

La Marque du maître:

Messiaen's Influence on Québécois Composers
Serge Garant, Clermont Pépin and André Prévost

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To David and my parents

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TABLE OF CONTENTS

DEDICATION.....	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS.....	v
LIST OF EXAMPLES.....	vii
LIST OF FIGURES	x
ABSTRACT.....	xi
ABRÉGÉ.....	xii
Chapter 1: Introduction.....	1
1.1 Messiaen and Influence.....	6
Messiaen as Pedagogue	8
Messiaen as Analyst	11
Messiaen as Composer	14
The Classroom as a Sphere of Influence.....	16
1.2 <i>Style</i> versus <i>Technique</i> : The External Esthetics and Poietics of Jean-Jacques Nattiez	19
1.3 From Humble Beginnings: Echoes of pre-1960's Québec in the Music of Garant, Pépin and Prévost	24
Garant the Rebel	26
Pépin the Romantic.....	30
Prévost the Believer	34
1.4 The Allure of France	39
Chapter 2: The Compositional Techniques of Olivier Messiaen.....	42
2.1 Les Rythmes non-rétrogradables / Non-Retrogradable Rhythms.....	43
2.2 Les Pédales rythmiques et les canons rythmiques / Rhythmic Pedals and Rhythmic Canons	48
2.3 Numerical Mysticism, Patterns and Palindromes.....	49
2.4 Les permutations symétriques / Symmetrical Permutations.....	56
2.5 Les Modes à transpositions limitées / Modes of Limited Transposition	64
Chapter 3: Serge Garant.....	71
3.1 Before Paris: <i>Un grand sommeil noir</i> (1949) and <i>Fantaisie pour clarinette et piano</i> (1950)	71
<i>Un grand sommeil noir</i> (1949)	71
<i>Fantaisie pour clarinette et piano</i> (1950).....	75
3.2 In Paris: <i>Concerts sur terre</i> (1951), <i>Et je prierai ta grâce</i> (1952) and <i>Variations pour deux pianos</i> (1952) ...	80
<i>Concerts sur terre</i> (1951)	80
<i>Et je prierai ta grâce</i> (1952).....	85
<i>Variations pour deux pianos</i> (1952)	92
3.3 After Paris: <i>Caprices</i> (1954), <i>Concerts sur terre</i> , mvt V (1956) and <i>Asymétries no 2</i> (1959)	109
<i>Caprices</i> (1954)	109
<i>Concerts sur terre</i> , mvt V (1956)	115
<i>Asymétries no 2</i> (1959)	117
Chapter 4: Clermont Pépin.....	130
4.1 In Paris: <i>Suite pour piano</i> (1951, rev. 1955), <i>Guernica</i> (1952) and <i>Le Rite du soleil noir</i> (1955).....	130
<i>Suite pour piano</i> (1951, rev. 1955).....	130
<i>Guernica</i> (1952)	144
<i>Le Rite du soleil noir</i> (1955)	157
4.2 After Paris: <i>Variations pour quatuor à cordes</i> (1956) and <i>Quasars</i> (1967).....	160
<i>Variations pour quatuor à cordes</i> (1956).....	160
<i>Quasars</i> (1967).....	177
Chapter 5: André Prévost.....	190
5.1 Before Paris: <i>Soleil Couchant</i> (1953) and <i>Mobiles</i> (1959).....	190
<i>Soleil Couchant</i> (1953)	190
<i>Mobiles</i> (1959).....	191
5.2 In Paris: <i>Sonate pour violon et piano</i> (1960) and <i>Quatre préludes pour deux pianos</i> (1961).....	195
<i>Sonate pour violon et piano</i> (1960)	195
<i>Quatre préludes pour deux pianos</i> (1961)	216
5.3 After Paris: <i>Triptique</i> (1953), <i>Célébration</i> (1959), <i>Terre des hommes</i> (1967) and <i>Hommage</i> (1971).....	238
<i>Triptique</i> (1953).....	238

<i>Terre des hommes</i> (1967).....	240
<i>Hommage</i> (1971)	246
Chapter 6: Conclusion	257
Compositions by Serge Garant.....	269
Compositions by Clermont Pépin.....	270
Compositions by André Prévost.....	272
BIBLIOGRAPHY	275

LIST OF EXAMPLES

Chapter 1: Introduction

Example 1-1: The Classic Communication Scheme.....	20
Example 1-2: Alteration of the scheme in example 1-1 by Jean Molino and Jean-Jacques Nattiez.....	20

Chapter 2: The Compositional Techniques of Messiaen: A Quick Primer

Example 2-1: A non-retrogradable rhythm of more than 3 values, <i>Traité</i> , vol. II, p. 26.....	44
Example 2-2: <i>Termes</i> by augmentation and (B) diminution, <i>Traité</i> , vol. II, p. 37.....	45
Example 2-3: Adding values to the extremes of a non-retrogradable rhythm, <i>Traité</i> , vol. II, p. 32.....	46
Example 2-4: <i>Monnayage</i> , as explained in the <i>Traité</i> , vol. II, p. 26.....	47
Example 2-5: “Acadabra magic triangle” as shown in the <i>Traité</i> , vol. II, p. 15.....	48
Example 2-6: Ascending and descending simple numerical series, <i>Harawi</i> (1945).....	55
Example 2-7: A 12-member <i>gamme chromatique</i>	57
Example 2-8: “De 3 en 3, groupes de 4,” <i>Traité</i> , vol. III, p. 325.....	58
Example 2-9: “De 4 en 4, groupes de 3,” <i>Traité</i> , vol. III, p. 325.....	59
Example 2-10: “De 2 en 2 par mouvement rétrograde (sauf les valeurs extrêmes),” <i>Traité</i> , vol. III, p. 325.....	59
Example 2-11: “De 5 en 5 [...] et de 6 en 6 [...], en alternant (sauf les valeurs extrêmes),” <i>Traité</i> , vol. III, p. 325.....	60
Example 2-12: <i>Ciseaux ouverts</i> permutation, <i>Traité</i> , vol. III, p. 325.....	61
Example 2-13a: Open-scissors permutation, <i>Traité</i> , vol. III, pp. 165-167.....	62
Example 2-13b: Closed-scissors permutation, <i>Traité</i> , vol. III, pp. 322-323.....	62
Example 2-14a: The 10 interversions of the open-scissors permutation.....	63
Example 2-14b: The 10 interversions of the closed-scissors permutation.....	63
Example 2-15: The modes of limited transposition.....	65-6

Chapter 3: Serge Garant

Example 3-1: Imitative Counterpoint, French / Jazz Harmonies, <i>Un grand sommeil noir</i> (1949).....	73
Example 3-2: Mode 1 ¹ and 1 ² voice-leading, Debussy’s <i>La Cathédrale engloutie</i>	74
Example 3-3a: Jazz scoring, <i>Fantaisie pour clarinette et piano</i> (1950).....	77
Example 3-3b: Comparable jazz scoring, Glenn Miller’s <i>Moonlight Serenade</i> (1939).....	77
Example 3-4: CCRs, recitation tones and movement by ic in <i>Concerts sur terre</i> (1952), mvt. 1.....	81
Example 3-5a: Voice-leading in Messiaen’s CCRs, <i>Traité</i> , vol. VII.....	82
Example 3-5b: Comparison between Messiaen’s CCRs and Garant’s in <i>Concerts sur terre</i> , mvt. I.....	83
Example 3-6a: Melodic concentration of ics 1 and 6, <i>Concerts sur terre</i> , mvt. II (1952).....	84
Example 3-6b: Melodic concentration of ic 6, Messiaen’s “Syllables,” <i>Harawi</i> (1945).....	84
Example 3-6c: Ic-6 recitation pitches, Messiaen’s “L’escalier redit, gestes du soleil,” <i>Harawi</i>	84
Example 3-7: Modal and chromatic zones, <i>Concerts sur terre</i> (1952), mvt. II.....	85
Example 3-8: Rhythmic and opis pedals, <i>Et je prierai ta grâce</i> (1952).....	86
Example 3-9: Retrograde and quasi-retrograde-inversionally related strings of opis in example 3-8.....	87
Example 3-10: Coordinating descent of pitch and reduction of repetitions, <i>Et je prierai ta grâce</i>	89
Example 3-11: Chords in example 3-10 as Messiaen’s <i>accords tournants</i> / turning chords.....	90
Example 3-12: Voice leading of Messiaen’s <i>accords tournants</i> , <i>Traité</i> , vol. VII.....	92
Example 3-13: <i>Métamorphoses</i> as symmetrical permutations, <i>Variations pour deux pianos</i> (1952).....	93
Example 3-14: <i>Les développements</i> within and between rows in <i>Variations pour deux pianos</i>	94
Example 3-15a: +1/-1 as limited symmetric reinterventions, Messiaen’s <i>Vingt Regards</i> , mvt. X.....	98
Example 3-15b: +1/-1 as limited symmetric reinterventions, <i>Variations pour deux pianos</i>	100
Example 3-16: <i>Candrakalâ tâla</i> and two <i>monnayages</i> , <i>Variations pour deux pianos</i>	102
Example 3-17a: Hypothetical notation of example 3-16 using Messiaen’s conventions.....	102
Example 3-17b: Realization of inversionally-symmetrical segments, <i>Variations pour deux pianos</i>	103
Example 3-17c: Rectangular permutation notation and the gradual shifting of example 3-17b.....	104

Example 3-18: Further permutation of the <i>candrakalâ</i> theme, <i>Variations pour deux pianos</i>	106
Example 3-19: Hypothetical derivation of bass and soprano pedals, <i>Variations pour deux pianos</i>	108
Example 3-20: “Adivinanza De La Guitarra,” <i>Poema del cante jondo</i> , Federico García Lorca	110
Example 3-21: Serial analysis of “Devinette la Guitarre,” <i>Caprices</i> (1954)	111
Example 3-22: Reconstructed <i>Originale</i> and <i>Renversements</i> matrices, <i>Caprices</i>	114
Example 3-23: Complementary tetrachord design, <i>Concerts sur terre</i> , mvt. V (1956)	116
Example 3-24: <i>Originale</i> and <i>Renversements</i> matrices, <i>Asymétries no 2</i> (1959)	118
Example 3-25: Determining series ordering, <i>Asymétries no 2</i>	120
Example 3-26: Creating a duration series, <i>Asymétries no 2</i>	122
Example 3-27: Creation of a dynamics series, <i>Asymétries no 2</i>	125
Example 3-28a: archived unmarked attack scale that was modified for use in <i>Asymétries no 2</i>	126
Example 3-28b: Calculating attacks through extraction, <i>Asymétries no 2</i>	127
Example 3-29: Serial analysis, <i>Asymétries no 2</i>	128-9

Chapter 4: Clermont Pépin

Example 4-2: Symmetrical sequence in “Allegro Leggiero,” <i>Suite pour piano</i> (1951, rev. 1955)	131
Example 4-2: Structural delineation via chromatic and mode 2 bass lines, “Allegro Leggiero”	133
Example 4-3: Chromatic ascent and sequence, Honegger’s <i>Symphonie pour cordes</i> (1941-42)	137
Example 4-4: Cipher, “Fantaisie en hommage à Arthur Honegger,” <i>Suite pour piano</i>	139
Example 4-5: encryption method, “Fantaisie en hommage à Arthur Honegger,” <i>Suite pour piano</i>	140
Example 4-6: Diatonic and natural and synthetic modes, “Danse Frénétique,” <i>Suite pour piano</i>	142
Example 4-7: Modes 2 ³ and 3 ⁴ sequence and ostinati, “Danse Frénétique,” <i>Suite pour piano</i>	144
Example 4-8: Mode 3 ² theme and mode 2 ³ countermelody, <i>Guernica</i> (1952), mvt. 1	145
Example 4-9: Mode 2 ² thematic fragments and cascading mode 2 ² scales, <i>Guernica</i> , mvt. 1.	146
Example 4-10: Mode 2 ¹ theme and accompaniment, <i>Guernica</i> , mvt. 3.	148
Example 4-11: Modes 2 and 3 descending scales, Messiaen’s <i>Turangalîla Symphony</i> (1948)	149
Example 4-12: Mode 2 ² step classes, step class sets and interval normal forms	150
Example 4-13: Comparing the mode 2 ² voice-leading of <i>Guernica</i> and the <i>Turangalîla Symphony</i>	151
Example 4-14: Mode 4 ⁶ step classes, step class sets and interval normal forms.	152
Example 4-15: Voice-leading of mode 4 ⁶ strings, <i>Turangalîla Symphony</i>	153
Example 4-16: Chromatic collection and modes 1 ² , 2 ¹ , 2 ² , 4 ³ and 4 ⁶ in Pépin’s <i>Guernica</i>	155
Example 4-17: Honegger’s <i>Rugby</i> as a template for Pépin’s <i>Guernica</i>	157
Example 4-18: Melodic and harmonic use of modes 2 ¹ , 2 ² and 2 ³ , <i>Le Rite du soleil noir</i> (1955)	158
Example 4-19: Mode 7 ³ main theme, <i>Le Rite du soleil noir</i>	159
Example 4-20: Harmonic tetrachords as a cycle-of-fifths, Berg’s <i>Lyrische Suite</i> (1925-26)	161
Example 4-21: Ic 5 overlapped and rotated rows, <i>Variations pour quatuor à cordes</i> (1956)	162
Example 4-22: Berg’s versus Pépin’s setting of the [0126] encrypted Berg-Fuchs-Robettin motive	164
Example 4-23: Simultaneous transposition / rotation, Berg’s “Allegro Misterioso,” <i>Lyrische Suite</i>	166
Example 4-24: Voice exchange and rotating pc pairs of row P0, <i>Variations pour quatuor à cordes</i>	167
Example 4-25: Reduction of the rotation in example 4-25.	168
Example 4-26: Full set of réinterversions in Var. VI, <i>Variations pour quatuor à cordes</i>	170
Example 4-27a: Order-3 Latin square formed by rotating pairs in example 4-27.	171
Example 4-27b: Cyclic and back-cyclic movement within a modular-3 cycle	171
Example 4-28: Shifting towards mode 3 scales in Var. VII, <i>Variations pour quatuor à cordes</i>	172
Example 4-39: Similar shifting fugal entries in Berg’s “Andante amoroso,” <i>Lyrische Suite</i>	173
Example 4-30: Voice-leading reduction of example 4-30	174
Example 4-31: Voice-leading reduction of example 4-29	175
Example 4-32: Five non-retrogradable Morsiques in “Morsiques,” <i>Quasars</i> (1973)	180
Example 4-33: Seven lines of Morsiques from the sketches	182
Example 4-34: P, R, I and RI forms of the rhythmic row for “C.T.A.-102,” <i>Quasars</i>	186
Example 4-35a: Rhythmic canon as a reflective (1, 2, 4, 3) permutation, <i>Quasars</i>	188
Example 4-35b: Rhythmic canon as a traditional two-voice contrapuntal combination, <i>Quasars</i>	188
Example 4-35c: Rhythmic canon as reflective exchanges, <i>Quasars</i>	189
Example 4-35d: Rhythmic canon as rotating pairs in a mod-2 cycle, <i>Quasars</i>	189

Chapter 5: André Prévest

Example 5-1: Mirrored contour and mode 2 ² imitative voices, <i>Soleils Couchants</i> (1953)	191
Example 5-2: 1 st interversion of an open-fan permutation, <i>Mobiles</i> , mvt. II (1959)	192
Example 5-3: Voice-exchange completing modes 1 ¹ and 1 ² scales, <i>Mobiles</i> , mvt. III.	193
Example 5-4: Mode 5 ⁴ as three ic 6 dyads ([06] * [012]), <i>Mobiles</i> , mvt. IV.	194
Example 5-5: Symmetrical properties of all-interval row, <i>Sonate pour violon et piano</i> (1960)	195
Example 5-6: Transpositionally-combinatorial pattern, <i>Sonate pour violon et piano</i>	196
Example 5-7: Modified open-fan permutation, <i>Sonate pour violon et piano</i> , mvt. III.	198
Example 5-8: Trichordal organisation of <i>Sonate pour violon et piano</i> , mvt. II	200
Example 5-9: Trichord segment reordering, <i>Sonate pour violon et piano</i> , mvt. II, <i>partie médiane</i>	202
Example 5-10: Illustration of concurrent 4- and 8-interversion palindromes in example 5-9.	203
Example 5-11: Direct and indirect subtractive processes, <i>Sonate pour violon et piano</i> , mvt. III.	205
Example 5-12: An indirect additive process in the A section, <i>Sonate pour violon et piano</i> , mvt. III.	207
Example 5-13: The series set as a non-retrogradable rhythm, <i>Sonate pour violon et piano</i>	207
Example 5-14: Section B, <i>Sonate pour violon et piano</i> , mvt. III.	208
Example 5-15: Section C, <i>Sonate pour violon et piano</i> , mvt. III.	209
Example 5-16: Comparing sections A and D, <i>Sonate pour violon et piano</i> , mvt. III.	210
Example 5-17: Detailing the differences between sections A and D shown in example 5-16	211
Example 5-18: Grace notes as an Eb pedal embellishment, <i>Sonate pour violon et piano</i> , mvt. III	212
Example 5-19a: Inverted open-fan permutation in coda, <i>Sonate pour violon et piano</i> , mvt. III.	213
Example 5-19b: Messiaen's open-fan permutation rotated to the right and inverted	213
Example 5-20: Form diagram of <i>Sonate pour violon et piano</i> , mvt. III.	215
Example 5-21: Inversely-related hexachords, <i>Quatre préludes pour deux pianos</i> , no. 1 (1961).	217
Example 5-22: Voice-leading of cells y (foreground) and x (middleground), <i>Quatre préludes</i> , no. 1	219
Example 5-23: +1/-1 processes working upon the boxed outer voices of example 5-22	222
Example 5-24: Pc mapping of foreground cell y s hown in example 5-22, mm. 2-3	225
Example 5-25: Tetrachord segmentation in <i>Quatre préludes</i> , no. 2	227
Example 5-26: Rotation to the right (T ₁ transposition) of contrapuntal combinations of ex. 24	228
Example 5-27: Symmetrical series in <i>Quatre préludes</i> , no. 3.	229
Example 5-28: Combined Hindu rhythms creating rhythms A, B, C and D, <i>Quatre préludes</i> , no. 3	232
Example 5-29: Rhythmic reduction, <i>Quatre préludes</i> , no. 3.	234
Example 5-30: Form diagram, <i>Quatre préludes</i> , no. 2	235
Example 5-31: Similar combinations of Hindu rhythms from Messiaen's <i>Traité</i> , vol. II	236
Example 5-32: Contour-symmetrical counterpoint of mode 4 ³ tetrachords, <i>Triptyque</i> (1962)	239
Example 5-33: ([01] * [048] = [014589]) flourish, <i>Célébration</i> (1966)	240
Example 5-34: A symmetrically arranged set of five <i>interversions</i> from Messiaen's <i>Traité</i> , vol. III	244
Example 5-35: Comparing similar permutations used by Messiaen and Prévest	245
Example 5-36: Theme of Beethoven's Op. 133 borrowed by Prévest, <i>Hommage</i> (1970-71)	246
Example 5-37: Symmetrical counterpoint, <i>Hommage</i>	248
Example 5-38: T _n , I _n and RI _n transformations contained in example 5-37	249
Example 5-39: Derivation of order-6 Latin square setting of the [012345] hexachord, <i>Hommage</i>	250
Example 5-40: Latin square analysed as an RI series of symmetrical permutations, <i>Hommage</i>	251
Example 5-41: Recursive application (symmetric reinterversion) of interventions, <i>Hommage</i>	252
Example 5-42: Realisation of the first two Latin squares and the beginning of the third, <i>Hommage</i>	253
Example 5-43a: Hearing the faces of a Rubik's cube one slice at a time, <i>Hommage</i>	256
Example 5-43b: Exponential increase of an order-6 series under recursive replication	256

Chapter 6: Conclusion

Example 6-1: Overview of use and development of Messiaen's techniques by Garant, Pépin and Prévest	258
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LIST OF FIGURES

Figure 1-1. Class notes by Serge Garant regarding the role of astronomy in Messiaen's <i>Harawi</i> (1944).....	34
Figure 4-1. Early sketch detailing methods of combining Morsiques in <i>Quasars</i> (1973)	185
Figure 4-2. Sketch of a rhythmic canon in <i>Quasars</i> (1973).....	187
Figure 5-1. Sketch detailing lakshniça, varnagâti and kaladhvani rhythms, <i>Quatre préludes</i> , no. 3	231
Figure 5-2. Prévost's Latin square, <i>Terre des hommes</i> (1967)	242
Figure 5-3. Sketch of Prévost's six Latin squares, <i>Hommage</i> (1970-71).....	254

ABSTRACT

This dissertation examines the influence of Olivier Messiaen upon three Québécois composers: Serge Garant (1929-1986), Clermont Pépin (1926-2006) and André Prévost (1934-2001). While the three developed different musical styles, their compositional techniques have much in common, which I attribute, in part, to the influence of their teacher. My thesis shows that this influence is most evident in the works written during and immediately after the three composers' studies with Messiaen.

I compare and contrast techniques used by the three Québécois composers with Messiaen's own compositional devices. My analyses draw upon information from compositional sketches housed in archives in Montréal and Ottawa, program notes and prefaces to scores, the composers' self-analyses, and most importantly, their recollections about their experiences with their teacher.

Garant's work most closely resembled that of Messiaen and he employed the greatest number of his techniques, but only for a very short time. Pépin employed the smallest number of his teacher's techniques, but was directly inspired by them, especially by the modes of limited transposition, throughout the first half of his career. Prévost represented a middleground between Garant and Pépin. Of the three, he was the most concerned with notions of symmetry—the guiding premise behind much of Messiaen's compositional language—and its manifestation in every structural level of his music.

ABRÉGÉ

Cette thèse examine l'influence d'Olivier Messiaen sur trois compositeurs Québécois: Serge Garant (1929-1986), Clermont Pépin (1926-2006) et André Prévost (1934-2001). Bien que les trois aient développé des styles musicaux différents, leurs techniques de composition conservent des liens communs que j'attribue, en partie, à l'influence de leur maître. Ma thèse démontre que cette influence est surtout évidente dans les œuvres composées pendant et immédiatement après les séjours des trois compositeurs auprès de Messiaen.

Je compare les techniques employées par les trois compositeurs Québécois avec les techniques de Messiaen. Mes analyses sont nourries d'informations tirées d'esquisses conservées dans des archives à Montréal et à Ottawa, de notes de programme et de préfaces à certaines partitions, d'analyses effectuées par les compositeurs mêmes, et surtout, de leurs souvenirs concernant leurs expériences avec leur professeur.

Le travail de Garant ressemble le plus à celui de Messiaen, et il employait le plus grand nombre de ses techniques, mais seulement pendant une très brève période. Pépin utilisait le moins des techniques de son maître, mais s'en inspirait directement, surtout des modes à transpositions limitées, pendant toute la première moitié de sa carrière. Prévost représentait un juste milieu entre Garant et Pépin. Parmi les trois, il était le plus préoccupé par les notions de symétrie—la prémisse de plusieurs aspects du langage de Messiaen—et ses manifestations à tous les niveaux structurels de sa musique.

Chapter 1: Introduction

Québec's New Music scene of the 1950's and 60's owed much to the training of Québécois composers in France. As students they worked under the tutelage of several legendary French teachers, of which Olivier Messiaen was arguably the most influential. This dissertation examines how three Québécois students—Serge Garant (1929-1986), Clermont Pépin (1926-2006) and André Prévost (1934-2001)—in their own early compositions adopted and developed techniques of Messiaen, their teacher and mentor.

From a compositional-technical perspective several factors motivate an examination of Messiaen's influence on these composers. Most extant research on Messiaen is biographical, music-theoretical, or theological in nature, focusing on aspects of his life as a composer, performer and a devout Roman Catholic. Little attention had been given to his role as a pedagogue before the work of Québécois musicologist Jean Boivin. In his numerous articles and his major publication, *La Classe de Messiaen*, Boivin provides a critical look at Messiaen's tenure at the Conservatoire nationale supérieur de musique and the far-reaching mark he made upon the musical world in his capacity as teacher.¹ Boivin weaves together carefully archival findings including Messiaen's syllabi, enrolment and attendance records, student class notes, and sketch books with existing research materials; he interprets each source of information with the results of his own interviews with sixty-eight former students.

As recorded in the writings of Boivin and in various published interviews, former students of Messiaen speak frequently of Messiaen's impact in terms of general compositional aesthetics and ideologies, but rarely in more specific compositional-technical terms. Boivin notes only two clear instances of directly attributed and clearly described influence upon students

¹ Jean Boivin, *La classe de Messiaen*. Paris: Christian Bourgois éditeur, 1995.

of the 1950's – the time when both Garant and Pépin were auditing Messiaen's class—Xenakis and Stockhausen.² While many sources recognize the impact of Messiaen's *Mode de valeurs et d'intensités* on integral serialism as a movement, studies dedicated to his influence upon the music composed by former students have only recently been undertaken.³ Our current knowledge of Messiaen's music-theoretical influence as a pedagogue is largely limited to what his students themselves have chosen to mention.

At the end of Boivin's article "Messiaen's Teaching at the Paris Conservatoire: A Humanist's Legacy," he states that "an exact appraisal of Messiaen's impact on each of his students remains difficult to assess, perhaps even impossible, as the creative process can never easily be summed up," but since "multiple influences were at work in his [Messiaen's] discourse, [...] his hundreds of students were certain to latch on to at least one or more."⁴

The goal of my own research, then, is to corroborate with Boivin's belief and to demonstrate, with tangible music-theoretical evidence, that Messiaen exerted tremendous influence upon three of his Québécois students. In doing so, I hope to also uncover additional, undisclosed music-theoretical influences that have so far been overlooked. Identifying the roots

² Boivin 1995, p. 112: "Curieusement, les deux élèves sur lesquels l'influence de Messiaen est reconnue pour avoir été décisive, au début des années cinquante, ne séjournèrent à sa classes qu'à titre d'*auditeurs*. Tout comme Karlheinz Stockhausen, Iannis Xenakis manifesta d'entrée de jeu une personnalité créatrice hors du commun—on peut parler de génies, cette génération en compte d'ailleurs plusieurs—et acquit rapidement une solide renommée dans le milieu d'avant-garde."

³ Several papers on influence were presented at the Messiaen 2008 International Centenary Conference in addition to my own on Serge Garant, Clermont Pépin and André Prévost, pointing to the growing interest in studying Messiaen's compositional language with respect to that of other composers. Speakers examining Messiaen's influence included: 1) Anne-Sylvie Barthel who presented "Messiaen: a model and originator for Xenakis' rationalization of compositional processes and development of additive rhythmic"; 2) Markus Bandur, focusing on Stockhausen, Boulez, Goeyvaerts in "Symmetrical permutation: Olivier Messiaen and the Genesis of Integral Serialism after 1950"; Marilyn Nonken presenting "Messiaen to Murail, or, what sounds become"; and 4) Caroline Rae, "Messiaen and Ohana: Parallel Preoccupations or Anxiety of Influence?" Those who compiled evidence concerning the influence of other composers upon Messiaen included: 1) Julian Anderson, speaking about "Messiaen and the Notion of Influence"; and 2) Vincent Benitez, who spoke on "Music as Incantation: An Examination of André Jolivet's Influence on Olivier Messiaen."

⁴ Jean Boivin, "Messiaen's Teaching at the Paris Conservatoire: A Humanist's Legacy," *Messiaen's Language of Mystical Love*, ed. Siglind Bruhn, New York: Garland Publishing, Inc., 1998, p. 26.

of the practices adopted from Messiaen will serve as the starting point for tracing subsequent technical developments in his students' music. These include innovations such as: Garant's further systematization of integral serialism; Pépin's "*Morsiques*" (Morse code rhythmic patterns related to Messiaen's non-retrogradable rhythms); and Prévost's recursive application of symmetrical permutations. I believe that under Messiaen's influence all three composers developed unique approaches to serialist techniques; in the broadest sense, this study will shed new light on Québécois musical history and the distinctive compositional practices of the generation of composers born in the 1920's and 1930's.

Finally, little attention has been given so far, from a music-theoretical perspective, to the role of Québécois composers in the development of post-war avant-garde music. The majority of research on contemporary Québécois composers is historical or archival in nature. There are six in-depth music-theoretical theses of note that should be mentioned.

Maya Badian's *Terre des hommes d'André Prévost: analyse musicologique*⁵ was originally a composition dissertation written at l'Université de Montréal under the direction of the composer himself. The book combines information from Prévost's extensive sketches with his comments about the genesis and development of the work. Her study thereby serves as a composer-sanctioned analysis providing a unique viewpoint into the composer's methods of composition.

A master's thesis from Université de Montréal written by Charles Déragon under the direction of Québécois music and Garant expert, Marie-Thérèse Lefebvre, uses a similar approach. Although Garant was not alive to provide feedback on Déragon's work, thesis advisor Lefebvre worked closely with the composer throughout his time at Université de Montréal.

⁵ Maya Badian, *Terre des hommes d'André Prévost: analyse musicologique*, Montréal: Les Éditions Lucian Badian, 1991.

Dérageon's thesis, "Analyse des 'Offrande' et des 'Circuit' du compositeur Serge Garant," offers a detailed look into Garant's extensive sketches.⁶ Dérageon's work is more analytical than Badian's. In addition, it situates the music within the larger context of musical modernism at that time.

The dissertation of Marie-Thérèse Lefebvre herself, at Université de Montréal, examines Garant's *Quintette* and compares it to *Octandre* by Varèse.⁷ The third section of the thesis provides an analysis from two disparate starting points: she first examines the compositional process, small-scale to large, from the perspective of the composer; and then analyses the piece from the perspective of the listener.

An English-language analysis of Serge Garant's *Offrande III* and André Prévost's *Ad Pacem* by noted Canadian composer Bruce Mather provides a detailed, measure-by-measure explanation of Garant's techniques.⁸ In particular, he explains Garant's harmonic density calculation through the use of a Latin square and the process of multiplication, which I refer to in this dissertation as "Boulez multiplication." The author's analysis of Prévost's *Ad Pacem* is likewise highly detailed, focusing on Prévost's propensity for row reordering. However, Mather does not delve into the derivations or mechanics of this reordering, and this is an issue that I cover in this dissertation.

There are also four English-language studies of note on the music of Clermont Pépin; of the three composers, his career enjoyed the widest reception outside of Québec. Stephanie Lind has recently published an article utilising transformational theory to demonstrate recursive

⁶ Charles Dérageon, "Analyse des 'Offrande' et des 'Circuit' du compositeur Serge Garant," Master's thesis, Université de Montréal, 1996.

⁷ Marie-Thérèse Lefebvre, "Nouvelle approche de la conception du matériau sonore dans les œuvres post-sérielle: une analyse du *Quintette* de Serge Garant," Ph.D. diss., Université de Montréal, 1981.

⁸ Bruce Mather, "Offrande III by Serge Garant, *De subitement lointain* by François Morel and Quatuor à cordes No. 2 "Ad Pacem" by André Prévost," *ex tempore* XI/2 (Spring/Summer 2003): 37-84.

trichords entitled, “An Interactive Trichord Space based on Measures 18-23 of Clermont Pépin’s Toccate no. 3.”⁹ Her dissertation, “Replicative Network Structures: Theoretical Definitions and Analytical Applications,” additionally analyzes a segment of Pépin’s *Monade VI – Réseaux*. The third study, by John Schuster-Craig, blends the type of work undertaken by Badian and Déragon but entails a wider scope of works covering samples across the composer’s complete oeuvre. Schuster-Craig’s dissertation, “Compositional Procedures in Selected Works of Clermont Pépin (1926-),” was written under the auspices of the composer himself.¹⁰ Thus, Schuster-Craig not only had the composer’s participatory interview materials but many of the sketches and records kept by Pépin from which to work. Schuster-Craig makes mention of Pépin’s use of Messiaen’s modes and other such examples of compositional-technical borrowing; these are discussed as they arise in the course of this dissertation.

Alan Freedman’s master’s thesis, “An Analysis of Clermont Pépin’s ‘*Implosion*’,” is the only study to date that was written without the direct input of the composer or an expert informant.¹¹ This work, the most music-theoretical, was an analysis deliberately undertaken without access to compositional sketch work; its purpose was to conduct analyses from the perspective of the listener. It is fascinating to compare the similarities between Schuster-Craig’s analytical results and Freedman’s. These similarities have reinforced my own belief in a dual analytical approach that commences from opposite poles of sketch study and listener perspective and later negotiates a middleground perspective.

⁹ Stephanie Lind, “An Interactive Trichord Space based on Measures 18-23 of Clermont Pépin’s Toccate no. 3,” *Music Theory Online* 15/1, March 2009 and

¹⁰ John William Schuster-Craig. “Compositional Procedures in Selected Works of Clermont Pépin (1926-),” Ph.D. diss., University of Kentucky, 1987.

¹¹ Alan Freedman, “An Analysis of Clermont Pépin’s ‘*Implosion*’,” Master’s thesis, San Diego State University, 1988.

1.1 Messiaen and Influence

Messiaen was a highly respected composer and teacher who instructed more Québécois students in Paris during his tenure at the Conservatoire nationale supérieur de musique (1941-78) than any other pedagogue with the exception of Nadia Boulanger.¹² Although, over the years, the name of his class changed roughly every seventh year, from *Harmonie* (1941-47), to *Ésthetique et analyse musicale* (1947-54), then *Philosophie musicale* (1954-61), followed by *Analyse musicale* (1961-68), and finally *Composition* (1968-78), former students from the first to the last years of his teaching career have remarkably similar memories of Messiaen as a pedagogue. Based on their accounts, one of his most apparent, and arguably, most influential qualities as a teacher was his encouragement of *individuality*. He had a special way of instilling a sense of intrinsic motivation by which each of his students developed his or her own unique set of musical skills and language, just as he had done himself.

A second kind of influence involves Messiaen's marvelous talents as an analyst. Several former students fondly recall a favourite lecture or two, most often mentioning classes on Berg's music as being especially superb. Furthermore, Messiaen's own highly refined and individualistic compositional language—with its distinct features such as the modes of limited transposition and rhythmic pedals—fascinated his students; and thanks to Messiaen's openness

¹² For complete lists of Messiaen's and Boulanger's Québécois students, see Boivin 1995, pp. 410-32 and Gilles Potvin and Helmut Kallmann, "France," *Encyclopedia of Music in Canada*. Historica Foundation, 2009, <http://www.thecanadianencyclopedia.com> (accessed 10 Oct 2009). Of the thirty-six former pupils of Nadia Boulanger listed by Potvin and Kallmann, twenty-six were originally from Québec or later settled there: István Anhalt, Françoise Aubut, Pierre Beaudet, Maurice Blackburn, Richard Boulanger, Gabriel Charpentier, Gabriel Cusson, Isabelle Delorme, Andrée Desautels, Paul Doyon, Elzéar Fortier, Kenneth Gilbert, Irving Heller, Kelsey Jones, Maryvonne Kendergi, Jeanne Landry, Claude Lavoie, Roger Matton, Pierre Mercure, Pierre Mollet, Jean Papineau-Couture, Marguerite Pâquet, Michel Perrault, Rosette Renshaw, William Keith Rogers, and Yehuda Vineberg. Boivin's research of the yearly enrollment of Messiaen's students lists fourteen Canadians, twelve of whom were either native or naturalized to Québec: Françoise Aubut, Clermont Pépin, Sylvio Lacharite, Serge Garant, Jocelyne Binet, Gilles Tremblay, Aline Legrand, Bruce Mather, André Prévost, Jacques Héту, Sœur Blanche LeBlanc and Jacques Faubert.

in revealing the technical details of his own work, they were free to pick and choose those techniques that they found most appealing. Thus, the nuts and bolts of Messiaen's compositional toolbox were a third source of influence, as were the newest techniques of other students in the class. This section details how Messiaen's *pedagogical* influence manifests itself in the music of Serge Garant, Clermont Pépin and André Prévost by virtue of their stylistic distinctiveness, how his *analytical* influence is seen in their shared emphasis on pre-compositional planning, and how his *compositional* influence is evidenced by the groups' borrowing of his compositional techniques.

What exactly is meant by *influence* in the present case? *Influence* is defined by the Oxford English Dictionary as: 1) the power or ability to affect someone's beliefs or actions; 2) a person or thing with such ability or power; 3) the power arising out of status, contacts or wealth; or 4) the power to produce a physical change.¹³ While definitions 1 and 2 describe an "ability," a characteristic that Messiaen had in abundance as we shall see in the following sections, definitions 3 and 4 situate influence as a product of *power*. While the word *power* may suggest positive or neutral shades of meaning such as ability and authority, and by association, the qualities of strength, tenacity, and vigor, it has many more negative connotations such as force, control, command and supremacy. These negative synonyms of *power* are associated with further undertones of obstinacy, stubbornness and arrogance.

¹³ "Influence," <http://www.askoxford.com>, 2009 (accessed 21 Sept 2009).

Messiaen as Pedagogue

Messiaen envisioned his role as a pedagogue to facilitate the cultivation of his students' own individualities. With a gentle spirit and kind words, he encouraged each pupil to grow in a direction stemming from his or her own unique talents, abilities and life experiences. As such, we must remove *power* from Oxford's formulaic definition of influence and instead turn to the Merriam-Webster Dictionary where influence is considered "the *act* or power of producing an effect *without apparent exertion of force* or *direct exercise of command*; or the power or *capacity* of causing an effect in *indirect or intangible* ways."¹⁴

The best witness of Messiaen's influence as a pedagogue is the attestations of his former students. After conducting countless interviews with them, Jean Boivin concluded that "practically everyone who was questioned on the subject of Messiaen's teaching methods, even when critical of some aspect or other of his theories and musical ideas, expressed a profound feeling of thankful affection for the man himself."¹⁵ Boivin noted several characteristics that were ascribed to Messiaen, including kindness, generosity and tranquility on one side, tempered by strong will on the other. Perhaps most key to his success as a pedagogue was his strong belief in his own convictions, be they personal, religious or musical. His inner confidence was outwardly manifested as a quiet countenance towards others, making him appear to be an individual who thought much but said little. Boivin explains how this personality trait was the catalyst for each student to find his or her own musical path and follow it with the same self-assuredness that Messiaen displayed:

When confronted with a work or a style in which he felt little interest, Messiaen eternally kept resolutely and calmly silent, a restrained—unequivocal—gesture which his students learned to respect and appreciate. French composer Gérard Grisey, a regular student of

¹⁴ "Influence," <http://www.merriam-webster.com/dictionary>, 2009 (accessed 21 Sept 2009). Emphasis mine.

¹⁵ Boivin 1998, p. 14.

Messiaen in the seventies, admits he was disappointed at first when this most admired pedagogue made only sparse and sibylline commentaries on the scores that were brought to him in class. Grisey later realized that by so doing, Messien sent him back to himself, to his music, and to the kind of criticism the composer alone can formulate on his own work. “Zen masters act like this with disciples who expect the truth of them.”¹⁶

I asked André Prévost how he perceived Messiaen as an influence in his own development as a composer; his reply echoed Grisey’s remark. The Québécois composer felt that “he showed us how to learn. [...] In that way, Messiaen had an influence. He forced me to reflect personally. He never wanted to create disciples. He always encouraged us to be ourselves.”¹⁷

Garant concurred:

Messiaen radiated a certain concept of music, and this is in my opinion the definition of a great teacher: one who never imposes on his students but succeeds in leaving his mark on them. This mark is not necessarily stylistic, moreover, since Messiaen’s teaching does not make you want to compose Messiaen’s music, but rather the music that he awakens in you.¹⁸

The “mark of Messiaen” as a pedagogue was his ability to teach each student “how to learn.” He did this by not dogmatically prescribing any certain manner of analyzing or composing and instead allowing each student to develop according to his or her own path.

Nowhere is Messiaen’s encouragement of individual growth more evident than in the well-known story of Iannis Xenakis. Xenakis had already faced significant roadblocks in his traditional-Western musical training, including unsuccessful studies in 1948 with Arthur Honegger at the École normale de Musique de Paris, and Darius Milhaud, who stepped in as Honegger’s health began to fail. Honegger was apparently jolted by the intentional parallel octaves and fifths that the aspiring composer wrote, and although Milhaud was more

¹⁶ Boivin 1998, p. 14.

¹⁷ André Prévost, Interview by author. Mini-disc recording. Montreal, QC, 5 August 2000, n.p.

