

## CHAPTER 5. MODES OF LIMITED TRANSPOSITION AND SPECIAL CHORDS

This chapter examines Messiaen's "modes of limited transposition" (*modes à transpositions limitées*) and "special chords" (*accords spéciaux*), which comprise the bulk of the harmonic content of Messiaen's *musique colorée*. Special chords include: the "chord on the dominant" (CD), the "chord on the dominant with appoggiaturas" (CDA), the "chord of resonance" (CR), the "chord with contracted resonance" (CCR), the "chord in fourths" (C4), the "turning chord" (TC), and the "chord of total chromaticism" (CTC). The construction, voicings, inversions, numberings, and colorations of each mode and each special chord will be explained.

Messiaen's writings contain numerous descriptions of his mode and chord colorations. The descriptions are cross-referenced and listed in the Appendix. The colorations provided are idealizations, determined by examining Messiaen's various descriptions and creating a coloration that accommodates the greatest number of descriptions, and by applying the method outlined in the previous chapter. The chapter reconstructs, inasmuch as possible, Messiaen's pre-compositional charts, which show modes and special chords in all possible transpositions and inversions, along with their respective colorations.

The following abbreviations are used for special chords:

CD	Chord on the dominant
CDA	Chord on the dominant with appoggiaturas
CTI	Chords with transposed inversions
CR	Chord of resonance
CCR	Chord with contracted resonance
C4	Chord in fourths
TC	Turning chord
CTC	Chord of total chromaticism

For special chords, superscripted numbers and letters will refer respectively to transposition and voicing. For example in the label CCR<sup>12A</sup>, "CCR" stands for "chord

with contracted resonance,” “12” indicates that the chord is in its twelfth transposition, and “A” indicates that the chord is in voicing “A.”

### **General characteristics of Messiaen’s modes of limited transposition**

Messiaen’s modes of limited transposition are among his earliest inventions.<sup>1</sup> The transpositions are “limited” because the modes are transpositionally symmetrical: certain transpositions yield the same pitch-classes as the original. (By contrast, the diatonic collection—which is transpositionally asymmetrical—exists in an “unlimited” number of transpositions; it can be transposed to all twelve chromatic degrees without reproducing itself.) In *Technique*, Messiaen identifies seven modes, and claims, “Their series is closed. It is mathematically impossible to find others, at least within our tempered system of twelve semitones.”<sup>2</sup> Although Messiaen presented seven modes in *Technique*, in practice he did not use them all. Later in his life, he admitted that although he had catalogued seven modes, in practice he made use of only four of them: modes 2, 3, 4, and 6.”<sup>3</sup> Mode 1 is a subset of modes 3, 6 and 7; mode 5 is a subset of modes 4 and 7; mode 7 is a superset of

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1. Messiaen’s modes have received much scholarly attention. In addition to the sources listed in Chapter 1, see: Jeffrey Burns, *Messiaen’s Modes of Limited Transposition Reconsidered* (MA thesis, University of Wisconsin-Madison, 1995); David Rogosin, *Aspects of Structure in Olivier Messiaen’s Vingt regards sur l’enfant Jésus* (DMA thesis, University of British Columbia, 1996); and Max Forster, *Technik modaler Komposition bei Olivier Messiaen* (Neuhausen-Stuttgart: Hänssler-Verlag, 1976).

2. “Leur série est close. Il est mathématiquement impossible d’en trouver d’autres, au moins dans notre système tempéré à 12 demi-tons.” Olivier Messiaen, *Technique de mon langage musical* (Paris: Alphonse Leduc, 1944), I, 51. Actually, there are other transpositionally symmetrical collections that Messiaen did not include with his modes. (Messiaen’s modes are listed later in the present chapter.) First, there are the complements to Messiaen’s seven modes, which exhibit the same transpositionally symmetrical properties. The complement to mode 2 is [0369], a diminished seventh chord. The complement to mode 3 is [048], an augmented triad. The complement to mode 7 is the dyad [06]. The complements to modes 4 and 6 are [0167] and [0268], respectively. Messiaen likely dismissed the complements to modes 2, 3, 4, 6 and 7 because of their small cardinality. (Modes 1 and 5 are self-complementary, so their complements do not comprise new collections.) Second, there is [014589], the so-called “hexatonic” collection, which could have qualified as a “mode,” transposable four times. Messiaen never mentioned it, possibly because it is a subset of mode 3. The hexatonic collection can be thought of as the combination of two augmented triads a semitone apart, while mode 3 can be thought of as the combination of three different augmented triads.

3. Olivier Messiaen, *Conférence de Kyoto* (Paris: Alphonse Leduc, 1988), 7.

modes 1, 2, 4, 5 and 6. Because of these subset/superset relationships, for Messiaen, modes 1, 5 and 7 were probably somewhat coloristically indistinct from the other modes.

Messiaen's modes represent more of a harmonic resource than a melodic resource. He claimed, "People have often referred to my modes of limited transposition as scales. They are not scales, but harmonic colors."<sup>4</sup> Messiaen did sometimes use the modes in a strictly melodic (i.e., monophonic, or unharmonized) manner, but only rarely after his early works.<sup>5</sup> Messiaen almost always presented his modes chordally, presumably to take advantage of their particular colorations; only by presenting notes of a mode simultaneously could a coloration emerge. He said of his modes, "Their function is coloristic. They are not harmonies in the classical sense of the term; they are obviously not tonal harmonies. They are not even classified chords."<sup>6</sup> He further described the modes as "colored locations, small colored regions, where the general color remains the same, as long as neither mode nor transposition changes."<sup>7</sup> In his writings, descriptions of modal coloration always refer to one or more chords, never to melodies.

According to Messiaen, a succession of three or more chords in the same mode (what is herein called a "modal passage") evoked a uniform coloration. Somehow, modal

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4. "On a souvent cité mes « modes à transpositions limitées » comme des gammes. Ce ne sont pas des gammes, mais des couleurs harmoniques." Messiaen, *Conférence de Kyoto*, 7. Additionally, Messiaen remarked, "The modes that I used, which I named 'modes of limited transposition,' are more harmonic than melodic." ("Les modes que j'utilisais, et que j'ai nommés depuis les modes à transpositions limitées, sont plus harmoniques que mélodiques.") Antoine Goléa, *Rencontres avec Olivier Messiaen* (Paris: René Julliard, 1960), 29.

5. For a rare example of the monophonic use of a mode, see "Subtilité des corps glorieux" (the first movement of the organ work *Les corps glorieux*). This entire movement comprises an unaccompanied melodic voice, and begins with a passage in mode 2<sup>2</sup>.

6. "Je dirai plus: leur emploi est coloré; ce ne sont pas des harmonies dans le sens classique du terme, ce ne sont évidemment pas des harmonies tonales, ce ne sont même pas des accords classés." Claude Samuel, *Entretiens avec Olivier Messiaen* (Paris: Editions Pierre Belfond, 1967), 48. Messiaen also said, "The keys of the classic period had a tonic. The antique church modes had a final. My modes have neither a tonic nor a final—they are colors. ("Les tonalités classiques avaient une tonique. Les modes antiques avaient une finale. Mes modes n'ont ni tonique ni finale, ce sont des couleurs.") Olivier Messiaen, *Musique et couleur: nouveau entretiens avec Claude Samuel* (Paris: Pierre Belfond, 1986), 66.

7. "Les modes sont des lieux colorés, des petits pays colorés, où la couleur générale reste la même tant que l'on ne change pas de mode ou de transposition." Messiaen, *Conférence de Kyoto*, 7–8.

passages evoked a general coloration, trumping the more local colors that any single chord might evoke. Further, although modes contain a variety of pitch-classes, some modes evoked a simple coloration—sometimes a single color. Isolated modal chords often evoked a slightly different coloration than that of the mode proper. When analyzing individual modal chords, or successions of two chords in the same mode, Messiaen would describe colorations of individual chords in addition to those of the mode proper. For example, in an analysis of two consecutive modal chords in *Chronochromie*, he describes the color of the mode proper as “violet blue,” the color of the first chord as “clear violet blue,” and the color of the second chord as “clear orange brown.”<sup>8</sup>

### Mode 1

Mode 1 is a six-note collection that exists in two transpositions. Example 5.1 lists both transpositions of mode 1.<sup>9</sup> The notes of mode 1 are a whole step apart; each transposition of mode 1 comprises a whole-tone collection. Messiaen rarely employed mode 1, and he never described colorations for its transpositions. In *Technique*, he explained why he shunned mode 1: “Claude Debussy (in *Pelléas et Mélisande*) and after him Paul Dukas (in *Ariane et Barbe-Bleue*) used it so remarkably that there is nothing left to add. We shall therefore carefully avoid helping ourselves to it—unless it is concealed in a superimposition of modes that renders it unrecognizable.”<sup>10</sup> Example 5.2 illustrates a passage from “Jésus accepte la souffrance” (the seventh movement of the organ work *La Nativité du Seigneur*) in which mode 1 is obscured by additional pitch-classes; this early work was composed in 1935, before Messiaen had become fully attuned to his synesthesia.

8. Olivier Messiaen, *Traité de rythme, de couleur, et d'ornithologie*, 7 vols. (Paris: Alphonse Leduc, 1992), V/1, 354.

9. In modal designations, superscripted numbers refer to transposition. Modal transpositions are numbered successively, in ascending order, beginning on C $\sharp$ .

