $F^{\#}$ pentatonic partial colors completely fills the keyboard. This expansion divides 'T' symbols (i.e., not 'T-units') yielding a twelve-tone chromatic sequence.

In computing color, by increasing color potential beyond eight-bits (i.e., 65 thousand, 16.7 million, etc.), colors appear solid in the definition window. Colors appear more spectacular, flowing gradually with a subtle blend. However, critical point colors including the RGB identity remain unchanged. Music and color affinities remain interesting but are more clear in eight-bits (i.e., 256 colors).

	RV	V	IV	I	B	GC	G	GY	Y	O	O	R	RV
R	1	1	½	¼	0	0	0	½	1	1	1	1	1
G	0	0	0	0	0	1	1	1	1	½	¼	0	0
B	½	1	1	1	1	½	0	0	0	0	0	0	½
	$G^{\#}$		$A^{\#}$			$C^{\#}$		$D^{\#}$			$F^{\#}$		$G^{\#}$
				b						f			
		A			C		D		E			G	
		T		s	T		T		T	s		T	

Figure 9: Pentatonic Overlay

$F^{\#}$ pentatonic black-key-only (i.e., 's-units') and C pentatonic white-key-only reciprocals (i.e., 'T-units') appears weak. $C^{\#}$, green-cyan, for instance, is partial to cyan. Cyan is not a template solid. However, F or $E^{\#}$ remains pivotal. With respect to chromaticism and tonality, orange wants to go to yellow (i.e., *fa* resolves to *mi*). Orange-red wants to go to red (i.e., in "movable *do*," *ti* resolves to *do*) implying a secondary dominant.

5. CHARTING THE PRIMARY TEMPLATE

5.1 Critical Point Flow

RGB components (i.e., via the scroll window) show the D Dorian Mirror chromatic distribution. Using the flow window one lever at a time, moving from unit to unit exhibts (i.e., sequentially) the template hue orbit and entire baseline cycle. Scrolling produces gradual, sudden, or no change in the appearance of one color. Essentially, certain bits or individual r, g, or b component values uniquely switch color appearance on or off. The resulting pattern indicates wide-range values. Wide-ranges appear as regions with edges or boundaries. Critical points lay within. The definition window shows wide-range components narrowing, becoming near-critical then

Pitches:		Colors:		Units:				Components:				Attributes:		
				R	G	B		r	g	b		Hue:	Sat:	Lum:
$G^{\#}$	←	red-violet	←	1	0	½	←	255	0	128	=	220	240	120
G	←	red	←	1	0	0	←	255	0	0	=	0	240	120
$F^{\#}$	←	orange-red	←	1	¼	0	←	255	64	0	=	10	240	120
F	←	orange	←	1	½	0	←	255	128	0	=	20	240	120
E	←	yellow	←	1	1	0	←	255	255	0	=	40	240	120
$D^{\#}$	←	green-yellow	←	½	1	0	←	128	255	0	=	60	240	120
D	←	green	←	0	1	0	←	0	255	0	=	80	240	120
$C^{\#}$	←	green-cyan	←	0	1	½	←	0	255	128	=	100	240	120
C	←	blue	←	0	0	1	←	0	0	255	=	160	240	120
B	←	indigo	←	¼	0	1	←	64	0	255	=	170	240	120
$A^{\#}$	←	indigo-violet	←	½	0	1	←	128	0	255	=	180	240	120
A	←	violet	←	1	0	1	←	255	0	255	=	200	240	120
$G^{\#}$	←	red-violet	←	1	0	½	←	255	0	128	=	220	240	120

Figure 10:
Scrolling Critical Points

critical with respect to saturation and luminance constants. The attribute constant benchmarks (i.e., for saturation and luminance) are given by the RGB identity.

5.2 Mapping the Primary Mirror

While the critical point RGB sequence conditionally determines chromatic distribution, attribute values (i.e., hue, saturation, and luminance) are more specific and reliable when RGB mixtures appear similar. Saturation and luminance constants establish the orbit leaving one baseline variable to track. Simply put, hue values (i.e., numeric color names, 0...239) orbit the axis.

At the piano and in computing color, Dorian Mirror symmetry infers a chromatic template, a map linking pitch names with color. The baseline shows a pitch name and color correlation that exhibits pentatonic, modal, and chromatic formations.