¹⁸ Boivin 1995, p. 359. Original French: [...] “Messiaen irradie un certain concept de la musique, et c’est à mon avis la meilleure définition d’un grand pédagogue: celui qui n’impose rien à ses élèves mais réussit à leur laisser son empreinte. Cette empreinte n’est pas nécessairement stylistique, d’ailleurs, puisque l’enseignement de Messiaen ne vous donnera pas l’envie de composer de la musique de Messiaen, mais une musique qu’il aura éveillée en vous.”

sympathetic, he was not instructing on a regular basis. Xenakis then attempted to study with Nadia Boulanger who liked his music but felt he was too old to be taught.¹⁹ In 1952 after several unsuccessful receptions of his earliest compositions Xenakis began to fret about his lack of traditional training and how it might prevent him from reaching his dream of becoming a composer. Messiaen recounted an occasion to Matossian when Xenakis knocked on the elder composer's door and despaired, "I've made an extraordinarily horrible choice! I can't write like the others because I've found that in order to write harmony, I must learn to hear and write counterpoint." Messiaen apparently replied, "No, you are thirty years old, you are lucky to be Greek and to have studied mathematics and architecture. Take advantage of those things and use them in your music."²⁰

Like Xenakis and the Québécois composers featured in this dissertation, many of Messiaen's former students were to become highly successful composers who were noted for their own individually, thanks in part to Messiaen. Several became teachers in their own right, and it would appear that they carried their teacher's heralded mantras akin to "be yourself" and "write what you know," to yet another generation of student composers. For instance, Prévost linked this pedagogical attitude of Messiaen, his second composition teacher, to Clermont Pépin, his first, saying "this is, for me, the mark of a good professor: not to only impose his own way and say, 'if it is not my way, it's bad.' No, [it was] never [this way] with Messiaen, and never

¹⁹ Boivin 1995, p. 113. Originally from Nouritza Matossian, Iannis Xenakis, Paris: Fayard, 1981, p. 89. "Honegger ayant bondi à la vue d'octaves et de quintes parallèles délibérément introduites par le jeune musicien grec dans une composition libre pour piano, ce dernier ne retourna pas à sa classe. L'accueil fait à sa musique par Darius Milhaud, appelé, à au moins une occasion, à remplacer Honegger dont la santé était de plus en plus chancelante, est plus sympathique mais il n'y aura pas de suite. A la même époque, Xenakis est également reçu par Nadia Boulanger, qui se montre intéressée mais le trouve trop âgé pour entreprendre de le former."

²⁰ Boivin 1995, p. 114. Originally from Matossian 1981, p. 58. "Là, j'ai fait une chose horrible, extraordinaire, que je ne ferais pas avec des autres, parce que je trouve qu'on doit faire de l'harmonie, qu'on doit apprendre à entendre et à faire du contrepoint; mais c'était un homme tellement hors du commun! Je lui ai dit : 'Non. Vous avez déjà trente ans, vous avez la chance d'être Grec, d'avoir fait des mathématiques, d'avoir fait de l'architecture. Profitez de ces choses-là, et faites-les dans votre musique.' Je crois finalement que c'est ce qu'il a fait."

with Clermont Pépin.”²¹ In light of Messiaen’s instructions as a pedagogue, we should not at all be surprised at the stylistic variety seen in the music of his protégés as a collective. It is, in fact, the crowning achievement of his tutelage.

Messiaen as Analyst

Garant, Pépin and Prévost have each described the influence that Messiaen has had on their own ways of understanding music. Clermont Pépin mentions in particular Messiaen’s analysis of Alban Berg’s *Lyric Suite*, and how it set him on a new path of serialism. In a 1980 interview with Gilles Potvin as part of Radio Canada International’s Anthology of Canadian Music, he said:

I feel obliged to say that of all of the artists with whom I’ve studied, Messiaen was clearly the one who enriched me the most. I’ll always remember the analysis he did of Alban Berg’s *Lyric Suite* [...]. I remember spending several weeks on this *Lyric Suite*, and then, there was a moment that I said to him, “Teacher, the more you talk about this work, the more I hate it.” He then replied, “Well, this is very interesting,” and said, “nonetheless, we will continue to study it in depth and then you will come to me in a year or two and we’ll talk about it.” I studied it intensely and I’m glad that Messiaen encouraged me to study this work, since after that, I wrote my second string quartet...²²

I believe that Messiaen passed on his analytical talents to Garant, Pépin and Prévost on a broad scale. As they sat through his classes and studied a variety of works through Messiaen’s critical lens, they learned how to create cohesive and aesthetically pleasing musical structures and became aware of the importance of pre-compositional planning. In addition, when describing

²¹ Prévost 2000, n.p.

²² Schuster-Craig 1987, p. 4. Original quote from an interview with Gilles Potvin in *Anthologie de la musique canadienne: Clermont Pépin*, inserted booklet with bibliography and program notes, Radio Canada International, 1980, translated by Edward Farrant. The original French from that interview is: “Oui, je me souviendrai toujours de l’analyse qu’il avait faite, la *Suite lyrique* d’Alban Berg. Je me souviens que il avait passé plusieurs semaines sur cette *Suite lyrique*, et puis, un moment donné je lui ai dit, “Maître, plus vous parlez de cette œuvre, plus je la déteste.” Alors, il dit, “bien, ça c’est très intéressant,” il dit, “quand-même, nous allons continuer à l’approfondir et puis vous m’en reparlerai dans un an ou deux.” Moi, je l’ai beaucoup approfondi, et je suis content que Messiaen m’ait fait connaître cette œuvre là, parce que c’est après ça que j’ai écrit mon deuxième quatuor.”

how Messiaen conceived of formal structure, all three Québécois composers referred to him as an *architect* of music. After Boivin interviewed Pépin in 1989, he wrote how “Pépin took great care to stress to us that he incorporated Messiaen’s method of working with its [the method’s] precise stylistic traits. It was to this ‘rigorous and passionate architect,’ a ‘Bach of the 20th century,’ that he said he was first and foremost indebted.”²³

Garant describes how Messiaen conveyed the importance of this “intelligent” structural blueprint:

The influence that he had on my music is apparent less in the sound plan than in the intellectual plan. *He taught me that one can think of music like an architect thinks of constructing a building*, that is to say, by following a rational method. I have learned from him that when one speaks of “inspiration,” that it should never take the place of intelligence that organizes the material. *Even more curious is the fact that Messiaen never explicitly said this kind of thing*. But, because of the way in which he taught, one became infused with a certain necessity of *constructing music*: of composing music that is both sensible and intelligent – I would even say intelligible – that is to say a legible structural plan. That was, for me, a real revelation.²⁴ (emphasis mine)

Garant states that Messiaen’s influence upon his music “is apparent less in the sound” plan than it is in “the intellectual plan,” which I understand to be the formal plan that he describes above. When I asked André Prévost what he thought of Messiaen’s *Mode de valeurs*, he also replied in terms of a detailed architectural analogy that reinforces Garant’s statements of constructing music according to a rigorous pre-determined plan. Prévost’s response additionally communicates the idea of layers of structural levels within the plan:

²³ Jean Boivin, “Olivier Messiaen et le Québec: une présence et une influence déterminante sur la création musicale de l’après-guerre,” *Canadian University Music Review* 17/1 (1996): 72-95, p. 86. Original French: “Pépin a tenu à nous préciser qu’il a davantage retenu de celui-ci une méthode de travail que des traits stylistiques précis. C’est à l’architecte rigoureux et passionné, au ‘Bach du XXe siècle’ qu’il dit vouer en premier lieu de la reconnaissance.”

²⁴ Boivin 1995, p. 359. Original French: “L’influence qu’il a eue sur ma musique se situe moins sur le plan sonore que sur le plan intellectuel. Il m’a enseigné qu’on peut penser la musique comme un architecte pense la construction d’un édifice, c’est-à-dire suivant un mode aussi rationnel que sensible. J’ai appris de lui que ce qu’on appelle “l’inspiration” ne devait jamais prendre le pas sur l’intelligence qui organise la matière. Le plus curieux, c’est que Messiaen n’a jamais dit explicitement ce genre de chose. Mais, à cause de la façon dont il enseignait, on devenait pénétré d’une certaine nécessité de construire la musique, de composer une musique à la fois sensible et intelligente, je dirais même intelligible, c’est-à-dire lisible sur le plan de la structure. Ce fut pour moi une véritable révélation.”

Ah, yes! *Mode de valeurs*! Well, you spoke about structure, but for me, of course, structure is important – it’s essential! The higher the building is, the more necessary it is to have a solid structure. But, this structure cannot be visible; otherwise you would know that it is a structure. It is absolutely necessary to have it in the building, but you don’t see the beams and plaster and things; [only] the architect sees them...the architect and engineers and so on.... However, the building must be functional, and as much as possible, it must also be pretty.²⁵

The above statements regarding large-scale formal structure by Messiaen’s three Québécois students, especially that of Prévost, are curious, since the bulk of Messiaen’s teaching and analysis was undeniably preoccupied with most telescopic aspects of the musical foreground. Boivin has described Messiaen’s focus on the surface as his attempt to:

explain everything that could be accounted for. Specific bars would be dissected in minute detail. Some variable would be isolated—be it rhythm, melodic shape, harmony or orchestration—according to the point he sought to make. Compositional devices and developmental techniques (added values, rhythmic canons, permutations, retrogradation, melodic inversion, interval expansion, and so on) would be brought to light.²⁶

This observation demonstrates the overlap between Messiaen’s influence as an analyst and as a composer. While Messiaen pointed to the concrete details of a score, he did so from the point of view of his own highly non-conventional compositional techniques. While canons and counterpoint have more standard definitions across musical cultures, other observations that Messiaen made do not. His broad conception and somewhat liberal application of “added values,” for instance, are especially problematic. In his famous analysis of Stravinsky’s *Rite of Spring*, Messiaen points to the individual cells that interact as *personnages rythmiques* or rhythmic characters, undergoing expansions and additions of duration in a sort of dialogue. I would assert

²⁵ Prévost 2000, n.p.

²⁶ Jean Boivin, “Musical Analysis According to Messiaen,” *Olivier Messiaen: Music, Art and Literature*, ed. Christopher Dingle and Nigel Simeone, Surrey, U.K.: Ashgate Publishing Ltd., 2007: 137-157, pp. 145-6. Boivin argues that “if we refer [...] to Nattiez’s semiological terminology, Messiaen therefore also focused his analytical lens on the neutral level, that of the score itself, freed of external considerations (such as the creator’s intentions or aural perceptions).” As an analyst, I do not agree with the possibility of true analysis at the “neutral” level, which Nattiez formally refers to as *immanent analysis*, and this is later discussed on p. 21 and footnote 37. In this 2007 article, Boivin also offers examples of Messiaen analyzing at Nattiez’s *esthesis* (from the perspective of the listener) and *poietic* (from the perspective of the composer) levels. This is further discussed in the following footnote.

that this teaches us much more about how Messiaen's analytical observations derive from his own compositional technique than it does about Stravinsky's pre-compositional intentions. In describing Messiaen's style of analytical discourse that "apparently moved at random from one observational level to another," Jean Boivin supports the view that in analyzing the music of others, "Messiaen frequently seemed to speak in place of the composer, even at times ascribing to him intentions he most probably never had."²⁷

Messiaen as Composer

Thus, the primary focus of this dissertation is the influence of Messiaen's own compositional techniques on the music of Garant, Pépin and Prévost. These techniques may be employed precisely as Messiaen used them in his own music, or they may be modified in some way. For example, we might consider innovations upon the threefold "charms of impossibilities." His students might not use specific modes, non-retrogradable rhythms or symmetrical permutations per se, but might maintain the principle of symmetry behind these techniques in some way. The results might include symmetrical pc-collections or permutations that were not used or classified by Messiaen, or a rhythmic pattern that is somewhat symmetrical, although not precisely so. Similarly, his students might be drawn to the concept of gradual process that is fundamental to such procedures as the symmetrical permutations or motivic development by *agrandissement asymétrique* (asymmetrical intervallic enlargement),

²⁷ Boivin 2007, p. 145. Boivin refers to this type of analysis as poietic, as Messiaen is speaking from the perspective of the creator/composer. However, I respectfully disagree that this constitutes true poietic analysis, since as Boivin admits, when Messiaen analysed the works of other composers, he was unaware of the compositional intentions behind those works. Therefore, Messiaen could only take a true poietic standpoint in analyzing his own works. Any analysis of the music of others is necessarily a result of esthetic analysis, the analysis of the listener. This is further explained below under "*Style versus Technique: The External Esthetics and Poietics of Jean-Jacques Nattiez.*"

but may employ that idea of process in a way that Messiaen did not explore, such as its application in recursive structures.

Very little is known today about Messiaen's influence on his students in concrete technical terms. While Garant admitted that "Messiaen's influence was only too obvious" in his *Concerts sur Terre* (1952), he was quick to follow this disclosure with the qualification "but I did not use any of his modes."²⁸ In his article on Messiaen and Québec, Jean Boivin mentions some of Messiaen's techniques that were of interest to Pépin.²⁹ Pépin told Boivin that he listened with fascination as Messiaen showed how he integrated his own unique language with simple techniques of modifying simple motives, such as enlargement and contraction of intervals in the *Vingt Regards*, and said that he was equally struck by the modes of limited transposition. Boivin proceeds to give examples of Pépin's later choice to feature the modes in his Parisian works: mode 3 in *Guernica* (1951-52) and mode 2 in *Le Rite du Soleil Noir* (1955).³⁰ John Schuster-Craig's dissertation provides ample analytical material pertaining to Pépin's use of the modes in these same two compositions and in other compositions, including *Variations pour quatuor à cordes* (1956).

Aside from these sources and other published and recorded interview materials, this study relies on my own analytical comparisons between works composed by Messiaen and compositions by Garant, Pépin and Prévost. I proceeded as follows: once I found a seeming connection between a technique of Messiaen's and that of one of the three Québécois composers, I referred to the excellent appendices provided in Jean Boivin's *La Classe de Messiaen*. The documents detail the official class enrollment as well as the auditors in Messiaen's class, and also provide a list of works that were studied in the classroom throughout the composer's time at

²⁸ Serge Garant, *Concerts sur terre*, Saint-Nicolas, QC: Les Éditions Doberman-Yppan, 1996, p. 5.

²⁹ Boivin 1996.

³⁰ Ibid, p. 86.

the Paris Conservatoire. Boivin's careful piecework provides significant insight into *which* of his own works Messiaen chose to discuss with his students and *when* he chose to do so, lending support to my own analytical observations.

The Classroom of Composers as a Sphere of Influence

We do know that Messiaen was extremely open with his students and often shared his newest pieces as soon as they were composed. It only stands to reason that if Messiaen's students were privy to the fine details of his recent developments, these younger composers, in turn, would absorb his techniques or the philosophy behind them and derive some sort of inspiration for their own works. As Boivin has written:

Messiaen did not hide any of the techniques used in his new compositions. The ink on the manuscripts was barely dry when a Pierre Boulez, Karel Goeyvaerts, Iannis Xenakis, or Serge Garant could plunge in and gather the fuel that their excited minds demanded. This free access, referred to as his "secret garden" by Gilles Tremblay, [...] contributed to the establishment of Messiaen's reputation as a master thinker amongst the younger postwar generation and made his class a distinguished place of western contemporary creation.³¹

Clermont Pépin and Serge Garant were each profiled in the journal *Musicanada*. When asked to name their favourite composers, neither mentioned Messiaen.³² However, both noted

³¹ Boivin 1995, p. 322. Original French: "Messiaen ne dissimulait aucun des mécanismes de cette écriture si nouvelle. L'encre de ses manuscrits était à peine sèche qu'un Pierre Boulez, un Karel Goeyvaerts, un Iannis Xenakis ou un Serge Garant pouvaient s'y plonger et y cueillir le combustible réclamé par leurs cerveaux en ébullition. Le libre accès que Messiaen offrait à ce que Gilles Tremblay nommait plus haut son 'jardin secret,' joint à l'érudition dont nous avons maintenant la preuve, contribua largement à asseoir sa réputation de maître à penser de la jeune génération de l'après-guerre et à faire de sa classe l'un des lieux éminents de la création contemporaine occidentale."

³² In their respective interviews ("Serge Garant: un portrait," *Musicanada* (April 1968), and "Clermont Pépin: un portrait," *Musicanada* (June 1967)) both Garant and Pépin note that their experiences in Messiaen's class had a profound impact on their development as composers, and Pépin additionally cites the class' most memorable works as taught by Messiaen. Curiously, when each was asked to name his favourite compositions, neither Garant nor Pépin mentioned any works by Messiaen. Pépin replied, "I don't have a preference for any one composer in particular. But Bach's *Chaconne*, Mozart's *Don Juan*, Beethoven's last quartets, Debussy's *Pelléas*, Berg's *Wozzeck*, and Stravinsky's *Rite of Spring* are, in my opinion, the greatest heights of music." Garant's answer was similar and he listed "*The Art of Fugue*, *The Musical Offering*, *Pelléas and Melisande*, *Wozzeck*, the late sonatas of Beethoven, certain works of Mozart," as his favourites.

that their experiences in Messiaen's class had a profound impact on their development as composers. Garant explained that "it was there that I became aware of and began to understand the profound revolution that had begun to change the contemporary musical world."³³ He might not have referred to Messiaen's music specifically but alluded to the influence of the avant-garde music he was hearing, in general. Pépin's more elaborate response lends credence to this argument, explicitly referring to works that were studied, one of which was Messiaen's:

At the Paris Conservatory, Messiaen had a class composed of students like Boulez, Stockhausen, Michel Fano, Serge Garant, and Sylvio Lacharité. The most important experiences for me were the analysis that Messiaen did of works like Berg's *Wozzeck*, and *Lyric Suite*, Schoenberg's *Erwartung*, and Messiaen's last symphony, *Turangalîla*. It wasn't yet published, and we studied the compositional techniques, his use of bird calls, the Hindu modes and all the rest. That was for me an unforgettable experience, and made quite an impact.³⁴

Pépin was not prone to namedropping. Essentially, he described the classroom as a *sphere of influence* with Messiaen at its centre. In political terms, a sphere of influence is a region or nation that holds control over its surrounding areas; while in the case of music, the classroom was a meeting place of some of the era's greatest young composers. From within this sphere, these talented students from a variety of cultural, academic and vocational backgrounds would influence music composed in the remainder of Europe and beyond. Messiaen encouraged the sharing of ideas and often he reserved class time for the presentation of student works-in-progress.³⁵ Within this circle, then, the occurrence of compositional influence was extended beyond those techniques of Messiaen himself to encompass the larger group of techniques used by the student collective.

³³ "Serge Garant: un portrait," *Musicanada* (April 1968), n.p.

³⁴ "Clermont Pépin: un portrait," *Musicanada* (June 1967), n.p. It should be noted that in the above quote, Pépin mentions Messiaen's *Turangalîla Symphony*. Indeed, techniques that Messiaen used in this composition appear in one of Pépin's earliest Parisian works, *Le Rite du soleil noir*, studied in chapter 3.

³⁵ Boivin 1995, p. 161.

For example, Garant was particularly struck by his classmate Boulez. Further examples in this paper will illustrate this. When asked whether he found Boulez or Messiaen more influential, Garant answered simply, “Listen, I would not really know what to attribute to whom.”³⁶ He remembered his “shock” at the lecture that Messiaen gave on Boulez’s 2nd Sonata. After that lecture, Garant explained that the sonata “remained on my piano throughout my time in Paris. [...] I looked with fascination at this monstrosity of a piece, about which I understood almost next to nothing except the boldness of writing, complexity, invention, novelty....everything, everything enticing me.”³⁷ In general, the music of Garant demonstrates a technical wedding of Messiaen’s sense of systematization with the symmetrical schemata of Boulez. Pépin and Prévost likewise absorbed ideas from the music heard in Messiaen’s class and tempered it with lessons learned from other concurrent teachers. Pépin’s symphonic poems stylistically resemble the music of Stravinsky and Honegger, while Prévost’s personal developments of serial reordering merge compositional techniques of Messiaen, Dutilleux and Berg.

³⁶ Marie-Thérèse Lefebvre, *Serge Garant et la révolution musicale au Québec*. Montreal: L. Courteau, 1986, p. 74. Original French: “Écoutez, je ne saurais vraiment dire la part de chacun.”

³⁷ Lefebvre 1986, p. 74. Original: “Et surtout, je me souviens du choc qu’a été pour moi la lecture de la 2^{ème} Sonate de Boulez qui est restée sur mon piano pendant tout les temps que j’ai été a Paris. Alors, je la regardais j’étais fasciné par cette espèce de monstre auquel je ne comprenais à peu près rien mais dont l’espèce d’audace d’écriture, la complexité, l’invention, la nouveauté, tout, tout me séduisait.”

Boulez and Garant remained in contact. In a letter to Garant in October 1954, Boulez discussed plans for a large Webern Festival in Paris and mentioned that he would love to receive some of Garant’s most recent scores. He concluded with a challenge of sorts, with the suggestion that “I understand your isolation, as Montreal is evidently not a [modern] music centre, at least not yet...” (Marie-Thérèse Lefebvre, p. 49: Je comprends votre isolement, car Montréal n’est évidemment pas un haut lieu de la musique, du moins pas encore...) The short-term result was a Montreal concert titled “In Memoriam Webern” that Garant assembled the following year, but in the long-term, the remark was somewhat prophetic, as Serge Garant is most commonly thought of as one of the most important founding fathers of avant-garde music in Québec.

1.2 *Style versus Technique: The External Esthetics and Poietics of Jean-Jacques Nattiez*

In order to find technical similarities between seemingly contrasting works one must first redefine “style” and “technique” to insure that they are not thought of as synonyms. While style and technique are certainly not mutually exclusive, the two may not be as concordant as one initially suspects. This is because technique is part of the compositional process that ends with the creation of a finished score. As such, it is separate from any stylistic attributes assigned by the listener. Understanding this separation of technique from style is crucial, because from a reception perspective, very little of the music by Garant, Pépin and Prévost sounds even remotely like Messiaen’s. Hearing and analysing beyond style helps to elucidate the otherwise overlooked techniques that link the oeuvres of Messiaen, Garant, Pépin and Prévost. These techniques include snippets of Messiaen’s famous “charm of impossibilities”—the tripartite modes of limited transposition, non-retrogradable rhythms and symmetrical permutations—as well as his other techniques. In the rhythmic domain, these include rhythmic pedals, canons, augmentation, diminution, Hindu rhythms and *monnayage*. In terms of harmonic and melodic techniques, they include added notes (both within modes and chords), the invented chords and asymmetrical enlargement.

Further differences between style and technique are defined in this dissertation with the aid of Jean-Jacques Nattiez’s semiology work, as presented in Carolyn Abbate’s translation of his text *Music and Discourse: Toward a Semiology of Music*.³⁸ Nattiez’s notion of the poietic process of the composer encompasses compositional technique, while his esthetic process is akin

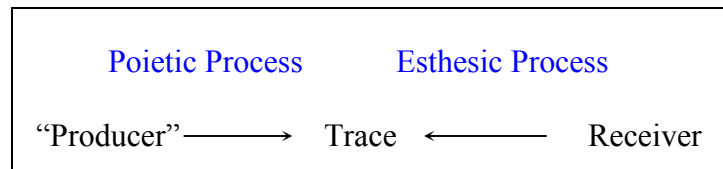
³⁸ Jean-Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music*, trans. Carolyn Abbate, Princeton, NJ: Princeton University Press, 1990.

to *style*. His work is based on his teacher Jean Molino's alteration of the classic scheme of communication, shown below in example 1-1.



Example 1-1: The classic communication scheme

The classic scheme in example 1-1 depicts communication as a one-way chain: the Producer creates a Message that is sent to, and received by, the Receiver. In the case of music, the Producer is the composer, the Message is the music (both the written score and its aural rendition through performance), and the Receiver is the audience. Molino's diagram, shown in black in example 1-2, departs from the classic communication schemata in two ways: its change in the direction of the arrow between the Message and Receiver; and its replacement of the word "Message," and its implied *action* and *intention*, with the word "Trace," which readily signifies an inactive, inanimate entity. Nattiez further refined Molino's changes in example 1-2, shown in blue. He referred to the relationship between the Producer and the Trace as a *poietic* process, and the one between the Receiver and the Trace, an *esthetic* process.



Example 1-2: Jean Molino's alteration of the classic scheme of communication (in black) and Nattiez's poietic and esthetic processes (in blue)

According to Nattiez, the completed model in example 1-2 differs from the classic communication scheme in several significant ways. The new *trace*, unlike the classic *message*: a) is no longer an “‘intermediary’ in a process of ‘communication’ that transmits” meaning from composer to audience; b) but “it is instead the result of a complex *process* of creation (the poietic process) [...]; and c) [...] is the point of departure for a complex process of reception (the esthetic process) that *reconstructs* a ‘message.’”³⁹ As the trace itself is merely the musical artefact (the score) it carries no meaning from the composer and can therefore transmit no meaning to the receiver. While the Producer/composer might have a specific purpose or message in mind during the poietic process, the Receiver/listener necessarily recreates his own message or interpretation independent of the intentions of the composer through a second esthetic process.⁴⁰

According to Nattiez’s schema, technique is considered part of the poietic process of the composer in creating the finished work in score form. That score is the point of departure for the esthetic process of reception, through which the listener compares and contrasts the work to other works that he or she has previously heard and then ascribes stylistic traits. Because of this break between poietic and esthetic processes, I argue that technique and style may be considered separate entities. Although *Guernica* (1952) by Clermont Pépin may sound like Stravinsky or Honegger, it in fact borrows Messiaen’s modes of limited transposition. Conversely, *Concerts sur terre* (1952) by Serge Garant may emulate the sound of Messiaen, but does not employ many of Messiaen’s specific techniques.

³⁹ Nattiez 1990, pp. 16-17.

⁴⁰ Ibid, p. 17. Nattiez supports his claim that a composer cannot necessarily communicate details concerning the creative process with the listener when he writes, “The experiments of Francès (1958) clearly demonstrated that quite unambiguous poietic “activities,” such as using a subject and countersubject in a fugue, are not necessarily identified by the “receiver.” On the other hand, the listener will project configurations upon the work that do not always coincide with those specifically intended during the poietic process, and do not necessarily correspond to what [Célestin] Deliège happily dubbed “realized intentions.”

Nattiez proposes that there are five types of analysis based on these three semiotic levels: immanent, external poietic, inductive poietic, external esthetic and inductive esthetic:

- 1) Immanent analysis involves the analysis of those neutral aspects of the score. This idea is somewhat problematic, as analysis by its very nature involves interpretation. Any “analysis” devoid of interpretation is merely description.⁴¹
- 2) Inductive esthetic analysis commences with the score. Through the process of listening, the analyst interprets the score and offers insight as to what the listener might hear at certain moments.
- 3) External esthetics fall within the realm of music psychology and begins with listening in an attempt to glean information about the score.⁴²

This dissertation is largely concerned with external and inductive poietics, working in both directions between composer’s plans and the finished score:

- 4) External poietics examines archival sketches, interview materials and other historical data in an effort to recreate the methodological process of the composer.
- 5) Inductive poietics looks backwards from the finished score and tries to imagine what the composer might have been thinking when little or no sketch or interview material is available. This is accomplished through comparisons made between numerous works within the composer’s output and then filling-in the gaps in light of their overall technical development.

⁴¹ Nattiez 1990, p. 140. Nattiez gives the example of Allen Forte’s set class analysis as representing the neutral level of immanent analysis. However, even when one labels set classes, the process is not impartial and therefore, not done on a neutral level, since the analyst must parse the music, deciding which pcs belong as part of the same set and which do not. In my mind, every analytical statement is necessarily esthetic or poietic in nature. For example, it is neutral to state that a piece has 352 measures and that the 222nd note in the bass is the pc E followed by an A. We might also agree that it is also a rather useless statement, in and of itself. To refer to the progression of E to A as an “authentic cadence” is a matter of an harmonic analytical interpretation and is therefore an esthetic statement.

⁴² Ibid, pp. 141-42.

As a caveat, inductive poietics includes the issue of compositional intention and it is crucial to note that there is no sure-fire way to determine what a composer was thinking, even if such information has been documented. One might consult notes and sketches or even ask the composer direct questions pertaining to a work. However, one must keep in mind that initial compositional intentions may have changed during the course of the poietic process, or they may have been forgotten or warped, after the fact, with the passage of time. I adhere as much as possible to the analytical nomenclature used by Garant, Pépin and Prévost and attempt to remain faithful to the way in which they, and Messiaen, might have expressed their thoughts about their own music.

Jean Boivin has found that “Messiaen the analyst [...] was not reliant on any system or unifying method. His discourse borrowed freely from the realms of aesthetics, music history and criticism.”⁴³ His manner of discourse does not fit what the author associates with “Anglo-Saxon culture,” in which “music analysis is practically considered one of the exact sciences. Precision, discipline, critical perspective, honesty and objectivity constitute the essential attributes of the worthy analyst.” In my own analytical work then, the tools used to explicate the music of Messiaen, Garant, Pépin and Prévost are not consistent between composers, or even between works by the same composer. The most striking features of the music itself—albeit as heard and determined through my own esthetic lens—dictate the analytical method to be applied.

⁴³ Boivin 2007, p. 145.

1.3 From Humble Beginnings: Echoes of pre-1960's Québec in the Music of Garant, Pépin and Prévost

The music composed by Serge Garant, Clermont Pépin and André Prévost in the 1950's to '70's reveals much information about the sweeping reforms that were distinctive to Québec during the earliest parts of their careers: namely, the tightly intertwined relationship between church and state that had held power over the people for several centuries that was quickly ripped apart by social and political revolution. The most common themes musically explored by each also found resonance in the teachings and music of Messiaen himself, who was fascinated with diverse subjects: death, like Garant; astronomy, Pépin; and the Catholic Faith, an early influence upon Prévost.

The compositional predilections of the three Québécois composers were first informed by their earliest educational experiences. In the first half of the 20th Century the Roman Catholic Church was responsible for education in the Province.⁴⁴ Under its system however, education in Québec was reserved for a chosen few. This was partly because the government in power at the time, the National Union Party led by Maurice Duplessis between 1936-39 and 1944-59, relied upon the Church's lowly-paid clergy to run schools and hospitals at their own expense.⁴⁵ School was consequently reserved for the elite and a few sons of working-class people that could obtain the recommendation and financial help of their local parish priest. More than half of all students

⁴⁴ Claude Bélanger, "Jean Lesage and the Quiet Revolution (1960-1966)," <http://faculty.marianopolis.edu/c.belanger/quebechistory/readings/lesage.htm>, 1998 (accessed 22 September 2009). The Roman Catholic Church made significant contributions to education in Québec. It expanded the French Catholic universities and established several other educational institutions including the Association Catholique de la Jeunesse Canadienne-française (ACJC), l'École Sociale Populaire, and the Semaines Sociales du Canada.

⁴⁵ Conrad M. Black, "Maurice Le Noblet Duplessis," *The Canadian Encyclopedia*, Historica Foundation, 2009, <http://www.thecanadianencyclopedia.com> (accessed 22 September 2009)

attending school were leaving by age fifteen. In rural areas it was the exception that one would study at all beyond the sixth grade.⁴⁶

Duplessis was renowned for his strong leadership style and had the full support of the Roman Catholic Church, big business, and non-unionized workers.⁴⁷ He put Québec-nationalist sentiments—brewing amongst the French population for many years—on the backburner in favour of: 1) extending significant financial assistance to farming communities; 2) persecuting organized labour; and 3) supporting continued industrialization by U.S. companies in order to develop rural Québec.⁴⁸ While many of his actions and leadership style are remembered as tyrannical by some, others stress that Duplessis should also be remembered for his positive contributions. Conrad M. Black has written a definitive biography of Duplessis and notes in *The Canadian Encyclopedia* that Duplessis “presided over a period of unprecedented prosperity, economic growth and investment in which Quebec was for the first time by almost any social or economic yardstick gaining on Ontario.”⁴⁹

⁴⁶ “The Quiet Revolution,” *Canada: A People’s History*, Canadian Broadcasting Corporation 2001, http://history1.cbc.ca/history/?Mlval=EpisContent&series_id=1&episode_id=16&chapter_id=1&page_id=1&lang=E (accessed 22 Sept 2009).

⁴⁷ All historical information contained in this dissertation is kept as neutrally-opinionated as possible. However, it must be noted that outside of historical facts, the French and English populations within Québec often hold differing opinions regarding the cultural significance of their respective histories. In order to reflect the sentiments of the French, I often refer to the opinions of the French population instead of those of the English. For instance, Duplessis’ time in public office was later referred to by the French as “la Grande Noirceur,” meaning “The Great Darkness,” and he was also colloquially named “Le Chef” or “The Boss” by that same population. While that nickname was used in negative manner to stress the totalitarian attitude of the Premier, it was also a measure of respect for some, who did recognize his achievements and admire his power.

⁴⁸ “Quebec,” *Encyclopædia Britannica Online*, 2009, <http://www.britannica.com/EBchecked/topic/486652/Quebec> (accessed 22 September 2009).

⁴⁹ Black, *The Canadian Encyclopedia*, 2009. Black’s book is titled *Render Unto Caesar: The Life And Legacy Of Maurice Duplessis*, Toronto: Key Porter Books Ltd., 2002. Black summarizes Duplessis’ achievements as follows: “His 15-year second term saw Duplessis assert the authority of the Québec state over that of the Church; wrestle part of the concurrent jurisdiction over direct taxes back from the federal government after WWII; and introduce social legislation, including Canada’s most generous minimum wage and home ownership assistance Acts. His government produced enormous public works, highway, hospital, school and university construction projects and ambitious hydroelectric power schemes, extending electrification throughout rural Québec.”

During the 1950's a group of nationalist Québécois and liberal Francophones began to reject the control that the Catholic Church and Duplessis' government held over their lives.⁵⁰ They grew discontented with what they felt was their only possible future: uneducated and relegated members of society who were fated to work rural farmland or hold only the lowest blue-collar positions offered by foreign industrial investors.⁵¹ The 1960's and '70's were a time of radical change in Québec marked by both the Quiet Revolution and the rise of the Front de libération du Québec (FLQ). When Duplessis died in office in 1959, the time was ripe for the sweeping reform of Jean Lesage, who led the Province from 1960-70. The first part of his tenure (1960-66) became known as the Révolution tranquille/Quiet Revolution. Empowered by Lesage's slogan "maîtres chez nous," or "our own masters," the Québécois slowly took back power of their own affairs. Lesage embarked on a massive campaign to fully modernize the province and redefined the role of Québec's French population and of the province itself within Canada.⁵² Nationalist sentiments of self-determination were growing once again.

Garant the Rebel

Serge Garant was a rebel of the Duplessis educational system who would later spearhead the revolution of music in Québec in the 1950's and '60's. He was born in Québec City in 1926 and his family moved through Verdun before settling in Sherbrooke when he was eleven years

⁵⁰ The term *nationalist* refers to a person subscribing to the tenets of *nationalism*, the devotion to one's nation or culture, in this case, the distinct culture of Québec. It is in this spirit that Québec's provincial governing body is considered *national* (the Assemblée nationale du Québec/National Assembly of Québec). Likewise, other official provincial institutions in Québec carry the title *nationale* with a lowercase *n*.

⁵¹ "Quebec," *Encyclopædia Britannica Online*, 2009.

⁵² Bélanger 1998. From 1960-67, Lesage reengineered the hospital education systems, created a provincial family allowance scheme, nationalized all of the private hydro electric facilities in Quebec, and instituted a number of regulatory departments, including Cultural Affairs and Federal-Provincial Relations, the Société Générale de Financement (the SGF controls public investment), the Quebec Pension Plan, the Caisse de Dépôt et de Placement (management of public pensions), and the Société Québécoise d'Exploration Minière (the SQEM promotes mineral exploration and is now a subsidiary of the SGF).

old. Official politically-correct biographies explain that Garant was largely self-taught; although he finished grade 9, and subsequently enrolled in the local School of Arts and Trades, he found it uninteresting and chose not to continue with his studies.⁵³ From his own perspective, the humorous composer had a different take on his education when he quipped in an early interview that he had actually “‘flunked out’ of the second year of a technical school and was expelled from a Catholic seminary for questioning the authorities.”⁵⁴ His first formal composition and piano lessons with Claude Champagne and Yvonne Hubert in Montreal began only at the age of eighteen. Being industrious, Garant paid for both his lesson fees and the necessary commute into the city by playing the clarinet in the Sherbrooke Symphony Orchestra and saxophone in local jazz groups.⁵⁵ He discovered atonal and serial music on his own when perusing a local Sherbrooke music store and he was instantly captivated. Before leaving for Paris he gave a hometown concert of Webern’s *Piano Variations*, Op. 27 and Schoenberg’s *Three Pieces for Piano*, Op. 11. Garant later reminisced about this early display of allegiance to modern music, admitting that the townsfolk “thought I was crazy—but these things fascinated me, and I felt someone had to do something about making them known.”⁵⁶

A large part of Garant’s music, ranging from the late 1950’s to the mid-1970’s, is composed in a highly personal style of integral serialism based on a series of proportions and his works were not intended to evoke any particular message, political or otherwise. He declared in a 1978 interview that “form is no longer a mold; it is the very concept of the work.”⁵⁷ When he did set text, however, he did so with great sensitivity and chose those that conveyed revolution,

⁵³ Lefebvre 1986, p. 25. “Ayant terminé une 9e année en 1944, il s’inscrit à l’École des Arts et Métiers mais, peu intéressé à poursuivre cette formation technique, il quitte l’institution et se trouve un emploi temporaire.”

⁵⁴ Keith MacMillan and John Beckwith, *Contemporary Canadian Composers*, Toronto: Oxford University Press, 1975, p. 78.

⁵⁵ Ian Leonard Bradley, *Twentieth Century Canadian Composers, II*. Agincourt, GLC Publishers Ltd.: 1982, pp. 175-6.

⁵⁶ Bradley 1982, p. 175.

⁵⁷ Lorraine Pilette, “Interview: Conversation with Serge Garant,” *Variations* 4, p. 45.

darkness and despair. These themes parallel life experiences such as his own early rebellion against the school system and his cries for musical modernism, as well as the disenchantment and inner conflict he surely felt as a homosexual raised within a culture adhering to the strict tenets of the Catholic Church.

Un grand sommeil noir/The Long Black Sleep (1949) by Paul Verlaine depicts the loss of all hope, desire and willingness to live in the face of death.⁵⁸ Given his background, it is hardly surprising that Garant did not write any music expressing allegiance with the Catholic Church. His 1952 *Et je prierai ta grâce*, to be discussed in Chapter 3 of this dissertation, at first appears to be religiously themed. However, its text by Hector de Saint-Denys Garneau is “radical in its form, with its unrhymed lines of various lengths, its lack of punctuation and its broken syntax.”⁵⁹ Saint-Denys Garneau was a restless revolutionary who is considered to be “a unique figure in the intellectual history of Québec and its first truly modern poet.”⁶⁰ The composer’s choice of text for *Cage d’oiseau/Bird Cage* (1962), also by Saint-Denys Garneau, is an example of the poet’s penchant for his favourite themes of death and solitude and is as dark as the aforementioned Verlaine poem.⁶¹ Here, the text is set as “a long monotonous chant cut by piano commentaries.”⁶²

⁵⁸ This popular poem has a well-established precedent as a French favourite, having been set by composers such as Georges Antoine, Arthur Honegger, André Jolivet, Maurice Ravel, Igor Stravinsky, Edgard Varèse, and Louis Vierne. A single slash (/) indicates a new line, and a double slash (//) indicates a new verse. Original French: Un grand sommeil noir / Tombe sur ma vie: / Dormez, tout espoir, / Dormez, toute envie! // Je ne vois plus rien, / Je perds la mémoire/Du mal et du bien... / O la triste histoire! // Je suis un berceau / Qu'une main balance / Au creux d'un caveau: / Silence, silence!

English translation: A long black sleep / Descends upon my life: / Sleep, all hope, / Sleep, all desire! // I can no longer see anything, / I am losing my remembrance / Of the bad and the good... / Oh, the sad story! // I am a cradle / That is rocked by a hand / In the depth of a vault. / Silence, silence!

⁵⁹ David M. Hayne, “Hector de Saint-Denys Garneau,” *The Canadian Encyclopedia*, Historica Foundation, 2009, <http://www.thecanadianencyclopedia.com> (accessed 10 Oct 2009).

⁶⁰ Ibid.