10. “Claude Debussy (dans « Pelléas et Mélisande ») et après lui Paul Dukas (dans « Ariane et Barbe-Bleue ») en ont fait un usage si remarquable qu'il n'y a plus rien à ajouter. Nous éviterons donc soigneusement de nous en servir. — A moins qu'elle ne soit dissimulée dans une superposition de modes qui la rende méconnaissable.” Messiaen, *Technique*, I, 52.

In this example, the dyads in the upper staff comprise mode 1<sup>1</sup>. The single notes in the lower staff move chromatically.

Example 5.1. Mode 1.



Example 5.2. Concealed use of mode 1 in “Jésus accepte la souffrance,” mm. 15–16.

**Douloureux et vif** (*ad lib.*)

Musical notation for Example 5.2, showing a piano accompaniment with a concealed use of mode 1. The upper staff has dyads and the lower staff has single notes moving chromatically. The dynamic marking is *mf*.

Example 5.3. Mode 2.

Musical notation for Example 5.3, Mode 2. The upper staff shows three transpositions of Mode 2: Mode 2<sup>1</sup>, Mode 2<sup>2</sup>, and Mode 2<sup>3</sup>.

## Mode 2

Mode 2 is an eight-note collection that exists in three transpositions. Example 5.3 lists Messiaen’s mode 2 in each of its transpositions. Mode 2, alternating semitones with whole tones, is commonly labeled an octatonic collection. The colorations evoked by mode 2 in each of its transpositions are:

Mode 2 <sup>1</sup>	violet blue
Mode 2 <sup>2</sup>	gold, brown
Mode 2 <sup>3</sup>	green

Messiaen employed mode 2 frequently.

### Mode 3

Mode 3 is a nine-note collection that exists in four transpositions. Example 5.4 lists Messiaen's mode 3 in each of its transpositions. Mode 3 alternates a whole tone with two semitones. The colorations of mode 3 in each of its transpositions are:

Mode 3 <sup>1</sup>	orange, gold, milky white
Mode 3 <sup>2</sup>	gray, mauve, a bit of gold
Mode 3 <sup>3</sup>	blue, green
Mode 3 <sup>4</sup>	orange, red, a bit of blue

Messiaen often expressed his fondness for the colorations evoked by mode 3. "Mode 3 is transposable four times, but its best transposition [i.e., the one I find the most attractive] is the second. I even think that mode 3<sup>2</sup> is the best of all of my modes."<sup>11</sup> Messiaen employed mode 3 more frequently than any other mode.

Example 5.4. Mode 3.

Example 5.4 displays four transpositions of Mode 3 on a single staff. The first two staves show Mode 3<sup>1</sup> and Mode 3<sup>2</sup>, and the second two staves show Mode 3<sup>3</sup> and Mode 3<sup>4</sup>. Each staff contains a sequence of notes with accidentals, illustrating the alternating whole tone and two semitone intervals.

Example 5.5. Mode 4.

Example 5.5 displays six transpositions of Mode 4 on a single staff. The first three staves show Mode 4<sup>1</sup>, Mode 4<sup>2</sup>, and Mode 4<sup>3</sup>, and the second three staves show Mode 4<sup>4</sup>, Mode 4<sup>5</sup>, and Mode 4<sup>6</sup>. Each staff contains a sequence of notes with accidentals, illustrating the alternating whole tone and two semitone intervals.

11. "Le mode 3 est quatre fois transposable, mais sa meilleure transposition est la deuxième. Je pense même que le mode 3 no 2 est le meilleur de tous mes modes." Messiaen, *Musique et couleur*, 68.

## Mode 4

Mode 4 is an eight-note collection that exists in six transpositions. Example 5.5 lists Messiaen's mode 6 in each of its transpositions. Mode 4 alternates three semitones with a minor third. The colorations of mode 4 in each of its transpositions are:

Mode 4 <sup>1</sup>	gray, gold, a bit of blue
Mode 4 <sup>2</sup>	streaks of iron gray, pink-mauve and coppery yellow; black and clear Prussian blue; green and purple violet
Mode 4 <sup>3</sup>	yellow, violet
Mode 4 <sup>4</sup>	violet, with white veins
Mode 4 <sup>5</sup>	deep violet
Mode 4 <sup>6</sup>	carmine red, violaceous purple, mauve, gray, pink

Messiaen employed mode 4 infrequently.

## Mode 5

Mode 5 is a six-note collection that exists in six transpositions. Example 5.6 lists Messiaen's mode 5 in each of its transpositions. Mode 5 alternates two semitones with a major third. Messiaen never described colorations for the transpositions of mode 5.

Example 5.6. Mode 5.

Musical notation for Example 5.6, showing six transpositions of Mode 5. The first row contains Mode 5<sup>1</sup>, Mode 5<sup>2</sup>, and Mode 5<sup>3</sup>. The second row contains Mode 5<sup>4</sup>, Mode 5<sup>5</sup>, and Mode 5<sup>6</sup>. Each mode is represented by a single treble clef staff with a sequence of six notes and their accidentals.

Example 5.7. Mode 6.

Musical notation for Example 5.7, showing six transpositions of Mode 6. The first row contains Mode 6<sup>1</sup>, Mode 6<sup>2</sup>, and Mode 6<sup>3</sup>. The second row contains Mode 6<sup>4</sup>, Mode 6<sup>5</sup>, and Mode 6<sup>6</sup>. Each mode is represented by a single treble clef staff with a sequence of six notes and their accidentals.

## Mode 6

Mode 6 is an eight-note collection that exists in six transpositions. Example 5.7 lists Messiaen's mode 6 in each of its transpositions. Mode 6 alternates two whole tones with two semitones. The colorations of mode 6 in each of its six transpositions are as follows:

Mode 6 <sup>1</sup>	gray, with bits of gold, orange, dark green
Mode 6 <sup>2</sup>	brown, russet, orange, violet
Mode 6 <sup>3</sup>	yellow, mauve, gold
Mode 6 <sup>4</sup>	yellow, violet, black
Mode 6 <sup>5</sup>	gold, pale blue, violet, with brown outlines
Mode 6 <sup>6</sup>	black, white, a bit of pale blue

Messiaen rarely employed mode 6.

## Mode 7

Mode 7 is a ten-note collection that exists in six transpositions. Example 5.8 lists Messiaen's mode 7 in each of its transpositions. Mode 7 alternates four semitones with a whole tone. Messiaen never described colorations for mode 7.

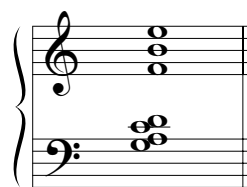
Example 5.8. Mode 7.

The image displays six musical staves, each representing a different transposition of Mode 7. Each staff begins with a treble clef and a key signature of one flat. The notes are arranged in a sequence of four semitones followed by a whole tone. The transpositions are labeled as follows:

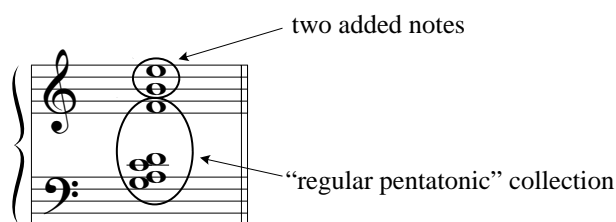
- Mode 7<sup>1</sup>: F, G, A, B $\flat$ , C, D, E $\flat$ , F
- Mode 7<sup>2</sup>: G, A $\flat$ , B, C, D, E $\flat$ , F, G
- Mode 7<sup>3</sup>: A $\flat$ , B $\flat$ , C, D, E $\flat$ , F, G, A $\flat$
- Mode 7<sup>4</sup>: B $\flat$ , C, D, E $\flat$ , F, G, A $\flat$ , B $\flat$
- Mode 7<sup>5</sup>: C, D, E $\flat$ , F, G, A $\flat$ , B $\flat$ , C
- Mode 7<sup>6</sup>: D, E $\flat$ , F, G, A $\flat$ , B $\flat$ , C, D



Example 5.9. CD in root position.



Example 5.10. Analysis of root-position CD.



Example 5.11. CD in its four fundamental voicings.

	root position	first inversion	second inversion	fourth inversion
	A	B	C	D
	<2,3,2,3,6,5>	<3,2,3,2,4,5>	<2,3,4,2,5,3>	<4,3,2,5,4,5>

### Chord on the dominant (CD)

The chord on the dominant (*accord sur dominante*) is one of Messiaen's earliest special chords. Example 5.9 shows a CD in root position.<sup>12</sup> In *Technique*, Messiaen defined the CD as a chord containing all the notes of the major scale;<sup>13</sup> in terms of pitch-class, the CD comprises a diatonic collection. In the Example 5.11, the notes of the CD belong to the C-major scale; the root of the chord is G. In *Traité*, Messiaen gave a more

12. Following Messiaen's theories, the root of a special chord is the lowest note of the chord when in its fundamental voicing (*état fondamental*).