Sat. = 240, Lum. = 120

$G^\#$ Dorian Mode Pitch Names:	$G^\#$		$A^\#$	B		$C^\#$		$D^\#$		$E^\#$	$F^\#$		$G^\#$
$G^\#$ Dorian "modal scale" Steps:	1		2	3		4		5		6	7		8
Fixed-do Pitch Names:	si		li	ti		di		ri		mi	fi		si
$F^\#$ Pentatonic Overlay s-units:	*		*			*		*			*		*
Common Tritone s-units:				*						*			
$G^\#$ Dorian Modal Affinities:	↘		↖	↘		↖		↘		↖	↘		↘
C Pentatonic T-units:		↓			↓		↓		↓			↓	
$G^\#$ Dorian Modal Color Names:	RV		IV	I		GC		GY		O	OR		RV
Primary Hue Orbit:	220	200	180	170	160	100	80	60	40	20	10	0	220
D' Dorian Mirror Color Names:		V		I	B		G		Y	O		R	
C Pentatonic T-units:		↑			↑		↑		↑			↑	
Common Tritone Affinities:				↗						↖			
Common Tritone s-units:				*						*			
C Pentatonic T-units:		*			*		*		*			*	
Fixed-do Pitch Names:		la		ti	do		re		me	fa		sol	
D Dorian Mirror Steps:		5		6	7		1		2	3		4	
D Dorian Mirror Pitch Names:		A		B	C		D		E	F		G	

Figure 11: The Baseline Orbit

Notice that red-violet (i.e., $G^\#$), appearing twice, forms a cycle, a one octave loop (i.e., an orbit), that can extend right and left to other octaves. Star and arrow symbols show the D Dorian Mirror template based on color attributes that coordinate with RGB critical points:

'T-unit' hue values (i.e., red = 0, yellow = 40, green = 80, blue = 160, and violet = 200) are multiples of forty. 's-units' form a subclass of 'half' and 'quarter' units. The 'half-unit' hue values (i.e., orange = 20, green-yellow = 60, green-cyan = 100, indigo-violet = 180, and red-violet = 220) are multiples of twenty. The 'quarter-unit' hue values (i.e., orange-red = 10 and indigo = 170) are multiples of ten.

Values that involve digits 1...9 are non-critical or offset (i.e., component value = 191 is an offset of 192 = ®). Of eighteen possible critical points, six do not directly apply to the template (i.e., an extra 'T-unit', 'half-unit', and four 'quarter-units.' The template uses primary blue (i.e., blue = 160). The extra 'T-unit' (i.e., cyan = 120) and 'half-unit' (i.e., blue-cyan = 140) create an unusual gap in the chromatic sequence.

5.3 Arrows and Stars

The previous baseline orbit relationships that represent the template progression appear condensed. Cascading the arrows clarifies D Dorian Mirror affinities. The affinities (i.e., *ti* resolves to *do*) relate somewhat to tonality and, while interesting, have not been fully explored.

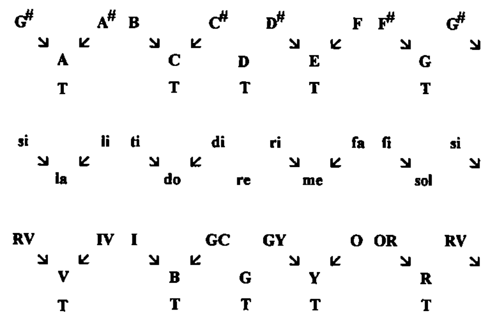


Figure 12: Affinity Cascade

Interestingly, while green is the "middle" of both rainbows, with respect to the F# pentatonic overlay and baseline, green's 's-unit' neighbors show no affinity for green.

8. CONCLUSIONS

The Dorian Mirror presents a view of the conventional piano keyboard. In this chromatic environment D Dorian Mirror symmetry specifies D as an axis of symmetry. This orientation establishes and orders 'T' and 's' symbols with respect to the G# Dorian modal scale. Using music terminology, a progression builds a template from an RGB identity using the primary colors of light: Red, Green, and Blue. The Dorian Mirror shows a pitch to color basis on which to form an image linking sound and color spectra.

"Rainbow" colors (i.e., VIBGYOR) first align with white-key pitch names in a C pentatonic and common tritone formation found in the D Dorian Mirror formation. Additional coincident partial colors then align with black-key pitch names in the a reciprocal F#pentatonic overlay formation.

The D Dorian Mirror correlation shows congruous colors values (i.e., components and attributes) aligning a template, conveying a cycle. Hue orbits an axis while saturation and luminance remain constant. Template hue attribute values reflect the constants.

Primary colors systematically establish (i.e., initialize) the sequence of critical points that form a baseline. The resulting unit measurement system correlates 'T' and 's' music formation symbols with computing color environment specific solid and partial colors.

Ramifications of this work involve other disciplines. The need for appropriate mathematical and computer models exists. The template itself functions as a basis for additional research. Intuitively, sound and color attributes determine, (i.e., infer) an image where pitch determines hue, and timbre determines saturation. Luminance remains in question.