⁶¹ Original French: Je suis une cage d’oiseau / Une cage d’os / Avec un oiseau // L’oiseau dans sa cage d’os/C’est la mort qui fait son nid // Lorsque rien n’arrive / On entend froisser ses ailes // Et quand on a ri beaucoup / Si l’on cesse tout à coup // On l’entend qui roucoule / Au fond / Comme un grelot // C’est un oiseau tenu captif / La mort dans ma cage d’os // Voudrait-il pas s’envoler / Est-ce vous qui le retiendrez / Est-ce moi / Qu’est-ce que c’est // Il

Garant's penchant for morose poetry bears similarity to Messiaen's own love of the deathly. In his article "Messiaen the Bibliophile," Gareth Healey points to numerous written references Messiaen made to poets Bertrand and Poe.⁶³ However, even though "Messiaen's enthusiasm for this macabre style of poetry, and the way in which it fired his imagination, shines through on every occasion," within the writings of the composer, it was rarely the subject of his own music. Healey observes that the only mention of death in the oeuvre of Messiaen is within three movements of *Harawi* (1944) that set both death and horrible dreams. The composer often transmutes themes of death and darkness to fear and awe in liturgical settings. Healey concluded that Messiaen's admiration for poets Hugo and Mallarmé was "somewhat shallow" and perhaps a result of secondary connections through the music of Franck, Boulez and Debussy: "It is hard to think of any other composer who made significant use of the poetry of Bertrand, whose fame is due largely to Ravel's setting of *Gaspard*."⁶⁴

Garant composed *Phrases II* (1967) that set texts from speeches by Ernesto "Che" Guevara and Pierre Bourgault: the former, an Argentinean-born Marxist guerrilla leader of the Cuban revolution; the latter, a Québécois sovereigntist leader of the Rassemblement pour l'indépendance nationale (Rally for National Independence, known as the RIN). Both championed nationalistic equality for all people. However, Garant claimed that the work was not

ne pourra s'en aller / Qu'après avoir tout mangé / Mon cœur / La source de sang / Avec la vie dedans // Il aura mon âme au bec.

English translation: I am a bird cage / A bone cage / With a bird // The bird in my bone cage / Is death making its nest // When nothing is happening / I hear its wings folding // And when I've laughed a lot / If I suddenly stop / I hear it cooing / Deep down / Like a small bell // It is a bird held captive / Death in my bone cage // Wouldn't it like to fly away / Is it you who holds it back / Is it me / Who is it // It cannot leave / Even after having eaten / All my heart / The blood source / With the life inside // It will have my soul in its beak.

⁶² Lefebvre 1986, p. 185.

⁶³ Gareth Healey, "Messiaen the Bibliophile," *Messiaen: Music, Art, Literature*, Aldershot, U.K.: Ashgate, 2007: 159-171.

⁶⁴ Ibid, p. 162.

politically motivated. Stating that he was not pro-Marxist, he nonetheless felt it “evident that I admire Che Guevara [...] in the South-American context, it is difficult not to be pro-Guevara.”⁶⁵

As political figures, Guevara and Bourgault relate to one another and also to Garant, with their preoccupation with death and darkness. But there is a significantly more violent comportment to consider. Guevara was known not only for his militaristic skill and bravery, but also his ability to execute any perceived traitor of the revolutionary movement. With the Castro brothers he helped launch a coup that overthrew the Cuban government to form a new ruling political party.

Likewise, the RIN movement began in 1960 when a group of restless protesters banded together; by 1963 it became an official political party. Despite having support, the RIN never won a voice in office. Although Bourgault was unlike Guevara in that he was not a soldier, the RIN was a rather agitated group and regularly rioted during public demonstrations. Its leftmost splinter group formed Canada’s most violent terrorist group, the Front de libération du Québec (FLQ), when the party divided in 1968. The majority of its members joined the Parti Québécois that since then has been the majority governing party of Québec between 1976-85 and 1994-98.

Pépin the Romantic

Compared to Garant, Pépin and Prévost were considerably more successful in navigating the Québec school system. Pépin was born in the small town of St-Georges-de-Beauce in 1926. He took his first piano and harmony lessons from Georgette Dionne-Lagacé, the daughter of a wealthy industrialist.⁶⁶ This contact with the elite was fortuitous for the young child in making

⁶⁵ Garant, Serge. “Phrases II,” in *Serge Garant et la révolution musicale au Québec*. Montreal: L. Courteau, 1986: 190-92.

⁶⁶ Schuster-Craig 1987, p. 1.

career-building connections early in life: at 12 years old he had an orchestrated minuet conducted by Wilfred Pelletier at a matinée of Les Concerts symphoniques de Montréal, a group that soon after became the Orchestre Symphonique de Montréal (OSM); and at 13, a symphony premiered by Québec's Société Symphonique.⁶⁷ His early piano and theory lessons in Montreal with Arthur Letondal and Claude Champagne in 1939-41 were followed by an impressive list of scholarship-funded studies. He studied piano with Jeanne Behrend and composition with Rosario Scalero at the Curtis Institute in Philadelphia from 1941-4, before returning to Montréal to study piano with Jean Dansereau, composition with Claude Champagne, chamber music with Louis Bailly, and conducting with Léon Barzin at the Conservatoire de musique du Québec à Montréal (CMM) from 1944-6. While at the CCM, he won three prizes from the Composers, Authors and Publishers Association of Canada Limited/Association des compositeurs, auteurs et éditeurs du Canada Ltée (CAPAC) for piano, composition and conducting lessons at the Senior School of the Royal Conservatory of Music with Lubka Kolessa, Arnold Walter and Nicholas Goldschmidt, respectively (1946-9).

While the music of Garant and Prévost developed along fairly straight continuous paths, the œuvre of Pépin contains several aesthetic breaks; the ones in 1956 and 1960 being most relevant to this dissertation. Pépin's pre-Parisian music (written prior to 1949) is decidedly Romantic in nature and does not reflect with the exception of an *Ave Maria* (1946) his earliest formative education administered by the Roman Catholic Church. Perhaps this is so because Pépin left Québec to study very early on in his career and was subsequently exposed to a more worldly and secular view of North American life.

⁶⁷ Gilles Potvin, "Clermont Pépin," *The Encyclopedia of Music in Canada*, Historica Foundation, 2009, <http://www.thecanadianencyclopedia.com> (accessed 29 September 2009)

Pépin's earliest works were non-thematic and given generic titles such as *Petite étude no 1* (1940), *no 2* (1946), *no 3* (1947), and *no 4* (1950), *Thème et variations* (1940 and another in 1947), *Andante pour piano* (1943), *Toccate no 1* (1946) and *Sonate en un mouvement* (1947). He wrote music for four ballets in the 1950's and continued to write smaller works for piano during the earlier half of the decade. His two symphonic poems from 1952 and 1955 mark an apex of his hold on tonality. It was after these two works that he made a small break in both his preferred compositional medium and aesthetic as he shifted towards chamber music in composing his first serial composition for string quartet in 1956 (discussed later in Chapter 3). However, he did not completely relinquish his hold on Romanticism, per se, at this time. In his book *The Music of Canada*, Timothy G. McGee asserts that Pépin "moved towards more dissonance and some use of the serial technique [...] but his compositions are still oriented toward the large colourful gestures and sweeping lines connected with the post-romantic movement."⁶⁸ Alan Freedman concurs by saying that "the decade of the fifties was a time when Pépin's romantic lyricism and rhythmic faculty came under the sway of his French teachers and the mainstream masters (Stravinsky, Bartók and Berg). Despite experiments in dodecaphony, there was no warning of the immanent break with his romantic past."⁶⁹

The bigger breaks were yet to come as Pépin turned to technological advancements as a source of inspiration. In a 1964 biography, he spoke not of local events, but rather global ones when considering "the impact of contemporary life on the modern composer" saying, "I am normally very interested in contemporary arts, astronomy, space, light and time."⁷⁰ His most notable works in this vein are *Quasars*, Symphony No. 3 (1967) that depicts the sounds of a

⁶⁸ Freedman 1988, p. 25, originally from Timothy J. McGee, *The Music of Canada*, New York: W.W. Norton and Company, 1985, p. 119.

⁶⁹ Ibid.

⁷⁰ A. Mason Clarke, *Thirty-four Biographies of Canadian Composers*, Montreal: Canadian Broadcasting Corporation, 1964, p. 81.

distant galaxy as it emits large pulsating radio waves; *Chroma* (1973) and *Prismes et cristaux* (1974), both concerning the deflection of light; *Implosion*, Symphony No. 5 (1983), the implosion of a star. Although it falls outside of the scope of this dissertation, Pépin turned yet another major methodological leaf in 1977 with his composition of *Interactions* that dispensed with traditional notation altogether in favour of a graphic score.

Pépin's turn to astronomy as a source of inspiration may also have been inspired, in part, by his lessons with Messiaen. Gareth Healey explains how two astrological writings figured in Messiaen's pedagogical notes of *Visions de l'Amen*. Messiaen draws upon quotes from *À travers les espaces célestes* by Abbé Theophile Moreux⁷¹ and the *Larousse Encyclopedia of Astronomy* by Lucien Rudaux and Gérard de Vaucouleurs⁷² in his *Traité* in to his analysis. While *Visions de l'Amen* was completed in 1943 before the publication of the *Larousse Encyclopedia*, Healey suggests that "it is probable that one of the movements – 'Amen des étoiles, de la planète à l'anneau' – was inspired (at least partly) by Moreux's discussion of Saturn (the ringed planet). Moreux supplies copious images of Saturn accompanied by lengthy descriptions, which surely fired Messiaen's imagination."⁷³ Jean Boivin's list of works taught during the 1951-52 academic year, the last of three years in which Pépin audited the course, include the *Visions de l'Amen*.⁷⁴ Garant was also auditing the course this year, and he noted in his class notes pertaining to *Harawi* (1944) that Messiaen told them that the movement "Répétition planétaire" was "based on a reading from an astrological treatise" (example 1-3).⁷⁵

⁷¹ Abbé Theophile Moreux, *A travers les l'espaces célestes*, Paris: Flammarion, 1934.

⁷² Lucien Rudaux and Gérard de Vaucouleurs, *Larousse Encyclopedia of Astronomy*, London: Batchworth, 1959.

⁷³ Gareth Healey 2007, p. 168.

⁷⁴ Boivin 1995, p. 438.

⁷⁵ Garant's student notes from 11 February 1952, Service de la gestion de documents et des archives, Université de Montréal. Fonds Serge Garant (P141), P141/B1.1. Garant's note reads, "La naissance de la terre – fait à la lecture d'un traité d'astrologie. Texte – Les "Ah!" appels en forêts (Tarzan!). Mapa nama etc – sans aucun sens page 42. Naissance de la terre." Translation: "The birth of the earth – based on a reading from an astrological treatise. Text – The "Ah!" [are] forest calls (Tarzan!). Mapa nama etc. – nonsensical page 42. Birth of the earth."

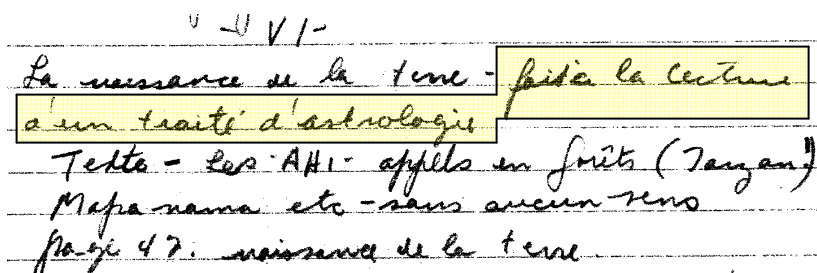


Figure 1-1: Garant's class notes indicating Messiaen's comments that he based *Harawi*, mvt. VI on an astronomy treatise (shown in yellow highlight)

Prévost the Believer

André Prévost was born in 1934 in Hawkesbury, Ontario, on the Québec-Ontario border. His family, having a long Québécois lineage, returned to the Province when he was still a child and settled in St-Jérôme. He had the advantage of early musical training at the Séminaire de St-Thérèse and the Collège de St-Laurent before enrolling at the Conservatoire de Musique à Montréal (CMM) in 1951.⁷⁶ There, he studied piano with Georges Savaria, bassoon with Symon Kovar, harmony, fugue and counterpoint with Isabelle Delorme and Jean Papineau-Couture, and composition with Clermont Pépin.⁷⁷ Before he left the CMM in 1960 he was awarded: the Sarah Fischer Award in composition (1959); the Chamber Music Award of the Fondation Les Amis de l'Art; and the CCM's first Prize in both composition and harmony (1960).⁷⁸

Prévost's earliest student etudes were often composed utilizing religious texts or in honour of Roman Catholic Feast Days. His sketchbook held by the Special Collections department of Library and Archives Canada contains an "Ave Maria" dated August 15, 1949, and an "Oratorio sur la mort du Christ [underlined in score]," dated "7 avril 1950, Vendredi

⁷⁶ Pierre Rochon, "André Prévost," *Encyclopedia of Music in Canada*, Historica Foundation 2009, <http://www.thecanadianencyclopedia.com> (accessed 31 July 2008)

⁷⁷ Bradley 1982, p. 216.

⁷⁸ MacMillan and Beckwith, 1975, p. 188.

Saint,” the Good Friday preceding Easter that year. God was still very present in his thoughts throughout his teens. His *Tristesse* (1950), composed six days before his 16th birthday, contains a prayer written across the top of the manuscript. Prévost had fallen in love with an unnamed young woman and implored, that in writing this piece, “I confide completely in God and my MUSIC in the hope that she will soon understand [emphasis in the original].”⁷⁹

A chronological list of twenty-three major compositions and their intended “message” is supplied by Maya Badian in her thesis *Terre des hommes d’André Prévost: analyse musicologique*, written with the assistance of Prévost himself.⁸⁰ While not overtly Catholic by any means, almost all of the works are imbued with Prévost’s desire for understanding, tolerance, and peace, or his despair over mankind’s indifference and unfathomable aggression towards his fellow man. The sample themes of *Chorégraphie I* (1972) and *II* (1974) tell of man’s self-inflicted demise and the blatant indifference he shows in the face of his own destiny.⁸¹ His feelings about the violence and bitterness involved in protesting war itself is the subject of *Ahisma* (1984).⁸² Only three works clearly express tenets of the Roman Catholic faith. These include: *Poème de l’infini* (1960) about God’s eternal creation; a setting of *Psaume 148* that tells of the praising of God’s glory by all the creatures of the universe⁸³ (1971); and his *Terre des hommes* (1964-1967) that describes “transfiguration by Human Love.”

Prévost’s move from defined religious themes to more abstract humanistic ones seems to reflect the political and social undercurrents of Québec during his lifetime. While Pépin left the Province and obtained the major part of his earlier education in more secular North-American

⁷⁹ “Fonds André Prévost,” Library and Archives Canada, MUS 264/D1,2 (folder 21). Prévost inscribed the date as July 24 (his birthday is July 30), and the following text: “...je me confie entièrement à Dieu et ma MUSIQUE en espérait qu’elle comprendra bientôt [emphasis in original].”

⁸⁰ Badian 1991, pp. 4-5.

⁸¹ Ibid: “Le mal dont l’homme est capable pour sa propre détérioration” and “L’ambiguïté de l’homme devant son destin.”

⁸² Ibid: “Aspiration à la paix,” and “Violente et amère protestation contre la guerre et exaltation de la paix.”

⁸³ Ibid: “Synthèse où se manifeste l’allégresse de l’univers dans la plénitude de la gloire de Dieu.”

cities, Garant chose to leave the religiously-run system altogether, but Prévost was educated entirely within Québec under the Duplessis-Church system in the 1940's and '50's. He composed *Poème de l'infini* the year after the death of Duplessis as Jean Lesage was just elected to office. *Terre des Hommes* was begun during the later half of the Quiet Revolution. His *Psaume 148* was begun in late 1970 and premiered at the 1971 Guelph Spring Festival.⁸⁴ Over the period encompassed by these compositions (1959-1971), Québec society moved continually further away from control by the Catholic Church until the FLQ violently declared its intent for an independent Québec during the October Crisis that began on October 5, 1970, and captivated the nation until its resolution several months later on December 28. I believe that this crisis, in particular, had a profound effect upon Prévost and his permanent move away from writing religiously-themed music.

The FLQ was a revolutionary movement desiring an independent, socialist Québec, or in its own words, the “total independence for Quebecers, united in a free society and purged for good of the clique of voracious sharks, the patronizing ‘big bosses’ and their henchmen who have made Quebec their private hunting ground for ‘cheap labor’ and unscrupulous exploitation.”⁸⁵ Founded in 1963, this terrorist group began its underground activities of increasingly violent armed robberies, and most notoriously, its bombings of mailboxes in English residential areas, Federal Government offices, McGill University, the residence of Jean Drapeau

⁸⁴ Correspondence with Mary Bond, archivist with Library and Archives Canada (LAC) on November 23, 2009. Ms. Bond indicated that letters found in file MUS 264/E48 of the *Fonds André Prévost* indicate that the work was commissioned on November 19, 1970 and its text was intended to be based on the Old Testament and Psalm 148 as of December 1, 1970. According to the historical timeline then, the work was commissioned and its text was finalized during the October Crisis, but before its resolution on December 28 of that same year.

⁸⁵ A portion of the Front de libération du Québec Manifesto, ed. and trans. Damien-Claude Bélanger, <http://faculty.marianopolis.edu/c.belanger/quebechistory/docs/october/documents/FLQManifesto.pdf> (accessed 22 October 2009). The text enclosed by interior quotes, ‘big bosses’ and ‘cheap labor,’ originally appeared in the manifesto in English and not French. Bélanger notes the reason for this being that “the FLQ used English terminology as a form of derision and also as a means to highlight the dominant role of Anglophones in Quebec’s economy.”

(provincial Minister of the Department of Labour), and the Montréal Stock Exchange. The terrorist activities came to a head on October 5, 1970 when the FLQ kidnapped James Cross (British trade commissioner), whom they later released, and Pierre Laporte (Minister of Immigration, Manpower and Labour), who was murdered.⁸⁶

Even though Québec society had been disassociating itself with the Catholic Church for many years before this, it would still have been unwise to an individual to align himself with Catholic ideology during and immediately after the height of the FLQ's violence, for the FLQ manifesto claimed that the Catholic Church was still very much in a position of power. The manifesto insisted that, "we are terrorized by the capitalist Roman Church, even though this seems less and less obvious (who owns the property on which the stock exchange stands?)."⁸⁷ Elsewhere in the manifesto, the FLQ expresses discontent with the Catholic Church, recalling the "Patriots of 1837-38 (those whom Our Holy Mother the Church hastily excommunicated to better sell out to British interests)." This complaint referred to the Church's refusal to administer the Sacrament of Communion to the anti-colonial rebels fighting British control at that time.

The Federal Government responded to the October Crisis by enforcing the War Measures Act against its own citizens and consequently the arrest of over 450 people. The group ceased its public activities shortly after in 1971. I suggest that even if Prévost's decision to move away from clearly religious works after 1971 and instead discussing more general matters of humanism was not related to the October crisis, his choice of text for his 1972 *Ad Pacem* was entirely a call for peace.

⁸⁶ Marc Laurendeau, "Front de libération du Québec," and Denis Smith, "October Crisis," *The Canadian Encyclopedia*, Historica Foundation 2009, <http://www.thecanadianencyclopedia.com> (accessed 19 October 2009)

⁸⁷ Front de libération du Québec Manifesto, Bélanger, 2009. The Roman Catholic Church held a significant amount of real estate on the island of Montréal.

Themes concerning the Roman Catholic faith and human love are also paramount in the music of Messiaen. He was a devout Catholic whose love for God permeated his entire output. One of his purposes in writing music was to “shed light on the Truths of the Catholic Faith.”⁸⁸ In his book *Olivier Messiaen’s System of Signs*, author Andrew Shenton explains that Messiaen focused on the monotheistic yet Trinitarian notion of God (the Three Persons—Father, Son and Holy Spirit—in One), God’s simplicity, immensity and immutability (from Aquinas’ “Essence of God” in the *Summa Theologica*), and four other defining elements of Roman Catholicism: the seven Sacraments, the Bible, apostolic succession (the belief that the modern church is descended from the original 12 apostles), and the fact that the church itself is formed of a worldwide community of believers.⁸⁹

Messiaen’s compositional language was itself developed to profess his faith. Considering the derivation of the tripartite “charms of impossibilities,” his modes of limited transposition reproduce the beautiful mixes of colour found within the stained glass windows of the churches and cathedrals he visited throughout his lifetime. He developed the non-retrogradable rhythms along similarly faith-inspired lines: “in order to express that God is boundless just as he is eternal, without beginning or end in space as in time, I have given two forms to my theme: one forward, one retrograde, as two extremities which face each other and which can fall back on each other indefinitely...”⁹⁰ The symmetrical permutations were created to subvert time. Ian Darbyshire concludes that “it is from numbering itself that we derive the notion of time. The definition of time given by Aquinas, which derives from Aristotle and which Messiaen often

⁸⁸ Olivier Messiaen, *Music and Colour: Conversations with Claude Samuel*, trans. E. Thomas Glasow. Portland, Oregon: Amadeus Press, 1994, p. 20.

⁸⁹ Andrew Shenton, *Olivier Messiaen’s System of Signs*, Surry, U.K.: Ashgate Publishing Ltd, 2008, p. 17.

⁹⁰ Ian Darbyshire, “The Theology of Illusion,” *Messiaen’s Language of Mystical Love*, ed. Siglind Bruhn, New York: Garland Publishing, Inc., 1998, p. 38. This is Darbyshire’s translation of Messiaen’s preface on “le langage communicable” in *Méditations sur le mystère de la Sainte Trinité*, Paris: Leduc, 1969.

quoted, that in ‘time there is no before and after’ whereas in eternity there is no such successiveness, depends on the idea of numeration.”⁹¹ By constantly changing the successiveness of the gamme chromatique through symmetrical permutation, Messiaen was able to rearrange the successiveness of time and thereby approach, as close as he could, a representation of eternity.

1.4 The Allure of France

Musical and cultural ties have been maintained between France and Québec since the first French settlers proclaimed Québec as “New France” in the 17th century. The first professional musicians arriving in Québec to teach in the mid-19th century inspired their best pupils to complete their training in France. According to historian Gilles Potvin and musicologist Helmut Kallmann, “thus began the continuing back-and-forth movement of young Canadian musicians who have undertaken extensive periods of study in France, chiefly in Paris, either in official institutions or with private teachers.”⁹² Potvin and Kallman maintain that the trend was steady even during the Franco-Prussian War (1870-1), World War I (1914-18), and World War II (1939-45).

The trend towards studying in France increased substantially in the 20th century thanks to the creation of the Prix d’Europe. This annual study grant is funded by the Ministère des Affaires culturelles du Québec (MACQ) and administered by the Académie de musique du Québec (AMQ). It was created by the Quebec government in 1911. In 1949, Clermont Pépin won the

⁹¹ Ibid, p. 41.

⁹² Gilles Potvin and Helmut Kallmann, “France,” *The Encyclopedia of Music in Canada*, The Historical Foundation 2009, <http://www.thecanadianencyclopedia.com> (12 October 2009)

prize, enabling him to live in Paris as a pianist from 1949-55.⁹³ Several Québécois students went to Paris in a private capacity or on scholarships from the Québec government or the Canada Council/Conseil des arts du Canada, launched in 1959 to foster and promote the study, enjoyment, and production of work in the arts.⁹⁴ Serge Garant was a part of the former situation; and André Prévost, the later. Garant's 1951-52 academic year in Paris was financed through the patronage of Madame Mimi Shea who had recognised his talent in 1949 through a local Sherbrooke group "Jeudi musical."⁹⁵ Prévost's 1960-61 year of study was funded through dual grants from both the government of Québec and the Canada Council. Although this dissertation analyzes selected works composed before, during and shortly after their studies in Paris, it emphasizes those composed in France, while each was auditing Messiaen's class at the Conservatoire.

In my examination of post-Parisian works, I again concentrate on those compositions which have techniques reflecting the mark of Messiaen. Their teacher and colleagues later visited Québec, helping to keep France-Québec musical relations strong. Messiaen, his contemporary Henri Dutilleux, and his students Pierre Boulez and Iannis Xenakis later visited Québec.⁹⁶ Serge Garant was an instrumental part of many of these visits in his role as conductor and founding member of the Société de musique contemporaine du Québec (SMCQ), established in 1966. The SMCQ has collaborated with an impressive list of European composers and their favourite performers such as Luciano Berio and soprano Cathy Berberian (1968), Olivier Messiaen and pianist Yvonne Loriod (1970 and 1978), Karlheinz Stockhausen and his group (1971), Mauricio

⁹³ Cécile Huot, "Prix d'Europe," *The Encyclopedia of Music in Canada*, The Historica Foundation 2009, <http://www.thecanadianencyclopedia.com> (12 October 2009)

⁹⁴ "Canada Council/Conseil des arts du Canada," *The Encyclopedia of Music in Canada*, The Historica Foundation 2009, <http://www.thecanadianencyclopedia.com> (accessed 23 Sept 2009)

⁹⁵ Lefebvre 1986, p. 25.

⁹⁶ Potvin and Kallmann, 2009

Kagel and the Kölner Ensemble für neues Musiktheater (1974), and Pierre Boulez and the Ensemble InterContemporain (1991).⁹⁷

⁹⁷ Hélène Panneton, Claire Rhéaume, Suzanne Thomas, Claire Versailles, Alexis Luko. "Société de musique contemporaine du Québec," *The Encyclopedia of Music in Canada*, The Historica Foundation 2009, <http://www.thecanadianencyclopedia.com> (accessed 2 Oct 2009). The other founders include noted composers Jean Papineau-Couture and Maryvonne Kendergi, and composer/administrator Hugh Davidson of the Canadian Broadcasting Corporation, the National Arts Centre, and the Canada Council.

Chapter 2: The Compositional Techniques of Messiaen: A Quick Primer

Messiaen took great care to detail the various technical devices of his distinctive musical language in two major texts. He published his *Technique de mon langage musical* (Technique of My Musical Language) in 1944, fairly early in his career and then continued to use and further refine many of the trademark techniques introduced in this text throughout his career while developing new ones. The second text, *Traité de rythme, de couleur, et d'ornithologie* (Treatise of Rhythm, Colour and Ornithology), was a long-term project for the composer and his wife, pianist Yvonne Loriod. Messiaen began writing the text in 1949 but it was not published until after his death with the additional assistance of his former student Alain Louvier. The seven volumes were edited considerably by Loriod and Louvier and made available, one by one, between the years 1994 and 2002. The *Traité* is somewhat poorly written as it liberally intermingles past and present tenses and the personal pronouns *he* and *I*, but it nonetheless contains a vast amount of information that provides invaluable poietic insight.⁹⁸ The following summary of Messiaen's compositional techniques refer for the most part to volumes II, III and VII, in which he discusses rhythm, permutation and the interrelated modes and invented chords, respectively.

My discussion of technique is limited to those procedures that are most relevant to the music composed by Serge Garant, Clermont Pépin and André Prévost. For example, Messiaen was a synaesthete who had the ability to “see” the colour of sound. Since synaesthesia is a highly personal phenomenon in that the colours seen by synaesthetes are not consistent between individuals, and because neither Garant, nor Pépin or Prévost were synaesthetes, the colouration

⁹⁸ Jean Boivin, “In Search of an Objective Evaluation of Messiaen's Theoretical Writings: The Reception of the *Traité de rythme, de couleur, et d'ornithologie*,” conference paper presented at the *Messiaen 2008 International Centenary Conference*, Birmingham, U.K., 21 June 2008.

aspect of Messiaen's music will not be discussed in this dissertation as a possible influence. Similarly, birdsong is not mentioned or used by the three Québécois composers and will thus not be addressed here either. Some other techniques will be mentioned only briefly as they are but rarely used in the music of the three students: these include added notes and rhythms; invented chords such as the chords of contracted resonance (les accords à resonance contractée) and the turning chords (les accords tournants); and asymmetrical intervallic enlargement (agrandissement asymétrique). A number of other distinctly Messiaenic characteristics—such as phrase shape and cadential gestures—also appear in the earliest music of Garant, Pépin and Prévost, and will be addressed accordingly.

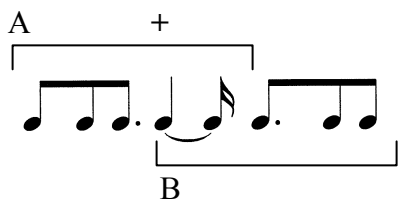
2.1 Les rythmes non rétrogradables (non-retrogradable rhythms)

Messiaen names these rhythmic units for their non-retrogradable palindromic structure, for their forward and backward readings are identical. Hindu rhythms served as a major source of inspiration for these palindromes, as discussed in the published conversations with journalist Claude Samuel. Messiaen considered it “extraordinary to think that the Hindu were the first to draw attention to and to rhythmically compose music utilizing this principle of non-retrogradation that we so frequently see around us.”⁹⁹ The composer first came across Sharngadeva's list of 120 Indian *deçî-tâlas* in Lavignac's *Encyclopédie de la Musique* while studying at the Paris Conservatoire from 1919 to 1930.

⁹⁹ Claude Samuel, *Entretiens avec Olivier Messiaen*, Paris: Belfonds, 1967, p. 82. “Il est extraordinaire de songer que les Hindous ont été les premiers à signaler et à utiliser rythmiquement et musicalement ce principe de non-rétrogradation que l'on rencontre si fréquemment autour de nous.”

Messiaen cites dhenkĩ  as an example of a simple non-retrogradable rhythm.¹⁰⁰

Palindromic rhythmic units with more than three components, such as in example 2-1 below from “Amen des anges, des saints, du chant des oiseaux, No.5” in *Visions de l’Amen*, are explained with two brackets that highlight the symmetrical halves. Of this rhythm, Messiaen says, “If we extend the figure of [the initial] 3 values by the expansion principle, we must say that all rhythms, divisible into 2 groups where one is the retrograde of the other, and with a ‘central common value,’ are non-retrogradable.”¹⁰¹ The brackets overlap at the central shared value of the palindrome that is indicated with a + sign that Messiaen used to demarcate *la valeur centrale commune*, the central shared value.



Example 2-1: Messiaen’s example of a non-retrogradable rhythm of more than 3 values from his *Traité*, vol. II, p. 26.

Messiaen often subjected his non-retrogradable rhythms to processes of motivic development. He accomplished this through the application of augmentation and diminution to only the central value or unit (example 2-2); adding additional rhythms to the outsides (example

¹⁰⁰ Olivier Messiaen, *Traité de rythme, de couleur, et d’ornithologie (1949-1992)*, vol. II, Paris: Leduc, 1996, p. 25.

¹⁰¹ Messiaen, *Traité*, vol. III, p. 26. “Si nous dépassons le chiffre de 3 valeurs, le principe s’agrandit, et nous devons dire: tous les rythmes, divisibles en 2 groupes rétrogradés l’un par rapport à l’autre, avec ‘valeur centrale commune,’ sont non rétrogradables.”

Although Messiaen uses the + sign for the first time on p. 26 of his *Traité*, vol. II, he does not specify the reason for its employment until p. 32 when discussing successive additive values in his *Turangalîla Symphonie*. His exact quote containing an explanation of the + sign in its original context may be found later in footnote 76.

2-3); and making *monnayages* of only the centre, outer two units, or all three (example 2-4).

When he subjected the same rhythm to several iterations of the same process of motivic development, he referred to each incremental product of these successive developmental steps as a “terme.” Messiaen illustrated the successive application of augmentation and its inverse, diminution, in the second and third couplets, respectively, of the “3e Rechant” from his *Cinq Rechants*, as shown in example 2-2. His original example as it appears in the *Traité* is shown in black, while my additions are in blue. The composer explains that this “other method of developing non-retrogradable rhythms,” namely “augmentation of the central value through adding a sixteenth note in each term,” or “diminution of the central value through subtracting a sixteenth note in each term” results in the following¹⁰²:

1^{er} terme → add sixteenth → 2^e terme → add sixteenth → 3^e terme

A

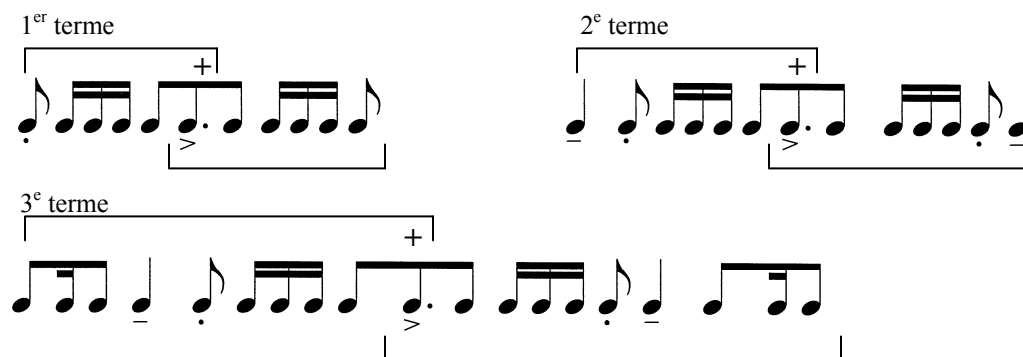
1^{er} terme → subtract sixteenth → 2^e terme → subtract sixteenth → 3^e terme

B

Example 2-2: *Termes* as a product of the successive application of (A) augmentation and (B) diminution, *Traité*, vol. II, p. 37.

¹⁰² Messiaen, *Traité*, vol. II, p. 37. The text accompanying example 2-2 reads, “Autre façon de développer un rythme non rétrogradable. Augmentation des valeurs centrales, en leur ajoutant une double croche à chaque terme [...] Effet opposé : Rythme non rétrogradable, répété avec diminution des valeurs centrales, en leur enlevant une double croche à chaque terme.”

In addition to the + sign in example 2-2, Messiaen has also employed a brace to demarcate the central shared value. This was done as the central common value is no longer a single duration, but a group of note values. In example 2-3 from the *Turangalila Symphonie*, his first term adds a quarter note to each extreme to yield the second term, which in turn adds a “dhenkî” figure to the right and left to produce the third.¹⁰³



Example 2-3: Adding values to the extremes of a non-retrogradable rhythm, *Traité*, vol. II, p. 32.

A *monnayage* is a “rhythmic conversion” that subdivides a rhythmic value or several values into composite groups totalling the same value, as indicated by Messiaen’s explanation of

¹⁰³ Messiaen, *Traité*, vol. II, p. 32. Messiaen explained as much in his own words, sharing that “the brackets indicate the 2 retrogradable groups, one about the other. The central common value, with a cross. 2nd term: plus a quarter at the extremes. 3rd term: plus a Hindu ‘dhenkî’ at the extremes—added to what already preexists.” The original French reads, “Les encadrements indiquent les 2 groupes rétrogradés l’un par rapport à l’autre. Valeurs centrales communes, aux croix. 2^e terme : plus une noire aux extrêmes. 3^e terme : plus le ‘dhenkî’ hindou aux extrêmes—l’ajout précédent subsiste. 4^e terme : plus 4 doubles croches aux extrêmes—les ajouts précédents subsistent.”

Messiaen actually shows four terms, but I have chosen to omit the last as he breaks his successive process in order to create the fourth, opting instead to add rhythmic values to the centre instead of the outsides. He comments that the penultimate row of “Chant d’amour 2” adds “a new central sforzando duration of 9 eighths: this new central religious duration is [...] freely added, interpolated at the centre.” His explanation in its original language and context is, “Et plus une nouvelle durée centrale sforzando valant 9 doubles croches : cette nouvelle durée centrale relègue au rang de pénultième de centre l’ancienne durée centrale (croche pointée), laquelle subsiste donc à droite et à gauche, et ajout libre, interpolé, au centre, en répétant à droite et à gauche du centre l’ancienne durée centrale pour conserver la non rétrogradation.”

the alterations made to rhythms a, b and c in example 2-4.¹⁰⁴ Here the composer demonstrates: a) making a *monnayage* through modifying the two extremes, exchanging each dotted eighth for three sixteenths; b) applying *monnayage* to only the central value, trading a single eighth for two sixteenths; and c) making a *monnayage* through the modification of all three rhythmic units, subdividing each into smaller eighth- and sixteenth-note units.

<p>a)</p>	monnayage des 2 extrêmes	
<p>b)</p>	monnayage du centre	
<p>c)</p>	monnayage des trois	

Example 2-4: *Monnayage* of the a) outside; b) central; and c) all sections as explained in the *Traité*, vol. II, p. 26.

¹⁰⁴ Based on Messiaen's description of the *monnayage* on p. 26 of the *Traité*, vol. II. The verb *monnayer* usually refers to the fabrication of money or the exchange of goods for money, or in some cases, currency exchange. In this case, I believe that Messiaen applied the term to describe a rhythmic exchange similar to a currency exchange: the same total "value" remains constant but the measure of smaller units held by that total value is convertible within the value of the whole, i.e. exchanging one quarter for two eighths, for four sixteenths and then changing back to a quarter again. Note that Messiaen did not use brackets or + signs in this example; I have added them in blue.

2.2 Pédales rythmiques and canons rythmiques (rhythmic pedals and rhythmic canons)

A rhythmic pedal is a rhythmic ostinato. Hindu and Greek rhythms often served as the basis of Messiaen's pedals and canons and they often contained non-retrogradable rhythms as well. He would layer two or three pedals of different periodicity as in the case of the cello and piano parts of the "Liturgie de cristal" from *Quatuor pour la fin du Temps* (periodicities of 15 and 17 quarters respectively), and the right and left hands of piano 1 in "Amen de la Création" from *Visions de l'Amen* (10 quarters and 11 ¼ quarters respectively).¹⁰⁵ His "Chant d'amour 2," the third section of *Turangalîla Symphonie*, superimposes two short and two long pedals. The shorter woodwind pedal, performed by oboes, English horn, clarinets and bass clarinet, totals 13 sixteenth notes (2+3+4+4); the shorter string pedal, performed by divided second violins and violas, totals 19 (4+4+4+2+3+2). These two pedals are paired against those longer ones of the snare drum (132 sixteenths) and the Chinese cymbal (249 sixteenths). The snare drum pedal is comprised of an original non-retrogradable rhythm 1^{er} terme of 17 sixteenths that undergoes three successive palindromic additions to its outsides, as partially shown in example 2-3. The structure of the Chinese cymbal part is discussed later in this chapter.

Although not as relevant to the focus of this dissertation, some of Messiaen's other pedal and canon techniques should also be noted. The composer superimposed his pedals with rhythmic canons, as in the case of the "Adieu" movement of *Harawi*. He also altered the time interval of imitation in his double and triple canons so that the parts grew closer together or further apart with successive iterations. This occurs, for instance, in *Visions de l'Amen*, "Amen

¹⁰⁵ Messiaen, *Traité*, vol. II, pp. 55-60.

de Consommation.”¹⁰⁶ Elsewhere, rhythmic pedals were pitted against augmented and diminished versions of themselves in canon, as in the case of “Regard du Fils sur le Fils” and “Regard du silence” from *Vingt regards*.¹⁰⁷

2.3 Numerical Mysticism, Patterns and Palindromes

There are several overarching themes and principles with which virtually all of Messiaen’s compositional techniques are associated, such as his Catholic faith, which was expressed primarily through symmetry and numerical symbolism. Messiaen was enthralled with symmetry and likened his musical palindromic structures to palindromes found in nature, architecture and various language and numerical constructions. The second volume of his *Traité* prefaces the discussion of palindromic non-retrogradable rhythms with examples of bilateral (left-right) symmetry in the human body, faces, butterflies, and addresses its popularity within the visual arts and architecture. Messiaen presents texted symmetries, such as in the ancient Latin SATOR square and in various near-palindromes like the “abracadabra magic triangle” that was printed on amulets and worn by Gnostic Romans to ward off disease, shown in example 2-5.¹⁰⁸ Messiaen explained that the near-symmetry (an “A” in the centre flanked by two similar-sounding consonants, C and D; another A; more rhyming consonants R and B; and a final A), illustrated by the dropping of one letter from each side with each new line of the triangle, was a

¹⁰⁶ Messiaen, *Traité*, vol. II, p. 61. Messiaen describes his process of drawing his two canonic voices closer together as a “canon rythmique de plus en plus serré.” The two voices are first heard entering 2 quarters apart, then 1 quarter, and finally 1 eighth apart.

¹⁰⁷ Ibid, pp. 65-80. In these two examples the two voices begin together, but one is $\frac{1}{4}$ longer than the other through the addition of a dot to the basic quarter, hence Messiaen’s explanatory subtitle, “canons par ajout du point, et par ajout du $\frac{1}{2}$ des valeurs.” The composer provides other examples of the technique as well, taken from “Dans le noir” from *Harawi* and “Amen des anges, des saints, du chant des oiseaux” from *Visions de l’Amen*.