13. Messiaen, *Technique*, I, 43.

## Example 5.12. The 48 CDs.

The image displays a musical score for 48 chords, organized into six systems of two staves each (treble and bass clef). Each system contains eight chords, labeled CD<sup>1A</sup> through CD<sup>12D</sup>. The chords are written in a piano style, featuring block chords in the treble clef and arpeggiated or broken chords in the bass clef. The key signature is D major, indicated by two sharps (F# and C#). The time signature is not explicitly shown but appears to be common time (C). The chords are arranged in a sequence that moves through various harmonic areas, including the tonic, dominant, and subdominant regions, as well as chromatic alterations. The notation includes stems, beams, and accidentals (sharps and flats) to specify the notes of each chord.

precise definition of the CD: “a dominant ninth with the tonic in place of the leading tone, and two added notes.”<sup>14</sup> Example 5.10 shows an analysis of the root-position CD. The “dominant ninth with the tonic in place of the leading tone” comprises a “regular pentatonic” collection, which lies at the bottom of the chord when in root position. The “two added notes” lie at the top of the chord, a major tenth and a major thirteenth above the root of the chord.<sup>15</sup>

Messiaen used the CD in four fundamental voicings: root position (*état fondamental*), first inversion (*premier renversement*), second inversion (*deuxième renversement*), and fourth inversion (*quatrième renversement*).<sup>16</sup> Messiaen’s labels for voicings are somewhat idiosyncratic and do not follow traditional usage. Because a specific voicing comprises a prescribed ordering of intervals, inversions are based on a chord’s primary disposition (its root position). For example, the root position CD on G comprises the pitches (low to high): G–A–C–D–F–B–E. In first inversion, the pitch A is in the bass; in second inversion, the pitch C is in the bass; in fourth inversion, the pitch F is in the bass. Example 5.11 shows the CD in its four fundamental voicings. Messiaen labeled the four voicings “A,” “B,” “C,” and “D.” The voicing of chord A is <2,3,2,3,6,5>. The voicing of chord B is <3,2,3,2,4,5>. The voicing of chord C is <2,3,4,2,5,3>. The voicing of chord D is <4,3,2,5,4,5>. The four voicings of the CD

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14. “L’accord sur dominante est une 9/7/+ avec la tonique à la place de la sensible, et 2 notes ajoutées.” Messiaen, *Traité*, IV, 105.

15. Although the notes of the CD can be reordered into a stack of thirds (G–B–D–F–A–C–E, a so-called “dominant thirteenth” chord), Messiaen did not present the CD as a tertian sonority. The CD is a specific collection of pitch classes in a specific voicing. The non-tertian construction of the CD is reinforced by the fact that Messiaen considered the third above the root an “added note,” not a part of the fundamental pentachord.

16. Messiaen never explained why he skipped the third inversion of the CD. In the introductory notes to the score of the organ work *La Nativité du Seigneur* (Paris: Leduc, 1935), a very early work (published nine years before *Technique*), he included the third inversion in a list of five possible dispositions of the CD. Perhaps he later decided to skip the third inversion because its voicing <3,4,3,4,3,4>, comprising alternating major and minor thirds, suggested a tertian sonority. Messiaen may have discarded the fifth and sixth inversions because they would require the CDA to have an appoggiatura in the bass; in such cases, a CD and its corresponding CDA would have different pitches in the bass. Since inversion is defined by the bass pitch, the two chords (with different bass pitches) would appear to be unrelated.

can be transposed to all twelve chromatic degrees, and there are a total of 48 CDs.

Example 5.12 shows the 48 CDs. The chart is arranged in twelve groups, corresponding to the twelve possible transpositions; the four chords of each group share the same bass note. Transpositions of CDs are numbered according to the root of the chord (the lowest tone of the chord when in root position), in ascending order, beginning on C $\sharp$ .

Messiaen rarely used the CD in his late works, and never gave examples of its colorations.<sup>17</sup> Messiaen possibly abandoned the CD because of its close tonal associations: each CD comprises a diatonic collection and can be understood as representative of a key.

Example 5.13. CDA in root position; comparison of CDA and CD.

The image shows a musical score for two staves (treble and bass clef). The first measure shows a CDA chord in root position (C major triad). The second measure shows a CDA chord in root position with an 'appoggiaturas' annotation pointing to the leading tone (F#) in the treble staff. The third measure shows a CD chord in root position with a 'resolution' annotation pointing to the leading tone (F#) in the treble staff.

Example 5.14. CDA in its four fundamental voicings.

The image shows a musical score for two staves (treble and bass clef) illustrating four voicings of the CDA chord (C major triad):

- root position: A
- first inversion: B
- second inversion: C
- fourth inversion: D

Below the score, the following intervallic structures are listed:

- <2,3,2,3,8,5>
- <3,2,3,2,6,5>
- <2,3,4,4,5,1>
- <4,3,2,5,6,5>

17. In an analysis in *Traité*, Messiaen described a chord that could be analyzed as CD<sup>1A</sup> as “a white chord, containing all the notes of C major.” (“Accord blanc, contenant toutes les notes de do majeur.”) However, it is unclear whether he was referring to synesthetic color or the “whiteness” of the key of C major. Messiaen, *Traité*, V/1, 357. Many musicians, non-synesthetes included, classify the key of C major as “white.” According to musicologist and humorist Nicolas Slonimsky, “What is the color of C major? Four out of five doctors say it is white. Why doesn’t the fifth doctor agree? Because he is a violinist.” Nicolas Slonimsky, “Colors and Keys,” *Medical Opinion and Review* (October 1966), 24.

## Example 5.15. The 48 CDAs.

The image displays a musical score for 48 Chordal Diads (CDAs), organized into six systems. Each system contains two rows of four CDAs, labeled from 1A to 12D. The notation is in piano style, featuring a grand staff with a treble and bass clef. The music consists of chords and dyads, with various accidentals (sharps, flats, naturals) and stems. The systems are as follows:

- System 1: CDA<sup>1A</sup>, CDA<sup>1B</sup>, CDA<sup>1C</sup>, CDA<sup>1D</sup>; CDA<sup>2A</sup>, CDA<sup>2B</sup>, CDA<sup>2C</sup>, CDA<sup>2D</sup>
- System 2: CDA<sup>3A</sup>, CDA<sup>3B</sup>, CDA<sup>3C</sup>, CDA<sup>3D</sup>; CDA<sup>4A</sup>, CDA<sup>4B</sup>, CDA<sup>4C</sup>, CDA<sup>4D</sup>
- System 3: CDA<sup>5A</sup>, CDA<sup>5B</sup>, CDA<sup>5C</sup>, CDA<sup>5D</sup>; CDA<sup>6A</sup>, CDA<sup>6B</sup>, CDA<sup>6C</sup>, CDA<sup>6D</sup>
- System 4: CDA<sup>7A</sup>, CDA<sup>7B</sup>, CDA<sup>7C</sup>, CDA<sup>7D</sup>; CDA<sup>8A</sup>, CDA<sup>8B</sup>, CDA<sup>8C</sup>, CDA<sup>8D</sup>
- System 5: CDA<sup>9A</sup>, CDA<sup>9B</sup>, CDA<sup>9C</sup>, CDA<sup>9D</sup>; CDA<sup>10A</sup>, CDA<sup>10B</sup>, CDA<sup>10C</sup>, CDA<sup>10D</sup>
- System 6: CDA<sup>11A</sup>, CDA<sup>11B</sup>, CDA<sup>11C</sup>, CDA<sup>11D</sup>; CDA<sup>12A</sup>, CDA<sup>12B</sup>, CDA<sup>12C</sup>, CDA<sup>12D</sup>

### Chord on the dominant with appoggiaturas (CDA)

The “chord on the dominant with appoggiaturas” (*accord sur dominante appoggiaturé*) is another of Messiaen’s early inventions, and is related to the CD.<sup>18</sup>

Example 5.13 shows a root-position CDA and its relation to the CD. The CDA and the CD share the same “regular pentatonic” collection; in the example, the collection comprises the lower notes G–A–C–D–F. The CDA has two added notes, which are a tone higher than those of the CD. In the example, the CD’s added notes are B and E; the CDA’s added notes are C $\sharp$  and F $\sharp$ . Because the C $\sharp$  and F $\sharp$  can be regarded as resolving downwards to B and E, Messiaen referred to the notes as “appoggiaturas.” Although the term “appoggiatura” traditionally implies resolution, the appoggiaturas of the CDA require no resolution—that is to say, in practice, the CDA need not be followed by a CD.

As is the case with the CD, the CDA exists in four fundamental voicings. Example 5.14 shows the CDA in each of its four voicings. Messiaen used the labels “A,” “B,” “C,” and “D” to refer to voicings of the CDA. The voicing of chord A is <2,3,2,3,8,5>. The voicing of chord B is <3,2,3,2,6,5>. The voicing of chord C is <2,3,4,4,5,1>. The voicing of chord D is <4,3,2,5,6,5>. The four voicings of the CDA can be transposed to all twelve chromatic degrees; there are a total of 48 CDAs. Messiaen used the CDA more frequently than any other of his special chords. Example 5.14 shows the 48 CDAs. Like CDs, CDAs are numbered according to the root of the chord (the lowest tone of the chord when in root position), in ascending order, beginning on C $\sharp$ . The colorations of the CDA that Messiaen annotated in his compositions and theoretical writings are as follows:<sup>19</sup>

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18. In his later writings, Messiaen used the terms *accords à renversements transposés* and *accords à renversements transposés sur une même note de basse* interchangeably with *accord sur dominante appoggiaturé*.

19. Gaps appear in descriptions because the colors of certain chords have not yet been described in the published writings of Messiaen. Messiaen promised that the final volume of his *Traité* (which has not yet been published) will describe the colorations of all of his special chords.