¹⁰⁸ Ibid, pp. 7-21. Ironically, although “Abracadabra” is not a palindrome, a similar word, “Ablanathanalba,” also used by the Gnostics, is a palindrome when written in Greek characters.

verbal equivalent to his technique of developing a palindromic non-retrogradable rhythm through the elimination of values from its outermost sides.¹⁰⁹

A	B	R	A	C	A	D	A	B	R	A
	B	R	A	C	A	D	A	B	R	
		R	A	C	A	D	A	B		
			A	C	A	D	A			
				C	A	D				
					A					

Example 2-5: The “Acadabra magic triangle” as shown in the *Traité*, vol. II, p. 15.

Messiaen felt that the so-called “charm of impossibilities”—as manifest in the modes of limited transposition, non-retrogradable rhythms, and symmetrical permutations—held a magical power of enchantment, as their “certain mathematical impossibilities, certain closed circuits, possess a strength of bewitchment, a magic strength, a charm.”¹¹⁰ In the *Traité*, this threefold set of compositional tools is first discussed in the first volume, followed by further explanations in the third with a focus on self-contained mathematically symmetrical formulations that create these “closed circuits” through intrinsic structural replications. The circuits of the modes of limited transposition are due to the fact that “they contain in themselves small transpositions,” while in the non-retrogradable rhythms, they arise from the fact “they contain in themselves

¹⁰⁹ Messiaen, *Traité*, vol. II, p. 15. “Cette disposition nous offre, en sens vertical, un exemple frappant d’élimination à droite à gauche: procédé de développement utilisé pour les rythmes non retrogradable.” (emphasis in the original)

¹¹⁰ Ibid, vol. III, p. 7. “Certaines impossibilités mathématiques, certains circuits fermés, possèdent une puissance d’envoûtement, une force magique, un charme.”

small retrogradations,” or divide into at least two equivalent halves, one the reverse of the other. The reordering process of the symmetrical permutations must necessarily “stop after a few interversions in that they soon stumble upon the original order again”¹¹¹ Likewise, the modes of limited transposition, when transposed, will eventually “fall upon those notes already heard in previous transpositions.”¹¹²

In each of these techniques, the closed circuit is a form of symmetry, not necessarily in the bilateral sense as in the case of the non-retrogradable rhythms (inversional symmetry), but in the replicative sense (inversional or transpositional symmetry), since the modes and the symmetrical permutations may only be transposed/reapplied a limited number of times before returning to their starting positions. More specifically, the symmetrical principles behind the non-retrogradable rhythms are the same as those supporting his modes of limited transposition. The two axes of measurement are the same but positioned perpendicular to one another, in that rhythm occurs along the horizontal flow of time, and harmony, across the vertical spectrum of pitch. As Messiaen himself summarized the mutual relationship of the two, “the modes of limited transpositions realize in the vertical direction (transposition) what non-retrogradable rhythms

¹¹¹ Messiaen, *Traité*, vol. III, p. 7. “C’est le cas pour les ‘Modes à transpositions limitées,’ qui ne peuvent se transposer au-delà d’un certain nombre de transpositions sous peine de retomber dans les mêmes notes, parce qu’ils contiennent en eux-mêmes de petites transpositions. C’est le cas pour les ‘rythmes non rétrogradables,’ qui ne peuvent être lus en sens rétrograde sans que l’on retrouve exactement le même ordre de valeurs que dans le sens droit, parce qu’ils contiennent en eux-mêmes de petites rétrogradations. C’est le cas enfin pour les ‘permutations symétriques’ qui s’arrêtent au bout d’un petit nombre d’interversions en butant sur un chromatisme de départ tôt retrouvé, parce qu’on les a lues toujours dans le même ordre de lecture.” (In this context, *déchiffrement* or *décodage* are interchangeable.)

Free translation: “This is the case for the ‘modes of limited transposition,’ which cannot be extended beyond a certain number of transpositions before landing on the same notes, because they contain in themselves small transpositions. This is the case for ‘non-retrogradable rhythms,’ which cannot be read in retrograde as they replicate exactly the same order of values as in the forward direction, because they contain in themselves small retrogradations. This is the case, at last, for the ‘symmetrical permutations’ which stop after a few interversions in that they soon stumble upon the original order again, because they were always reordered in the same way.”

¹¹² *Traité*, vol. VII, pp. 50-51. “Au bout d’un certain nombre de transpositions chromatiques qui varie avec chaque Mode, ils ne sont plus transposables, parce que l’on retombe dans les notes déjà entendues aux transpositions précédentes.”

realize in the horizontal direction (retrogradation).”¹¹³ Messiaen considered the non-retrogradable rhythms to be a symbol of eternity, a belief of his Catholic faith, when he said, “[...] this time [rhythm] that I beat: there is an eternity before, eternity after: it is a non-retrogradable rhythm.”¹¹⁴ He likened these palindromes to the symmetrical permutations as both could harness and manipulate time:

The musician possesses a mysterious power: by means of his rhythms, he can chop up Time here and there, and can even put it together again in the reverse order, a little as though he were going for a walk through different points in time, or as though he were amassing the future by turning to the past, in the process of which, his memory of the past becomes transformed into a memory of the future. The “symmetrical permutations” and “non-retrogradable rhythms” utilize this power, nevertheless working against it.¹¹⁵

“Messiaen, who denied being a mathematician, was fascinated with numbers,” writes Alain Louvier in the introduction to vol. III of the *Traité*.¹¹⁶ Messiaen used numbers such as 3, 7, 9 and 10 for their religious associations. He cites the number 1 as representing Divine Unity and 3 as representing the Trinity (Father, Son and Holy Spirit).¹¹⁷ He thought of 7 as the number of “creation”¹¹⁸ and has more specifically linked numbers 7 and 8 in saying that “seven is the perfect number, the creation of six days sanctified by the divine Sabbath; the seventh of this peace persists in eternity and becomes the eighth of unfaltering light, of changeless peace.”¹¹⁹ The number 10 is an addition of 3 + 7, or God (the Trinity) and earth (His creation).¹²⁰ Some of

¹¹³ Olivier Messiaen, *The Technique of My Musical Language*, Trans John Satterfield. Paris: Alphonse Leduc, 1956, vol. I, p. 21.

¹¹⁴ Claude Samuel, *Entretiens avec Olivier Messiaen*, Paris: Belfonds, 1967, pp. 83-4. The full quote is: “...ce moment que je vis, cette pensée qui me traverse, ce mouvement que j’accomplis, ce temps que je frappe : il y a l’éternité avant, l’éternité après : c’est un rythme non-rétrogradable.”

¹¹⁵ Jean Marie Wu, “Mystical Symbols of Faith: Olivier Messiaen’s Charm of Impossibilities,” *Messiaen’s Language of Mystical Love*, ed. Siglind Bruhn, New York: General Music Publishing Co., 1998: 85-120, p. 104.


¹¹⁶ *Traité*, vol. III, p. 1. “Messiaen, qui se défendait d’être mathématicien, semblait fasciné par le Nombre.”

¹¹⁷ Ibid, p. 347.

¹¹⁸ Ibid.

¹¹⁹ Olivier Messiaen, programme notes for “La Recherche Artistique présente hommage à Olivier Messiaen,” a series of concerts given in November and December of 1978 to mark the 70th birthday of the composer. His original wording is as follows: “Sept est le nombre parfait, la création de six jours sanctifiée par le sabbat divin; le sept de ce repos se prolonge dans l’éternité et devient le huit de la lumière indéfectible, de l’inaltérable paix.”

¹²⁰ Messiaen, *Traité*, vol. III, p. 347.

these numbers correspond to values that carry cultural significance within the Hindu rhythms, as Messiaen explains in the case of *Candrakalâ*, which consists of three eighths followed by three dotted eighths and a sixteenth (). Messiaen discussed this rhythm in detail in the *Traité*, describing the symbolic references to Hindu mythological belief: the 7 independent rhythmic characters represent the 7 chalices of the liquor of immortality; the 3 different types of rhythmic values--dotted quarter, quarter and eighth--represent the earth, sun and moon, in that order.¹²¹

Although Messiaen was originally unaware of the symbolism associated with the Hindu rhythms when he first began integrating them in earlier works such as the *Méditations sur le mystère de la Sainte Trinité*,¹²² he later studied the subject in great detail and it became part of his discussion of the work in his *Traité*. Andrew Shenton has summarised Messiaen's explanations of the numerical symbolism of this rhythm as follows:

In the *Traité* [...] he provides several interpretations of the rhythm, relating it to the Hindu cosmos and to number symbolism (the number seven for the number of values in the rhythm); analyzing Hindu names for the moon, symbols of the male and female, yin and yang; and finally noting that the divisions of the rhythm into equal subdivisions provides the first six beats [in sixteenth notes] (six symbolizing conception) followed by nine (symbolizing birth) and finally one (symbolizing Divinity). This [...] analysis has obvious connections with Christianity and is perhaps what interested Messiaen most about the rhythm.¹²³

Messiaen also loved numerical series for their supernatural associations. In discussing non-retrogradable symmetries, Messiaen includes a short section on Magic squares. He wonders at the novelty of so many possible horizontal, vertical and diagonal lines all totalling the same number and links their qualities to the supernatural powers of literary characters Macbeth and

¹²¹ Messiaen, *Traité*, vol. I, pp. 309-311.

¹²² Johnson 1975, p. 10.

¹²³ Shenton 2008, p. 57. Shenton is citing Messiaen's discussion in the *Traité*, vol. I, pp. 309-11.

Faust, declaring, “Magic squares! ...One also speaks of Kabbalistic, devilish squares, panmagic, satanic...Is this to say that we are at crossroads between mathematics and the sorcery?”¹²⁴

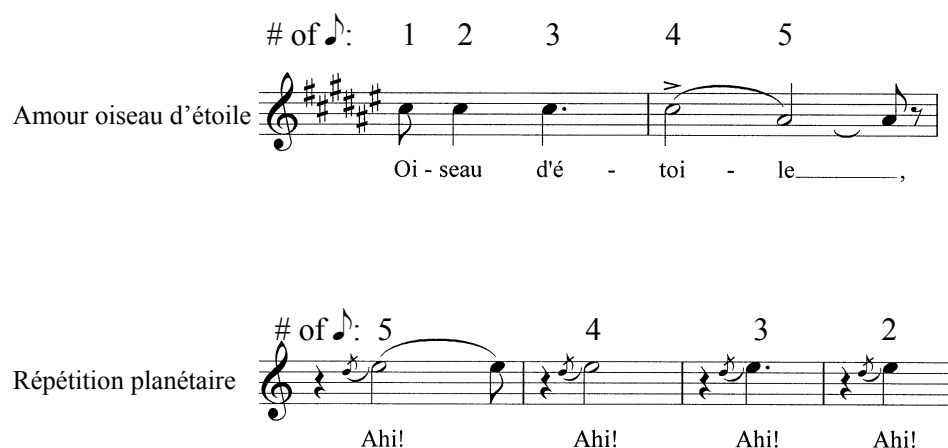
The composer was especially fond of prime numbers and numerical series with special properties, such as in strings of prime numbers or the Fibonacci series, and he often chose rhythms whose values were derived from these numerical strings. His *Traité* contains a chart of “Nombres premiers traits en rythmes non rétrogradables,” demonstrating non-retrogradable rhythms using the prime numbers from 5 through 71. “Dhenkî” again figures prominently in its eighth-sixteenth-eighth rendition. Messiaen makes note of its occurrence alone, where it represents 5 beats, its use as the central component of the 23- and 43-beat palindromes, and its dual appearance within the one of 53-beats.¹²⁵

Simple ascending numerical series served as the basis of the gamme chromatique, or chromatic gamut, to which the symmetrical permutations were applied. This gamut of durations gradually increased from the value of one to twelve or fifteen sixteenths by continual increments of a sixteenth. Occasionally Messiaen used a simple range of ascending rhythmic values directly in a composition, as in the case of “Amour oiseau d'étoile” from *Harawi: Chant d'amour et de mort* (1945). Siglind Bruhn has pointed to the straightforward setting of 1-2-3-4-5 eighths in example 2-6 as a primary motive of this movement.¹²⁶ I suggest that an opposite series, one that incrementally decreases, appears in the song “Répétition planétaire” from the same work. The singer's exclamations of “Ah!” in the same example decrease by eighth notes in a 5-4-3-2 series that is heard several times in the movement.

¹²⁴ Messiaen, *Traité*, vol. II, pp. 17-18. “Carrés magiques!...On parle aussi de carrés cabalistiques, diaboliques, panmagiques, sataniques...Est-ce à dire que nous sommes à mi-chemin entre les mathématiques et la sorcellerie?”

¹²⁵ Ibid, pp. 28-29.

¹²⁶ Siglind Bruhn, *Messiaen's Explorations of Love and Death: Musico-poetic Signification in the “Tristan Trilogy” and Three Related Song Cycles*, Hillsdale, NY: Pendragon Press, 2008, p. 194. Bruhn provides a detailed analysis of *Harawi* in the third part her book (“*Fated Love, a Demanding Path to God*”) where she interprets the motive in example 2-5 above from the tenth movement as a variation upon Messiaen's previously composed *thème de Dieu* from his *Vingt Regards sur l'Enfant-Jésus*.



Example 2-6: Ascending and descending simple numerical series in “Amour oiseau d’étoile” and “Répétition planétaire” from *Harawi* (1945)

The Chinese cymbal part in “Chant d’amour 2” of the *Turangalîla Symphonie* uses a simple descending series, the numbers from 17 to 7, as the basis of a non-retrogradable rhythm that is used as a pedal. It begins with a cymbal stroke lasting for the duration of 17 sixteenths, followed by 16, etc. Once the duration of 7 sixteenths has been reached, Messiaen again increases the distance between strokes by increments of 1, until the duration of 17 sixteenths is reached. The total number of cymbal attacks in this pedal is 21. Mirjana Šimundža suggests that “number 21 is a symbol of perfection, maturity [...] and God’s wisdom, wisdom has 21 attributes. The number 21 is made by trebling number 7 whose complex symbolism (some sevens are symbols of other sevens) is present in almost all cultures and religions.”¹²⁷ In his discussion of palindromes in *Traité*, vol. II, Messiaen mentions a similar ascending and descending “series” by increments of 1, shown on the right side of the curious equation $123.456.789 \times 99.999.999 = 1.234.567.887.654.321$.¹²⁸

¹²⁷ Mirjana Šimundža, “Messiaen's Rhythmical Organisation and Classical Indian Theory of Rhythm I,” *International Review of the Aesthetics and Sociology of Music* 18/1 (June 1987): 117-144, p. 135.

¹²⁸ Messiaen, *Traité*, vol. II, p. 16.

2.4 Les permutations symétriques (symmetrical permutations)

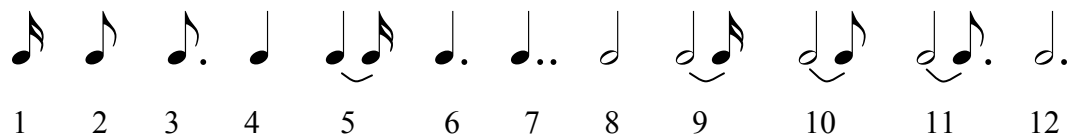
Messiaen begins his explanation of symmetrical permutation with a table that shows the number of possible reorderings of 2 objects (2 interversions), 3 objects (6 interversions), etc. up to 12 objects (479,001,600 interversions). He then poses the question, “What would we do [when faced] with all these millions of versions and interversions [from which to choose]?” and proposes his method of symmetrical permutations in an effort to avoid the otherwise massive amount of time one would spend generating all possible combinations at the pre-compositional level. To this end, Messiaen employed the symmetrical permutations to reorder (intervertir) the chromatic gamut—usually a series of durations in ascending or descending increments of sixteenth notes—by a regular process that continued to re-reorder (réintervertir) the series by the same means until the process was exhausted in that the original order of the chromatic gamut was re-obtained.¹²⁹

In his *Traité*, Messiaen outlines many methods of performing interversion that I would classify as falling into three categories: cyclic, fanning, and *deçi-tâlas*. Those interversions that reorder the Hindu *deçi-tâlas* are not employed by the three Québécois composers featured in this dissertation and shall thus not be discussed further here.¹³⁰ The cyclic reorderings are made upon an ascending chromatic gamut of sixteenth notes beginning with 1 sixteenth note, shown in example 2-7. The number 1 is then followed by numbers representing durations equivalent to that number of sixteenths, so that 2 equals two sixteenths or one eighth, 3 equals three sixteenths or a dotted eighth, etc. Messiaen applied both cyclic and fanning permutations to series of

¹²⁹ Ibid, vol. III, p. 11. “Que ferions-nous de tous ces millions de versions et interversions? Il faudrait les lire, les assimiler, écarter les moins bonnes, choisir les meilleures, perdre un temps considérable à quelque chose qui ne serait encore que l’antichambre du rythme et de la musique. Les permutations symétriques évitent tous les inconvénients. Ce sont tout simplement des réinterversions d’interversions, réinterviées dans le même ordre de lecture.”

¹³⁰ Those interested in reviewing Messiaen’s *deçi-tâla* interversions should review the figures in Annexe I of vol. III of the *Traité*, specifically pp. 326-343.

various lengths, ranging from 12 to 36 elements. In the music of Prévost and Garant, the technique was applied not only to a series of 12 durations, but a dodecaphonic series of 12 pcs as well. For this reason, I explicate the symmetrical permutations with a chromatic gamut of 12 units, be they duration or pitch.



Example 2-7: A 12-member *gamme chromatique*

What I refer to as the *cyclic permutations* reorder the integers of the original series by means of a cyclic pattern. Messiaen demonstrated four such cycles on a 12-unit gamut as shown in examples 2-8 to 2-11 below. In these permutations Messiaen retained the original units of 1 and 12 at the far left and right, respectively, in their original positions.

In the permutation procedure shown in example 2-8 Messiaen started with the first value of the “gamme chromatique” and extracted every third value (1, 4, 7, 10). He then repeated the same process starting on the second and third values respectively (2, 5, 8, 11 and 3, 6, 9, 12). Messiaen described this reordering of the “gamme chromatique” as “Je la lis de 3 en 3 durées, par groupes de 4 durées, en allant toujours de gauche à droite.”¹³¹ I shall henceforth abbreviate this process simply as “de 3 en 3, groupes de 4” (= taking every third value, in groups of 4).

¹³¹ Messiaen, *Traité*, vol. III, p. 12.

de 3 en 3, groupes de 4											
La gamme chromatique	1	2	3	4	5	6	7	8	9	10	11 12
Interversion I	1	4	7	10	||	2	5	8	11	||	3 6 9 12
Interversion II	1	10	8	6	||	4	2	11	9	||	7 5 3 12
Interversion III	1	6	11	5	||	10	4	9	3	||	8 2 7 12
Interversion IV	1	5	9	2	||	6	10	3	7	||	11 4 8 12
Interversion V/ La gamme chromatique	1	2	3	4	5	6	7	8	9	10	11 12

Example 2-8: Messiaen's "de 3 en 3, groupes de 4" illustrated (based on *Traité*, vol. III, pp. 12-13)

After the first interverson was obtained, Messiaen either chose to apply a different symmetrical permutation to the resulting series of values, or reapply the same procedure. When he repeated the same permutation he referred to the process as a *réinterverson* by virtue of its reapplication. These *réinterversons* eventually exhausted all possible reorderings available. Messiaen found the limitation on the number of unique *réinterversons* obtainable within his "closed circuit" of reapplication especially appealing. In his *Traité*, he does not explicitly spell out each *réinterverson*, but I have illustrated the full process in the examples here.

"De 4 en 4, groupes de 3," illustrated in example 2-9, is similar to "de 3 en 3, groupes de 4" in that it extracts every 4th instead of every 3rd value from left to right, grouped in four groups of three values each. "De 2 en 2 par mouvement rétrograde (sauf les valeurs extrêmes)" (taking every second value from right to left without touching the outer values), in example 2-10, differs slightly. The first interverson of this permutation maintains the outer positions of 1 and 12 but extracts values in reverse, from right to left, and places them from left to right. This results in two distinct interval groups of the even numbers (10, 8, 6, 4, 2) followed by the odd ones (11, 9, 7, 5, 3).

	de 4 en 4, groupes de 3														
La gamme chromatique	1	2	3	4	5	6	7	8	9	10	11	12			
Interversion I	1	5	9	||	2	6	10	||	3	7	11	||	4	8	12
Interversion II	1	6	11	||	5	10	4	||	9	3	8	||	2	7	12
Interversion III	1	10	8	||	6	4	2	||	11	9	7	||	5	3	12
Interversion IV	1	4	7	||	10	2	5	||	8	11	3	||	6	9	12
Interversion V/ La gamme chromatique	1	2	3	||	4	5	6	||	7	8	9	||	10	11	12

Example 2-9: Messiaen's "de 4 en 4, groupes de 3," illustrated (based on *Traité*, vol. III, p. 325)

de 2 en 2 par mouvement rétrograde (sauf les valeurs extrêmes)													
La gamme chromatique	1	2	3	4	5	6	7	8	9	10	11	12	
Interversion I	1	10	8	6	4	2	||	11	9	7	5	3	12
Interversion II	1	5	9	2	6	10	||	3	7	11	4	8	12
Interversion III	1	4	7	10	2	5	||	8	11	3	6	9	12
Interversion IV	1	6	11	5	10	4	||	9	3	8	2	7	12
Interversion V/	1	2	3	4	5	6	7	8	9	10	11	12	
La gamme chromatique													

Example 2-10: Messiaen's "de 2 en 2 par mouvement rétrograde (sauf les valeurs extrêmes)" illustrated (based on *Traité*, vol. III, p. 325)

The permutation "de 5 en 5 par mouvement droit et de 6 en 6 par mouvement rétrograde, en alternant (sauf les valeurs extrêmes)" (example 2-11) is similar to "de 2 en 2" in that without changing the position of 1 and 12, Messiaen places (2, 7) just left of the rightmost 12, then proceeding towards the left with pairs (3, 8), (4, 9), (5, 10) and (6, 10). The second part of his descriptor, "de 6 en 6 par mouvement rétrograde, en alternant," referring to retrograde movement by 6s in alternation, is the key difference between this cycle of 5s and the one of 2s, as although

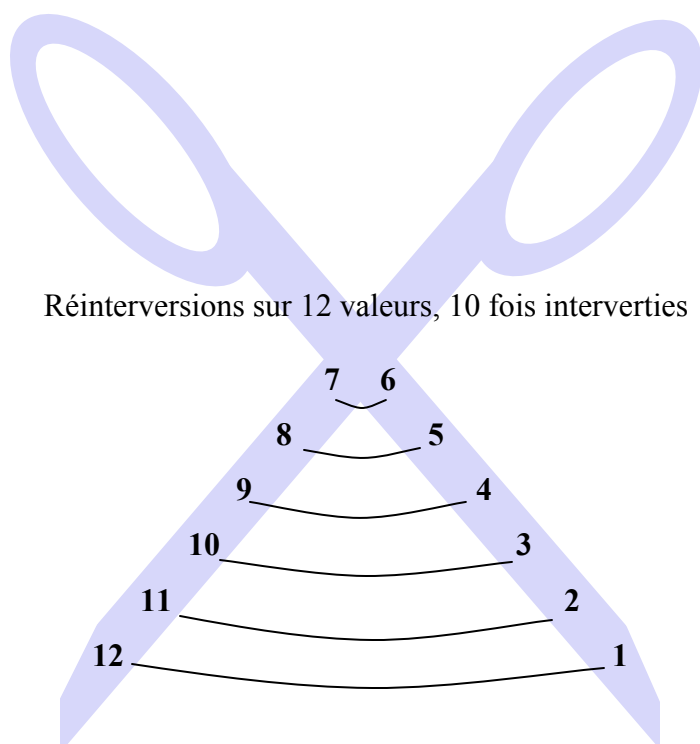
he first appears to be working from right-to-left, he is not. Beginning on 1, he takes every fifth value to obtain the first segment (1, 6, 11). From this point, he *alternately* counts 6 in the *retrograde* direction, 11- 6, arriving at 5. Switching direction again, he jumps forward by 5, to 10. Continuing this process he obtains 4 (from 10-6), 9 (from 4+5), 3 (9-6), 8 (3+5), 2 (8-6) and 7 (2+5).

de 5 en 5 par mouvement droit et de 6 en 6 par mouvement rétrograde, en alternant (sauf les valeurs extrêmes)																
La gamme chromatique	1	2	3	4	5	6	7	8	9	10	11	12				
Interversion I	1	6	11	||	5	10	||	4	9	||	3	8	||	2	7	12
Interversion II	1	4	7	||	10	2	||	5	8	||	11	3	||	6	9	12
Interversion III	1	5	9	||	2	6	||	10	3	||	7	11	||	4	8	12
Interversion IV	1	10	8	||	6	4	||	2	11	||	9	7	||	5	3	12
Interversion V	1	2	3	4	5	6	7	8	9	10	11	12				
La gamme chromatique																

Example 2-11: Messiaen's "de 5 en 5 par mouvement droit et de 6 en 6 par mouvement rétrograde, en alternant (sauf les valeurs extrêmes)" illustrated (based on *Traité*, vol. III, p. 325)

The fanning permutation upon a chromatic gamut of 12 integers mimics the opening and closing shapes that Messiaen likened to fans or scissors. I have illustrated this in example 2-12 below by adding a pair of scissors to Messiaen's example of a *ciseaux ouverts* permutation from the *Traité*.¹³²

¹³² Messiaen, *Traité*, vol. III, p. 325.

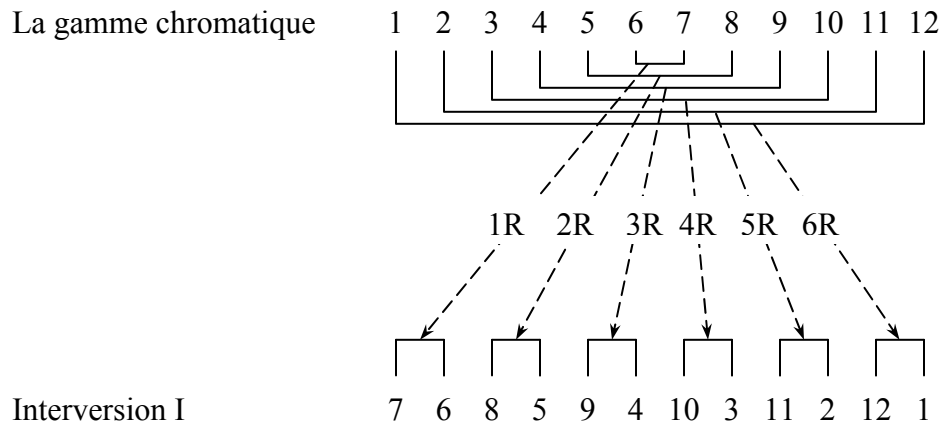


Réinterversions sur 12 valeurs, 10 fois interverties

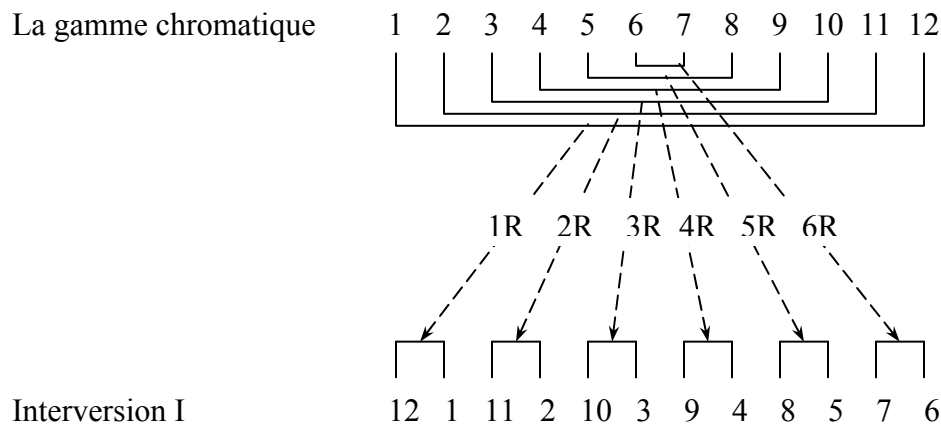
Example 2-12: Messiaen's *ciseaux ouverts* permutation, illustrated (*Traité*, vol. III, p. 325, open scissors added)

As shown in example 2-13a, in the open-scissors interversion the gamut undergoes an opening motion in that the dyads are opened, or extracted in pairs, from inside towards the outside and each retrograded (shown with "R"/dotted lines). The opposite closed-scissors motion in example 2-13b does the inverse, extracting the pairs from the outsides inwards, while reversing them.¹³³

¹³³ Although Messiaen often reversed the order of each pair of extracted numbers (reading them as right-left pairs) when he diagrammed the open- and closed-fan permutations in his theoretical writings, he often employed non-reversed pairs (left-right) in his compositions. Robert Sherlaw Johnson demonstrates this in his analysis of *Mode de valeurs*, "Étude de rythme," in his book, *Messiaen*, University of California Press: Berkeley and Los Angeles, 1975, pp. 105-108. Another example of Messiaen's utilization of the left-right ordering occurs in the fourth movement of *Concert à quatre*, pp. 69-70.



Example 2-13a: Open-scissors permutation (based on *Traité*, vol. III, pp. 165-167)



Example 2-13b: Closed-scissors permutation (based on Messiaen's diagram of the technique applied to a gamut of 12 values, *Traité*, vol. III, pp. 322-323)

It is in this context that Messiaen describes how réintersion quickly exhausts itself.¹³⁴

Examples 2-14a and b list the ten possible interversions obtained through open-scissors and closed-scissors permutation respectively.

¹³⁴ Messiaen, *Traité*, vol. III, p. 326. "En appliquant la même ordonnance de chiffres avec laquelle nous avons lu la gamme chromatique des valeurs à l'intersion ci dessus, pour la réintertir; et en continuant toujours la même opération sur toutes les interversions successivement obtenues : nous revenons à notre point de départ."

Ciseaux ouverts (réintersion sur 12 valeurs, 10 fois interverties)												
La gamme chromatique	1	2	3	4	5	6	7	8	9	10	11	12
Intersion I	7	6	8	5	9	4	10	3	11	2	12	1
Intersion II	10	4	3	9	11	5	2	8	12	6	1	7
Intersion III	2	5	8	11	12	9	6	3	1	4	7	10
Intersion IV	6	9	3	12	1	11	4	8	7	5	10	2
Intersion V	4	11	8	1	7	12	5	3	10	9	2	6
Intersion VI	5	12	3	7	10	1	9	8	2	11	6	4
Intersion VII	9	1	8	10	2	7	11	3	6	12	4	5
Intersion VIII	11	7	3	2	6	10	12	8	4	1	5	9
Intersion IX	12	10	8	6	4	2	1	3	5	7	9	11
Intersion X/ La gamme chromatique	1	2	4	3	5	6	7	8	9	10	11	12

Example 2-14a: The 10 interversions of the open-scissors permutation

Ciseaux fermés (réintersion sur 12 valeurs, 10 fois interverties)												
La gamme chromatique	1	2	3	4	5	6	7	8	9	10	11	12
Intersion I	12	1	11	2	10	3	9	4	8	5	7	6
Intersion II	6	12	7	1	5	11	8	2	4	10	9	3
Intersion III	3	6	9	12	10	7	4	1	2	5	8	11
Intersion IV	11	3	8	6	5	9	2	12	1	10	4	7
Intersion V	7	11	4	3	10	8	1	6	12	5	2	9
Intersion VI	9	7	2	11	5	4	12	3	6	10	1	8
Intersion VII	8	9	1	7	10	2	6	11	3	5	12	4
Intersion VIII	4	8	12	9	5	1	3	7	11	10	6	2
Intersion IX	2	4	6	8	10	12	11	9	7	5	3	1
Intersion X/ La gamme chromatique	1	2	4	3	5	6	7	8	9	10	11	12

Example 2-14b: The 10 interversions of the closed-scissors permutation

2.5 Les Modes à transpositions limitées (Modes of Limited Transposition)

The modes of limited transposition are symmetrical pitch-class collections that Messiaen considered to be “more harmonic than melodic.”¹³⁵ As is well known, they also carry colour associations.¹³⁶ Messiaen stressed the transpositional symmetrical properties of the modes above all else, and in vol. VII of his *Traité*, as in the earlier *Technique de mon langage musical*, he used brackets to illustrate the overlapping repetitive cells of which they are comprised. In example 2-15, the black brackets indicate Messiaen’s notation of the first transposition of modes 2, 3, 4, and 6. Although he discussed seven modes in his earlier *Technique de mon langage musical*, he did not illustrate modes 5 and 7 in his later *Traité*. Thus, I have added these brackets, as they appeared in *Technique*, in blue. Mode 1 consists of 6 transpositions of the whole-tone dyad, mode 2 of 4 transpositions of the [013] trichord, mode 3 of 3 transpositions of the tetrachord with normal order [0234], etc.¹³⁷

¹³⁵ Messiaen, *Traité*, vol. VII, p. 50. Messiaen explained: “Ces Modes utilisent les 12 sons chromatiques de notre système tempéré. [...] Ils sont plus harmoniques que mélodiques, et doivent être employés harmoniquement, **sans jamais sortir des notes du Mode**. Ces notes sont considérées enharmoniques, c’est-à-dire que Ut dièse et Ré bémol s’équivalent. Cependant il est bon, dans les agrégations de plusieurs sons, d’adopter une orthographe qui soit toujours la même pour chaque Mode – quelques bizarres d’écriture que cela puisse présenter – car les accords doivent être pensés et lus **modalement**, et non selon les lois de l’harmonie classique.” (emphasis in the original)

¹³⁶ Jonathan W. Bernard was the first to examine the correspondence between the various modes, their transpositions, and their associated colours in his article “Messiaen’s Synaesthesia: The Correspondence between Color and Sound Structure in his Music,” in *Music Perception* 4 (Fall 1986): 41-68. He has recently presented on this topic in the conference paper, “Messiaen’s Synaesthesia: A follow-up report,” at the *Messiaen 2008 International Centenary Conference*, UCE Birmingham Conservatoire, Birmingham, U.K., June 2008.

¹³⁷ Messiaen, *Traité*, vol. VII, p. 50. “Les Modes à transpositions limitées sont basés sur les multiples de 12: 2 fois 6, 3 fois 4, 4 fois 3, 6 fois 2. Dans ces multiplications : le multiplicateur indique le nombre de transpositions possible de chaque Mode. En conséquence : le 1^{er} Mode aura 2 transpositions et 6 groupes, le 2^e Mode 3 transpositions et 4 groupes, le 3^e Mode 4 transpositions et 3 groupes, les Modes suivants 4, et 6, 6 transpositions et 2 groupes.”

Mode 1

1¹ (mode 1 transposition 1) 1² (mode 1 transposition 2)

Mode 2

2¹ 2²

2³

Mode 3

3¹ 3²

3³ 3⁴

Mode 4

4¹ 4²

4³ 4⁴

4⁵ 4⁶

Example 2-15: Transpositional symmetry of modes 1-7 illustrated (based on Messiaen's discussion in *Traité*, vol. VII, pp. 51, 118, 122-3, 128-9, 132-3; *Technique*, vol. II, pp. 50-54; and on Harris (2004)¹³⁸)

¹³⁸ Joseph Edward Harris, "Musique Colorée: Synesthetic Correspondence in the Works of Olivier Messiaen," Ph.D. diss., University of Iowa, 2004, pp. 53-4.

Mode 5

Mode 6

Mode 7

Example 2-15, cont.

Secondly, Messiaen thought of the modes as manifestations of the kinds of closed circuits that also characterize the symmetrical permutations. He explained that the modes consist of overlapping groups of pitch classes (in the sense illustrated above) but that they are not a series,

and that they have neither tonic nor dominant, beginning nor end.¹³⁹ The internal transpositional symmetry in each mode produces the “closed circuit” effect described earlier, in which “each mode of limited transposition has a special colour, due precisely to this impression of a closed door, or circuit closed,” and in association with the specific pc collection projected by each transposition of a mode.¹⁴⁰

In practice, Messiaen did not consider all of his modes as equals and certainly preferred some over others. Joseph Harris’ dissertation, “Musique Colorée: Synesthetic Correspondence in the Works of Olivier Messiaen,” examines how often each mode is used in Messiaen’s music. Harris found that mode 3 was used most frequently and that it was the one which the composer was most fond of, citing from *Musique et Couleur*: “Mode 3 is transposable four times, but its best transposition is the second. I even think that mode 3² is the best of all of my modes.”¹⁴¹ Harris found that mode 2 is the next most commonly used, followed by mode 4, which is infrequently used, and finally modes 5, 6 and 7, which are rarely used.¹⁴²

Messiaen’s use, or rather avoidance, of mode 1 warrants special attention. Robert Sherlaw Johnson felt that “because of its use by previous composers, notably Debussy, Messiaen tends to avoid it unless it is well concealed in the texture.”¹⁴³ This observation is based on Messiaen’s own statement in *Technique de mon langage musical* that “Claude Debussy (in *Pelléas et Mélisande*) and after him Paul Dukas (in *Ariane et Barbe-Bleue*) used it so remarkably

¹³⁹ Messiaen, *Traité*, vol. VII, pp. 50-51. “Ces Modes sont, en effet, formés de plusieurs groupes symétriques, la dernière note de chaque groupe étant toujours commune avec la première groupe suivant. [...] Les Modes à transpositions limitées n’ont ni tonique, ni dominante. Ils n’ont pas d’initiale, ils n’ont pas de finale. Ils ne sont pas un lieu, comme la tonalité majeure. Ils ne sont pas un ordre, comme la série. Ils sont des **couleurs**, et des **couleurs** harmoniques.” (emphasis in original)

¹⁴⁰ Ibid, p. 51. “Chaque Mode à transpositions limitées a sa couleur particulière, due précisément à cette impression de porte close, de circuit fermé, et aussi aux combinaisons de sons diverses, que lui confère son nombre réduit de transpositions.”

¹⁴¹ Harris 2002, p. 52. Messiaen, *Musique et couleur*, p. 68: “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.”

¹⁴² Ibid, pp. 51-54.

¹⁴³ Johnson 1975, p. 16.

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.”¹⁴⁴

Harris also states, however, that Messiaen failed to associate a colour with mode 1. This is incorrect. In vol. VII of *Traité* Messiaen again discussed the use of mode 1 by Debussy and Dukas in both *Pelléas et Mélisande* and *Ariane et Barbe-Bleue*, respectively, and pointed out that Debussy employed the mode “for effects of silent terror, when it is gray or black on the scene, and when anguish and even the temptation of crime shakes the characters’ subconscious.”¹⁴⁵ In light of this inconsistency, Johnson’s and Harris’ reasons for Messiaen’s avoidance of mode 1 need to be reassessed against the more recent evidence in the *Traité*.

Despite the fact that Messiaen takes credit for the creation of all of modes 2 through 7 (while claiming that mode 1 was “created by Debussy and [...] is found scattered throughout his work”¹⁴⁶), he also shows snippets of mode 2 in the music of Debussy and several other composers. He cites uses of mode 2 in Debussy’s *Pelléas et Mélisande* (Act II) and “La Terrasse des audiences du clair de lune” from the second book of Preludes, as well as in the music of composers across a broad historical and stylistic range, including: Rimsky Korsakow (*Sadko*, 2nd tableau); Bach (B Minor Mass, Kyrie); Wagner (*The Walkyrie*, Act III); Stravinsky (Petrouchka, 2nd tableau); Bizet (*Carmen*, Act II); Weber (*Der Freischütz*, Act II, Finale); Schütz (*Dialoghi per la Pascua*), Monteverdi (*Orfeo*, Acts II and IV); and Gesualdo (fifth book of Madrigals, “itene ô miei sospiri).”¹⁴⁷

¹⁴⁴ Messiaen, *Technique I*, p. 52. Harris (2002, p. 50) cites mm. 15-16 of “Jésus accepte la souffrance” from *La Nativité du Seigneur* (1935) as an example of this, where the upper-dyad mode 1 movement is concealed by the semitone monadic movement on the lower staff.

¹⁴⁵ Messiaen, *Traité*, vol. VIII, p. 51. “[...] où la gamme par tons est toujours employée pour des effets de terreur sourde, quand il fait gris ou noir sur la scène, et que l’angoisse et même la tentation de crime agitent le subconscient des personnages.”

¹⁴⁶ Ibid: “Le 1er Mode à transpositions limitées est la gamme par tons. Elle à été créée par Debussy et on la trouve un peu partout dans son œuvre.”

¹⁴⁷ Ibid, pp. 110-117.