- CDA<sup>1A</sup> upper zone: quartz and citrine; lower zone: copper with gold streaks  
 CDA<sup>1B</sup> high to low: mauve, sapphire blue  
 CDA<sup>1C</sup> orange, with bands of pale yellow, red and gold  
 CDA<sup>1D</sup> from high to low: pale green, amethyst violet, and black
- CDA<sup>2A</sup> high to low: gold, yellow, mauve, white  
 CDA<sup>2B</sup> low to high: red, gray, pale green  
 CDA<sup>2C</sup> blue streaked with green  
 CDA<sup>2D</sup> high to low: very clear violet, over clear green
- CDA<sup>3A</sup> campanula mauve, over a white and clear gray haze  
 CDA<sup>3B</sup> burnt-earth crystals, amethyst violet, clear Prussian blue, warm reddish chestnut, with stars of gold  
 CDA<sup>3C</sup> violet irises with orange centers, over a turquoise blue foundation  
 CDA<sup>3D</sup> red, lilac and violacious purple
- CDA<sup>4A</sup> green, violet, deep blue  
 CDA<sup>4B</sup> gold, silver, white with a bit of yellow  
 CDA<sup>4C</sup> intense sapphire blue, Parma violet, Chartres blue  
 CDA<sup>4D</sup> a spiral of gold, with blue and pink streaks, over a large carmine red foundation
- CDA<sup>5A</sup>  
 CDA<sup>5B</sup> high to low: clear ashen gray, mauve, pale green  
 CDA<sup>5C</sup> red and pink, with gray  
 CDA<sup>5D</sup> high to low: mauve gray, yellow, pale green
- CDA<sup>6A</sup> copper, gold, brown, blackened red  
 CDA<sup>6B</sup> pale blue, amethyst violet, emerald green  
 CDA<sup>6C</sup>  
 CDA<sup>6D</sup> low to high: gold and silver
- CDA<sup>7A</sup> yellow, stained with pale green and white  
 CDA<sup>7B</sup> bands of white and red, over a pink foundation, with black designs; dominant color: red  
 CDA<sup>7C</sup> low to high: yellow, white, and gold  
 CDA<sup>7D</sup> orange, red and brown, lemon yellow
- CDA<sup>8A</sup> yellow, mauve, pale blue, pale green, pink, amber, a bit of gold  
 CDA<sup>8B</sup> carmine red, leathery brown; white, gold and greenish speckles  
 CDA<sup>8C</sup> violet amethysts, mauve campanulas, white pebbles, pale green and ashen gray  
 CDA<sup>8D</sup> violet, pink and mauve, over a turquoise blue foundation
- CDA<sup>9A</sup> orange, ringed with green and pale blue  
 CDA<sup>9B</sup> green tinged with blue, with a bit of yellow and violet  
 CDA<sup>9C</sup>  
 CDA<sup>9D</sup> sapphire blue, translucent fluorine blue, clear Chartres blue
- CDA<sup>10A</sup> turquoise blue, underscored by pink and mauve  
 CDA<sup>10B</sup> brilliant gold with red streaks, over pale yellow orange, a bit of very clear Prussian blue, and transparent crystal—an adamantine brilliance!  
 CDA<sup>10C</sup> red and pink  
 CDA<sup>10D</sup> stains of pale gray, pink, pale green, over a red foundation

CDA <sup>11A</sup>	leathery brown, surmounted with dull lapis lazuli blue and a bit of violet
CDA <sup>11B</sup>	lemon yellow, with red stains
CDA <sup>11C</sup>	
CDA <sup>11D</sup>	chocolate brown foundation, with carmine red outlines, over which a gold star stands out
CDA <sup>12A</sup>	pink, black, pearl gray
CDA <sup>12B</sup>	high to low: pink, mauve, purple violet, turquoise blue
CDA <sup>12C</sup>	
CDA <sup>12D</sup>	brilliant golden sunshine over white snow

Each chord contains from two to five colors.

### Chords with Transposed Inversions (CTI)

In his early works, Messiaen employed a compositional procedure involving the transposition of a chord's inversions, resulting in a series of chords with a common bass pitch. Example 5.16 illustrates the procedure applied to a dominant-seventh chord. In the upper staff of the example, a C dominant-seventh and its inversions are shown; each chord comprises the same four pitch-classes, but their voicings (shown beneath the staff) are different. In the lower staff, the voicings are maintained and the chords transposed over the pitch C. The chords now comprise four tonally unrelated dominant-seventh chords with roots C, A<sup>b</sup>, F, and D. Each chord evoked a different coloration for Messiaen, the progression involving a series of changing colors, what Messiaen referred to as a "stained-glass effect."<sup>20</sup> He explained:

In its root position, the chord possesses a certain color. Its inversions, different dispositions of the same notes, evoke analogous but dissimilar colors. If we transpose the inversions over the same bass note, we obtain four very different colors.<sup>21</sup>

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20. "Effet de vitrail." Messiaen, *Technique*, I, 43.

21. "L'accord à l'état fondamental possède une certaine couleur. Ses renversements, en groupant différemment les mêmes notes, donnent des couleurs analogues mais non semblables. Si nous transposons les renversements sur la même note de basse, nous obtenons quatre couleurs très différentes." Messiaen, *Conférence de Kyoto*, 8.



Although the procedure of transposing inversions can be applied to any type of chord, in his late works Messiaen restricted this procedure almost exclusively to the CDA; in fact, whenever he used the term “chords with transposed inversions” (*accords à renversements transposés*) in his later writings, he was speaking of technique applied to the CDA.<sup>22</sup>

Example 5.16. Technique of transposed inversions applied to dominant-seventh chord.

Dominant-seventh chord, four inversions.

<4,3,3>    <3,3,2>    <3,2,4>    <2,4,3>

Same voicings, all chords transposed over the bass pitch C♭.

<4,3,3>    <3,3,2>    <3,2,4>    <2,4,3>

The “analogous but dissimilar” colorations evoked by different voicings of the same pcsets can be verified by examining CDAs. By definition, pcsets represented in Messiaen’s chart of CDAs exist in four different voicings. The colorations of the 48 CDAs, grouped according to pitch-class equivalencies, are as follows:

CDA <sup>1A</sup>	upper zone: quartz and citrine; lower zone: copper with gold streaks
CDA <sup>3B</sup>	burnt-earth crystals, amethyst violet, clear Prussian blue, warm reddish chestnut, with stars of gold
CDA <sup>6C</sup>	
CDA <sup>11D</sup>	chocolate brown foundation, with carmine red outlines, over which a gold star stands out
CDA <sup>2A</sup>	high to low: gold, yellow, mauve and white
CDA <sup>4B</sup>	gold and silver, over white with a bit of yellow; dominant color: gold
CDA <sup>7C</sup>	low to high: yellow, white, and gold
CDA <sup>12D</sup>	brilliant golden sunshine over white snow
CDA <sup>3A</sup>	campanula mauve, over a white and clear gray haze
CDA <sup>5B</sup>	high to low: clear ashen gray, mauve, pale green

22. In *Technique*, Example 209 shows the procedure applied to the CR. Messiaen, *Technique*, II, 37. In *Traité*, in an analysis of *Sept Haïkai*, Messiaen showed how he applied the procedure to TCs. Messiaen, *Traité*, V/2, 463. Messiaen also used the term *accords à renversements transposés sur une même note de basse*.

- CDA<sup>8C</sup> violet amethysts, mauve campanulas and white pebbles, over a pale green and ashen gray foundation
- CDA<sup>1D</sup> from high to low: pale green, amethyst violet, and black
- CDA<sup>4A</sup> vertical bands of green, violet and deep blue
- CDA<sup>6B</sup> low to high: emerald green, amethyst violet, pale blue
- CDA<sup>9C</sup>
- CDA<sup>2D</sup> high to low: very clear violet, over clear green
- CDA<sup>5A</sup>
- CDA<sup>7B</sup> bands of white and red, over a pink foundation, with black designs; dominant color: red
- CDA<sup>10C</sup> red and pink
- CDA<sup>3D</sup> red, lilac and violacious purple
- CDA<sup>6A</sup> copper, gold and brown, blackened red
- CDA<sup>8B</sup> carmine red and leathery brown, with white, gold and greenish speckles
- CDA<sup>11C</sup>
- CDA<sup>4D</sup> a spiral of gold, with blue and pink streaks, over a large carmine red foundation
- CDA<sup>7A</sup> yellow, stained with pale green and white
- CDA<sup>9B</sup> green tinged with blue, with a bit of yellow and violet
- CDA<sup>12C</sup>
- CDA<sup>5D</sup> high to low: mauve gray, yellow, pale green
- CDA<sup>8A</sup> streaks of yellow, mauve, pale blue, pale green, pink, and amber, with a bit of gold
- CDA<sup>10B</sup> brilliant gold with red streaks, over pale yellow orange, a bit of very clear Prussian blue, and transparent crystal—an adamantine brilliance!
- CDA<sup>1C</sup> orange, with bands of pale yellow, red and gold
- CDA<sup>6D</sup> low to high: gold and silver
- CDA<sup>9A</sup> orange, ringed with green and pale blue
- CDA<sup>11B</sup> lemon yellow, with red stains
- CDA<sup>2C</sup> blue streaked with green
- CDA<sup>7D</sup> orange, red and brown, lemon yellow
- CDA<sup>10A</sup> turquoise blue, underscored by pink and mauve
- CDA<sup>12B</sup> high to low: pink, mauve, purple violet, turquoise blue
- CDA<sup>3C</sup> violet irises with orange centers, over a turquoise blue foundation
- CDA<sup>8D</sup> violet, pink and mauve, over a turquoise blue foundation
- CDA<sup>11A</sup> leathery brown, surmounted with dull lapis lazuli blue and a bit of violet
- CDA<sup>1B</sup> low to high: sapphire blue, very clear mauve
- CDA<sup>4C</sup> broad cloak of intense blue sapphire; in the folds, streaks of Parma violet and Chartres blue
- CDA<sup>9D</sup> sapphire blue, translucent fluorine blue, clear Chartres blue
- CDA<sup>12A</sup> pink, black, pearl gray
- CDA<sup>2B</sup> low to high: red, gray, pale green
- CDA<sup>5C</sup> red and pink, with gray
- CDA<sup>10D</sup> stains of pale gray, pink, pale green, over a red foundation

The colorations of the chords in each four-chord grouping are similar. For example, the chords in the second grouping all contain different combinations of gold, yellow, and white. Juxtaposed chords with identical pcsets rarely—if ever—appear in Messiaen’s music; CTIs are very common.

Example 5.17. CR in root position; overtone series.

Example 5.18. Mode 3<sup>1</sup> and three related CRs.

### Chord of resonance (CR)

The term “resonance” is defined as “the intensification and prolongation of sound, especially of a musical tone, produced by sympathetic vibration.”<sup>23</sup> However Messiaen used the term resonance to describe not the intensification of sympathetic pitch classes (unison and octaves) but the engendering of complementary pitch classes.<sup>24</sup> The “chord of

23. *American Heritage Dictionary of the English Language*, fourth ed. (Boston: Houghton Mifflin Company, 2000), 1484.

24. André Jolivet, who held a slightly different view of resonance, recognized tonal relationships between chords and their resonances. André Jolivet, “Réponse à une enquête: André Jolivet, ou la magie expérimentale,” *Contrepoints* 1 (January 1946): 33–37. For an in-depth comparison of the musical

resonance” (*accord de la résonance*), another of Messiaen’s early harmonic inventions, illustrates the complementary relationship of resonance. Regarding the CR, Messiaen claimed, “Nearly all the perceivable notes—for an extremely keen ear—in the resonance of a low C appear, ‘tempered,’ in this chord.”<sup>25</sup> What Messiaen meant by the CR being a “tempered” realization of the overtone series is that certain partials within the overtone series are ambiguous and lie in-between semitones. Example 5.18 shows a CR in root position and the overtone series. The CR contains all the pitch-classes of the overtone series up to the sixteenth partial, compressing the tones into a compact, mostly tertian eight-note chord. In the example, black noteheads indicate “out-of-tune” partials in the overtone series, which must be adjusted in order to conform to equal temperament. The thirteenth partial is an ambiguous tone; over the fundamental C, the thirteenth partial actually lies between  $A\flat$  and  $A\sharp$ . Although most twentieth-century French music theorists chose the raised version  $A\sharp$ , Messiaen chose the lowered version  $A\flat$  (respelling the  $A\flat$  as  $G\sharp$  in the CR).<sup>26</sup> Messiaen might have chosen the lowered version in order to establish a connection between the CR and his modes of limited transposition, and thereby strengthening his own theories. In *Technique*, Messiaen points out the close relationship between mode 3 and the CR.<sup>27</sup> Each transposition of mode 3 contains three distinct CRs. Example 5.18 shows

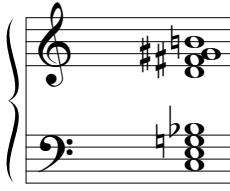
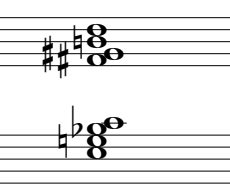

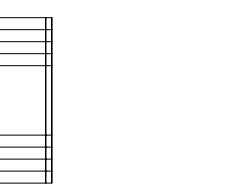
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styles and techniques of Jolivet and Messiaen, see Bridget F. Conrad, *The Sources of Jolivet's Musical Language and his Relationships with Varèse and Messiaen*, Ph.D. dissertation (City University of New York, 1994).

25. “Presque toutes les notes perceptibles — pour une oreille extrêmement fine — dans la résonance d’un ut grave, figurent, « *tempérées* », dans cet accord.” (Italics in original.) Messiaen, *Technique*, I, 43.
26. French composer André Jolivet, who was dissatisfied with tempered tuning in general, chose the lowered version of the thirteenth partial. Furthermore, Jolivet invented a modal scale based on natural acoustic properties; the scale has the same notes as Messiaen’s chord of resonance. See Conrad, *The Sources of Jolivet's Musical Language*, 259. Charles Koechlin and Jacques Chailley also preferred the lowered version of the thirteenth partial. See Charles Koechlin, *Traité de l'harmonie*, 3 vols. (Paris: Max Eschig et Cie., 1928), I, 7; Jacques Chailley, *Éléments de philologie musicale* (Paris: Alphonse Leduc, 1985), 61. Alexander Scriabin, in his so-called “mystic chord,” used the raised version of the thirteenth partial. Analyzing the music of Béla Bartók, Erno Lendvai discussed an “acoustic (overtone) scale,” which uses the raised version of the thirteenth partial. See Erno Lendvai, *Béla Bartók: An Analysis of his Music* (London: Kahn & Averill, 1971), 67.
27. Messiaen wrote, “The chord of resonance furnishes all the notes of the third mode of limited transposition.” (“[L]’accord de la résonance donne toutes les notes du « 3e mode à transpositions

mode 3<sup>1</sup> and the three CRs found therein. Mode 3<sup>1</sup> contains three CRs: CR<sup>1A</sup>, CR<sup>5A</sup> and CR<sup>7A</sup>; inversions of each of these CRs are also contained in mode 3<sup>1</sup>.

Example 5.19. CR in its four fundamental voicings.

root position	first inversion	second inversion	third inversion
A	B	C	D
			
<4,3,3,4,4,2,3>	<3,3,2,6,2,3,3>	<3,2,4,4,3,3,4>	<2,4,3,4,3,4,2>

The CR exists in four fundamental voicings. Example 5.19 shows the voicings of the CR. The four voicings are labeled “A,” “B,” “C,” and “D.” Chord A comprises the voicing <4,3,3,4,4,2,3>; chord B comprises the voicing <3,3,2,6,2,3,3>; chord C comprises the voicing <3,2,4,4,3,3,4>; chord D comprises the voicing <2,4,3,3,4,2>. The four voicings of the CR can be transposed to all twelve chromatic degrees; there are a total of 48 CRs. Example 5.20 shows the 48 CRs. Messiaen never referred to CRs by number; for the purposes of my own analyses, I assign numbers to CRs according to the root of the chord (the lowest tone of the chord when in root position), in ascending order, beginning on C. Messiaen rarely used the CR in his late works, possibly because of its tertian associations. Messiaen never mentioned colorations for CRs.

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limitées ».) However, since the CR comprises eight pitch-classes, and mode 3 comprises nine pitch-classes, the CR cannot possibly furnish *all* the notes of mode 3. However, the converse is possible: mode 3 can furnish all the notes of the CR. Messiaen, *Technique*, I, 43.

## Example 5.20. The 48 CRs.

The image displays a musical score for 48 Chordal Relations (CRs), organized into six systems. Each system contains two rows of four CRs, labeled CR<sup>1A</sup> through CR<sup>12D</sup>. The notation is in piano format, with a grand staff (treble and bass clefs) and a brace on the left. The chords are represented by vertical stems with circles indicating the notes. The key signature and mode change across the systems: the first two systems are in D major (one sharp), the next two in B minor (two flats), and the last two in D minor (one flat). The CRs are arranged in a grid-like fashion, with each CR consisting of a unique combination of notes across the two staves.

CR<sup>1A</sup> CR<sup>1B</sup> CR<sup>1C</sup> CR<sup>1D</sup> CR<sup>2A</sup> CR<sup>2B</sup> CR<sup>2C</sup> CR<sup>2D</sup>

CR<sup>3A</sup> CR<sup>3B</sup> CR<sup>3C</sup> CR<sup>3D</sup> CR<sup>4A</sup> CR<sup>4B</sup> CR<sup>4C</sup> CR<sup>4D</sup>

CR<sup>5A</sup> CR<sup>5B</sup> CR<sup>5C</sup> CR<sup>5D</sup> CR<sup>6A</sup> CR<sup>6B</sup> CR<sup>6C</sup> CR<sup>6D</sup>

CR<sup>7A</sup> CR<sup>7B</sup> CR<sup>7C</sup> CR<sup>7D</sup> CR<sup>8A</sup> CR<sup>8B</sup> CR<sup>8C</sup> CR<sup>8D</sup>

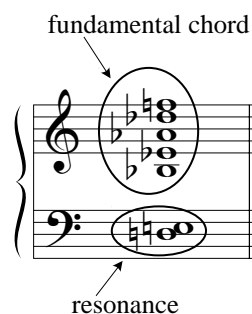
CR<sup>9A</sup> CR<sup>9B</sup> CR<sup>9C</sup> CR<sup>9D</sup> CR<sup>10A</sup> CR<sup>10B</sup> CR<sup>10C</sup> CR<sup>10D</sup>

CR<sup>11A</sup> CR<sup>11B</sup> CR<sup>11C</sup> CR<sup>11D</sup> CR<sup>12A</sup> CR<sup>12B</sup> CR<sup>12C</sup> CR<sup>12D</sup>

### Chord with Contracted Resonance (CCR)

In addition to the CR, the concept of resonance is embodied in another chordal type: the “chord with contracted resonance” (*accord à résonance contractée*). Example 5.21 illustrates the internal construction of the CCR.