I conjecture that Messiaen's general avoidance of mode 1 may be due to its colour, for a mode projecting gray and black could hardly be said to "dazzle the senses" of the composer. Although Messiaen taught the music of the Second Viennese School, particularly Berg and Webern, he was not especially fond of it. Jean Boivin has suggested that Messiaen's dislike of much dodecaphonic music of the Second Viennese School, with the exception of Berg, stemmed from his claim that this music, too, was devoid of all colour. Indeed, Messiaen despaired to Claude Samuel that "serial music, dodecaphonic music, atonal music....it is all the same! One has killed the resonance [...] without resonance, only a feeling of darkness remains."¹⁴⁸ Jean Boivin has concluded that for Messiaen this music was of a "uniform, compact gray that his *ear* could not tolerate."¹⁴⁹

To support my hypothesis that Messiaen avoided mode 1 for its lack of colour, we might contrast the darkness of mode 1 with the colours Messiaen associated with his other modes and their transpositions. Harris summarizes the colorations identified in vol. VII of *Traité* for modes 2, 3, 4 and 6, excepting modes 5 and 7 for which Messiaen did not provide this information. A quick survey of the colorations show that *gray* (infrequent) and *black* (rare) appear only as components of larger complexes. Harris summarizes that mode 2 colorations include: 2¹ – violet blue; 2² gold, brown; and 2³ green. Mode 3 colorations include: 3¹ – orange, gold, milky white; 3² – *gray*, mauve, a bit of gold; 3³ – blue, green; and 3⁴ – orange, red, a bit of blue. Mode 4

¹⁴⁸ Boivin, 1995, p. 301. "Musique sérielle, musique dodécaphonique, musique atonale...Le résultat est le même. On a aboli la résonance. [...] sans résonance, seul demeure un sentiment de noirceur."

¹⁴⁹ Ibid, p. 310. "A ce gris uniforme et compact que son Oreille ne peut tolérer s'ajoute la noirceur de la thématique expressionniste." He continues to discuss the compounding effect of the dark subject matter, in general, of expressionist music on p. 310. According to Boivin, Messiaen apparently thought that the theme of *Pierrot Lunaire* was "horrible," while *Lulu* was "abject." It should be noted that Messiaen's dislike of this music did not keep him from studying the music itself, for he always placed the needs and desires of his students above his own preferences. Boivin recounts how Clermont Pépin depicted Messiaen's propensity for rushing through the analysis of Berg's *Wozzeck*, "like a record that was turning too fast; he had to be forced to slow down." ("Le Canadien Clermont Pépin se souvient que Messiaen s'en plaignait constamment en analysant *Wozzeck*, ce qu'il aurait fait très vite, 'comme un disque qui se met à tourner trop vite; il fallait vraiment le forcer à ralentir.'" (ibid.)).

colorations include: 4¹ – *gray*, gold, a bit of blue; 4² – streaks of iron *gray*, pink-mauve and coppery yellow, *black* and clear Prussian blue, green and purple violet; 4³ – yellow, violet; 4⁴ – violet with white veins; 4⁵ – deep violet; and 4⁶ – carmine red, violacious purple, mauve, *gray*, pink. Mode 6 colorations include: 6¹ – *gray* with bits of gold, orange, dark green; 6² – brown, russet, orange, violet; 6³ – yellow, mauve, gold; 6⁴ – yellow, violet, *black*; 6⁵ – gold, pale blue, violet with brown outlines; 6⁶ – *black*, white and a bit of pale blue.¹⁵⁰

¹⁵⁰ Harris 2002, pp. 51-54.

Chapter 3: Serge Garant

3.1 Before Paris: *Un grand sommeil noir* (1949) and *Fantaisie pour clarinette et piano* (1949)

From the time of his first lessons in Montreal, Garant knew “almost immediately” that he “wanted to write music, though jazz was my only interest at the time.”¹⁵¹ His *Fantaisie pour clarinette et piano* (1949) and *Musique pour saxophone alto et harmonie* (1950) bear witness to this. Further, *Un grand sommeil noir* (1949) for soprano and piano, written in a short ABA’ form (example 3-1), mingles traditional contrapuntal techniques and a combination of French and jazz harmonic languages. Contrapuntally, the bracketed soprano motive in mm. 4-6 (E_b₅, B₄, A_b₄, A₄, E₄, F_#₄) serves as an imitated subject, echoed by the highest and second-to-highest voices in the piano in mm. 6-7. Its original pattern of ordered pitch intervals (*opis*), measuring interval size by the number of semitones spanned as well as direction, up (+) or down (-), undergoes slight intervallic expansion; the second -3 vocal opi is adjusted to -4.

Decidedly French elements include the use of extended harmonies and their parallel voice leading in mm. 7-10. The non-functional chord succession in mm. 9-10 slides downwards entirely by whole tone, or Messiaen’s mode 1, in a manner reminiscent of the planing technique that Debussy employed in his *La Cathédrale engloutie* (example 3-2).¹⁵² Both the Garant and

¹⁵¹ Clarke 1964, p. 46.

¹⁵² Messiaen credited Debussy with the genesis of Mode 1 in his *Traité*, vol. VII, p. 51. He writes that “the 1st mode of limited transposition is the whole-tone scale. It was created by Debussy and is found scattered throughout his work.” Original French: “Le 1^{er} Mode à transpositions limitées est la gamme par tons. Elle a été créée par Debussy et on la trouve un peu partout dans son œuvre.”

Incidentally, as part of the following continuation of his discussion, Messiaen claimed that the mode in Debussy’s music was associated with quiet terror, scenic gray or black, anguish and a character’s criminal temptation that shakes the subconscious (quote below). This effect is mostly likely evoked by the directionless pitch field of the mode with its lack of semitones or perfect fourths/fifths. Although Garant had not yet studied with Messiaen nor had access to his writing, he nonetheless used mode 1 for the “scenic black” of this piece, *Un grand sommeil noir*, meaning “a long black sleep,” i.e. death. Messiaen’s original French: “La gamme par tons est toujours employée pour des effets de terreur sourde, quand il fait gris ou noir sur la scène, et que l’angoisse et même la tentation du crime agitent le subconscient des personnages.”

Debussy examples plane down from $E\flat/D\sharp$: Garant descends from $E\flat_2$ to G_1 , and Debussy slides from $D\sharp_3$ to $G\sharp_2$.¹⁵³ Both composers mark their respective arrivals with a break in the established pattern. Debussy breaks the stepwise motion of his series of dominant seventh chords through the insertion of a penultimate jump up to $C\sharp_3$ that leaps down by 4th to lend cadential weight to the concluding $G\sharp_2$, whereas Garant changes his chord type from a major 9th with a sharp 13th ($\Delta 9 + \sharp 13$)¹⁵⁴ to a considerably more settled G with an added 6th (G^6) upon the arrival of the G_1 .

With the exception of the last chord in the Debussy excerpt, the individual chord tones in both examples slide through one of the two possible mode 1 scale transpositions. In the first chord of the Debussy example, the A \sharp s belong to and move through mode 1¹, as do Garant's treble $F\sharp_4$ and D_4 and bass $B\flat_2$ in the first chord of m. 9. The voice leading of these mode 1¹ pcs is outlined in red. All other pcs move by mode 1², outlined in blue.

¹⁵³ The bracketed D_5 in the soprano of m. 9 (example 3-1) is a decorative tone that does not adhere to the whole tone planing pattern.

¹⁵⁴ The triangle refers to a chord—assumed to be major unless otherwise specified—with a major 7th, e.g. C-E-G-B = $C^{\Delta 7}$. If this chord also had a major 9th, its symbol may be written in long hand as $C^{\Delta 7} + 9^{\text{th}}$ or abbreviated as $C^{\Delta 9}$. Stacking a $\sharp 13$ creates $C^{\Delta 9} + \sharp 13$. I have written the chord within the figured bass with the higher number, $\sharp 13$, on top, and the lower $\Delta 9$ below. Later, we shall see an A minor chord with a major 7th, an $A m^{\Delta 7}$.

A

Soprano

Piano

opis: -4 -3 +1 -5 +2

opis: -4

Dm¹¹ Dm^{b13} etc...

B

S.

Pno.

opis: -4 +1 -5 +2

opis: -4 -4 +1

E⁷ F⁹ A^{b9} D^{bΔ9} E^{b#13} D^{b#13} B^{#13} A^{#13} G^{add6} G^{b7} F^{sus4}

downwards planing

A'

S.

Pno.

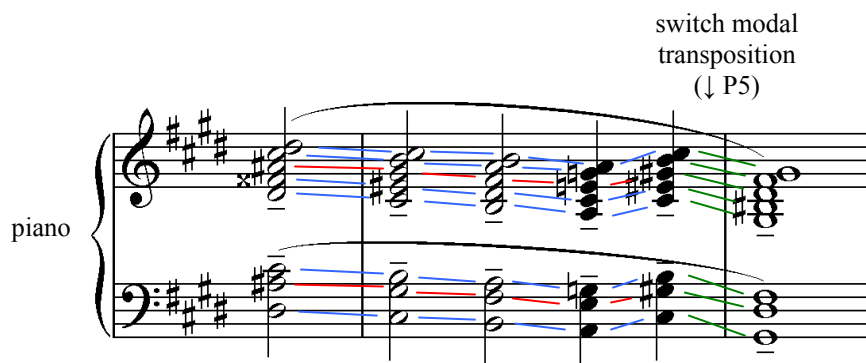
Dm¹¹ Dm^{b13} etc...

16

S.

Pno.

Example 3-1: Imitative counterpoint and French/jazz harmonies in *Un grand sommeil noir* (1949)



Example 3-2: mode 1¹ (red) and 1² (blue) voice-leading in Debussy's *La Cathédrale engloutie*, mm. 62-64.

Jazz harmonies are evidenced in Garant's highly inflected chords, such as the ostinato in mm. 1-6 and 12-16. The two half-note chords in the right hand of each measure, C major and E \flat ⁷, are a plagal prolongational gesture oscillating over a D minor pedal. From a jazz perspective, these right hand chords are decorative figurations of a base D minor sonority – an alternation of the extensions of Dm¹¹ and Dm^{b13}. The second half of each measure contains a superimposed A \flat triad that is related by tritone to the D minor tonic underneath. The sliding Δ 9 + #13 chords in m. 9 are jazz harmonies, as are the following G⁶, G \flat ⁷ and F^{sus4} chords in m. 10.

Syntactically, the F^{sus4} functions as a temporary tonic that ends the short B section (mm. 7-11). Working backwards then, the G⁶ is a predominant (II with added 6th) and the G \flat ⁷ is a bII⁷. This tritone-related bII⁷ chord stands in for the expected dominant, C, a jazz harmonic procedure referred to as a tritone sub (substitution). The resolution of dominant to tonic in Western tonal music releases tension as the leading tone pulls towards the tonic by semitone, while a tritone sub, especially one containing a raised-7th degree progressing to tonic (akin to a Ger⁺⁶ of I),

simply adds chromatic intensity as its $\flat 2$ and $\flat 6$ scale degree pull by semitone towards degrees 1 and 5 of the tonic.

Also noteworthy is the voice-leading to and from the G^6 chord. Garant could have harmonised the chord as a $G^{\Delta 9 + \#13}$ (which would be $G_1, D_1, B_2, F\#_3, A\#_3, F_4$), thereby continuing the preceding contrapuntal pattern. In composing the added sixth chord instead, each pc of that chord can step by semitone to a pc of the penultimate $G\flat^7$ tritone sub. The G^6 sonority then, functions as a *leading chord*: a linear structure resolving entirely by chromatic motion that heightens the intensity of a dominant (or in this case, the $G\flat^7$ dominant substitution) in a similar fashion as the augmented 6th chords in Western tonal music.¹⁵⁵

Garant's 1950 *Fantaisie pour clarinette et piano* (example 3-3a) employs similar leading chords, including the asterisked $E\flat^7$, m.1. Its opening melody extemporises on various modes, including E-mixolydian, D-ionian and lydian, and the whole tone collection. The piano ostinato harmonies contain minor and major added sevenths in their Bm^7 and $Am^{\Delta 7}$ respectively, as well as an $E\flat^7$ major-minor chord. Their orchestration resembles four-part saxophone sectional writing of the Big Band era. To illustrate these points, a reduction of Glenn Miller's famous *Moonlight Serenade* (1939) (example 3-3b) is shown below Garant's *Fantaisie*.

Both examples are based on a four-part harmonisation containing the melodic lead in the highest voice: In *Serenade*, this "Miller lead" structure—a clarinet lead reinforced an octave below by a harmonically expendable saxophone—reduces the number of unique parts from five to four. In a Miller lead, the soprano melody in the clarinet is harmonised from the top to bottom

¹⁵⁵ The Miller example 3-3b contains two asterisked leading chords in its fourth measure, built on E_4 and $F\#_4$.

with diatonic seventh and added 6th chords in closed position.¹⁵⁶ Their dense texture and homorhythmic motion, when combined with Miller's slow tempos, creates a lush and enveloping sound. In examples 3-3a and b, both Garant and Miller employ this type of simple 7th and 6th harmonisations, closed voicing and homorhythmic motion.

¹⁵⁶ Open voicing in 4- and 5-part sectional harmonisation is achieved through one additional modification to the closed voice stack dropping the second-to-highest voice by one octave, which opens the harmonic space between the lead voice and its harmonising voices.

E-mixolydian or D-orian \longrightarrow Lydian whole tone mm. 3-4 \downarrow m2

* Bm⁷ Am^Δ Bm Eb⁷ Am^Δ etc...

Clarinet

Piano

(repeat)

↑ dia 3rd ↓ dia 3rd ↑ chrom 3rd ↓ chrom 3rd

Example 3-3a: jazz-harmonized ostinato, closed-voiced sectional harmonisation with Miller lead, leading chord (*), modal outlines and diatonic/melodic 3rd outlines in Serge Garant's *Fantaisie pour clarinette et piano* (1950), mm. 1-6

(repeat)

↑ diatonic 3rd ↑ chromatic 3rd ↑ diatonic 3rd

Cm⁷ C^{o7} Fm⁷ (sus) Eb^{b6}

Clarinet lead / Saxophones

Brass (muted)

↓ chromatic 3rd

Example 3-3b: closed-voiced sectional harmonisation with Miller lead, leading chords (*), modal and diatonic/melodic 3rd outlines in Glenn Miller's *Moonlight Serenade* (1939)

The two examples differ in that Miller always composed his sectional harmonisations in parallel motion, while the upper and lower pairs of voices in Garant's example move in contrary motion. This element of contrary motion recalls the saxophone writing of Duke Ellington and Billy Strayhorn, who also used clarinet leads in contrary motion. As composer Roger Aldridge has summarised:

At times, Ellington or Strayhorn would write a contrary motion line (in relation to the clarinet lead) for the baritone sax and then harmonize melodic lines for other saxes up from the baritone sax. This approach to big band arranging is significantly different from the traditional top-down method of harmonization. The result was a clarinet-lead-over-saxes sound that changes shape: moving from an open section sound inward to a tight sound or, conversely, moving from a tight sound outward to an open sound.¹⁵⁷

However, as Aldridge also noted, this writing in contrary motion usually resulted in open or spread voicing with more dissonant 5-part harmony.¹⁵⁸ In example 3-3a, Garant moves his right and left hand harmonic 3^{rds} from the context of a single open-voiced Bm7 chord through closed-voiced chords to the narrowest Bm triad. These pairs of 3^{rds} approach the central triad by stepping through a linear diatonic 3rd and continue, eventually returning to their starting position, through a chromatic one. Miller's chord succession outlines similar harmonies and his saxophone succession moves almost entirely by parallel motion to outline ascending diatonic and chromatic 3^{rds}, and these are bracketed above example 3-3b. There is an element of the contrary/chromatic motion found in the Miller example that is performed by the brass, notated on the lower staff. On a four-measure hypermetric level, the brass harmonised in 3^{rds} steps down through a chromatic 3^{rds}. This provides contrary motion to the ascending saxophone 3^{rds} on the foreground.

¹⁵⁷ Roger Aldridge, "The Clarinet and the Evolution of the Big Band," *In the Mood: The Olney Big Band Newsletter* 4/1: 6-8, p. 7. http://www.olneybigband.org/newsletter_pdfs/Mar2009_eFile.pdf (accessed 21 July 2009).

¹⁵⁸ *Ibid.*, p. 6.

Garant may not have had the advantage of formal training before his late teens but he certainly lost no time making up for any musical education he might have missed. Only a few months after finishing his *Fantaisie*, he explored serial techniques. The resulting piece, *Musique pour saxophone alto et harmonie*, set him on the path of modernism that would later bring him great renown. Beckwith writes, “Although not serial in the Schoenbergian sense, it is nevertheless atonal and this forecasts the direction in which Garant was to move in the years to come.”¹⁵⁹

¹⁵⁹ Keith MacMillan and John Beckwith, *Contemporary Canadian composers* Toronto: Oxford University Press, 1975, p. 78.

3.2 In Paris: *Concerts sur terre*, mvts. I and II (1952), *Et je prierai ta grâce* (1952), and *Variations pour deux pianos* (1952)

Garant's compositional language continued to change during the academic year that he spent in Messiaen's class, as is evident in the first two movements of his 1951 *Concerts sur terre*. He acknowledged:

Messiaen's influence was only too obvious; but I did not use any of his modes. In these two melodies there is a continual mutation of a series of chords. However, it is not the chords themselves that vary, but rather their colour, and this is due to the way in which the chords are distributed.¹⁶⁰

Example 3-4 is a reproduction of the first seven measures of the movement. Considered horizontally, the upper three voices in m. 2 move in parallel motion by major third, major second and minor second, interval classes (ics) 4, 2 and 1, while the bass voice moves in contrary motion by semitone. The result is a slow harmonic mutation, as the spacing of the [016] trichord in the upper voices remains fixed while only the bass changes. This gradual shift in pitch content and distribution is analogous to various hues of the passage's primary colour, since each of these harmonies is a subset-class of the chord in m. 3, the harmonic nexus and culmination of the passage.

¹⁶⁰ Garant 1996, p. 5.

Agitato ♩ = 144-152

ics: 4 3 1 3 1 3 1 6 1 1

sop

ics: 4 2 4 1 4 1 1 1

Ah — Que s'in-surge et se dé-goû-te la

piano

[016]

ics: 1

"CCR"

[012367]

ics: 1 5 1 4

chair au moins Qui ra jeu-nit con-tre la tra-hi-son du souf-fle

pno

f 3 3 7

Red. 3

ics: 4 2 4 1 4 1 1

pro-je-tant son ab-sur-de cri sur la ter-re sale et san-glan-te

pno

[016]

ics: 1

"CCR"

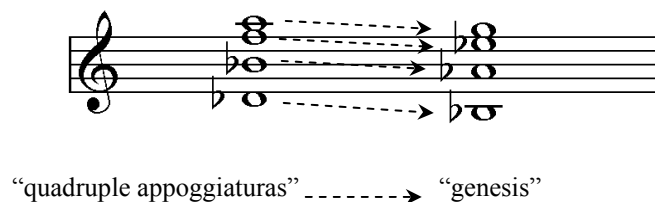
[01367]

V V

Example 3-4: “CCRs” in context, melodic “recitation tones” and linear movement primarily by ic 1 in Serge Garant’s *Concerts sur terre* (1952), mvt. 1

This kind of relationship occurs three times in the movement, resulting in nexus chords in measures 3, 7 and 11. As a group, they bear resemblance to Messiaen’s *accord à resonance contractée*, or chords of contracted resonance (CCR). Messiaen used either his appoggiatura or

genesis chord as the basis of a CCR (example 3-5a). The former was named for its voice-leading, as each pitch is an appoggiatura that moves down, mostly by step, to a pitch of the genesis chord. Here, the genesis chord is a slightly altered major 9th chord without a leading-tone whose 9th is placed at the bottom. In example 3-5b, the appoggiatura and genesis chords are placed over a contracted resonance, the combination tones of a major second dyad, to form a CCR.¹⁶¹ I have transposed Garant's three chords from *Concerts sur terre* to the bass note D for clearer comparison. All three can be considered CCRs in that they contain a contracted dyad below a more widely-spaced tetrachord. The third chord most closely resembles the specific spacing of Messiaen's CCRs. In terms of interval-class content, Messiaen's appoggiatura CCR contains three semitones, while Garant's CCRs in measures 3 and 11 contain four.



Example 3-5a: The voice-leading of Messiaen's “quadruple appoggiatura” and “genesis chords” from his *Traité*, vol. VII, 162.

¹⁶¹ Messiaen, *Traité*, vol VII, p. 162. These two particular chord types are explained as follows: “Contraction de la résonance, dont les 2 notes sont ramassées dans un intervalle plus petit et transportées au médium.” Translation: “Contracted resonance, such that 2 notes are compressed into a smaller interval and are moved [transposed] to the medium [range].” The chords discussed above belong to the “second type” of CCR that Joseph Edward Harris defines in his “Musique Colorée: Synesthetic Correspondence in the Works of Olivier Messiaen,” Ph.D. diss., University of Iowa, 2004; pp. 69-75.

What Harris refers to as a “first type” of CCR contains an upper pentachord – not a tetrachord. This first type of genesis chord utilises the pentatonic collection, which Messiaen explained as a dominant 9th chord whose leading-tone is replaced by its tonic. Accordingly, this pentachord has a quintuple appoggiatura, as opposed to a quadruple one.

Messiaen's Appoggiatura CCR	Messiaen's Genesis CCR	Garant's "CCR", m. 3	Garant's "CCR", m. 7	Garant's "CCR", m. 11
prime form: [013478]	[012568]	[012367]	[01367]	[012367]

resonance contractée

Example 3-5b: Comparing Messiaen's Chords of Contracted Resonance (*accord à resonance contractée*) to Garant's similarly-constructed chords in his *Concerts sur terre*, mvt. I

In general, the work's melodic structure resembles Messiaen's music with its use of recitation pitches and its emphasis on movement by semitone and tritone, ics 1 and 6. Example 3-4 was saturated with ic 1 melodic movement and structurally emphasised one of Messiaen's two favourite melodic intervals, the descending minor 6th. This interval and the tritone have been noted to be two of Messiaen's favourites by Robert Sherlaw Johnson, based on the composer's own writings in Chapter VIII of *Technique de mon langage musical*.¹⁶²

The opening phrase of the second movement of Garant's *Concerts sur terre*, shown in example 3-6a, proceeds almost exclusively by ics 1 and 6. The emphasis on these two intervals and the use of B \flat and E recitation pitches are reminiscent of Messiaen's vocal writing in *Harawi*, specifically the alternation of G \sharp and D in "Syllables" (example 3-6b) and the same oscillation between B \flat and E in "L'escalier redit, gestes de soleil" (example 3-6c). Further support for the connection between Garant's *Concerts sur terre* and *Harawi* is provided by Jean Boivin. His

¹⁶² Johnson 1975, p. 20.

compilation of Messiaen's 1951-52 class syllabus includes *Harawi*.¹⁶³ In addition, Garant's archived class notes devote more pages to *Harawi* than any other composition studied that year.¹⁶⁴

ics: 6 1 5 6 6 6 1 4 1 6

Il fait tris-te de ton ab-sen-ce et pour-tant, Je n'ai qu'à pen-cher mon vi-sa-ge in-qui-et de toi

Example 3-6a: Melodic line saturated with ics 1 and 6 in the first phrase of *Concerts sur terre*, mvt. II (1952)

ics: 6 5 6 5 6 1 5 6 2 5 6 2

O mon ciel tu fleu-ris, Pi-rout-cha mi-a! Kahi pi-pas, mahi pi-pas,
O dé-pli-ons du ciel, Pi-rout-cha mi-a!
O fleu-ris-sons de l'eau Pi-rout-cha mi-a!

Example 3-6b: Descending tritone dyads and alternation of ic 6 G# and D in Messiaen's "Syllables" from *Harawi* (1945), mm. 9-17

ics: 2 2 4 1 6 3 6 6 6 6 6 6 3 3 6 6

l'es-ca-lier sou-rit, Cha-que mar-che vers le sud, Du ciel, de l'eau, du temps, l'es-ca-lier du temps.

Example 3-6c: Ic 6-related Bb/A# and E recitation pitches in Messiaen's "L'escalier redit, gestes du soleil" from *Harawi*, mm. 2-4

¹⁶³ Boivin 1995, p. 438.

¹⁶⁴ Service de gestion de documents et des archives, Université de Montréal, Fonds Serge Garant (P141), P141/B1,1.

Garant asserted that he, himself, did not use the modes, as such, but explored other small scale fragments that equally partition the octave. Example 3-7 points to modal zones and scale fragments in mm. 5 and 6 of the second movement. The boxes shown in m. 5 divide the texture into two different zones by register. The higher blue box projects the octatonic mode, Messiaen's mode 2³, while the lower red one is chromatic. In m. 6, the highest two voices and a middle line of the left hand step down through whole-tone, or mode 1¹, scale fragments. Two middle voices in the right hand similarly step through a transposition of that mode, mode 1², and the remaining voices step through chromatic scale fragments.

The image displays a musical score for soprano and piano, spanning measures 5 and 6. The score is annotated with various modal and chromatic zones and scale fragments.

- Mode 2³ zone:** A blue dashed box highlights the upper register in measure 5, encompassing the soprano and the upper right-hand piano staves.
- Chromatic zone:** A red dashed box highlights the lower register in measure 5, encompassing the lower right-hand piano staff.
- Scale fragments:**
 - Mode 1¹:** Indicated by arrows pointing to the soprano and the upper right-hand piano staves in measure 6.
 - Mode 1²:** Indicated by arrows pointing to the middle right-hand piano staves in measure 6.
 - Chromatic:** Indicated by arrows pointing to the lower right-hand piano staff in measure 6.
 - Mode 1¹:** Indicated by an arrow pointing to the lower right-hand piano staff in measure 6.

The lyrics for the soprano part are: "où j'ai tant re-cher-ché" in measure 5 and "La claire é-toi-le de la" in measure 6.

Example 3-7: modal and chromatic zones and scale fragments in mm. 5-6 of *Concerts sur terre*, mvt. II (1952)

Garant's next Parisian composition bears similarity to the first two movements of *Concerts sur terre*. He felt that his *Et je prierai ta grâce* (1952) for soprano and piano was "a

very lyrical, yet very organised” composition.¹⁶⁵ In example 3-8, the left and right hands of the piano appear to adhere to a predetermined structure of repeated melodic and rhythmic cells similar to the medieval technique of composing colour and talea. The two hands of the piano are in canon at the distance of a sixteenth with the left hand leading the right. Perhaps to articulate phrasing, two quarters in the initiating left hand (circled in blue) are substituted for a dotted eighth and a sixteenth rest in the right (circled in red). The repeated rhythmic pattern of the piano consists of seven eighth notes and one quarter, followed by three eighths and one quarter. In total, the rhythmic cell appears twice complete and once incomplete.

voice

Pour qu'ils ne cou - rent pas sur les

piano

rhythmic pedal + 8 in canon

rhythmic pedal: 7 8 + 1 3 + 1

opis: +1 +3 -1 (-6) +4 (+5) -1 (-4) +1 +3 -1 -1 +1

opis pedal

voice

rou - tes fer - mées, les rou - tes qui s'en vont ver - ti - gi - neu - se - ment De

piano

rhythmic pedal in canon: 7 8 + 1 3 + 1

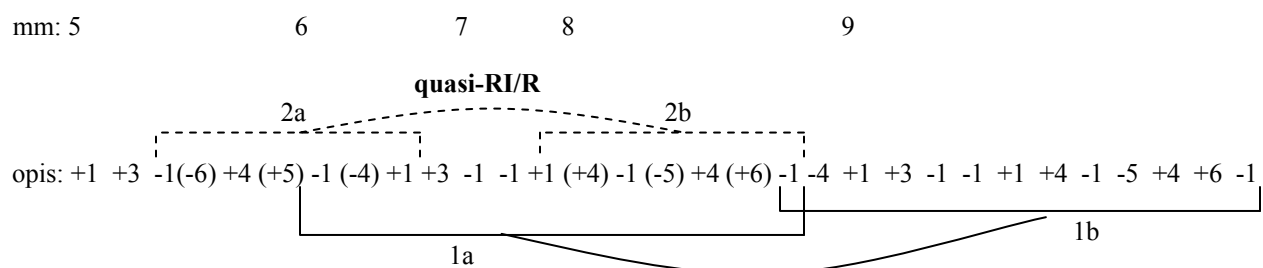
opis: (+4) -1 (-5) +4 (+6) -1 -4 +1 +3 -1 -1 +1 +4 -1 -5 +4 +6 -1

opis pedal

Example 3-8: Rhythmic and opus pedals in *Et je prierai ta grâce* (1952), mm. 5-9

¹⁶⁵ Clarke 1964, p. 47.

The repeated melodic cells are not always used commencing with the same pc or proceeding in the same direction. Rather, their manipulation bears witness to a composer moving increasingly towards serial practice, as they appear under quasi retrograde/retrograde-inversion in example 3-9, which extracts only the opis of example 3-8. Bracket 1a begins in m. 6, where the (D \flat , C, A \flat , A), linked by opis (-1, -4, +1) begins a melodic chain that runs until the last pc in m. 8 (F \sharp). Its second appearance (1b) overlaps by two pcs. Beginning then with the previous E in m. 8, the pattern (G, F \sharp , D, E \flat) and associated opis (-1, -4, +1) is transposed up by ic 6. Embedded with this larger transposed repetition is a second inexact replication, brackets 2a and 2b that both begin on B \flat in mm. 5 and 7 respectively. This repetition is a quasi-RI or -R as the interval sizes are reversed but only half inverted: every second opi maintains its original direction, but those in parentheses are inverted.



Example 3-9: A reduction of the repeated string (solid lines) and quasi-retrograde/retrograde-inversionally related strings (dotted lines) of opis in example 3-8

Although Garant had previously used mode 1 as a planing interval (as in example 3-7), its employment in *Et je prierai ta grâce* is somewhat more complex. In example 3-10, the pcs of the right hand compose-out the chords in the left. The first measure of the piano reduction appears three times; the second, twice; and the third through sixth, once each. Starting in the first measures, the circled left-hand chord—of which the A, D \flat and G belong to mode 1² and F \sharp belongs to mode 1¹—descends by whole tone as shown by the arrows on the example.¹⁶⁶ In the first system of the pattern then, each step down through mode 1, a -1 whole-tone step in pitch (2 semitones), is matched by a -1 subtraction in the number of measures repeated at that pitch level, a mutually reinforcing coordination of pitch and repetitions. The chord in the beginning, built on A₃, is heard three times. Then it undergoes a -1 transformation of pitch and repetition to become the chord in m. 14 built on “A minus 1 whole-tone,” or G₃, performed “3 minus 1 times,” which is twice. This chord, in turn, is transformed into to the chord in m. 16 built on “G minus 1,” or F₃, that is heard 2 “2 minus 1 times,” or once.

¹⁶⁶ Since all step sizes in mode 1 are equivalent, I have chosen here to refer to intervals with respect to the number of scale steps traversed within the mode as opposed to by their size measured in semitones. Hence, I make use of the intervallic distance of “1 step” and not “ic 2.” In chapter 4, I utilise Christoph Neidhöfer’s theory of step class intervals to likewise measure the uneven intervals found in modes 2 through 7, considering all steps within the mode equivalent regardless of their size in semitones.

Example 3-10: Coordinating descent of pitch and reduction of repetitions in *Et je prierai ta grâce*, mm. 11-19

Garant has compared this particular work to “some previous compositions, [...] based on “permutations of chords, but in a *chromatic* manner’.”¹⁶⁷ I contend that as in *Concerts sur terre*, the composer used a base chord from which he *chromatically* moved through a series of voice leading patterns, much as he did in the second measure of example 3-4. In that example from *Concerts sur terre*, the upper voices of the first chord followed a planing pattern of voice-leading transformations that moved up and then down, while the bass followed its own semitone pattern in contrary motion, moving down and then up, in a wedge shape.

Example 3-11 extracts the left hand of example 3-10, m. 11. The four voices in example 3-11 follow a wedge shape expansion and contraction as the soprano and bass voices step outwards and then inwards. The highest voice of the first chord moves up by semitone (T_{+1}) from

¹⁶⁷ Clarke 1964, p. 47. Italics mine.

G₄ to A \flat ₄. The other three voices move down by semitone (T₋₁), to A \flat ₃, C₄ and F₄. This is illustrated by the red arrows and the numbers above the staff that correspond to transposition by semitone. The progression from the second to the third chord simply reverses or retrogrades (R) the voice leading intervals and the third chord is thus the same as the first. The progression from the third to the fourth chord is the inverse of the first to the second: instead of expanding outward, it contracts inward; and it does so through an inverted (I) voice leading pattern, i.e. the first column of numbers that read (+1, -1, -1, -1) from top to bottom has been flipped to read (-1, -1, +1, +1).

The diagram illustrates voice leading patterns for a sequence of four chords. The top part shows a staff with four chords and red arrows indicating voice leading. Above the staff, a diagram shows two columns of intervals: the first column has +1, -1, -1, -1 and the second column has -1, +1, +1, +1. An arrow labeled 'R' points from the first column to the second. Above this, an arrow labeled 'I' points from the second column back to the first. Below the staff, a diagram shows two columns of intervals: the first column has +1, -1, -1, -1 and the second column has -2, 0, 0, +2. An arrow labeled 'I' points from the first column to the second.

Example 3-11: The right hand chords in m. 11 of example 3-10 as Messiaen's *accords tournants*

The notion of slight expansion and contraction is a key component of Messiaen's *accords tournants*, or turning chords (example 3-12). The name derives from the swirling effect of the voice leading as the chord turns upon itself; its top voice moves up by semitone and down by whole tone (boxed +1, -2 above the staff) while its bass continues down by whole tone and up by

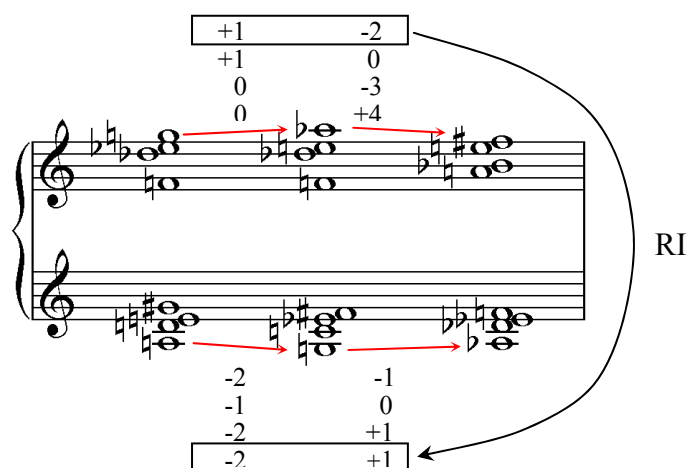
semitone (-2, +1), the RI of the soprano. The chords have been studied by Wai ling Cheong and more recently, by Julian Anderson.¹⁶⁸ Messiaen, a synaesthete who could hear colour, described the swirling of the turning chords as hearing the change of light produced by a translucent glass octahedron, a polyhedron with eight faces.¹⁶⁹

Returning to Garant's example 3-11, omit the third chord in parentheses (a replication of the first); let us consider again the remaining three. The voice leading intervals corresponding to each of the four voices within these three chords are shown below the staff and that of the outer voices are again boxed. The highest voice (G, A \flat , F \sharp), replicates Messiaen's in example 3-12.

Both of the bottom voices in the Messiaen and Garant examples begin on A, but Garant's voice leading is not the retrograde-inversion of his top voice but rather its inversion (-1, +2) and instead moves from A through A \flat and finishes on B \flat . The middle voices in both examples either move along with one of the outer voices or remain static, but it is the characteristic swirling motion of the outer voices in Garant's pattern that makes it so similar to Messiaen's.

¹⁶⁸ Wai ling Cheong was the first to reveal the detailed structure of Messiaen's turning chords in two key articles: "Messiaen's Chord Tables: Ordering the Disordered," *Tempo* 57/226 (October 2003): 2-10; and "Rediscovering Messiaen's Invented Chords," *Acta Musicologica* 75/1 (2003): 85-105. Julian Anderson has more recently discussed Messiaen's appropriation of the turning chords and, in particular, the alteration of the outer voices as a trait most likely appropriated from Jolivet on p. 5 of his article, "Messiaen and the Notion of Influence," *Tempo* 63/247 (January 2009): 2-18.

¹⁶⁹ Messiaen, *Traité*, vol. VII, p. 166. Messiaen explained that: "Each face of the octahedron (1 sound among the 8 of each chord) has three possible changes according to the type of light (this creates 3 combinations of 8 sounds, for a total of 24 between the 3 chords). There is only one sound column (chord) that turns and changes and the memory remembers the global sonority, the fruit of the three chords. Likewise, a single complex colour bursts with the three aspects of the colour chords. I thus indicate for each group of three chords: a) first, three groups of colours; then b) the remembered colour effect, with multicoloured dazzling, and principal or dominant colour, like a stained glass window." Original French: "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) à 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 tourne en changeant, la mémoire enregistrant une sonorité globale qui est le fruit des trois 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 trois 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."



Example 3-12: The voice leading of Messiaen's *accords tournants*, or turning chords, from his *Traité*, vol. VII, p. 170.

Garant, while returning to Québec by ship following his year of study with Messiaen, sketched elaborate plans for a work that he left incomplete: *Variations pour deux pianos* featured many of Messiaen's compositional techniques, including Hindu rhythms, permutation processes, non-retrogradable rhythms and rhythmic pedals. His sketches contain a page of *Serie* [sic] à *developpements et metamorphoses* [sic] (example 3-13). This set of 24 rows in two columns of twelve is not the traditional arrangement of twelve row transpositions and their inversions that one might expect to find in a French serial composition of this era.¹⁷⁰ Rather, all twelve of the rows in the first column are unique, begin on D, and are partitioned with dotted lines. The right-hand column lists their inversions, pairing them side by side. Three of the twelve rows in the first column are assigned the letter names A, B and C, setting them apart from the remaining nine.

¹⁷⁰ The majority of musicians taught in North American use a single "Babbitt" twelve-tone matrix whose rows consist of the twelve prime form transpositions (P), and columns contain its inverted ones (I). A typical French "Boulez" row calculation is divided into two separate 12 x 12 matrices. The first contains the twelve transpositions of the *originale* (O) and the second contains the inverted, or *renversement* (R) forms. Order numbers are tied to a specific pc, so that the first pc of series O-I is 1, the second, 2, the third, 3, etc. Garant often extracted the order numbers assigned to each pc in the two columns of twelve rows and recopied only these order numbers as a shorthand notation in two 12 x 12 squares. These two shorthand Latin squares are commonly referred to as a *Boulez matrix*. A representation can be found in György Ligeti, "Pierre Boulez: Decision and Automatism in Structure Ia," *Die Reihe* 4 (1960): 36–62. An example in this dissertation is seen later in example 3-20.

Serie [sic] à developpements et metamorphoses [sic]

les
metamorphoses

Prime (P) / Originale (O)

Inversion (I) / Renversement (R)

The musical score consists of 12 rows, each with a treble clef and a key signature of one flat (B-flat). The rows are numbered 1 through 12. Above each row, there are numerical annotations in blue, grouped by vertical lines. Arrows on the left side of the score point from the original row to its metamorphoses.

Row 1 (A [1]): 1 2 3 4 5 6 7 8 9 10 11 12

Row 2 (A [2]): 1 5 9 || 2 6 10 || 3 7 11 || 4 8 12

Row 3 (A [3]): 1 3 5 7 9 11 || 2 4 6 8 10 12

Row 4 (A [4]): 1 4 7 10 || 2 5 8 11 || 3 6 9 12

Row 5 (B [5]): 1 2 3 4 5 6 7 8 9 10 11 12

Row 6 (B [6]): 1 5 9 || 2 6 10 || 3 7 11 || 4 8 12

Row 7 (B [7]): 1 3 5 7 9 11 || 2 4 6 8 10 12

Row 8 (B [8]): 1 4 7 10 || 2 5 8 11 || 3 6 9 12

Row 9 (C [9]): 1 2 3 4 5 6 7 8 9 10 11 12

Row 10 (C [10]): 1 5 9 || 2 6 10 || 3 7 11 || 4 8 12

Row 11 (C [11]): 1 3 5 7 9 11 || 2 4 6 8 10 12

Row 12 (C [12]): 1 4 7 10 || 2 5 8 11 || 3 6 9 12

Arrows on the left indicate the following relationships:

- Row 1 to Row 2: de 4 en 4, groupes de 3
- Row 1 to Row 3: de 2 en 2, groupes de 6
- Row 1 to Row 4: de 3 en 3, groupes de 4
- Row 5 to Row 6: de 4 en 4, groupes de 3
- Row 5 to Row 7: de 2 en 2, groupes de 6
- Row 5 to Row 8: de 3 en 3, groupes de 4
- Row 9 to Row 10: de 4 en 4, groupes de 3
- Row 9 to Row 11: de 2 en 2, groupes de 6
- Row 9 to Row 12: de 3 en 3, groupes de 4

Example 3-13: Garant's 12 rows (in black) from sketches of his incomplete *Variations pour deux pianos* (1952), and my explanation of their *metamorphoses* as systematically reapplied symmetrical permutations

I believe that row A is the original row and B and C are variations derived from the properties of A, or the *développements* indicated by Garant's title (example 3-14). These three rows are partitioned into three segments of four pcs. The first tetrachord of row A [0124] produces the second by an I_5 transformation, the operation defined by inverting the original collection around its first pc, D, and transposing it up by five semitones to G. The third is a combination of the ordered pitch class intervals (opics), which consider both the size and the direction of the intervals formed within the first two segments: the first opi of the first tetrachord, +1, is followed by the second opi of the second tetrachord, -2; and the missing pc of the aggregate (C-natural) completes the row. The structural intervals marked by solid and dotted arrows in row A are then applied to generate rows B and C.