Example 5.21. CCR, internal construction.



In the label for the CCR, the word “resonance” refers to the complementary relationship between a fundamental chord and a resonant set. Like the CD and the CDA, the CCR contains a fundamental pitch-complex and two added pitches; in the CCR, these added pitches comprise a minor-seventh dyad, which is “contracted” into a major second and positioned beneath the fundamental pitch-complex.

There are two varieties of CCR: “type 1” and “type 2.”<sup>28</sup> Each type comprises two members, labeled “A” and “B.” Example 5.22 illustrates the internal construction of the two chords of the CCR type 1.<sup>29</sup> The two chords of the CCR type 1 comprise an appoggiatura chord (chord A) and a genesis chord (chord B). The upper part of the genesis chord contains a dominant-ninth chord without the leading tone, for the leading tone is replaced by the tonic (*accord de neuvième sans sensible*). The upper part of the appoggiatura chord contains five different notes: what Messiaen labeled a “quintuple

28. The terms “type 1” and “type 2” are my own. All other terms regarding the construction of the CCR are Messiaen’s.

29. For Messiaen’s explanation of the construction of the CCR type 1, see *Traité*, III, 287.

appoggiatura” (*quintuple appoggiature*). The two chords share a common inferior (*inférieur*) bass dyad, which Messiaen described as “combination tones” (*sons resultants*).<sup>30</sup> The use of the term “combination tone”—a real acoustical phenomenon in which a third pitch is heard as the result of two sounding pitches—reinforces the resonant relationship between the upper pentachord and the bass dyad.

Example 5.22. CCR type 1, chords A and B, internal construction.

appoggiatura chord    genesis chord

quintuple appoggiatura    A    B    genesis pentachord

$\langle 2, 2, 7, 8, 6, 4 \rangle$      $\langle 2, 6, 5, 5, 5, 4 \rangle$

contracted resonance

Example 5.23. The 24 CCRs, type 1.

CCR<sup>1A</sup> CCR<sup>1B</sup> CCR<sup>2A</sup> CCR<sup>2B</sup> CCR<sup>3A</sup> CCR<sup>3B</sup> CCR<sup>4A</sup> CCR<sup>4B</sup> CCR<sup>5A</sup> CCR<sup>5B</sup> CCR<sup>6A</sup> CCR<sup>6B</sup>

CCR<sup>7A</sup> CCR<sup>7B</sup> CCR<sup>8A</sup> CCR<sup>8B</sup> CCR<sup>9A</sup> CCR<sup>9B</sup> CCR<sup>10A</sup> CCR<sup>10B</sup> CCR<sup>11A</sup> CCR<sup>11B</sup> CCR<sup>12A</sup> CCR<sup>12B</sup>

30. Messiaen, *Conférence de Kyoto*, 8. See also Messiaen, *Traité*, III, 87.



In the CCR type 1, the voicing of chord A is <2,2,7,8,6,4>; the voicing of chord B is <2,6,5,5,5,4>. The two voicings can be transposed to all twelve chromatic degrees.

Example 5.23 shows the 24 CCRs type 1. Transpositions of the CCR type 1 are numbered according to the lowest note of the bass dyad, in ascending order, beginning on D.

The colorations of the 24 CCRs type 1 are as follows:

CCR <sup>1A</sup>	high to low: yellow, mauve, gray
CCR <sup>1B</sup>	high to low: green tinged with blue, mauve, gray
CCR <sup>2A</sup>	high to low: clear purple violet, clear yellow, orange red
CCR <sup>2B</sup>	high to low: pale green, over clear gray with a bit of red
CCR <sup>3A</sup>	
CCR <sup>3B</sup>	high to low: carmine red, clear gray, leather brown
CCR <sup>4A</sup>	high to low: clear jade green, pale blue mixed with diamond, over mauve and a bit of yellow
CCR <sup>4B</sup>	high to low: ruby red, orange, with a bit of yellow beneath
CCR <sup>5A</sup>	high to low: ashen yellow, greenish brown
CCR <sup>5B</sup>	high to low: pale green, yellow, clear chestnut, with a bit of black
CCR <sup>6A</sup>	gray, clear green, yellow
CCR <sup>6B</sup>	blue and green, with a bit of yellow below
CCR <sup>7A</sup>	
CCR <sup>7B</sup>	orange yellow over white and mauve
CCR <sup>8A</sup>	high to low: mauve, icy blue, gray
CCR <sup>8B</sup>	high to low: brilliant pale blue, mauve, gray tinged with blue
CCR <sup>9A</sup>	high to low: clear magenta violet, pinkish white, with a bit of orange red
CCR <sup>9B</sup>	high to low: violacious blue, very clear coffee, green and silver, reddish brown
CCR <sup>9</sup>	mixture of violacious blue (the principal color) with orange red, reddish brown and violet, with a bit of green and silver
CCR <sup>10A</sup>	high to low: gold, orange, a very small bit of black
CCR <sup>10B</sup>	high to low: clear carmine red, over yellow and black
CCR <sup>11A</sup>	
CCR <sup>11B</sup>	brilliant clear red, gold, pale gray
CCR <sup>12A</sup>	high to low: clear violet streaked with green, pale blue, silvery gray, a bit of black
CCR <sup>12B</sup>	high to low: brilliant yellow gold, a bit of white, violet and black

Since the chords of each CCR pairing share a common bass dyad, the lower portions of the two chords evoke similar colors. For example, the lowermost color of both  $CCR^{2A}$  and  $CCR^{2B}$  is red, which was evoked by the chords' lowest tone  $E^b$ .

The CD, CDA, and chord B of CCR type 1 are similar in construction. Each chord comprises a “regular pentatonic” collection plus two notes. Example 5.24 reveals the differences among the three chords.

Example 5.24. CD, CDA,  $CCR^B$ : internal differences.

The image shows three chord voicings on a grand staff. The first two,  $CD^{3A}$  and  $CDA^{3A}$ , are in the treble clef. The third,  $CCR^{1B}$ , is in the bass clef. A circled region in the bass clef, shared by all three chords, is labeled "regular pentatonic" collection. Arrows point from this label to the circled region in each of the three chord voicings.

Each chord contains the pentachord  $E^b-F-A^b-B^b-D^b$ . In the CD and the CDA, the two added notes lie above the pentachord; in the CCR, they lie below the pentachord. The coloration of  $CDA^{3A}$  is “campanula mauve, over a white and clear gray haze.” (Since  $CD^{3A}$  shares the same “regular pentatonic” collection in the lower part of the chord, its coloration is likewise similar.) The coloration of  $CCR^{1B}$  is “green tinged with blue, mauve, over gray.” Both descriptions contains references to mauve and gray. The coloristic differences between the chords are due to different voicings of the same pcs within the pentachord, and different added notes. It stands to reason that all such related CDs, CDAs and CCRs evoked somewhat similar colorations.

The CCR type 2 is similar in construction to the CCR type 1. Example 5.25 illustrates the construction of the CCR type 2.

Example 5.25. CCR type 2, internal construction.

appoggiatura chord      genesis chord  
A                                  B

<2,9,9,7,4>                      <2,6,10,7,4>

contracted resonance

Example 5.26. The 24 CCRs, type 2.

CCR<sup>1A</sup> CCR<sup>1B</sup> CCR<sup>2A</sup> CCR<sup>2B</sup> CCR<sup>3A</sup> CCR<sup>3B</sup> CCR<sup>4A</sup> CCR<sup>4B</sup> CCR<sup>5A</sup> CCR<sup>5B</sup> CCR<sup>6A</sup> CCR<sup>6B</sup>

CCR<sup>7A</sup> CCR<sup>7B</sup> CCR<sup>8A</sup> CCR<sup>8B</sup> CCR<sup>9A</sup> CCR<sup>9B</sup> CCR<sup>10A</sup> CCR<sup>10B</sup> CCR<sup>11A</sup> CCR<sup>11B</sup> CCR<sup>12A</sup> CCR<sup>12B</sup>

As in the CCR type 1, the lowest two notes of the CCR type 2 are separated by a major second. Unlike the CCR type 1, the CCR type 2 contains a superior tetrachord instead of a superior pentachord. The voicing of chord A (the appoggiatura chord) is <2,9,9,7,4>; The voicing of chord B (the genesis chord) is <2,6,10,7,4>. The 48 CCRs type 2 are presented in Example 5.26. Transpositions of the CCR type 2 are numbered according to the lowest note of the bass dyad, in descending order, beginning on B $\flat$ . To date, the published writings of Messiaen contain only a few descriptions of the colorations of 2 type CCRs, and all are of A–B pairings—not of individual chords. The colorations of the CCR type 2 are as follows:

- CCR<sup>3</sup> amber (yellow and clear chestnut), veined with violet and chocolate brown, with some pale blue stains<sup>31</sup>
- CCR<sup>7</sup> clear and brilliant scarlet red, with a bit of pale blue and steel gray<sup>32</sup>
- CCR<sup>8</sup> a very small patch of gray and red, then a large zone of mauve with silvery gray stains<sup>33</sup>
- CCR<sup>10</sup> mauve and clear gray, with a bit of yellow<sup>34</sup>
- CCR<sup>12B</sup> high to low: white, red; the low C $\sharp$  is black<sup>35</sup>

Although the terms “genesis” and “appoggiatura” imply hierarchy (the appoggiatura chord having less structural significance than the genesis chord) and order (the appoggiatura being heard before the genesis chord), in practice Messiaen treated each member of the CCR pairing as freestanding harmonic entities. Just as a CDA need not “resolve” to a CD, a CCR<sup>A</sup> need not “resolve” to a CCR<sup>B</sup>. Members of a CCR pairing may be presented in either order (A–B, or B–A). Furthermore, an individual CCR may appear intermixed with other special chord types. The identity of each chord of the CCR pairing is reinforced through their respective colorations. Messiaen claimed, “In the case of the chord with contracted resonance, we will always have two colors: the color of the appoggiatura chord, and the color of the actual chord.”<sup>36</sup>

Examples of the CCR first appeared in Messiaen’s music around the time of *Visions de l’Amen* (1943). Excerpts from *Visions* that illustrate the CCR are present in

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31. “Couleur ambre (jaune et marron clair), veinée de violet et de brun chocolate, avec quelques taches de bleu pâle.” Messiaen, *Traité*, V/1, 180.
32. “Les 2 accords enchaînés donnent un rouge écarlate clair et brillant, avec un peu de bleu pâle et de gris d’acier.” Messiaen, *Traité*, V/1, 179.
33. “L’ensemble de la mesure donne un tout petit coin de gris et de rouge puis une grande zone mauve avec des taches gris argenté.” Messiaen, *Traité*, V/1, 181.
34. “Mauve et gris clair, avec un peu de jaune.” Messiaen, *Traité*, V/1, 181.
35. “De haut en bas : blanc, rouge — le do dièse grave est noir.” Messiaen, *Traité*, V/1, 470.
36. “Dans le cas des « accords à résonance contractée », nous aurons toujours deux couleurs : la couleur de l’accord appoggiature, la couleur de l’accord réel.” Messiaen, *Conférence de Kyoto*, 8.

*Technique* but are not accompanied by the term “chord with contracted resonance.”<sup>37</sup>

Messiaen did not discuss the construction of the CCRs in the excerpts, except to point out how the music “contracts the resonance” (inverts the minor seventh into a major second).<sup>38</sup>

Messiaen used the CCR frequently in his later works; type 1 is encountered often, while use of type 2 is rare.

### Chord in Fourths (C4)

In *Technique*, Messiaen defined the chord in fourths (*accord en quartes*) as “a chord with augmented and perfect fourths.”<sup>39</sup> Example 5.27 shows a C4. In the example, perfect fourths and augmented fourths alternate. (The uppermost augmented fourth is spelled as a diminished fifth.) Example 5.28 shows a particularly striking example of C4s from Messiaen’s orchestral work *Réveil des oiseaux* (1953). In the Example, each chord is a C4; voices move in parallel motion.

Despite Messiaen’s precise definition in *Technique*, in reality the term “chord in fourths” is something of a blanket description. In the music of Messiaen, dyads and trichords are the most common types of sonorities built in fourths. In many of his works—his keyboard works, especially—Messiaen used a trichord involving the conjunction of a perfect fourth and an augmented fourth.<sup>40</sup> Example 5.29 shows the opening bars of “Regard de l’onction terrible” (from *Vingt Regards sur l’Enfant Jésus*). In

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37. For examples of CCRs, see *Technique*, Examples 288–293.

38. Messiaen, *Technique*, I, 47. For a rare example of an early CCR in which the resonance is not contracted, see “Vocalise, pour l’Ange qui annonce la fin du Temps” (from *Quatuor pour la fin du temps*), m. 1.

39. “Un accord en quartes augmentées et justes.” Messiaen, *Technique*, I, 44.

40. This type of trichord is sometimes referred to as a “Viennese fourth chord,” due to its frequent use by composers of the second Viennese school (Arnold Schoenberg, Alban Berg, and Anton Webern). See Robert P. Morgan, *Twentieth-Century Music: A History of Musical Style in Modern Europe and America* (New York: W. W. Norton & Company, Inc., 1991), 71.

the example, both hands play trichords comprising a perfect fourth and an augmented fourth. In the upper register, the chords descend by semitone.

Example 5.27. C4.

Example 5.28. C4s in *Réveil des oiseaux*, p. 4, mm. 9–11.

Example 5.29. C4 trichords in “Regard de l’onction terrible,” mm. 1–2.

In *Technique*, Messiaen points out how the C4 contains all the notes of the fifth mode of limited transposition.<sup>41</sup> However, in practice Messiaen rarely used mode 5; as with the CR, it is possible that he mentioned the modal connection simply to bolster his

41. Messiaen, *Technique*, I, 55.

various theories. Messiaen did not number C4s. Examples of the C4 are rare in Messiaen's later works. Messiaen rarely provided colorations for the C4s that he did use.<sup>42</sup>

### Turning Chord (TC)

Messiaen started using "turning chords" (*accords en tournant*) in the early 1940s, around the time of *Visions de l'Amen* (1943). TCs appear in *Technique* under the blanket category of "carillon sonorities," although no explanation for them is supplied.<sup>43</sup> The term "turning chord" first appeared in print in the score of *Méditations sur le Mystère de la Sainte Trinité* (1969).<sup>44</sup>

Example 5.30. Turning chords, three fundamental voicings.

A                      B                      C

<5,2,1,3,5,2,4>   <5,3,2,1,7,3,4>   <5,2,2,4,1,6,2>

As with CDs, CDAs, and CCRs, TCs exist in groups. A TC group comprises three chords, labeled "A," "B" and "C." Example 5.30 shows the three chords of a TC group in their fundamental voicings. The fundamental voicing of chord A is <5,2,1,3,5,2,4>. The voicing of chord B is <5,3,2,1,7,3,4>, while the voicing of chord C is <5,2,2,4,1,6,2>. The three chords of a turning chord group do not share the same

42. In *Traité*, Messiaen described the colors of the chord  $A\flat_2-D_3-G_3-C\sharp_4$  as "iron gray, tinged with blue, with gleams of yellow and black." ("Une couleur gris de fer bleuté à reflets jaunes et noirs.") Messiaen, *Traité*, V/1, 121.

43. Messiaen, *Technique*, II, 47, Example 299.

44. Olivier Messiaen, *Méditations sur le mystère de la Sainte Trinité* (Paris: Alphonse Leduc, 1969), 7, 37, 76.

bass note, nor are they inversionally related. The lowest note of chord B is a whole step below that of chord A; the lowest note of chord C is a half step below that of chord A. As with the CCR pairing, the three chords of a TC group may appear in any order; they may also appear intermixed with other chord types.

Example 5.31. The 36 TCs.

The musical score displays 36 Turning Chords (TCs) arranged in four systems of three measures each. Each measure is labeled with a specific TC designation (e.g., TC<sup>1A</sup>, TC<sup>1B</sup>, TC<sup>1C</sup>, etc.). The notation is presented in piano style, with treble and bass staves for each system. The chords are represented by block letters and accidentals, showing various triads and dyads across different keys and inversions.

For Messiaen, the term “turning chord” referred to the turning of colors. He explained:



Each group has three *eight-note chords*—24 notes total. A group resembles an octahedron of translucent opal or, more simply, of iridescent glass. Each facet of the octahedron (each facet representing one tone among the eight of each chord) has the possibility of *three changes* according to the incidences of light (which produce three combinations of eight tones—24 tones divided among three chords). A single column of tones turns, changing, one’s memory recording a global sonority resulting from the three chords. Likewise, a single complex of colors gushes from the triple perspective of the combination of colors. Thus, for each three-chord group, I indicate: first, three sets of colors; then, the colored effect that remains in my memory, with a multicolored dazzle and a principal or dominating color, as in a stained-glass window. The colors vary with each transposition.<sup>45</sup>

The three chords of a TC group occupy the same register; the chords’ somewhat fixed ambitus and changing inner voices bolster the image of a rotating octahedron.<sup>46</sup>

The three voicings of the TC can be transposed to all twelve chromatic degrees; there are a total of 36 TCs. Example 5.31 shows the 36 TCs. TC groups are numbered according to the lowest tone of the group (which is the lowest tone of chord B), in descending order, beginning on D. The colorations of the 36 TCs are as follows:

TC <sup>1A</sup>	high to low: orange, mauve, and clear blue
TC <sup>1B</sup>	
TC <sup>1C</sup>	high to low: pale blue over darker blue violet
TC <sup>2A</sup>	high to low: gold and white over blue violet
TC <sup>2B</sup>	high to low: yellow, over gray and clear Prussian blue
TC <sup>2C</sup>	high to low: red, gray and brown, over orange yellow
TC <sup>3A</sup>	high to low: clear red violet over green gray and yellow
TC <sup>3B</sup>	high to low: green tinged with blue, purple violet, emerald green, lead gray
TC <sup>3C</sup>	clear yellow over orange

45. “Chaque tableau a 3 *accords de 8 sons*, 24 sons au total. Cela ressemble à un octaèdre en opale translucide ou plus simplement en verre irisé : chaque face de l’octaèdre (1 son parmi les 8 de chaque accord) a la possibilité de *trois changements* suivant les incidences de lumière (ce qui donne 3 combinaisons de 8 sons, soit 24 sons répartis en 3 accords.) Il y a une seule colonne de sons qui tournent en changeant, la mémoire enregistrant une sonorité globale qui est le fruit des 3 accords. De même, un seul complexe coloré jaillit du triple aspect de l’accord de couleurs. J’indique donc pour chaque groupe de trois accords : a) d’abord 3 ensembles de couleurs — b) puis l’effet coloré qui reste dans le souvenir, avec éblouissement multicolore et couleur principale ou dominante, comme dans un vitrail. Tout cela varie avec chaque transposition.” (Italics in original.) Messiaen, *Traité*, III, 86.