The image displays three musical staves, labeled A, B, and C, illustrating transformations and intervallic relationships. Row A is the original row, partitioned into three segments of four pitch classes (pcs): [0124], [0124], and [0123]. Below the staff, the ordered pitch class intervals (opics) are listed: +1, +2, -4, -1, -2, +4, +1, -2, +3. A solid arrow labeled I_5 indicates a transformation from the first segment to the second. Row B is derived from Row A via transformations $T_{10}(-2)$ and T_{-2} . It is partitioned into three segments of four pcs: [0167], [0167], and [0167]. Row C is derived from Row A via transformations $R_{-10}(2)$, I_1 , and $I_7(-5)$. It is partitioned into three segments of four pcs: [0123], [0123], and [0123]. Solid and dotted arrows indicate structural intervals within and between the rows.

Example 3-14: The role of ics 1, 2 and 5 in *les développements* within and between rows A, B and C in *Variations pour deux pianos*

In row A, ics 1 and 2 (traced with thin and thick dotted arrows, respectively), are contained by all three tetrachords, while ic 5 (solid arrow) is the interval by which the first two tetrachords are related through inversion. These three intervals are used to create rows B and C. Row B is generated by extracting the first pitches of tetrachords 1 and 2 of Row A (D and G) and expanding outward by semitone: stepping down from D to C# and up from G to G#. This replicates the mirroring between the first and second tetrachords of row A. This new four-note segment becomes the first partition of row B, which is then sequenced down by ic 2 twice. Row C can be derived in two ways. Either, we may think of its first tetrachord as an intervallic expansion of row B's wedge, or as the retrograde of the last Bb-B-A-C segment of row A transposed up by step (R_2). This first segment generates the others through inversion by I_5 followed by I_1 , again projecting structural ics 1 and 5.

The dotted partitioning lines of the non-lettered rows in example 3-13 create segments of 3, 4 and 6 pcs. This variation in segment length between rows points to Garant's use of Messiaen's *permutations symétriques* as the *métamorphoses* acting upon rows A, B and C to generate the remaining nine rows. Messiaen codified two categories of symmetrical permutations whose purpose was to reorder or permute the order numbers from 1 to 16 or 1 to 12 of the *gamut chromatique*. Each new permutation reordering was referred to as an *intversion*, and Messiaen maximised potential *intversions* through the continuous application of the process until all possible reorderings were obtained and the procedure thereby exhausted. The ascending chromatic gamut of order numbers represents a single musical parameter such as pitch, duration or dynamic. He referred to the first type of permutation as *éventail ouvert* (open fan) and *éventail fermé* (closed fan), occasionally substituting the word *ciseaux* (scissors) for *éventail*.¹⁷¹ The

¹⁷¹ This set of permutations will be examined more closely in the music of André Prévost in chapter 5.

second type of permutation is based on the repetitive application of an interval cycle, and it was this variety of permutations that Garant employed in his *Variations pour deux pianos*, although he did not exhaust the system as Messiaen might have done, instead choosing only the first *intersion* of each permutation.

Rows 2, 6 and 10 are divided into four segments; rows 3, 7 and 11 into two; and rows 4, 8 and 12 into three. The rows of three segments follow Messiaen's "de 4 en 4, groupes de 3" permutation (4s—every fourth integer—in 4 segments, groups of 3). Beginning on 1, Garant cycled through fourths obtaining the order numbers 5 (1+4), and 9 (5+4). At that point, he repeated the cycle from the next-to-lowest integer (2), generating the remaining segments (2, 6, 10), then (3, 7, 11) and (4, 8, 12). According to the conventions outlined in Messiaen's *Traité*, my analytical notation uses double bar lines to delineate the segments, which are here consistent with the location of Garant's dotted lines.¹⁷² Rows of two segments correspond to "de 2 en 2, groupes de 6" (2s in 2 segments, groups of 6), an extraction cycle of seconds; while those of three, to "de 3 en 3, groupes de 4" (3s in 3 segments, groups of 4), an extraction cycle of thirds. This pattern of three interval cycles is applied three times, once to each of the primary rows A, B, and C.

Elsewhere in the sketches, I believe that Garant borrowed Messiaen's technique of *agrandissements asymétriques* from the *Vingt Regards sur L'Enfant Jésus* (1944). Literally translated, it refers to the asymmetric enlargement of a predetermined pitch pattern. Messiaen wrote this description under mm. 41-53 of mvt. 10, "Regard de l'Esprit de joie." Example 3-15a reproduces the right and left hands of the enlargement process side by side in separate columns, the right hand on the left and the left on the right. Each row corresponds to one measure, so that m. 41 comprises the first row, m. 42 the second, etc. With each new measure, the right hand

¹⁷² Messiaen, *Traité*, vol. III, pp. 323-325.

follows a regular pattern of transposition that shifts its highest register pcs down by semitone (-1), including the first, fourth, seventh and tenth pcs. Meanwhile, the intervening lower-register pcs—the second, third, fifth, sixth, eighth, ninth, eleventh and twelfth—shift up by semitone (+1). The thirteenth and last pitch acts as an anchor: a point of reference for listeners so that they might be able to segment the components of the process and track its gradual transpositions aurally. This repeated pattern of “1 pitch down and 2 pitches up” is inverted by the left hand. The first and fourth pcs move up and the second and third move down, following a “1 pc up and 2 pc down” pattern ending in a fifth pc that acts as the anchor.

measure #

right hand

left hand

Diagram illustrating the musical notation for measures 41 through 53, showing the right hand and left hand parts. The notation includes measure numbers (41-53) and specific transposition instructions (+1, -1, anchor) above the staves. The right hand part is marked with measure numbers 41 through 53. The left hand part is marked with measure numbers 41 through 53. The notation includes various musical symbols such as treble and bass clefs, key signatures, and specific transposition instructions (+1, -1, anchor) above the staves. The right hand part is marked with measure numbers 41 through 53. The left hand part is marked with measure numbers 41 through 53. The notation includes various musical symbols such as treble and bass clefs, key signatures, and specific transposition instructions (+1, -1, anchor) above the staves.

Example 3-15a: +1/-1 successive transposition processes applied as limited symmetric reinterventions in Messiaen's *Vingt Regards*, X, "Regard de l'Esprit de joie," mm. 41-53

According to Jean Boivin's compilation of Messiaen's syllabi in his book *La Classe de Messiaen*, the *Vingt Regards* were taught during the 1951-52 year in which Garant was registered.¹⁷³ Garant's sketches contain two pages of pitch patterns that are delineated by double barlines into 12 segments of 45 pitches. In example 3-15b, these 45-pitch segments are realigned uniformly so that one segment appears per line. The best indication of Garant's compositional methodology is a series of commas he wrote above the first pattern outlining groups of three's and two's: the first comma appearing after the third pc; the second after the fifth; the third after the seventh, etc. Following the use of the commas, I have reconstructed groups transposed up and down by successive semitones moving by *agrandissements asymétriques*. Garant's repetitive pattern consists of an alternation between moving and anchored groups of 3 and 2 pcs, respectively. In the first line of example 3-15b, the first three pitches of each segment, (enclosed in solid boxes) are transposed by increments of +1. The fourth and fifth pitches (unboxed) are stationary anchors. The next three pitches are transposed by -1 (dotted boxes). Again, two anchors follow. The overall pattern was confirmed by a separate page of notes within the same archival file, on which Garant planned his compositional techniques in prose. He wrote in the sketches that "this asymmetric enlargement is as follows: 1 static triplet, 1 that rises, 1 static, 1 that descends—and so on."¹⁷⁴ He diverted from this plan by commencing with an ascending triplet instead of a static one and choosing to use static duplets instead of triplets.

¹⁷³ Boivin 1995, p. 438.

¹⁷⁴ Original French: "Puis agrandissement asymétrique que comme suit: 1 triolet immobile, 1 qui monte, 1 immobile, 1 qui descend—ainsi de suite."

The image displays a musical score for 45 measures, numbered 1 through 45. The notation is organized into a grid of 12 staves, with measures 1-12 on the first staff, 13-24 on the second, 25-36 on the third, and 37-45 on the fourth. The music features a series of chords and melodic lines, with some measures containing multiple notes. Above the score, a series of curved lines indicate transposition processes: a solid line labeled '+1' connects measure 1 to measure 12, a dashed line labeled '-1' connects measure 12 to measure 24, a solid line labeled '+1' connects measure 24 to measure 36, and a dashed line labeled '-1' connects measure 36 to measure 45. The notation includes various musical symbols such as clefs, key signatures, and note heads.

Example 3-15b: +1/-1 successive transposition processes applied as limited symmetric reinterversions in Garant's sketches for *Variations pour deux pianos*

Garant manipulates a single melodic line as opposed to two different voices divided between left and right hands. In example 3-15b, Garant's pattern is inversionally symmetrical. The central three pcs of the 45-pitch segment, 21, 22 and 23, are transposed by +1. From this middle +1 transposition, moving towards the outside, the transpositions follow a mirror pattern as indicated by the arcs above example 3-15b. Order numbers 16, 17, 18 and 26, 27, 28, equidistant from the central +1 transposition, are transposed by -1. The pc-anchors to either side of the trichords, 14, 15 and 29, 30, are followed by another +1, transposition of 3 pcs. The alternating pattern continues towards the outsides, so that in total from the centre, there is a completely symmetrical *agrandissement* pattern: (+1, anchor, -1, anchor, +1, anchor, -1, anchor, +1). Both Messiaen and Garant maximised the number of unique patterns obtainable by their predetermined *agrandissements asymétriques* procedures. Notice that in both examples 3-15a and 3-15b, if further +1 or -1 shifts occur after the twelfth and last pattern, the original would be recreated with the transposing pcs having been transferred up or down by an octave.

Messiaen found compositional inspiration in Sharngadeva's numbered list of 120 deçî-tâlas and shared it with his students. Example 3-16 from Garant's *Variations* is comprised of an original *candrakalâ* tâla (#105) and two *monnayages*, or "rhythmic conversions," that subdivide the second and third bracketed variations into composite groups of the same total value, indicated within dotted boxes.¹⁷⁵ Two noted Messiaen scholars, Robert Sherlaw Johnson and Harry Halbreich, both remark that *Candrakalâ* was one of Messiaen's favourites.¹⁷⁶ In what was

¹⁷⁵ The verb *monnayer* usually refers to the fabrication of money or the exchange of goods for money, or in some cases, currency exchange. In this case, I believe that Messiaen applied the term to describe a rhythmic exchange, that like a currency exchange, maintains the same total value: by exchanging the first eighth note in example 3-16 for two sixteenths in at the beginning of the example's second measure, he makes "rhythmic change", if you will, by trading a twenty dollar bill (the eighth) for two tens (the sixteenths).

¹⁷⁶ Johnson 1975, p. 34. Johnson states that *candrakalâ* and *lackskmîça* (#88) were two of Messiaen's favourite rhythms. In personal communication, 7 March 2009, Harry Halbreich suggested that *candrakalâ*, *lackskmîça* and *râgavardhana* (#93) were his three favourites. These three, in particular, were combined by André Prévost in example 5-27.

to be “section D, subsection A” of the piece, Garant applied a permutation pattern to this theme that Messiaen might have described as “de sept en sept, groupes de quatre,” or a reordering cycle of 7ths in seven segments, 4 rhythms in each segment, starting on 1. Messiaen would have notated the segments in a single line as shown in example 3-17a. Garant however, chose to divide the segments by notating each in a separate row, one below the other in a rectangle (example 17b). Messiaen’s single row notation visually suggests performing the segments only forward and backward horizontally, whereas Garant’s alternative multi-row layout allows the composer to select not only horizontal segments, but vertical and diagonal ones as well.

original monnayage monnayage

order: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
numbers

Example 3-16: Theme comprised of a *Candrakalâ tâla* Hindu rhythm and two *monnayages*, or “rhythmic conversions” in Garant’s incomplete *Variations pour deux pianos*

1 8 15 22 || 2 9 16 23 || 3 10 17 24 || 4 11 18 25 || 5 12 19 26 || 6 13 20 27 || 7 14 21 28

Example 3-17a: Hypothetical notation of “de sept en sept, groupes de quatre” according to the conventions used in Messiaen’s *Traité*, vol. III.

The image shows a musical score for two pianos and a corresponding pitch matrix. The score is for Piano 1 and Piano 2, each with a treble and bass staff. Piano 1's right hand (RH 1) plays the top row backwards (22, 15, 8, 1), while its left hand (LH 1) plays the bottom row from right to left (7, 13, 19, 25). Piano 2's right hand (RH 2) plays the top diagonal from left to right (1, 9, 17, 25), and its left hand (LH 2) plays the bottom diagonal from left to right (28, 21, 14, 7). The pitch matrix on the right is a 7x4 grid of numbers 1-28, with a dashed line labeled 'axis of symmetry' running from the top-left to the bottom-right. The numbers are color-coded: red (1, 8, 15, 22), blue (2, 9, 16, 23), green (3, 10, 17, 24), purple (4, 11, 18, 25), orange (5, 12, 19, 26), pink (6, 13, 20, 27), and grey (7, 14, 21, 28).

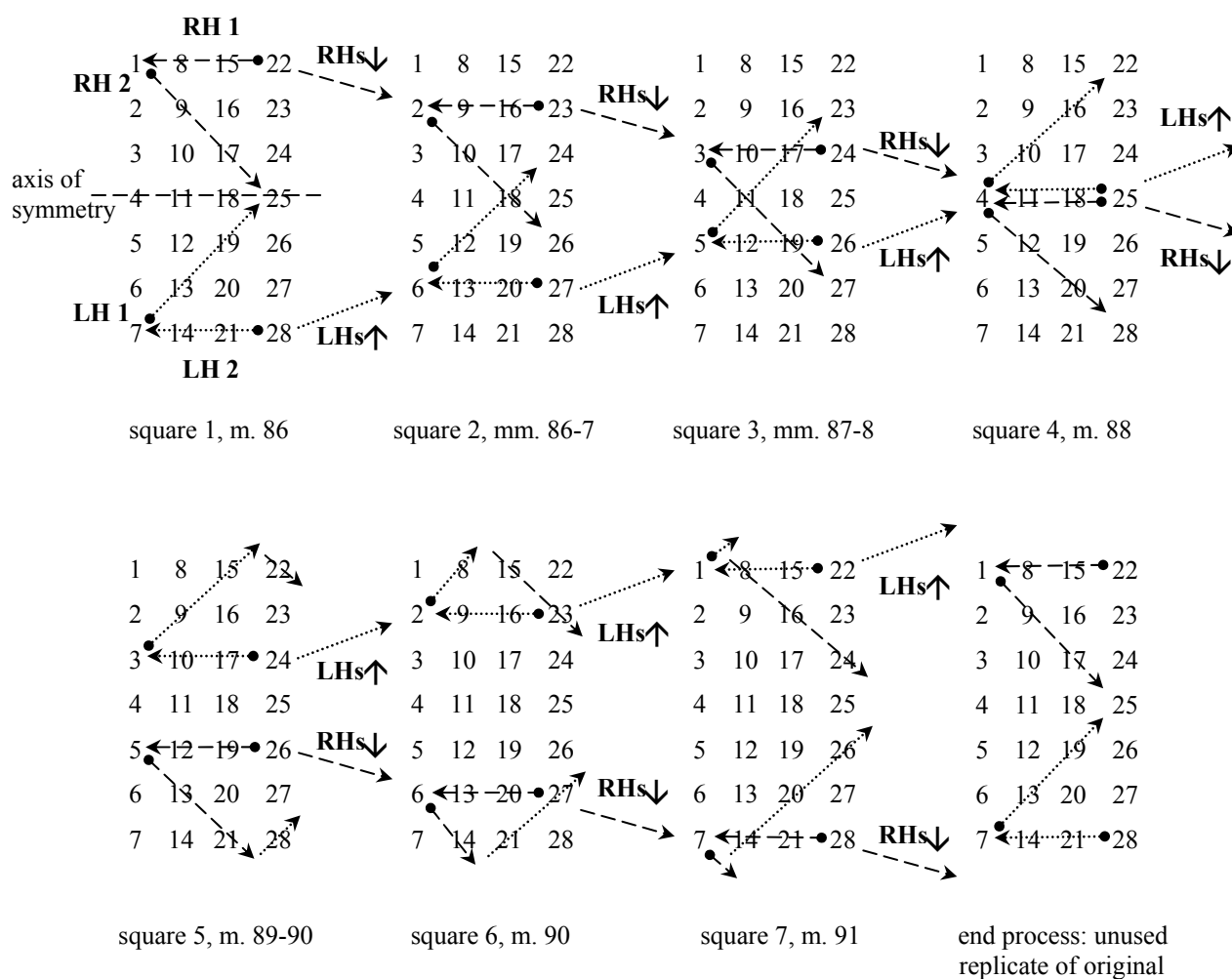
1	8	15	22
2	9	16	23
3	10	17	24
4	11	18	25
5	12	19	26
6	13	20	27
7	14	21	28

Example 3-17b: The compositional realisation, at left, of the four inversionally-symmetrical readings on the right, *Variations pour deux pianos*, m. 86

In a short section between mm. 86 and 91, Garant chose his four simultaneously-performed segments according to a symmetrical design, so that right and left hands and piano 1 and 2 are each other's inverse reading. The realisation of this first square is shown in example 3-17b. The right hand of piano 1 (RH 1) performs the top row backwards, from right to left, while the right hand of piano 2 (RH 2) plays the top diagonal in the opposite direction, from left to right. This pair of segments reflects the pair in the left hands: the bottom row from right to left (LH 2), and the bottom diagonal from left to right (LH 1).

In the next combination of four pitches/rests shown in the second square of example 17c, the right hand of piano 1 shifts down by one position, performing the second row backwards: 23, 16, 9, 2. Mirroring this move, the left hand of piano 2 plays the penultimate row assigned the numbers 27, 10, 3, and 6, in that order. The right hand of piano 2 moves down diagonally, performing 2, 10, 18, and 26, and the left hand of piano 1 mirrors with 6, 12, 18, 24. Since there are 7 rows, each line may be found in 7 different positions. Garant continued his successive shifting to obtain all possible segment positions, wrapping around his square when necessary,

and thus ensuring that each of the theme's 28 pitches/rests appears once in each hand. Any additional shifting beyond this point would replicate the original segment positions. He thereby exhausted the reordering potential of the successive shifting, in a manner that parallels his maximisation of the transposition process of his *agrandissements asymétriques* (example 3-15a).



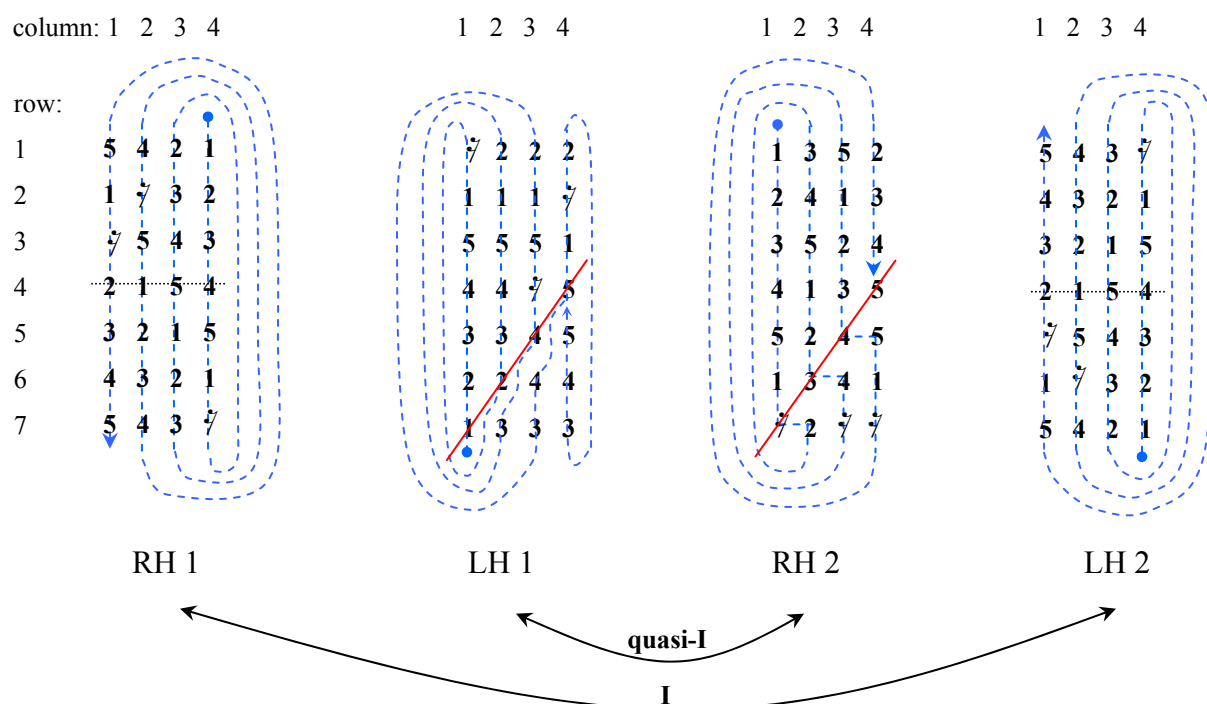
Example 3-17c: Garant's rectangular permutation notation and the gradual shifting of his four-segment basic shape, *Variations pour deux pianos*, mm. 86-91

Pascal Decroupet informally suggested that Boulez used a similar method of choosing integer strings according to symmetrical schemata.¹⁷⁷ An analysis by Jean-Louis Leleu explores similar schemata in Boulez's *Livre pour quatuor* (1948-49).¹⁷⁸ The main difference between the two works is a measure of rigor. Garant's designs were used rather systematically whereas Boulez's were not. From a historical perspective, however, Boulez's influence is still very likely since his piece was composed two years before he befriended Garant in Messiaen's classroom.

Garant sketched additional schemas of this *candrakalâ* theme that also call to mind those of Boulez. Example 3-18 shows how Garant replaced the order numbers 1-28 with a repeating pattern of order numbers 1-5, respecting the placement of the sixteenth rests. On the same page of sketching, he then arranged this repeating pattern in a number of different ways. The 4 x 7 matrix of the right hand of piano 1 (example 18, RH 1) appears to have been generated through commencement with the top-right corner (row 1, column 4), and filling downwards through the fourth column. The starting point of each matrix fill is indicated by a round dot and the path is traced with a dotted blue line that concludes with an arrow, showing the direction of the fill. Within this first matrix then, the top-to-bottom column fill is repeated, next tracing down through column three, then two, and finally one. The left hand matrix of piano 2 (example 18, LH 2) seems to have been filled by the same procedure from its bottom rightmost corner (row 7, column 4). Opposing the pattern displayed by RH 1, the fill of LH 2 moves up through the fourth column, then third, second and first. The retrograde of RH 1 would trace the same path backwards, whereas this relationship between the outermost hands is one of inversion around the central fourth row of both squares, which is indicated by a black dotted line.

¹⁷⁷ Personal communication, 14 October 2007, 6th European Music Analysis Conference/ VII. Jahreskongress der Gesellschaft für Musiktheorie, Freiburg, Germany.

¹⁷⁸ Jean-Louis Leleu, *Pierre Boulez: Techniques d'écriture et enjeux esthétiques*. ed. Jean-Louis Leleu and Pascal Decroupet, Geneva: Éditions Contrechamps, 2006, pp. 13-38.



Example 3-18: The inversionally- and quasi-inversionally-related fill patterns that were planned as a permutation device to be performed upon the *candrakalâ* theme of *Variations pour deux pianos*

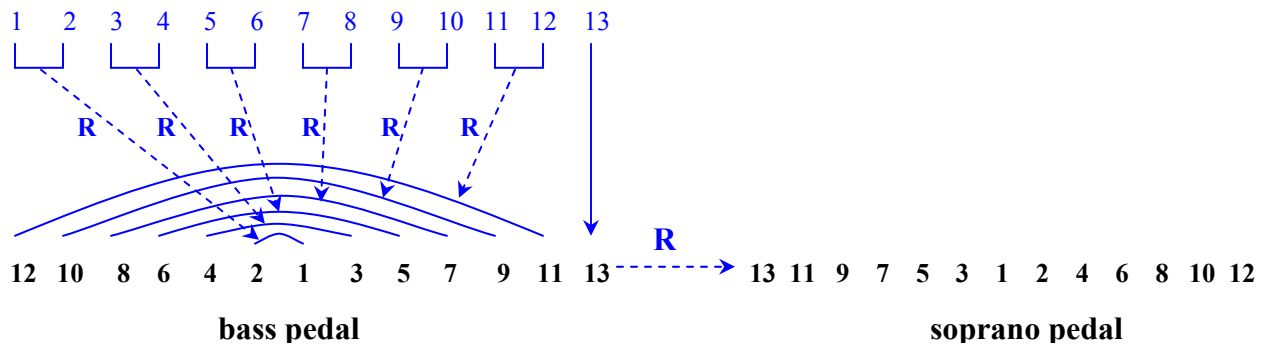
The matrices of the inner two hands, the left hand of piano 1 (example 3-18, LH 1) and the right hand of piano 2 (example 3-18, RH 2), are slightly more complex. LH 1 begins from the bottom left corner (row 7, column 1), fills straight up to the top left corner (row 1, column 1), and like the other two designs, wraps around to the bottom of the next row. However, it does not start tracing the fill from the expected position (row 7, column 2), but rather skips it in favour of

row 6 of the second column. The fill proceeds to the top, after which point it wraps around and returns to the skipped seventh row position. Now, when column 3 is filled, instead of skipping only the lowest row position, the trace skips the lowest two before wrapping around and catching them at the end. The fourth and final row fill follows suit, skipping the lowest three. The red diagonal line shows the row position at which each column is filled from left to right, moving upwards by one row position with each ensuing column. RH 2 shares several similarities with LH 1. Almost its inversion (quasi-I), it begins filling from the top left (row 1, column 1). Unlike LH 1, it does not skip the first row position of column 2 (which would be row 1, column 2), but instead preemptively advances into the bottom of the next column before wrapping around again to fill from the top.

Garant's sketches also include plans for a non-retrogradable rhythm and a rhythmic pedal. A page of text describes a 4-part form, "A – A2 – B – A," a rounded-binary. On the left he has written these letters and underlined them. To the right of the first A, Garant wrote, "thème – en 2 sections A + B – retrogradation de A," supposedly referring to a manipulation of his *candrakalâ* theme, previously discussed. Presumably, the theme was to be divided into two parts, A and B, followed by the first half, A, in reverse: an arch form and a non-retrogradable rhythm of sorts.

The A2 section calls for the theme to be accompanied by two rhythmic pedals, one in the bass and one in the soprano. The pedals are shown in black in example 3-19. The numerical rearrangement of integers 1-13 in the bass pedal follows Messiaen's interversion IX of the *ciseau ouvert* (open scissors) permutation, also known as the *éventail ouvert* (open fan) permutation, shown in example 2-13a. Garant would have simply added the integer 13 to the end of the series: (12, 10, 8, 6, 4, 2, 1, 3, 5, 7, 9, 11 + 13). However, it is much more likely that he obtained the

ordering through a single reordering process that expanded Messiaen's, as demonstrated in blue above the bass pedal. With each intervention (example 2-13a), Messiaen moved from the innermost to the outermost pairs of integers, reversed them, and placed them from left to right. Conversely, as shown in example 3-19, Garant must have extracted pairs from the series (1, 2, 3...12) from left to right, reversed them (as indicated with “**R**” and dotted lines), and placed them from the centre towards the outsides. The soprano pedal is simply the retrograde of the bass one.



Example 3-19: Hypothetical derivation of bass and soprano pedals illustrated, *Variations pour deux pianos*

3.3 After Paris: *Caprices* (1954), *Concerts sur terre*, mvt. V (1956) and *Asymétries no 2* (1959)

Garant wrote *Caprices*, his first decidedly serial composition to set four texts by Spanish poet Federico García Lorca (1898-1936) in 1953-54. Although the composer was eager to utilise serial procedures, he was conflicted throughout the composition process for fear that his strict adherence to serial procedures would stifle his creativity, and as a result the music “wouldn’t behave in the [creative] spirit in which it was intended.”¹⁷⁹ Afterwards, Garant humorously admitted with great relief, “in listening to it, I realised that it was musical.”¹⁸⁰ In terms of musical effect, Garant “didn’t try to compose Spanish music, per se, but rather recreated the poems through music; the lightness and timidity of *Guitar*, the solemn lyricism of *Cactus*, the raging violence of *Agave* and the pointillist vision of *Croix*.”¹⁸¹ The persona of the guitar in the first movement, “*La Devinette de la guitare*” (“The Riddle of the Guitar”) from Lorca’s 1921 *Poema del cante jondo* (*Poem of Deep Song*), is as coy and subtle as its text. Example 3-20 shows the original Spanish version of the poem with the French translation set by Garant and an English translation. Garant’s translation reinterprets the original first lines of the Spanish text, “En la redonda encrucijada, seis doncellas bailan (At the round crossroads, six maidens dance)” as “Au carrefour rond, six vierges folles (At the round crossroads, [there are] six silly/crazy maidens).”

¹⁷⁹ Lefebvre 1986, p. 47. Original French: “En composant *Caprices*, je craignais qu’il ne s’agisse que d’une vue de l’esprit.”

¹⁸⁰ Ibid. Original French: “En les entendant, je me suis rendu compte que c’était musical.”

¹⁸¹ Clarke 1964, p. 47. Original French: “Je n’ai pas essayé de composer de la musique espagnole, dit-il, mais plutôt de recréer les poèmes en musique; la légèreté et la timidité qu’on retrouve dans *Guitare*, le lyrisme solennel de *Cactus*, la violence déchaînée de *Agave* et l’optique pointilliste de *Croix*.”

“Adivinanza De La Guitarra” “Devinette de la Guitare” “Riddle of the Guitar”

En la redonda encrucijada, seis doncellas bailan. Tres de carne y tres de plata. Los sueños de ayer las buscan pero las tiene abrazadas, un Polifemo de oro. ¡La guitarra!	Au carrefour rond, six vierges folles. Trois de chair et trois d'argent. Les rêves d'hier les cherchent mais ils les tiennent enlacés, Polyphème d'or. La guitare!	At the round crossroads, six maidens dance. Three of flesh, and three of silver. Dreams from yesteryear pursue them, but they are held fast by a Polyphermus of gold. Ai!, the guitar!
---	---	---

Example 3-20: Spanish, French and English texts of Lorca's poem “Adivinanza De La Guitarra” from his 1921 *Poema del cante jondo*

I believe that the three maidens of flesh refer to the guitar's three upper strings traditionally made of catgut, and the three of silver, the lower three strings of metal. Held fast by their golden bridge, they dance—albeit somewhat manically—at the round crossroads, the sound hole of the guitar. In the excerpt shown in example 3-21 arpeggios sweep up and down through wide registers in what the listener perceives as constantly changing tempi: for example, the first measure arpeggiates via three sixteenths; the second, three thirty-seconds; and the third, three triplet sixteenths followed by two sixteenths and four dotted thirty-seconds. Sforzando attacks leap from their quiet surroundings. Even the voice outlines a few wider dissonant intervals, such as the leaps of sevenths and ninths $C_5\text{-}D\flat_4\text{-}E\flat_5$ in mm. 2-3 and $B_4\text{-}C_4$ in m. 3.

Allegretto ♩ = 120

voice

2a 9 10 11 12 1 2b 2 3 4 5 6/12

“R” IX

Au car - re - four rond, six vier - ges fol - les.

1a 1b

piano

p *mf* *pp* *sfz* *p* *sfz* *pp*

O I 1 2 3 4 5 7 8 “R” I 1 2 3 4 5 6 7 8 9 10 11 12 10/7 11/9

RétR VIII

voice

9 10 11 12/1 2 3 8 2c 9

Trois de chair et trois d’ar - gent. Les

1c

piano

sfz *p* *pp* *ff* *sfz* *p sub.* *mf* *pp*

O III 3 4 5 6 7 8 4 6 7 9 10 11 12 “R” I 1 2 3 4 5 7 6

1

←

7 3

rê - ves d’hi - er - les

←

8 9 10 11 12

Example 3-21: Serial analysis of Serge Garant's "Devinette de la Guitare" from *Caprices* (1954)

Garant composed guitar rhythmic cells that contain groups of six and three, possibly as a nod to Lorca's six dancing maidens in groups of three.¹⁸² These cells undergo exact and inexact rhythmic augmentation and diminution, techniques that Messiaen often applied to his non-retrogradable rhythms. The primary rhythmic cell in the guitar beginning the piece (solid bracket 1a) consists of three softer fleeting gestures; three descending sixteenths, an eighth decorated with a grace note, and a dyad. These three rhythmic components are punctuated by a sfz D \flat that signals the end of the cell. The cell is then repeated under an uneven augmentation and diminution in mm. 2-3 (1b). In the first half of the cell, the pitch durations are halved and the rests are doubled. The three opening sixteenths are diminished to thirty-seconds, the sixteenth rest is augmented to two sixteenths, while the eighth with grace note is diminished to a sixteenth. The following sixteenth rest near the centre of the figure, indicated with an arrow, remains the same, like a pivot. After it, the triplet sixteenth is transformed into three triplet sixteenths, the triplet sixteenth and regular sixteenth rests are roughly halved into a single sixteenth, and the D \flat sfz, originally equal to three sixteenths, is doubled to the equivalent of six. The original cell values return in m. 6 (1c). The final articulating D \flat of the cell in m. 7 is delayed like the unobtainable perfect past that pursues the maidens, or rather, that they seek but cannot recapture. In its place, a G $_1$ dotted eighth, starkly contrasting dynamic and register, punctuates their dreams (*rêves*).

The voice part has its own rhythmic cell that undergoes both exact and inexact rhythmic augmentation. The original cell in m. 2 (dotted bracket 2a) is comprised of two groups, the first of three sixteenths and the second of two dotted sixteenths. The cell is augmented exactly in m. 3

¹⁸² Lefebvre 1986, p. 47. In this piece, Garant experimented, "for the first time." with "rhythmic cells [...] as well as canons and all of the serial procedures." Original French : "J'y utilisais pour la première fois des cellules rythmiques [...] ainsi que des canons et tous les procédés sériels."

(2b) when the sixteenths are elongated to eighths and the dotted sixteenths, to dotted eighths.

Cell 2a undergoes inexact augmentation and a rhythmic rotation in mm. 6-7 (2c). The original sixteenth of 2a become a trio of triplet eighths instead of simple eighths. The first dotted sixteenths of cell 2a is exactly augmented as a dotted eighth, but the second one is shortchanged, becoming a sixteenth.

With respect to serial calculations, Garant followed standard French practices of his time, adhering to what is commonly known as a “Boulez matrix.” As shown in the reconstruction of Garant’s matrices in example 3-22, the *Originale* (O) series, analogous to prime, is found on the left, and their *Renversements* (“R”), or inversions, are on the right.¹⁸³ The O-series transpositions are placed below one another, their order determined by the order of pcs in OI, the original row at the top left. The second pc of that row, order number 2, becomes the level of transposition for O II directly underneath, followed by O III, then O IV, etc. The “R”-series is its own independent matrix. After the first row of the O-series is inverted around its first pc to obtain the first row of the “R”-series, the remaining “R” transpositions are listed one under the other according to the order determined by the first “R” series. In example 3-21 then, “R” I is on E, “R” II, on F#, R III on F, etc. I have abbreviated *Rétrograde* and *Rétrograde-Renversement* as (Rét) and (RétR). The numbers appearing in black above the note heads are pc numbers that act as a form of numerical shorthand. Garant often referred to a 12x12 grid of numbers when composing, often dispensing with the originating longhand matrices. The order numbers in colour in example 3-22 match those appearing in the serial analysis of example 3-21.

¹⁸³ This matrix was calculated according to Lefebvre’s notation of the O I and “R” I series of the work in her 1986 text, p. 47.

	Originale (O) →	← Rétrograde (Rét)	Renversement ("R") →	← Rét-R (RétR)
O I	<p>O I 1 2 3 4 5 6 7 8 9 10 11 12</p> <p>1 2 3 4 5 6 7 8 9 10 11 12</p>		<p>"R" I 1 2 3 4 5 6 7 8 9 10 11 12</p> <p>1 4 5 2 3 10 12 9 8 6 11 7</p>	
O II	<p>2 12 8 1 3 9 4 10 5 6 7 11</p> <p>1 2 3 4 5 6 7 8 9 10 11 12</p>		<p>4 7 9 1 5 8 2 6 3 10 12 11</p>	
O III	<p>3 8 2 5 1 7 9 12 4 11 6 10</p>		<p>etc...</p>	
O IV				
O V				
O VI				
O VII				
O VIII		<p>RétR VIII 12 11 10 9 8 7 6 5 4 3 2 1</p> <p>9 6 7 5 4 2 3 11 1 12 8 10</p>		
O IX		<p>"R" IX 8 3 2 10 12 7 6 1 11 4 9 5</p> <p>1 2 3 4 5 6 7 8 9 10 11 12</p>		
O X				
O XI				
O XII				

Example 3-22: A reconstruction of the *Originale* (O, at left) and *Renversements* (“R,” at right) matrices for *Caprices*. Series employed in example 3-21 are shown here in corresponding colour.

Garant favoured the O and “R” forms of the series, using O I, “R” I and “R” IX once each, and O III twice. He used only one form involving retrograde, RétR VIII. His series choices seem to have been made to establish centricity, namely around the pitches E and D \flat as most of these series contain one or the other as its first pc. Although O III technically does not begin with either, the composer scored the first three pcs of the series to be attacked simultaneously on the downbeat of m. 4 and the D \flat grace note is marked *sfz*. Likewise it is the second pc of RétR IX that is the D \flat , but the first pc of the series doubles as the last of the previous, therefore making the D \flat function as the first.

When Garant returned to *Concerts sur terre* in 1956 to complete its remaining three movements, by employing newly acquired atonal techniques (example 3-23) he reproduced the sound of the previously composed movements. Movement V maintains the melodic focus on ics 1 and 6 found in mvts. I and II (examples 3-4, 3-6a and 3-7) but does this through the choice of three complementary symmetrical tetrachords that are saturated with those intervals: Set A, (F, F \sharp , B, C) = [0167]; Set B (C \sharp , D, E \flat , E) = [0123]; and Set C (G, A \flat , A, B \flat) = [0123], which is a transposition of B by 6 semitones, so that $T_6B = C$ and $T_6C = B$. Sets A, B and C form the aggregate and are used formally as a simple palindrome. The sets first appear in the order (A-B-C) and are mirrored by the final three chords (C-B-A). The succinct form and the presence of the two [0123] tetrachords, whose T_6 replicative relationship is not that dissimilar from the type of duplication involved in a derived series, resonate with Webern’s compositional practice.¹⁸⁴

¹⁸⁴ The [0123] tetrachord generates the derived series in Webern’s *Quartet for Strings*, Op. 28 and *Cantata no. I*, Op. 29. Both works contain wedges within each of their [0123] tetrachords. The series for his *Variations for Orchestra*, Op. 30 feature a similar ABA tetrachordal segmentation comprised of three symmetrically placed sets: [0134], [0147], [0134].