46. In *Traité*, Messiaen used another metaphor to describe the three chords of a TC group: “columns of air in mobile resonances, like wind in the trees.” (“[Ils] sont des « colonnes d’air en résonances mobiles » (comme le vent dans les arbres).” Messiaen, *Traité*, III, 238.) Plato also related the octahedron to air, proposing that each air particle is composed of a regular octahedron. Plato, *Timaeus*, 55d–56b.

TC <sup>4A</sup>	high to low: yellowish green over silver, gray and black
TC <sup>4B</sup>	mauve and orange, very clear
TC <sup>4C</sup>	high to low: velvety blue, pinkish mauve, grassy green
TC <sup>5A</sup>	gray and gold
TC <sup>5B</sup>	clear orange, gold, smoky brown, deep violet
TC <sup>5C</sup>	high to low: pink, red, and gold
TC <sup>6A</sup>	rubies—royal blue, mauve ash
TC <sup>6B</sup>	high to low: dark red, orange, gray tinged with blue
TC <sup>6C</sup>	high to low: leather brown, royal blue, carmine red
TC <sup>7A</sup>	
TC <sup>7B</sup>	golden yellow, the yellow zone surrounded by two light black and white circles
TC <sup>7C</sup>	
TC <sup>8A</sup>	upper zone: pale yellow, mauve; lower zone: coppery pink, pearly gray
TC <sup>8B</sup>	upper zone: dull green chrysoprase tinged with blue; lower zone: sardonyx (alternating black, white and reddish brown), with pale yellow
TC <sup>8C</sup>	high to low: quartz, sparkling deep green “cat’s eye”
TC <sup>9A</sup>	
TC <sup>9B</sup>	high to low: yellow and pink, over steel gray
TC <sup>9C</sup>	high to low: very clear brown, over golden yellow
TC <sup>10A</sup>	
TC <sup>10B</sup>	
TC <sup>10C</sup>	
TC <sup>11A</sup>	pink and gray, over smoky brown yellow
TC <sup>11B</sup>	
TC <sup>11C</sup>	high to low: clear brick red (pale brown), yellow, clear green, red, with a bit of gray
TC <sup>12A</sup>	
TC <sup>12B</sup>	
TC <sup>12C</sup>	high to low: gray and gold, over translucent fluorine blue

Although Messiaen claimed that each three-chord TC group evoked a “global” coloration, his published writings contain only three such descriptions. These are the colorations of

TC groups:

TC <sup>6</sup>	red, orange, purple violet
TC <sup>8</sup>	global colored effect: pale yellow, streaked with white, black and gray, with green stains; dominant color: pale yellow
TC <sup>10</sup>	red, orange, gold

Global colorations stem from a group's three constituent harmonic colorations. For example, the “red, orange, purple violet” evoked by TC<sup>6</sup> stems from the chords' red (“rubies in” TC<sup>6A</sup>; “dark red” in TC<sup>6B</sup>; “carmine red” in TC<sup>6C</sup>), orange (in TC<sup>6B</sup>), and violet tones (“mauve ash” in TC<sup>6A</sup>).

### Chord of Total Chromaticism (CTC)

The “chord of total chromaticism” (*accord du total chromatique*) is a relatively late harmonic invention of Messiaen, first appearing around the time of *Couleurs de la cité céleste* (1963). It was not until some twenty years later, in the preface to *Petites esquisses d'oiseaux* (1985), that Messiaen first mentioned the CTC. Example 5.32 shows a CTC in its fundamental voicing. The CTC comprises two distinct pc sets: an inferior octachord and a superior complementary tetrachord. Regarding the presence of the complete aggregate in the CTC, Messiaen stated, “The chord of total chromaticism is not a cluster, but a collection of twelve tones: eight colored tones and four supplementary high tones, which are contained within the resonance of the first eight.”<sup>47</sup> The fundamental voicing of the CTC is <5,4,4,6,4,5,2,9,5,6,8>. As the octachord and tetrachord of the CTC exist in a resonant relationship, in addition to being complementary pitch-class sets, they are typically presented with contrasting timbres, dynamics, and articulations. These contrasts accentuate the resonant relationship. Example 5.33 shows the CTC in the final measure of the orchestral work *Un Vitrail et des oiseaux* (1986). In the passage, the octachord is sustained by the winds; the resonant tetrachord is punctuated by the piano. In the music of Messiaen, the octachord of the CTC sometimes appears alone, without the superior tetrachord. Example 5.34 shows a passage from “Le Chemin de l'invisible” (the tenth movement of *Éclairs sur l'Au-Delà*). In the example, a CTC octachord ascends by semitone; the final octachord is sustained, and its complementary tetrachord is above it.

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47. “Dans le cas des « accords du total chromatique », il s'agit non pas d'un ‘cluster’ mais d'un ensemble de douze sons comprenant huit sons colorés, et quatre sons supplémentaires aigus qui rentrent dans la résonance des huit premiers.” Messiaen, *Conférence de Kyoto*, 8.

Example 5.32. CTC, internal construction.

upper tetrachord

lower octachord

<5,4,4,6,4,5,2,9,5,6,8>

Example 5.33. CTC in *Un Vitrail et des oiseaux*, final measures.

tetrachord

piano

*Sva*

*ff*

*Red.*

octochord

winds

*ff*

The CTC exists in twelve transpositions; Messiaen did not invert the CTC.

Example 5.35 shows the twelve transpositions of the CTC. CTCs are numbered according to the lowest tone, in ascending order, beginning on  $E\flat$ . Messiaen used the CTC infrequently, compared to his other special chords. The CTC is found only in Messiaen's later works.

Example 5.34. CTCs in “Le Chemin de l’invisible,” rehearsal 2.

upper tetrachord of CTC<sup>7</sup>

picc.,  
xylo.,

oboe,  
xylorim.

strings

CTC<sup>1</sup> CTC<sup>2</sup> CTC<sup>3</sup> CTC<sup>4</sup> CTC<sup>5</sup> CTC<sup>6</sup> CTC<sup>7</sup>

*f* *ff* *mf*

Example 5.35. The CTC in its twelve transpositions.

CTC<sup>1</sup> CTC<sup>2</sup> CTC<sup>3</sup> CTC<sup>4</sup> CTC<sup>5</sup> CTC<sup>6</sup>

*8va--1* *8va--1* *8va--1* *8va--1* *8va--1* *8va--1*

CTC<sup>7</sup> CTC<sup>8</sup> CTC<sup>9</sup> CTC<sup>10</sup> CTC<sup>11</sup> CTC<sup>12</sup>

*8va--1* *8va--1* *8va--1* *8va--1* *8va--1* *8va--1*

The voicing of the CTC covers a wide register, evoking three distinct “zones” of color. Messiaen explained the phenomenon as follows:

I have chords, for example, that contain all twelve pitches. The pitches are not clusters, nor are they series in the style of Schoenberg; they are superimpositions of colors. One clearly hears a color, a second color, a third color. There are twelve pitches total, but in reality, for the ear and for the eye and for the mind, there are three colors.<sup>48</sup>

To date, the published writings of Messiaen contain descriptions of the colorations of only four CTCs. These are:

CTC <sup>4</sup>	high zone: thin band of very pale green blue middle zone: stony gray, stained with pink and violet low zone: reddish leather brown
CTC <sup>8</sup>	high zone: a bit of pale blue middle zone: clear carmine red low zone: a bit of green
CTC <sup>9</sup>	high zone: a large, clear, brilliant gray blue circle, with a trace of pale yellow middle zone: a small zone of clear carmine red low zone: a large zone of ruby red
CTC <sup>12</sup>	high zone: a thin band of clear, greenish gray smoked quartz middle zone: very clear Prussian blue low zone: yellow and pink

Messiaen described the CTCs in terms of three zones of color, each zone corresponding to the three tetrachords that comprise each chord. Sometimes, the zones evoked similar colorations; for example, in CTC<sup>9</sup> the lower two zones evoked different shades of red. However, it appears that for the most part each zone remains coloristically distinct.

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48. “J’ai des accords, par exemple, qui contiennent les douze sons. Les sons ne sont pas des clusters, ils ne sont pas des séries à la Schoenberg, ce sont des superpositions des couleurs. On entend très bien une couleur, une deuxième couleur, une troisième couleur. Ça fait un total de douze sons, mais en réalité pour l’oreille, et pour l’œil, et pour l’esprit, ça fait trois couleurs.” Olivier Messiaen, *Entretien avec Claude Samuel* (Erato ECD 75505). See also, Almut Rössler, *Contributions to the Spiritual World of Olivier Messiaen: With Original Texts by the Composer*, trans. Barbara Dagg, Nancy Poland, and Timothy Tikker (Duisburg: Gilles und Francke, 1986), 81.

## Summary

Messiaen's modes and special chords constitute a large portion of the harmonic resources of *musique colorée*. The descriptions of colorations listed in this chapter will serve as the foundation for the examination of a work's coloristic content in the following chapter. As the analysis will demonstrate, Messiaen did not avail himself equally of all chordal types. However, the harmonic vocabulary within *musique colorée* is readily classifiable, and voicings are quite consistent—factors which greatly facilitate taxonomic analyses based upon color.