Molto lento $\text{♩} = 55$ **A [0167]** **V** **B [0123]**

p semplice

Je vou-drais tant que ma joie fût heu - reu se — Puis-qu'elle vient de s'in - car -

pp

A [0167]

ner Et tou-tes les au-tres de-meu - rent —

C [0123] = T_6 B **A tempo** **B**

f poco stringendo

Ah! Puis-ses-tu des-cendre en mon âme a-mou! - reu - se J'ai tant de zo - nes de bon -

mf *pp*

heu Qui ne fu-rent ja-mais don - nées

A [0167] **C** **B** **A** **L.V.**

pp *ppp*

Example 3-23: A simple pc design of complementary tetrachords in *Concerts sur terre*, mvt. V (1956)

As Messiaen's compositional language is broadly based upon the notion of symmetry, Garant's *Asymétries no 2* (1959) certainly pique one's interest. Music analysts, including myself, are drawn typically towards aspects of symmetry, balance and proportion. As analysts we may wonder what musical elements of these compositions inspire the title *asymmetry*. Through a close examination of the archival files for the piece, I believe that for Garant, asymmetry was tantamount to *opposition*, particularly with respect to odd versus even numbers, and direction of movement, in terms of left versus right and up versus down.

The archival file for *Asymétries no 2* also contains many of the materials for *no 1* as well as references to other compositions.¹⁸⁵ After a process of elimination, I have determined that the O and "R" transpositions of the series in example 3-24 are the ones that Garant employed in *Asymétries no 2*.¹⁸⁶ His original sketch material consists of the note heads appearing in black typeface; my analytical addition of the corresponding note and pc numbers are in blue. According to the norms of integral serialism, every musical parameter of the work adheres to the internal structure of the O and "R" matrices. Parameters not corresponding to a specific series order within these two matrices instead correspond to one within an additional sub-matrix derived from the original.

¹⁸⁵ The archives at Université de Montréal appear to have retained some of the composer's personal filing/sorting system. The file for *no 1* (P 141/ D1, 6, 11) is quite thin, containing only a copy of the finished manuscript and a few pages of planning materials, while the file for *no 2* (P 141 / D1, 6, 12) is considerably larger and contains many of the material for *no 1* as well as references to other compositions. Presumably, when Garant began work on *no 2* he removed materials from his file for *no 1* and other compositional files for his own reference and then kept them with his new composition instead of returning them to their original files. Therefore, I began with the file for *Asymétries no 2* and sorted through the pages of matrices to find which specified both clarinet and piano—the instrumentation of *no 2*—as opposed to only piano, which could pertain to either *no 2* or to *no 1*, scored for solo piano. Since most of the sketch pages do not specify to which piece they belong, I then studied the series of numbers within the individual matrices to determine which of them appeared to be interrelated. Each interrelated set formed a group and I was left with two large groups and a few scattered pages. I then applied each of these groups and other questionable pages to the score *Asymétries no 2* to arrive at an integral serial analysis.

¹⁸⁶ There are four different pages of O / "R" series included in the file, one of which belongs to *Asymétries no 1*, a second to *no 2*, and two "mystery" series that do not pertain to either piece. It is for this reason that I have concluded that Garant referred to the series of previously-composed pieces in deriving the series of *Asymétries no 2*.

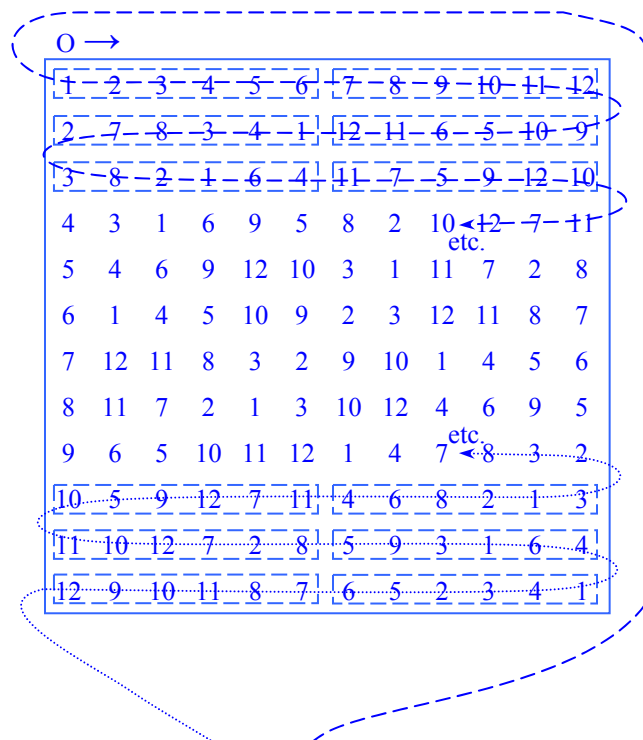
	O		"R"
O / "R" I	1 2 3 4 5 6 7 8 9 10 11 12		1 6 4 3 8 2 9 5 7 11 10 12
O / "R" II	2 7 8 3 4 1 12 11 6 5 10 9		6 9 5 4 3 1 12 10 2 8 11 7
O / "R" III	3 8 2 1 6 4 11 7 5 9 12 10		4 5 6 1 2 3 10 9 8 7 12 11
O / "R" IV	4 3 1 6 9 5 8 2 10 12 7 11		3 4 1 2 7 8 5 6 11 12 9 10
O / "R" V	5 4 6 9 12 10 3 1 11 7 2 8		8 3 2 7 12 11 4 1 10 9 6 5
O / "R" VI	6 1 4 5 10 9 2 3 12 11 8 7		2 1 3 8 11 7 6 4 12 10 5 9
O / "R" VII	7 12 11 8 3 2 9 10 1 4 5 6		9 12 10 5 4 6 7 11 1 3 8 2
O / "R" VIII	8 11 7 2 1 3 10 12 4 6 9 5		5 10 9 6 1 4 11 12 3 2 7 8
O / "R" IX	9 6 5 10 11 12 1 4 7 8 3 2		7 2 8 11 10 12 1 3 9 5 4 6
O / "R" X	10 5 9 12 7 11 4 6 8 2 1 3		11 8 7 12 9 10 3 2 5 6 1 4
O / "R" XI	11 10 12 7 2 8 5 9 3 1 6 4		10 11 12 9 6 5 8 7 4 1 2 3
O / "R" XII	12 9 10 11 8 7 6 5 2 3 4 1		12 7 11 10 5 9 2 8 6 4 3 1

Example 3-24: *Originale* and *Renversements* matrices for *Asymétries no 2* (1959) by Serge Garant, Service de la gestion de documents et des archives de l'Université de Montréal, P 141/D1, 6, 12

Within the work, the order in which the series follow one another (i.e. the “R” XII, followed by O IX and then “R” X in the first measures of the clarinet) was determined by the order of pcs in his O and “R” matrices. In example 3-25, the series order of the first movement is based on the O matrix. The clarinet series order begins by tracing through the last row of the matrix from left to right and using the pc numbers as subscripts for the series. In this way, the first O hexachord of the last row (12, 9, 10, 11, 8, 7) becomes (“R” XII, O IX, “R” X, O XI, “R” VIII, O VII, as shown on the bottom left). Garant then traced the second row backwards and continued to snake up and down through the matrix. The arrow designations specify the order in which that series is performed: from left to right (\rightarrow); from right to left (\leftarrow); from the centre to the right (\rightarrow); from the centre to the left (\leftarrow); and from the middle to the outsides (\leftrightarrow). The “R” versus O designations themselves arise from a simple alternation pattern between the two, going left to right, row by row, from top to bottom. Once Garant reached the end of the last row of the O matrix, he traced the next-to-last row from right to left, proceeding to weave up through the matrix as indicated by the dotted blue line.

The order of the series in the piano employs the same snaking pattern in an opposing fashion with respect to topography, weaving from the top of the matrix to the bottom and moving from the left towards the right in a similar fashion. The “R” and O designations alternate for the most part. The seven exceptions exclude the bracketed series that are realised as rests. The five red pairs of series are repetitions of the same order type and usually involve two successive R series. The blue “R” + O V indicates a compression in which Garant composed the first few pcs of each while maintaining the alternation pattern pertaining to direction. The green “R” + O II is a similar compression that breaks the alternation pattern. The first 14 series of the clarinet and 15 of the piano appear below in example 3-29.

Series Order



Clar

$\overrightarrow{\text{"R"}} \text{XII}$	$\overleftarrow{\text{O}} \text{IX}$	$\overrightarrow{\text{"R"}} \text{X}$	$\overleftarrow{\text{O}} \text{XI}$	$\overrightarrow{\text{"R"}} \text{VIII}$	$\overleftarrow{\text{O}} \text{VII}$
$[\text{"R"} \text{VI}]$	$\overrightarrow{\text{O}} \text{V}$	$\overleftarrow{\text{"R"}} \text{II}$	$\overrightarrow{\text{O}} \text{III}$	$\overrightarrow{\text{"R"}} \text{IV}$	$\overrightarrow{\text{O}} \text{I}$
$\overrightarrow{\text{"R"}} \text{IV}$	$\overrightarrow{\text{O}} \text{VI}$	$\overrightarrow{\text{"R"}} \text{I}$	$\overrightarrow{\text{O}} \text{III}$	$\overrightarrow{\text{"R"}} \text{IX}$	$\overrightarrow{\text{O}} \text{V}$
$\overrightarrow{\text{"R"}} \text{VIII}$	$\overleftarrow{\text{O}} \text{II}$	$\overleftarrow{\text{"R"}} \text{VII}$	$\overrightarrow{\text{O}} \text{XII}$	$[\text{"R"} \text{X}]$	$\overrightarrow{\text{O}} \text{XI}$
$\overrightarrow{\text{"R"}} \text{X}$	$\overrightarrow{\text{O}} \text{V}$	$[\text{"R"} \text{IX}]$	$\overleftarrow{\text{O}} \text{XII}$	$\overleftarrow{\text{"R"}} \text{VII}$	$\overrightarrow{\text{O}} \text{XI}$
$\overleftarrow{\text{R}} \text{IV}$	$\overleftarrow{\text{O}} \text{VI}$	$\overleftarrow{\text{R}} \text{VIII}$	$\overleftarrow{\text{O}} \text{II}$	$\overrightarrow{\text{R}} \text{I}$	$\overleftarrow{\text{O}} \text{III}$
$[\text{"R"} \text{II}]$	$\overrightarrow{\text{O}} \text{III}$	$\overleftarrow{\text{R}} \text{VIII}$	$\overrightarrow{\text{O}} \text{VII}$	$\overrightarrow{\text{R}} \text{IV}$	$\overleftarrow{\text{O}} \text{I}$
$\overrightarrow{\text{R}} \text{XII}$	$\overleftarrow{\text{O}} \text{XI}$	$\overleftarrow{\text{R}} \text{X}$	$[\text{O V}]$	$\overrightarrow{\text{R}} \text{VI}$	$\overleftarrow{\text{O}} \text{IX}$
$\overrightarrow{\text{R}} \text{VIII}$	$\overrightarrow{\text{O}} \text{XI}$	$\overrightarrow{\text{R}} \text{VII}$	$\overleftarrow{\text{O}} \text{II}$	$[\text{"R"} \text{I}]$	$\overleftarrow{\text{O}} \text{III}$
$\overrightarrow{\text{R}} \text{X}$	$\overleftarrow{\text{O}} \text{XII}$	$\overleftarrow{\text{R}} \text{IV}$	$\overrightarrow{\text{O}} \text{VI}$	$\overrightarrow{\text{R}} \text{IX}$	$\overleftarrow{\text{O}} \text{V}$
$\overleftarrow{\text{R}} \text{VI}$	$\overrightarrow{\text{O}} \text{V}$	$\overleftarrow{\text{R}} \text{IV}$	$[\text{O I}]$	$\overrightarrow{\text{R}} \text{X}$	$\overrightarrow{\text{O}} \text{IX}$
$\overleftarrow{\text{R}} \text{II}$	$[\text{O III}]$	$\overrightarrow{\text{R}} \text{VIII}$	$\overrightarrow{\text{O}} \text{XI}$	$\overrightarrow{\text{R}} \text{XII}$	$\overrightarrow{\text{O}} \text{VII}$

Piano

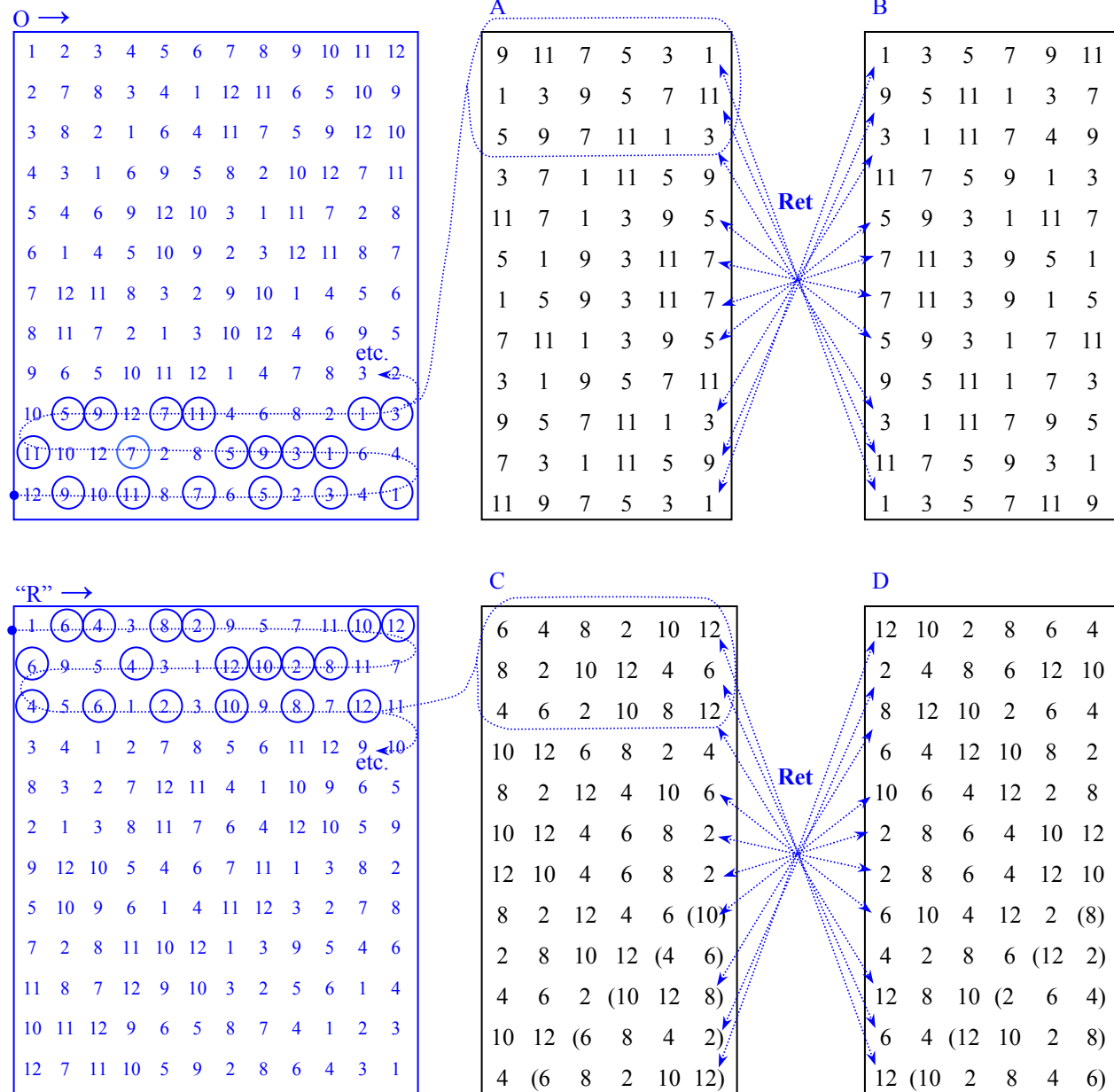
$[\text{O I}]$	$\overleftarrow{\text{R}} \text{II}$	$[\text{O III}]$	$\overrightarrow{\text{O}} \text{IV}$	$[\text{"R"} \text{V}]$	$\overrightarrow{\text{R}} \text{VI}$
$\overrightarrow{\text{O}} \text{VII}$	$\overrightarrow{\text{R}} \text{VIII}$	$\overleftarrow{\text{O}} \text{IX}$	$\overrightarrow{\text{R}} \text{X}$	$\overleftarrow{\text{O}} \text{XI}$	$\overrightarrow{\text{R}} \text{XII}$
$\overleftarrow{\text{O}} \text{IX}$	$\overrightarrow{\text{R}} \text{X}$	$\overrightarrow{\text{O}} \text{V}$	$\overrightarrow{\text{R}} \text{VI}$	$\overrightarrow{\text{O}} \text{XI}$	$\overrightarrow{\text{R}} \text{XII}$
$\overleftarrow{\text{O}} \text{I}$	$\overleftarrow{\text{R}} \text{IV}$	$\overleftarrow{\text{O}} \text{III}$	$\overleftarrow{\text{R}} \text{VIII}$	$\overleftarrow{\text{O}} \text{VII}$	$\overrightarrow{\text{R}} \text{II}$
$\overrightarrow{\text{O}} \text{III}$	$\overleftarrow{\text{R}} \text{VIII}$	$\overleftarrow{\text{O}} \text{II}$	$\overleftarrow{\text{R}} \text{I}$	$\overrightarrow{\text{R}} \text{VI}$	$\overrightarrow{\text{O}} \text{IV}$
$\overrightarrow{\text{R}} \text{XI}$	$\overrightarrow{\text{O}} \text{VII}$	$\overrightarrow{\text{R}} \text{V}$	$\overrightarrow{\text{O}} \text{IX}$	$\overleftarrow{\text{R}} \text{XII}$	$\overrightarrow{\text{O}} \text{X}$
$\overrightarrow{\text{R}} \text{XI}$	$\overrightarrow{\text{O}} \text{VII}$	$\overrightarrow{\text{R}} \text{XII}$	$\overleftarrow{\text{R}} \text{X}$	$\overleftarrow{\text{O}} \text{II}$	$\overrightarrow{\text{R}} \text{VIII}$
$\overrightarrow{\text{O}} \text{V}$	$\overrightarrow{\text{R}} \text{IX}$	$\overrightarrow{\text{O}} \text{VI}$	$\overrightarrow{\text{R}} \text{I}(\text{O})$	$\overrightarrow{\text{O}} \text{III}$	$[\text{"R"} \text{IV}]$
$\overrightarrow{\text{R}} \text{+O V}$	$\overleftarrow{\text{R}} \text{IV}$	$\overleftarrow{\text{O}} \text{VI}$	$\overrightarrow{\text{R}} \text{IX}$	$\overrightarrow{\text{R}} \text{XII}$	$\overleftarrow{\text{O}} \text{X}$
$\overleftarrow{\text{R}} \text{III}$	$\overrightarrow{\text{O}} \text{I}$	$\overrightarrow{\text{O}} \text{XI}$	$\overleftarrow{\text{R}} \text{VII}$	$\overrightarrow{\text{R}} \text{+O II}$	$\overleftarrow{\text{O}} \text{VIII}$
$\overleftarrow{\text{R}} \text{VII}$	$[\text{O VIII}]$	$\overrightarrow{\text{R}} \text{XI}$	$\overleftarrow{\text{O}} \text{XII}$	$\overrightarrow{\text{R}} \text{III}$	$\overrightarrow{\text{O}} \text{II}$
$[\overleftarrow{\text{R}} \text{IX}]$	$[\text{O X}]$	$\overleftarrow{\text{R}} \text{V}$	$\overleftarrow{\text{O}} \text{IV}$	$\overrightarrow{\text{R}} \text{I}$	$\overrightarrow{\text{O}} \text{VI}$

Example 3-25: Determining series ordering for *Asymétries no 2* (1959)

The four black 6 x 12 rectangles in example 3-26 were found in this layout, as a set, on a page of Garant's notes for *Asymétries no 2*. I conclude that they were derived by extracting the odd numbers from the O matrix (upper left, blue) and the even numbers from the "R" one (lower left, blue). Garant probably commenced with the O matrix, extracting its odd pc numbers from the bottom left corner with the number 12.¹⁸⁷ He proceeded to extract numbers from left-to-right across the bottom row and recopied those six digits as the first line of the 6 x 12 matrix A (9, 11, 7, 5, 3, 1). He then continued, tracing along the dotted blue line through the second-to-bottom line of the O matrix, now in the opposite direction from right to left. The extracted odd numbers, however, were not copied in the new 6 x 12 matrix from right to left, but remain in left-to-right succession. Garant continued to weave back and forth, from bottom to top, through his original O matrix in this fashion. Matrix B is the opposing retrograde-inversion of matrix A (rotation of 180°): the first column of matrix A corresponds to the last of B in retrograde, the second of A to the retrograde of the second to last of B, etc. This is indicated by the x-shaped crossed lines between the two matrices and the abbreviation (Ret), for retrograde.

¹⁸⁷ The start position is indicated with a blue dot and the fill direction with an arrow in accordance with the conventions outlined in example 3-18.

Durations / Durées



Example 3-26: my reconstruction (in blue) of the arrival of the duration series through a weaving extraction pattern applied to the O and “R” matrices in *Asymétries no 2* (1959)

Garant created matrix C by applying a similar procedure to the “R” matrix. Here, he extracted even numbers from left to right, commencing with the top row instead of with the

bottom. He again snaked through the matrix from left to right, then right to left, etc., to fill his 6 x 12 matrix C row by row, left to right and top to bottom. Matrices C and D share the same retrograde-inversional relation as A and B. The replication of the extraction procedure under inversion (starting from the top as opposed to starting from the bottom) creates a sense of symmetry through its mirrored inversion, as does the idea of exact replication exemplified by the retrograde-invertible relationship held between both pairs of matrices; A and B, and C and D.

Matrices A, B, C and D determine the duration of series segments appearing in the clarinet and piano. In the score in example 3-29, the numbers of A correspond to the number of sixteenth notes/rests belonging to a single series in the clarinet line of the first of two movements in *Asymétries no 2*. Matrix B determines the piano part of the same movement, and C and D, the clarinet and piano of the second movement. In example 3-29, the first row of A (9, 11, 7, 5, 3, 1) is realised as follows: the first “R” XII series in the clarinet lasts for 9 sixteenths; the second O IX for 11 sixteenths; then “R” X for 7; O XI for 5; “R” VIII for 3; and finally, O VII for 1. Matrix B similarly determines the length of series segments in the piano. Here, the (1, 3, 5, 7, 11, 9) translates as such: the first [O I], in brackets, is replaced by 1 sixteenth rest; “R” II lasts for 3 sixteenths; [O III] is replaced by 5 sixteenth rests; O IV lasts for 7 sixteenths; [“R” V] is replaced by 11 rests; and RVI lasts for 9 sixteenths.

Recognising the principle behind the dynamics and attacks is more difficult. The black graduated scales of dynamics at the top of example 3-27 appear in the corresponding sketch on the bottom of an otherwise blank sheet of manuscript. The two black 6 x 12 squares of dynamics appear in conjunction with matrices A and B in example 3-26. The dynamics are lightly sketched in over the top of each value in matrices A and B, but I have separated them to clarify differences of derivation. After applying a similar extraction process of digits 1 through 7 to the O and “R”

matrices, I have found that Garant uses the scale labelled “Intensité a et b” for both the clarinet and piano in first movement of the work. This scale was applied to the digits 1 through 7 of the R matrix.

Garant calculated his dynamics for the first movement in the same way that he arrived at the total duration of each series segment, weaving from left to right and right to left in alternation, from the bottom row to the top for the clarinet, and the top row to the bottom for the piano. To determine series duration (example 3-26), Garant had applied his weaving pattern to the O series to derive the lengths for the first movement, and the “R” series to calculate lengths for the second. In example 3-27, he did the opposite, generating the order of dynamics for the first movement through an extraction process performed upon the R matrix, while arriving at the dynamics of the second through extraction from the O matrix. Once the digits were extracted, forming matrices E and F, they were converted into their dynamic equivalents as outlined by the scale “Intensité a et b.”

In example 3-26, matrix B could also be generated by weaving from the top left corner of the O matrix, down. Since Garant was extracting 6 numbers per row in O to slot into 6 numbers per row of matrix A, each odd number of the O matrix was used, thereby accounting for the retrograde-inversional relationship between matrices A and B. In example 3-27 however, Garant extracted 7 numbers per row of matrix “R”, and thus filled his 6 x 12 matrix E during the second-to-last rows of R, and so matrices E and F are necessarily different. In matrix E, for example, the last row (1, 6, 5, 4, 6, 5) consists of the (1, 6, 5, 4) of the third row of the R matrix, moving from right to left, and the (6, 5) of its second row, moving from left to right. The remaining numbers of the second and first rows of the “R” matrix are superfluous and do not appear in E.

Dynamics / Intensités

Intensité a et b)	1	2	3	4	5	6	7
	<i>ppp</i>	<i>pp</i>	<i>p</i>	<i>mf</i>	<i>f</i>	<i>ff</i>	<i>fff</i>

c)	2	4	6	8	10	12		12	10	8	6	4	2
	<i>ppp</i>	<i>pp</i>	<i>p</i>	<i>mf</i>	<i>f</i>	<i>ff</i>		<i>pp</i>	<i>p</i>	<i>mf</i>	<i>f</i>	<i>ff</i>	<i>fff</i>

1	6	4	3	8	2	9	5	7	11	10	12
6	9	5	4	3	1	12	10	2	8	11	7
4	5	6	1	2	3	10	9	8	7	12	11
3	4	1	2	7	8	5	6	11	12	9	10
8	3	2	7	12	11	4	1	10	9	6	5
2	1	3	8	11	7	6	4	12	10	5	9
9	12	10	5	4	6	7	11	1	3	8	2
5	10	9	6	1	4	11	12	3	2	7	8
7	2	8	11	10	12	1	3	9	5	4	6
11	8	7	12	9	10	3	2	5	6	1	4
10	11	12	9	6	5	8	7	4	1	2	3
12	7	11	10	5	9	2	8	6	4	3	1

7	5	2	6	4	3
1	3	2	1	4	7
5	6	7	3	2	5
6	1	4	6	4	5
3	1	2	7	5	6
1	4	3	2	7	2
3	1	7	6	4	5
2	1	3	7	6	4
5	5	6	1	4	7
2	3	3	4	1	2
7	5	6	7	3	2
1	6	5	4	6	5

substitute
dynamics

Clar

<i>fff</i>	<i>f</i>	<i>pp</i>	<i>ff</i>	<i>mf</i>	<i>p</i>
[<i>ppp</i>]	<i>p</i>	<i>pp</i>	<i>ppp</i>	<i>mf</i>	<i>fff</i>
<i>f</i>	<i>ff</i>	<i>fff</i>	<i>p</i>	<i>pp</i>	<i>f</i>
<i>ff</i>	<i>ppp</i>	<i>mf</i>	<i>ff</i>	[<i>mf</i>]	<i>f</i>
<i>p</i>	<i>ppp</i>	[<i>pp</i>]	<i>fff</i>	<i>f</i>	<i>ff</i>
<i>ppp</i>	<i>mf</i>	<i>p</i>	[<i>pp</i>]	<i>fff</i>	<i>pp</i>
[<i>p</i>]	<i>ppp</i>	<i>fff</i>	<i>ff</i>	<i>mf</i>	<i>f</i>
<i>pp</i>	<i>ppp</i>	<i>p</i>	[<i>fff</i>]	<i>ff</i>	<i>mf</i>
<i>f</i>	<i>f</i>	<i>ff</i>	<i>ppp</i>	<i>mf</i>	<i>fff</i>
<i>pp</i>	<i>pp</i>	<i>p</i>	<i>mf</i>	<i>ppp</i>	<i>pp</i>
<i>fff</i>	<i>f</i>	<i>ff</i>	[<i>fff</i>]	<i>p</i>	<i>pp</i>
<i>ppp</i>	[<i>ff</i>]	<i>f</i>	<i>mf</i>	<i>ff</i>	<i>f</i>

1	6	4	3	8	2	9	5	7	11	10	12
6	9	5	4	3	1	12	10	2	8	11	7
4	5	6	1	2	3	10	9	8	7	12	11
3	4	1	2	7	8	5	6	11	12	9	10
8	3	2	7	12	11	4	1	10	9	6	5
2	1	3	8	11	7	6	4	12	10	5	9
9	12	10	5	4	6	7	11	1	3	8	2
5	10	9	6	1	4	11	12	3	2	7	8
7	2	8	11	10	12	1	3	9	5	4	6
11	8	7	12	9	10	3	2	5	6	1	4
10	11	12	9	6	5	8	7	4	1	2	3
12	7	11	10	5	9	2	8	6	4	3	1

1	6	5	3	2	5
7	7	2	1	3	4
5	6	4	5	6	1
2	3	7	6	5	7
2	1	4	3	3	2
7	4	1	6	5	5
4	6	7	3	1	2
5	4	6	7	1	2
2	7	2	3	4	1
6	5	7	2	1	3
5	4	6	4	1	6
5	2	3	7	6	5

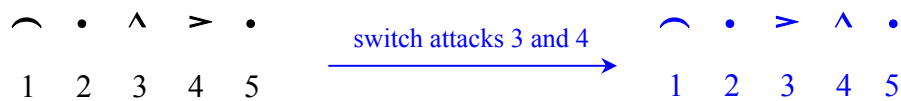
substitute
dynamics

Piano

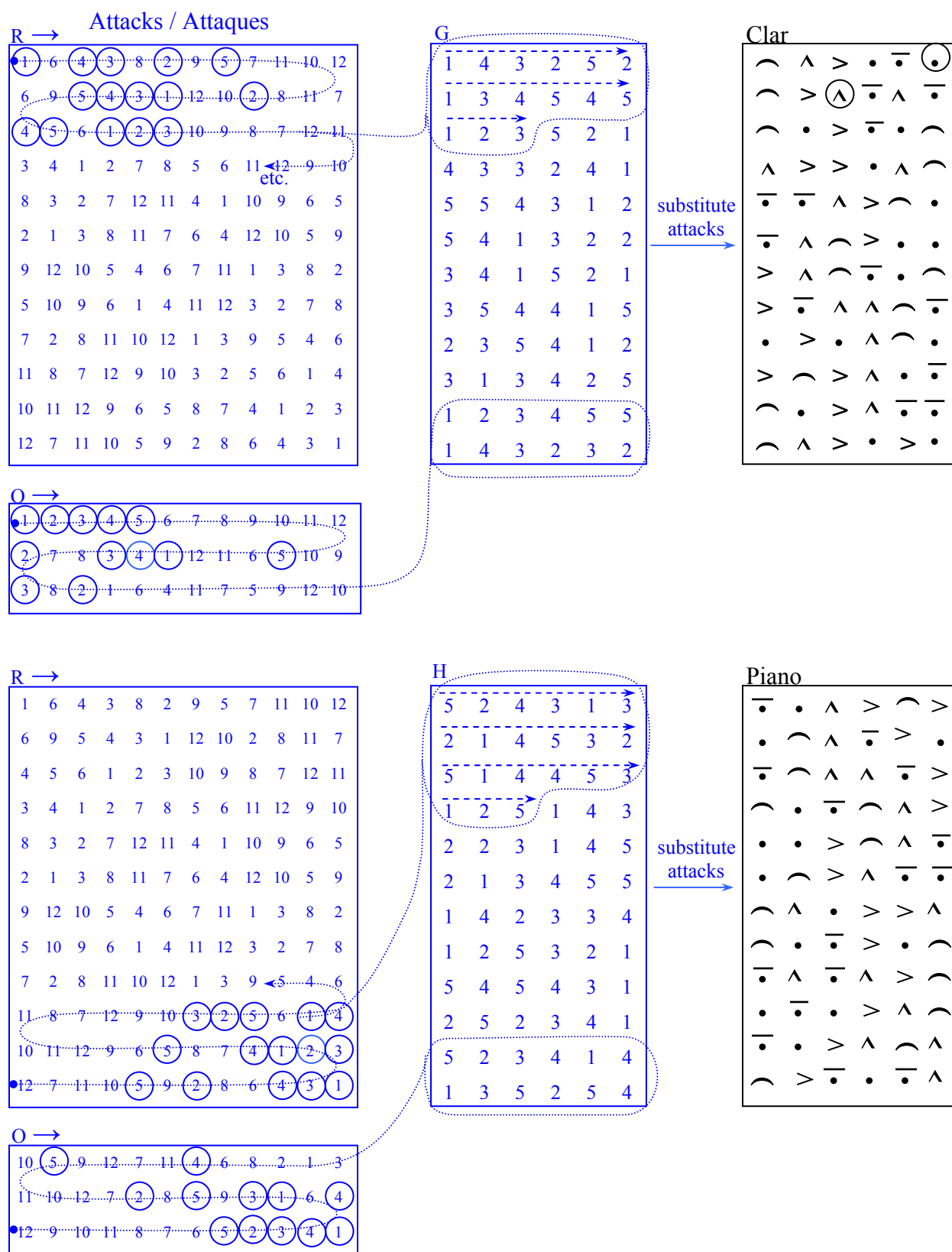
[<i>ppp</i>]	<i>ff</i>	[<i>mf</i>]	<i>p</i>	[<i>pp</i>]	<i>f</i>
<i>fff</i>	<i>fff</i>	<i>pp</i>	<i>ppp</i>	<i>p</i>	<i>f</i>
<i>f</i>	<i>ff</i>	<i>mf</i>	<i>f</i>	<i>ff</i>	<i>ppp</i>
<i>pp</i>	<i>p</i>	<i>fff</i>	<i>ff</i>	[<i>f</i>]	<i>fff</i>
<i>pp</i>	<i>ppp</i>	<i>mf</i>	<i>p</i>	<i>p</i>	<i>pp</i>
<i>fff</i>	<i>mf</i>	<i>ppp</i>	<i>ff</i>	<i>f</i>	[<i>f</i>]
<i>mf</i>	<i>ff</i>	<i>fff</i>	<i>p</i>	<i>ppp</i>	<i>pp</i>
<i>f</i>	<i>mf</i>	<i>ff</i>	<i>fff</i>	<i>ppp</i>	[<i>pp</i>]
<i>pp</i>	<i>fff</i>	<i>pp</i>	<i>p</i>	<i>mf</i>	<i>ppp</i>
<i>ff</i>	<i>f</i>	<i>fff</i>	<i>pp</i>	<i>ppp</i>	<i>p</i>
<i>f</i>	[<i>mf</i>]	<i>ff</i>	<i>mf</i>	<i>ppp</i>	<i>ff</i>
[<i>f</i>]	[<i>pp</i>]	<i>p</i>	<i>fff</i>	<i>ff</i>	<i>f</i>

Example 3-27: The creation of a dynamics series through a weaving extraction pattern applied to the “R” matrices in *Asymétries no 2* (1959)

Like the dynamics indicated in matrices E and F in example 3-27, the attacks for *Asymétries no 2* are also sketched lightly above individual series duration numbers in matrices A and B (example 3-28). Again, they have been separated here for clearer explanation. The file for *Asymétries no 2* does not contain a scale of dynamics for this specific piece, but there is a closely-related unmarked scale from another piece included in the file that is shown below in black (example 3-28a). It applies to *Asymétries no 2* if one switches the dynamics associated with values 3 and 4, as shown in blue. The extraction process that gives rise to the 6 x 12 clarinet matrix G and the piano matrix H is the same as the one for the dynamics (example 3-27). The only difference is the use of digits 1 to 5 instead of 1 to 7. Where the dynamics scale of 7 numbers left superfluous digits, this attack scale of 5 increments overruns the R matrix. Garant solved this problem by continuing into the O matrix, reading top-down in the clarinet, and bottom-up in the piano, which corresponds to their original top-down and bottom-up weaving of the original “R” matrix.



Example 3-28a: An attack scale at left (black) found in the archival file for *Asymétries no 2* that Garant must have modified slightly for this composition (blue)



Example 3-28b: Calculating attacks, from a scale of 1 to 5, through extraction, *Asymétries no 2*

Clarinet in B \flat

Piano

Cl.

Pno.

9 ♩ / 1 = \smile RXII

11 ♩ / 4 = \wedge OIX

3

5

8^{va}

fff

f

ff

p

[OI] RII [OIII] OIV [RV]

1 ♩ 3 ♩ 5 ♩ / (4 = \wedge) 7 ♩ / 3 = \succ 9 ♩ / (1 = \smile)

(5 = $\overline{\cdot}$) 2 = \bullet

7 ♩ / 3 = \succ 5 ♩ / 2 = \bullet 5 ♩ 1 ♩ (1 ♩) 3 ♩ / 3 = \succ 9 ♩ / 4 = \wedge

3

tr

RX

OIX

RVIII

OVI [RVI]

OIV

RII

pp

ff

mf

p

ppp

p

f

mf

pp

f

fff

3

3

RVII

RVIII

RVII

RVIII

9 ♩ cont. 11 ♩ / 3 = \succ (add $\overline{\cdot}$ \wedge \smile) 9 ♩ / 2 = \bullet

Example 3-29: Serial analysis of *Asymétries no 2* (1959), mm. 1-5

9 ♩ cont. 5 ♩ / 5 = $\overline{\cdot}$ 7 ♩ / 4 = 11 ♩ / 5 = $\overline{\cdot}$

Cl. 6 *ppp* *fff*

Pno. *fff* *ppp* *(pp)* *ppp* *p* *(p)* *mf*

OIX RX OXI RXII OIX

9 ♩ cont. 5 ♩ / 1 = \sim 11 ♩ / 4 = \wedge (add $\overline{\cdot}$) 1 ♩ / 5 = $\overline{\cdot}$ 3 ♩ / 2 = \cdot 7 ♩ / 2 = \cdot

11 ♩ cont. 5 ♩ / 1 = \sim 9 ♩ / 2 = \cdot

Cl. 9 *f* *ff*

Pno. *(mf)* *mf* *(mf)*

RX OV RVI

7 ♩ cont. 3 ♩ / 5 = $\overline{\cdot}$ 1 ♩ / 1 = \sim 11 ♩ / 4 = \wedge

Example 3-29, cont.: Serial analysis of *Asymétries no 2*, mm. 6-10

Chapter 4: Clermont Pépin

4.1 In Paris: *Suite pour piano* (1951-55), *Guernica* (1952) and *Le Rite du soleil noir* (1955)

Clermont Pépin's early student compositions were highly advanced for a young musician owing to his extensive and diversified training, both inside and outside of Québec, from a fairly young age. His harmonic language and wide use of contrapuntal procedures were solidly rooted in the compositional idiom of the late-Romantic Germanic tradition. These earlier studies undoubtedly made him reluctant to change his compositional aesthetic, as opposed to his classmate Serge Garant, whose adoption of modernist features evolved much more rapidly.

Although Pépin arrived in Paris in 1949, it was not until the *Suite pour piano*, composed in 1951 and revised in 1955, that we see a shift towards the contemporary music of the composers with whom he was studying in France: Messiaen (1949-52); Arthur Honegger (1949-52); and André Jolivet (1949-55). The first movement of the *Suite*, in F minor, has a palindromic ABACABA form that recalls Honegger's love of symmetrical forms, including arch and reverse-recapitulation models that Pépin explained through architectural metaphor:

The re-exposition of the order A followed by B is illogical, showing as it does, a defect in symmetry. In architecture you have a façade, the two left pillars of which, for instance, are arranged so that A is followed by B [...] Symmetrically, then, you must have B followed by A in the recapitulation since you had A followed by B in the exposition.¹⁸⁸

The 16-measure theme of the A section combines Honegger's manner of motivic sequencing but casts it within Messiaen's synthetic modal framework (Honegger himself shied away from synthetic modes in favour of diatonic and pan-diatonic ones). The first 8 measures of the A theme is reproduced in example 4-1. Its first four measures of tonic pedal underlying the

¹⁸⁸ Keith Waters, *Rhythmic and Contrapuntal Structures in the Music of Arthur Honegger*, Burlington, VT: Ashgate Publishing Ltd., 2002, p. 28. Originally published by Paul Landormy, "Arthur Honegger," trans. Red Rothwell, *The Musical Times* (Sept 1929): p. 789. The translation above is by Geoffrey K. Spratt and found in his book *The Music of Arthur Honegger*, Cork: Cork University Press, 1987, p. 68.

progression I – V – Ger+6 – V⁷ – I (reduced on the bottom staff) fall just outside of Pépin’s prior harmonic comfort zone in their exploration of extended harmonies and increased chromaticism.

The image displays a musical score for 'Allegro Leggiero' from *Suite pour piano* (1951, rev. 1955), measures 1-9. It consists of two systems, each with a 'piano' staff and a 'reduction' staff. The key signature is F minor (three flats). The first system's reduction includes a bracketed section with the following harmonic analysis: F minor: I (ped) V Ger+6 (5/3) V 7 (b9/b5) I. The second system's reduction features three distinct harmonic regions: 'mode 1 (whole tone)' (measures 1-2, green dashed box), 'chromatic' (measures 3-4, blue dashed box), and 'parallel 6ths' (measures 5-6, red dashed box). A red dashed line labeled 'mode 2 (octatonic)' spans from the beginning of the chromatic section to the end of the parallel 6ths section. The final harmonic analysis for the second system is V 7 of V VII 4+ (3) I.

Example 4-1: Traditional late-Romantic harmony followed by sequencing of symmetrical chromatic, mode 1 and mode 2 subsets in “Allegro Leggiero,” *Suite pour piano* (1951, rev. 1955), mm. 1-9

Measures 5 and 6 venture into new contrapuntal territory with their semitone, mode 1 (whole tone, bracketed in green) and mode 2 (octatonic, bracketed in red) fragments sequenced down a whole tone to form a non-functional succession that bridges the first four and last two tonal measures.¹⁸⁹

The B section of the same movement is comprised of a two-part stepwise bass ascent. The first part, shown in example 4-2, ascends from C₂ in m. 17 to C₃ in m. 32.¹⁹⁰ The beginning of the ascent is chromatic and begins with a C₂ in m. 16 that is followed by D_b in m. 17, D-natural, E_b in m. 18, and F_b in m. 19. This ic 1 movement encompasses the interval of a major 3rd, ic 4, before the pattern is broken with two successive ic 4 leaps from F_b to A_b in m. 19, and from A_b up to C₃ in m. 20. Through the combination of an ic 4 chromatic fill and two ic 4 leaps, the full octave from C₂-C₃ has been traversed. A second chromatic ascent, an octave higher than the first, commences from the C₃ in the left hand at m. 20. The right hand repeats its material from mm. 17-19 but transforms it by transposition up a fifth and invertible counterpoint: the single pcs A_{b2}, A-natural₂ and C₃ in m. 17 become the E_{b3}, E-natural₃, and G₃ of m. 21, while the E_{b3}/A_{b3} and E-natural₃/A-natural₃ dyads of m. 17 are inverted as the previous alto voice leaps up an octave above the soprano. This second chromatic rise ends when the bass leaps down, again by ic 4, to the C_{b3} in m. 23 and we are returned to the last chromatic pcs attained by the initial

¹⁸⁹ Christoph Neidhöfer has pointed me to the similarity between the texture of the “Allegro Leggiero” shown in example 4-1 and Stravinsky’s Piano Sonata (1924). Pépin, whose Parisian studies were originally funded through his winning the Prix d’Europe as a pianist, most likely came across the piece as a performer. On p. 17 of his dissertation, Alan Freedman remarks that the stylistic combination of Shostakovich and Stravinsky in Pépin’s *Guernica* (1952) “gives the impression that Pépin must have come into contact with the music of the Russian composers early in his stay in Paris.” Kurt Stone has also noted the striking similarities to the Neo-Classical work of Stravinsky in Pépin’s early music in his review of “Music and Musicians of Canada,” *The Musical Quarterly* 53/3 (July 1967), pp. 440-452. Stone writes: “The same disc (Vol. I) contains the Symphony No. 2 by Clermont Pepin (b. 1926). This, too, is an exciting and tumultuous work. Its hectic opening movement, Toccata, reminds one of Prokofiev and Stravinsky, but is marked by enough originality to be entitled to consideration on its own merits.”

¹⁹⁰ I refer only to the octave designation of the upper pc in each left-hand octave, hence C₂ and not C₁. Accordingly, this upper pc is the one shown in the reduction.

climb, the E \flat and E \sharp in mm. 25 and 27 respectively, in their original register. In retrospect, mm. 19-25 insert parenthetical material that develops the previous gestures, within the larger-scale bass ascent of the entire passage.

16

piano

bass reduction

pp *cresc. poco* *a poco* *mf*

ic 4 ic 4

chromatic ascent outlining major 3rd / ic 4

chromatic ascent?

22

ic 4

ic 3 sequence

minor 3rd / ic 3

ic 3

chromatic ascent

mode 2¹ ascent or [01] x [0369]

28

ic 3

ic 3

ic 3

ic 3

sempre cresc.

Example 4-2: Chromatic and mode 2 ascending bass lines as structural delineators in Pépin's "Allegro Leggiero," *Suite pour piano*, mm. 17-32

The continuing bass ascent unfolds between mm. 25 to 32 from the $E\flat_2$ to C_3 within Messiaen's mode 2¹. The motivic outlines and leaps of ic 4 that occurred in mm. 16-23 are now replaced by ic 3. This interval class is more characteristic of the octatonic mode, considering its partitioning into two fully diminished seventh chords ic 1 apart: $[01] \times [0369] = [0134679T]$.¹⁹¹ Pépin uses ic 3 as a decorative leap within mode 2 as a consonant skip within that mode. The prominence of ic 3 continues through two successive transpositions by ic 3, first in mm. 28-30 and then again in mm. 31-32. The sequenced material is gradually truncated until m. 32, where Pépin ends the mode 2 bass line and breaks the sequence by encircling the goal C_3 with lower and upper neighbouring tones, accenting the fourth through eighth beats of the measure, and thickening the right hand dyads into trichords.

Messiaen's mode 2 plays an important structural role, but the technical model for Pépin's form-delineating bass line and sequencing in example 4-2 may be found in Honegger's *Symphonie pour cordes* (1941-42). I believe that Pépin uncovered the finer details of Honegger's language as a result of Messiaen's analysis of his colleague's works and not as a result of any

¹⁹¹ Pierre Boulez, *Boulez on Music Today*, trans. Susan Bradshaw and Richard Rodney Bennett. Cambridge, Mass.: Harvard University Press, 1971, p. 39. Boulez puts forth that "if the ensemble of all of the complexes [a series of chords] is multiplied by a given complex [a single chord], this will result in a series of complexes [chords] of mobile [varying] density, of which, in addition, certain constituents will be irregularly reducible." For example, Boulez would take a major chord (C, E, G) and multiply it by the pitches (D, F), meaning that he would add to the first set its transpositions to each of the pitches of the second, obtaining the resulting nine-member set (C, E, G) + (D, F# A) + (F, A, C).

Richard Cohn later referred to this multiplicative process as *transpositional combination* in his article "Inversional Symmetry and Transpositional Combination in Bartok," *Music Theory Spectrum* 10 (1988): 19-42. On p. 29 of his article, Cohn combines the prime forms of dyads (F, F#) and (A, A#) using the notation $1 * 4 = 4-8$, meaning that the prime forms $[01] \times [04] = \text{set class } 4-8$. My notation is closer to Cohn's but maintains the value "0" in order to remember the retention of all of the original pcs represented by the "0." I also maintain the "x" multiplication sign in reference to Boulez's original use of the technique, and I write the complete resulting set-class constituents instead of using Forte set-class labels. Hence, $[01] \times [0369] = [0134679T]$, where $T = 10$ and $E = 11$.

Boulez originally used his multiplication technique to obtain chords of varying density, and indeed, Serge Garant uses the technique in this way (discussed briefly in the conclusion). However, I find it especially appealing to invoke it to describe the self-generation of synthetic modes or twelve-tone rows in this way, as it conveys the combinatorial symmetrical thinking behind the generation of these larger collections and series by Messiaen, Pépin and Prévost. In fact, Boulez himself defined the twelve-tone series on p. 35 of this same book as "the germ of a developing hierarchy [...] with a view to organizing a FINITE ensemble of creative possibilities [...] This ensemble of possibilities is deduced from an initial series by a FUNCTIONAL generative process. [...]"

help from Honegger himself. It may seem unlikely that Pépin would learn about the technique of Honegger through the analytical lens of Messiaen, especially since he was studying with Honegger and Messiaen concurrently. As Jean Boivin explains, Honegger was quite sick at the time. Pépin felt that Honegger “wasn’t very interested in the technical aspects of the works that he [Pépin] presented; he [Honegger] chose to limit his commentaries to a rather general level. Deeply pessimistic, he came across as rather hard on his students, to the point of inclining them towards not placing any hope in their compositional careers.”¹⁹² Boivin continues that by contrast, Messiaen’s classroom was greatly stimulating for Pépin and there he found new inspiration for his own technical development.¹⁹³

After noting a connection between Honegger’s *Symphonie pour cordes* and the excerpt from Pépin’s *Suite pour piano* in example 4-2, I consulted Boivin’s detailed records of the syllabi for Messiaen’s class. While in attendance at the Conservatoire, Messiaen very rarely presented Honegger’s work at all; he taught *l’Antigone* (1926) in some private lessons during the years 1941-46, *Judith* (1925) as part of his 1947-1948 class, and most notably, covered a veritable treasure chest of Honegger’s music in 1950-51 when Pépin was in attendance. The syllabi included *Pacific 231* (1923), *Rugby* (1928), and excerpts from *Symphonie pour cordes* and *Jeanne d’Arc au bûcher* (1935).¹⁹⁴

In his book *Rhythmic and Contrapuntal Structures in the Music of Arthur Honegger*, Keith Waters discusses Honegger’s propensity for articulating points of structural arrival through

¹⁹² Boivin 1996, p. 85. Original French: “L’auteur du Roi David était déjà très malade—il devait mourir en 1955—et, au dire de Pépin, ne s’intéressant que très peu à l’aspect technique des œuvres qu’on lui présentait; il se bornait volontairement à des commentaires d’ordre assez général. Profondément pessimiste, il se montrait parfois assez dur avec ses élèves, au point de les inciter à ne placer aucun espoir dans la carrière de compositeur. Le jeune Pépin pourra bientôt constater que l’atmosphère à la classe de Messiaen est très différente.”

¹⁹³ Ibid, p. 85.

¹⁹⁴ Boivin 1995, pp. 434-435.

the device of chromatic ascent in *Symphonie pour cordes*.¹⁹⁵ He notes the role of Honegger's sketches as template, writing:

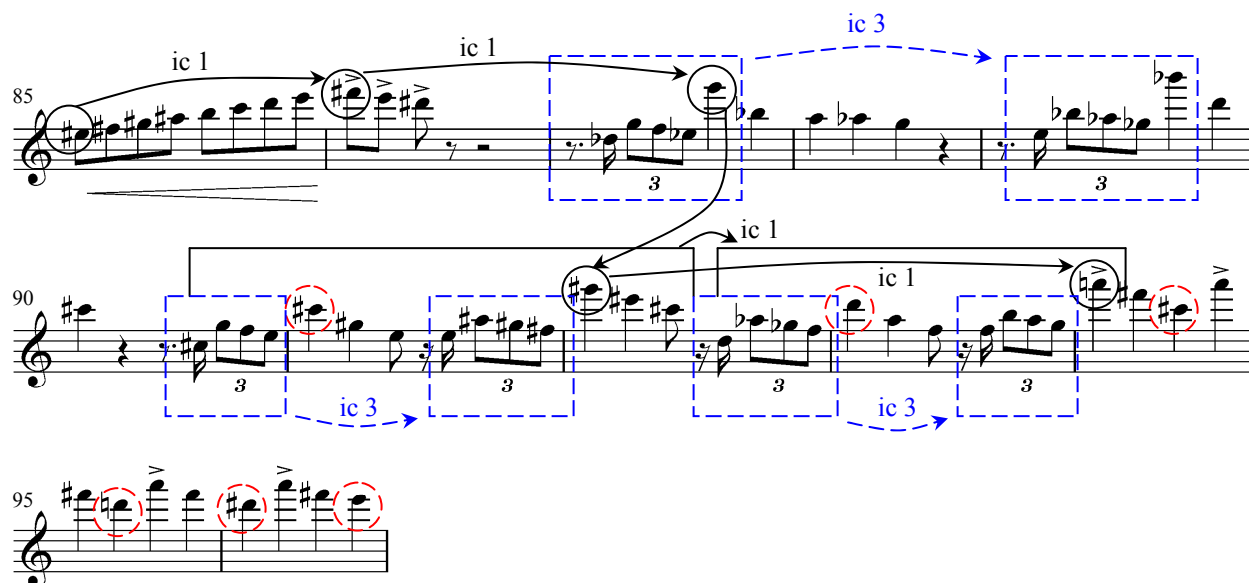
The strategy of articulating arrival points through chromatic ascent or inversional symmetry is corroborated by the sketches. In fact, the sketches reveal that certain approaches to structural points are calculated through a simpler background which then becomes elaborated in the composition.”¹⁹⁶

Waters outlines a gradual chromatic ascent in the first violin of the *Symphonie pour cordes* from an E₅ in m. 85 to an A₆ in m. 94. In example 4-3 below, I have extracted the violin 1 part from his analysis and circled, in black, the pcs involved in the ic 1 ascent and connected them with black arrows. As the other coordinating string parts also ascend by ic 1, Waters next draws a correlation between the local ic 1 trajectory in the first violin and a more structurally removed 2-measure sequence utilising that same interval from mm. 90-92 and 92-94. I have bracketed this sequence, also in black, in the example. In examples 4-2 and 4-3, both Pépin and Honegger took a structural interval of ascent and repurposed it as an interval of sequential repetition: in example 4-2, ic 3 serves this function; in example 4-3, Waters and I both show, respectively, that ics 1 (shown in black) and 3 (blue) function in this capacity.

Pépin was not only an accomplished composer, but clearly an excellent analyst in his own right as we shall see in his careful study of Berg's *Lyrische Suite* and in his teaching of Messiaen's techniques to student André Prévost, which will be examined in due course. For this reason, his interpretation of Honegger's techniques sheds additional light on the technical subtleties of the passage in example 4-3.

¹⁹⁵ Waters 2002, pp. 150-155. I wish to note that Waters' analysis was undertaken to demonstrate that “these sort of ic1 ascents seemed to form an important aspect of dramatic pacing for Honegger, often working in tandem with contrapuntal and rhythmic density” (personal communication 10 July 2010). As such, I kindly suggest that interested readers refer to his text for a full appreciation the subtleties of his argument in its original context.

¹⁹⁶ Ibid, p. 193.



Example 4-3: chromatic ascent and sequence in Honegger's *Symphonie pour cordes* as analysed by Keith Waters (in black) and myself (in blue)

Waters describes the E₅ as part of the chromatic ascent based on the fact that in the earliest drafts, it was initially placed in the same register as the ascent from F₆ to A₆. My own analysis of Pépin's interpretation of this technique suggests a second possible reading. Honegger may have changed his mind early on and purposely placed the E₅ in a lower register to launch the E₅-F₆ heightening scale that announces the first appearance of the triplet-containing motive in m. 86 (boxed in blue). It is this triplet motive that characterises and unifies mm. 86-94. In example 4-2, the subtle registral shifts may at first seem to be part of a chromatic ascent, but in the larger scheme of things, are merely false starts of the real thing (as in the case of the second ascent from the pitch C₂ in m. 20 of example 4-2 that jumps register to C₃) or continuations of a previously abandoned process (as is the E₂ in m. 25 of that same example).

Thus, if one disregards the E₅ in example 4-3 as a “false start,” the remaining pcs, F₆ to A₆ outline an ic 3, the same interval class that Pépin chose to use as a “consonant skip” or embellishing composing-out of his primary structural ascent. Here Honegger appears to do the same through a second chromatic outline unfolding in the alto register of the same instrument. The C₆ goal of the penultimate motivic triplet in m. 90, circled in red on the downbeat of m. 91, attempts to initiate its own climb as it moves to D₆ in m. 93, fails, and then restarts its ascent in m. 94 climbing up a minor third (ic 3) to E₆ in m. 96. Just as in Pépin’s sequence, the interval of transposition here, between the triplet figures, is a minor third (ic 3) indicated with dotted blue boxes. This first occurs between mm. 87 and 89, and next embedded in the following sequence by ic 1 mentioned by Waters, as the interval of transposition between the triplet figures in mm. 90 and 91, and those in mm. 92 and 93.

The second movement of Clermont Pépin’s *Suite pour piano* is a quasi-serial yet pc-centric fantasy based on encryption. While the more diatonic leanings of the first and third tonal and polytonal movements suggest they were part of the original 1951 edition, this second movement was most likely part of the “revision” made in 1955. This view is supported by the fact that Pépin was admittedly hesitant to write atonal and serial music. He only began integrating these elements into his work around 1955 as he began composing his *Variations pour quatuor à cordes*, discussed later in this chapter. Furthermore, “Fantaisie en hommage à Arthur Honegger” clearly refers to Honegger’s death in 1955.¹⁹⁷ Pépin includes the encrypted version of the name “Arthur Honegger” at the top of the first page of the movement. He presented his

¹⁹⁷ Shenton 2008, p. 76. Shenton describes a long French musical history of commemorative *Tombeaux* composed in commemoration of deceased musicians in his book *Olivier Messiaen’s System of Signs*, p. 76. As Shenton notes, further information about the use of encryption in tombeaux is available in the dissertation of Thomas Daniel Schlee, “Olivier Messiaen: *Méditations sur le Mystère de la Sainte Trinité*,” Ph.D. dissertation, University of Wien, 1984.

teacher's name both forward and in retrograde, as shown in example 4-4 below. The composer stressed that the G_{b4} may also be spelled as $F\sharp_4$, which I have indicated with a blue arrow.

The image shows a musical staff with two systems of notes. The top system is for the name 'ARTHUR HONEGGER' and the bottom system is for its retrograde 'R E G G E N O H R U H T R A'. Each letter is represented by a specific pitch and accidentals. A blue arrow points to the G in 'HONEGGER' and another blue arrow points to the G in 'R E G G E N O H R U H T R A'.

Example 4-4: Cipher at the top of Pépin's "Fantaisie en hommage à Arthur Honegger," from *Suite pour piano*

Pépin used a basic algorithm to calculate the pcs associated with each letter. This is shown in example 4-5. After assigning the first 7 letters of the alphabet to the corresponding pcs A through G, he wrapped the remaining 19 letters onto those same seven pc names, in order, from left to right. The only exception appears to be his decision to interpret the "H" in "Honegger" as a $B\flat$. According to his cipher, H corresponds to the pc A. Pépin most likely made the decision to set the H as $B\flat$, considering it an $A\sharp$, in order to avoid additional emphasis on the pc A that was already present three times. Two of them occur in musically significant positions: the first and highest sounds. Since no pc is repeated immediately in the theme, the pc A corresponding to the letter "O" in Honegger would be highly repetitious if preceded by yet another A.

pitch	A	B	C	D	E	F	G
	A	B	C	D	E	F	G
	H	I	J	K	L	M	N
	O	P	Q	R	S	T	U
	V	W	X	Y	Z		

Example 4-5: Pépin’s encryption method for “Fantaisie en hommage à Arthur Honegger,” from *Suite pour piano*

According to Andrew Shenton, Honegger made similar idiosyncratic misspellings in his own encryption method for his *Hommage à Albert Roussel* (1929).¹⁹⁸ Shenton notes that in this piece, “Honegger misspells some of the letters, presumably to make it easy for the pianist to read,” but adds that by setting the cipher at the top of the score above the first system of music, the misspellings become interpretable.¹⁹⁹ In light of Honegger’s loose assignment of pc spellings and Pépin’s insistence on making the G \flat_4 and F \sharp_4 interchangeable for presumably the same performance reason as his teacher had, we might consider that Pépin also intended the “H” of Honegger, B \flat_4 , to be also understood as an A \sharp .²⁰⁰

¹⁹⁸ Shenton 2008, p. 75.

¹⁹⁹ Ibid.

²⁰⁰ Interestingly, neither Pépin nor Honegger chose to adhere to the Germanic cipher tradition, where *b* denotes B \flat , *h* refers to B-natural, and *s* stands for E \flat (the German “Es”). On p. 73 of his book, Shenton cites Malcolm Boyd’s *New Grove Dictionary of Music and Musicians* “B-A-C-H” article (ed. Sadie, vol. 1, pp. 877-8) in which the author suggests that the idea of a B-A-C-H cipher originated with the 1732 *Musikalisches Lexikon* by J.G. Walther. Only after that did Bach encrypt his own name in his Contrapunctus XIV of *Die Kunst der Fuge* (1750). Shenton notes that since then, “it was subsequently employed by many composers, writing in a wide variety of styles, among them J.L. Krebs, Schumann, Liszt, Reger, Busoni, Rimsky-Korsakov, d’Indy, Schoenberg, Webern and Dallapiccola.” Messiaen adopted Germanic cipher traditions in his *langage communicable* in his *Méditations sur le Mystère de la Sainte Trinité* (1969).

The third movement, “Danse Frénétique,” is polytonal and polymodal, making use of diatonic and modal scales, both natural and synthetic (example 4-7). The various centricities of Pépin’s carefully interwoven complex of tonalities and modalities slowly morph as the listener changes focus from one structural level to another. At the broadest level, the primary pc-collection of the movement, as a whole, is cemented by the repetitive left hand pattern that begins the dance and is boxed in orange: C-D \flat -D-E \flat -G-A-B \flat . This C-centric collection is grounded by a pounding C-G tonic-dominant arpeggiation of the bass. Its collection most closely resembles C-Phrygian, albeit with a raised 6th scale degree, but also resonates as a somewhat incongruous Dorian with its lowered 2nd degree. Listening to the bass alone, C minor and E \flat major harmonies are the most prominent, although due to the parallel motion of open fourths, one might also hear third-less C⁵ and E \flat ⁵ chords.

The right hand melody belongs in neither mode nor key but instead is comprised of a jumble of different small symmetrical sets. The intoned F \sharp_3 / F \sharp_4 in mm. 5-11, boxed in red, are symmetrically framed by their upper neighbour G \sharp (m. 8) and lower neighbour E-natural (m. 11). The symmetrical trichord is transposed by T₃ for its next iteration in mm. 13-20 on A₃ / A₄ (in blue) where it is compressed to and transformed into a chromatic [0123] tetrachord. The expected upper neighbour B₃ / B₄ is preceded by a passing A \sharp and followed by a skip down to G \sharp . The parenthesised D \sharp octaves in m. 20 fall outside of the collection and are a means through which the melody leaps into the upper octave for its next appearance on C₅ / C₆ in m. 21.

pp

Cm / C⁵ and EbM / Eb⁵ harmonies = [03]

C/Eb [03] + F#-centric whole tone / mode 1¹ = tonal centres T₀ [036]

p

simile

8

sf

C/Eb [03] + A-centric chromatic = T₉ [036]

p

15

ff

p

cresc.

ff

22

C-centric + T₂ [0369] = mode 2³

ff

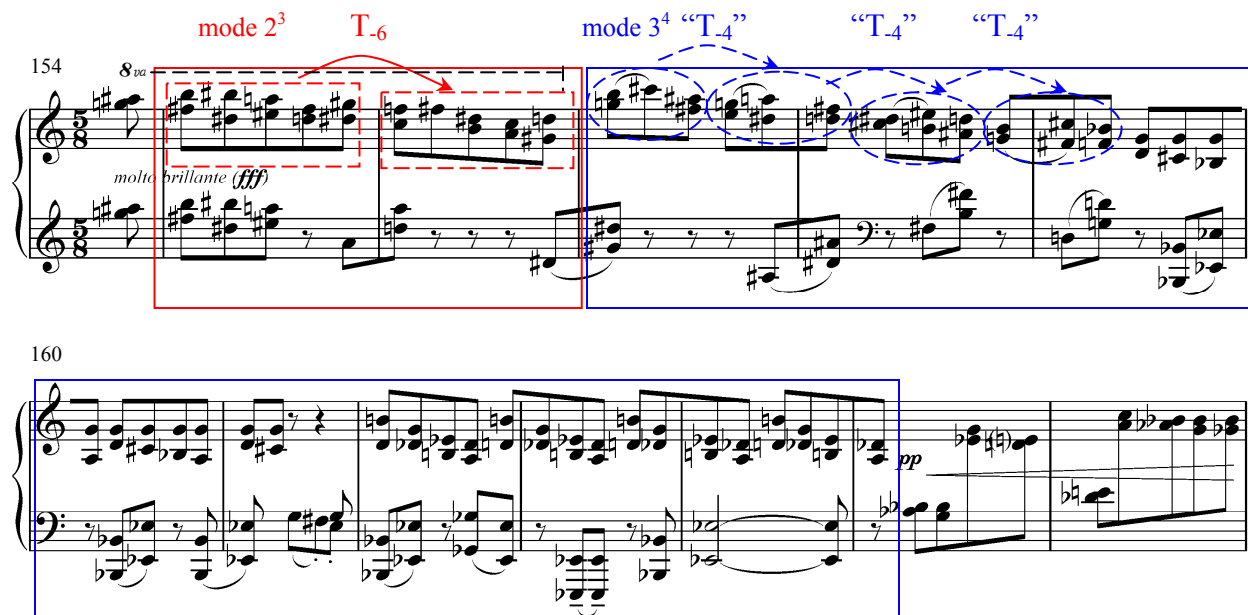
Example 4-7: Diatonic and modal collections, both natural and synthetic, in “Danse Frénétique,” *Suite pour piano*, mm. 1-28

By now, this melodic leap to the pc C is predictable by the pattern unfolding with the first two melodic intonations on F# and A, related by ic 3. These pcs, in combination with the C-Eb bass harmonies, also in an ic 3 relationship, yield a [0369] relationship. It becomes apparent that

this [0369] is the referential collection governing the ic 3 cycle of keys. However, just as Pépin expectedly begins the melody in m. 21 on C, up ic 3 from the previous A in m. 13, he throws the listener a curveball: a second accented [0369] collection (D, B, G#, F) that is first heard in mm. 23-24 and then again in mm. 27-28. When combined with the initial [0369] centric area, this second tetrachord is heard not only as a transposition of the first by T_2 , but also as completing the mode 2^3 octatonic collection.

The gradual emergence of mode 2^3 in example 4-7 foreshadows a brief but prominent excursion into modal territory from mm. 155 to 165, shown in example 4-8. This short segment is enclosed on either side by a sea of atonal chromatic material (not shown) yet ventures back into mode 2^3 (mm. 155-156), that same transposition of the octatonic mode first heard in mm. 23-24. The first measure of example 4-8 features a five-dyad pattern in the right hand that is immediately sequenced down T_6 in the next measure, highlighting the modal property of self-replication at the tritone.²⁰¹ Pépin then moves into mode 3^4 in mm. 157-159 where he utilises the triple symmetrical axes of that mode and its three internally symmetrical [012] subsets. The sequencing is not exact; hence the use of quotation marks and dotted arrows when denoting the “ T_4 ” succession. After the B_5 / G_5 dyad in m. 157 is replicated an octave lower at the end of m. 158, Pépin moves away from the three-dyad patterns and instead composes-out that dyad horizontally. It becomes the soprano tones of two ostinati patterns. The first pattern pits a static G_4 soprano against a descending mode 3^4 alto tetrachord, and the second is comprised of two descending tetrachords in that same mode.

²⁰¹ The alto $D\#_5$ on beat 2 of m. 155 is transposed to A_5 and written into the left hand and heard on beat 1 of m. 156. Also, the $D-D\#$ in the alto voice at the end of m. 155 is transposed in reverse order, becoming $A-G\#$ in the next measure.



Example 4-8: Sequence and ostinati within modes 2^3 and 3^4 in “Danse Frénétique,” *Suite pour piano*, mm. 155-166

The various degrees and types of tonality combined by Pépin throughout *Suite pour piano* again point to the influence of Honegger, who, according to Waters, blends “atonality, tonality, extended tonality, and polytonality, at times, all within a single composition.”²⁰² Meanwhile, the additional commixture of synthetic modes demonstrates that Pépin was keen to appropriate tools from more than one pedagogical source, then combine and rework them as part of his own developing compositional language.

He composed two symphonic poems in Paris: *Guernica* (1952) and *Le Rite du soleil noir* (1955). *Guernica* was inspired by Pablo Picasso’s painting of the Basque town of Guernica after it was bombed in 1937 by the Fascists during the Spanish Civil War.²⁰³ The second work is loosely based on Antonin Artaud’s “Tutuguri, ou Le Rite du soleil noir” from his radio play *Pour en finir avec le jugement de dieu*. According to Schuster-Craig, Artaud’s first drafts date back to

²⁰² Waters 2002, p. 2.

²⁰³ Schuster-Craig 1987, p. 13

1936 after his experience with the Tarahumara Indians. Pépin's manner of depicting the poem's ritualistic events is not directly narrative. Since these rituals were frequently carried out under the influence of the hallucinatory drug peyote, "both poem and music aim, rather, at suggesting a place or atmosphere, an atmosphere that is primitive, ritualistic, and violent."²⁰⁴

Both *Guernica* and *Le Rite du soleil noir* entwine the compositional techniques of Honegger and Messiaen. Stylistically, these pieces feature ostinati with shifting accents and mechanistically stuttering rhythms that are layered into multiple blocks of sound and juxtaposed like the pieces of a patchwork quilt. Because the textures are pitch-centric but harshly dissonant, the two symphonic poems evoke the "primitivism" of Stravinsky's *Le Sacre du printemps*. These qualities also pertain to some of the music of Honegger, particularly *Rugby*. Pépin studied *Le Sacre du printemps* under Messiaen's tutelage in his two first academic years in Paris (1949-50 and 1950-51). In the second year he also studied *Rugby* and was undoubtedly inclined towards Honegger's music as the comparison of *Suite pour piano* and *Symphonie pour cordes* in examples 4-2 and 4-3 has shown.

Pépin's *Le Rite du soleil noir* and Stravinsky's *Rite of Spring* both depict savage ritual, but the game of rugby is physically brutal in its own right. Honegger himself has said that while he liked football, he preferred rugby, because it is "more spontaneous, more direct and *closer to nature* than football. [...] For me the *savage, brusque, untidy and desperate* rhythm of rugby is more attractive."²⁰⁵ Noted Honegger scholar Geoffrey K. Spratt has said of *Rugby* that "the *virility and organic force* of the rhythmic structures [...] are combined with a degree of syncopation and cross-play that, whilst being Stravinskyian in origin, is peculiarly his own [...]."²⁰⁶

²⁰⁴ Schuster-Craig 1987, pp. 36-38.

²⁰⁵ Geoffrey K. Spratt, *The Music of Arthur Honegger*, Cork: Cork University Press, 1987, pp. 148-9. Emphasis mine.

²⁰⁶ Spratt 1987, p. 150. Emphasis mine.

bassoon
 mode 3²

cello/bass
 mode 2³

Snippets of the theme reappear in stretto near the end of the movement, immediately before transitioning into the second, “Marche Funèbre” (example 4-10). Four combined mode 2² fragments are part of this intermediate transformational stage. The thematic material is first split between the celli/bass who initiate part 1 of the theme on B \flat beginning in m. 279, and horns 1 and 2 who complete the second part of that same statement from mm. 283 to 287. The celli/bass initiate the theme once more in m. 283, and upon the dramatic arrival of an open fifth G/D in m. 290, the trumpets/trombones perform part 2 on B.

chord quality: + + + + + + + +
inversion: 6 6 6 6 6 6 6 6
4 3 4 3 4 3 4 3

279

cells/bass: theme, part 1

horns 1&2: continuation of theme, part 2

285

cells/bass: theme, part 1

trumpets and trombones 1&2: theme, part 2

Example 4-10: Reduction of mode 2^2 thematic fragments (blue) and cascading woodwind mode 2^2 scales (red) in *Guernica*, mvt. 1, mm. 279-293

The theme completes its modal transformation in mm. 3-6 of the third and final movement, “Marche Militaire,” where both the theme and its accompaniment ostinato arrive on mode 2^1 (example 4-11). Over the course of the three movements, the accompaniment in these examples also undergoes a transformational process, systematically winding back through all three possible mode 2 transpositions and effectively sinking a semitone at the beginning of each movement.



Example 4-11: Reduction of the mode 2¹ theme in the bassoon and accompaniment in the cello/bass, *Guernica*, mvt. 3, mm. 3-6

The second of these three thematic zones borrows most heavily from Messiaen's oeuvre. The woodwind cascade in example 4-10 contains pianistic mode 2² block chords that begin in a high register and descend by half and whole steps through several octaves in even eighth notes, with the exception of the lowest quarter-note voice in the reduction that moves by minor thirds. This waterfall effect is strikingly similar to mm. 37-9 (reh. 6) of Messiaen's *Turangalila Symphony* (example 4-12).²⁰⁷ Given the historical context, the evidence for this specific influence is quite strong. *Guernica* was completed in 1952 and won first prize in a competition celebrating the centenary of Laval University in Québec City that same year.²⁰⁸ Presumably, Pépin composed the bulk of the work during 1951 and perhaps started sketching even earlier. According to Jean Boivin's compilation of Messiaen's course outlines, the *Turangalila Symphony* was the only piece composed by Messiaen himself that he chose to analyse with his students in the 1950-51 academic year.²⁰⁹

²⁰⁷ Messiaen's *Harawi*, studied by his class during the 1951-52 year, also begins with four measures of the same voice-leading pattern in mode 2¹. However, the much slower speed (approximately eighth note = 60) produces a very different effect than the one discussed here in *Guernica*.

²⁰⁸ Laval University was actually founded in 1663 by Monseigneur François de Laval (the first bishop of New France) under the auspices of the King of France, Louis XIV. Originally called the Séminaire de Québec, it was renamed Université Laval in 1852, and it is the centenary of this event that was observed in 1952.

²⁰⁹ Boivin 1995, pp. 437-438.

chord quality: + - + - + - + -
inversion: 6 6 6 6 6 6 6 6
 4 3 4 3 4 3 4 3

mode 2²
winds

mode 4⁶
strings

Example 4-12: Mode 2² and mode 4⁶ descending scales in woodwinds and strings in the “Introduction” of Messiaen’s *Turangalila Symphony* (1948), reh. 6, mm. 37-39

Aside from the fact that Pépin’s eighth notes and Messiaen’s sixteenths differ visually in the scores, they sound very similar in performance. Pépin’s example contains a repetitive pattern of parallel descending major chords in alternating second and first inversions, as shown within the boxes. Messiaen, on the other hand, changes the quality of first inversion triads from major to minor (also boxed). If Pépin had split each of his quarter notes in the bottom voice into two eighth note scale steps, he would have created alternating major and minor chord qualities as Messiaen has done. Because both examples are so brisk in speed, the chordal runs sound almost identical.

For the analysis of passages like the one in example 4-12, Christoph Neidhöfer has proposed measuring intervallic relationships within modes according to the number of scale steps traversed, rather than the number of chromatic semitones, as is normally done within an atonal or serial modular-12 context.²¹⁰ In example 4-13, the mode 2² collection reproduced is considered as a modular-8 [or mod 8] system in which each unique pc is assigned a *step class* number from

²¹⁰ Christoph Neidhöfer, “A Theory of Harmony and Voice Leading for the Music of Olivier Messiaen,” *Music Theory Spectrum* 27:1 (2005): 1-34.

0 to 7 according to the scale's ascending pattern (C# = 0, D = 1, E = 2, etc., continuing to B = 7).

Step class intervals are the distance between any two step classes.

mode 2-2

SC: 0 1 2 3 4 5 6 7 0 SCS: {1,4,7} {5,0,3}

INF: (233) (233)

Example 4-13: The step classes (SC) of mode 2² and the step class sets (SCS) and interval normal forms (INF) of the first chords of *Guernica* and the *Turangalîla Symphony*

Example 4-14 compares Messiaen's and Pépin's block chords after inserting the "missing" scale-steps in *Guernica*'s lowest voice, indicated with parentheses. According to this method then, the single scale steps of the minor and major second of mode 2² in example 4-12 are equivalent. The solid arrows in example 4-14 indicate a downwards voice leading by successive step class intervals of -1 within the context of the alternating semitones and tones of the mode 2 collection. When we include the parenthesised pcs in *Guernica*'s lowest voice and the new voice leading created between actual and inserted pcs shown with dotted arrows, each of the three voices conforms to a parallel stepwise voice leading of -1.

Turangalila woodwinds SCI

SCS: {5,0,3} {4,7,2} {3,6,1} {2,5,0} {1,4,7} {0,3,6} {7,2,5} {6,1,4} {5,0,3} {4,7,2} {3,6,1} {2,5,0}

INF: (233) —

T₋₆ or SCI₋₄

Guernica woodwinds SCI


etc.

Example 4-14: Comparing the mode 2² voice leading in terms of step class intervals (SCI), harmonic step class sets (SCS) and interval normal forms (INF) between Messiaen's *Turangalila Symphony* and Pépin's *Guernica*. The boxed common chords indicate that Messiaen's passage maps onto Pépin's when transposed down by 6 semitones (T₋₆) or 4 step class intervals (SCI₄).

Neidhöfer then defines a *step class set* as the collection of unordered step classes within a chord. In example 4-13, these step class sets (SCS) can all be reduced to Forte set-class {0,3,7}, making them members of the same step class set class and harmonically equivalent in terms of spacing within mode 2, regardless of their alternating major and minor chord qualities. The two passages in example 4-14 map onto, or replicate, one another. Messiaen commences on a C# major triad, step class set {5,0,3}, while Pépin starts on a G major chord, step class set {1,4,7}, creating an overlap of four common chords within the dotted box. Because the two passages lie precisely half an octatonic scale apart, we can transpose either passage by six semitones (T₆) or 4 step classes to overlap them completely.

Following Regener, Neidhöfer considers the interval normal form (INF) as an elegant alternative notation to the normal form commonly used in pitch-class set theory in that the most compact arrangements of the SCSs (most packed to the left) can be found via simple rotation of the adjacent step-class intervals. In example 4-13, for instance, one can see that both chords have the same INF (233). Returning to example 4-14, note that all of the chords created through the mode 2 scales belong to INF (233). The idea of defining chords by their INF is most useful when comparing harmonic structures occurring in different modes (of the same cardinality) as the voice-leading patterns projected onto two different modes may be isomorphoric. This is illustrated by examples 4-15 and 4-16 that analyse the strings harmonies in mode 4⁶ that are heard concurrently along with the mode 2² woodwinds in the fragment of Messiaen's *Turangalîla* Symphony in example 4-14. Example 4-15 shows the SCs, SCSs and INFs of the chords in example 4-16. Notice that the same uniform descending stepwise progression found in example 4-14 is also used here, only this time in mode 4.

mode 4⁶



SC: 0 1 2 3 4 5 6 7 0 SCS: {0,2,4,7} {2,4,7}

INF: (1223) (233)

Example 4-15: The step classes (SC) of mode 4⁶ and the step class sets (SCS) and interval normal forms (INF), used in the strings of Messiaen's *Turangalîla* Symphony, mm. 37-39

Each of the four string lines in example 4-16 moves by step class intervals of -1 within mode 4⁶, just as the winds did in their own respective mode 2. The INF (1223) of the string

chords takes into account the four distinct step classes in each chord. When we remove the bottom voice of each string chord (shaded) the remaining three voices share only two chords with the corresponding woodwind parts if we consider only their sound within a mod 12 chromatic context: a minor chord in second inversion followed by a major chord in first inversion. Its remaining two harmonies are quartal. The $\{0,3,6\}$ spacing in the winds can be understood as a rotation of the INF ((233) rotated to (332)). Hence the chords in the winds belong to a subset class of the step-class set class of the chords in the strings ((233) forms a subset of (1223)).

chord quality							
of $\uparrow 3$ staves:	—	+	quartal	quartal	—	+	quartal
inversion:	6	6	—	—	6	6	—
	4	3	—	—	4	3	—

Turangalila strings

complete SCS: $\{0,2,4,7\}$ $\{7,1,3,6\}$ $\{6,0,2,5\}$ $\{5,7,1,4\}$ $\{4,6,0,3\}$ $\{3,5,7,2\}$ $\{2,4,6,1\}$ $\{1,3,5,0\}$

complete INF: (1223) — — — — — — — — — —

$\uparrow 3$ staves SCS: $\{2,4,7\}$ $\{1,3,6\}$ $\{0,2,5\}$ $\{7,1,4\}$ $\{6,0,3\}$ $\{5,7,2\}$ $\{4,6,1\}$ $\{3,5,0\}$

$\uparrow 3$ staves INF: (233) — — — — — — — — — —

Example 4-16: Upper three string parts (the fourth is shaded) *Turangalila Symphony*, m. 38

In his dissertation “Compositional Procedures in Selected Works of Clermont Pépin (1926-),” John Schuster-Craig notes that “the most important element of pitch organisation in *Guernica* is Pépin’s extensive use of the octatonic mode.”²¹¹ I would add to this observation that Pépin often combines several modes and their transpositions and makes each audible by careful orchestration. Each mode or modal transposition is used contrapuntally and assigned to a specific instrument or instrumental family. Just as in example 4-12 that shows how in the *Turangalîla Symphony* Messiaen divided modes 2 and 4 between winds and strings respectively, Pépin similarly projects modes 2 and 4 in the winds and brass while additionally asserting the mode 1 and chromatic collection in the celli and bass. Immediately after the theme of the first movement is first heard in mm. 12-16 (example 4-9 above) its characteristic repeated notes and upper neighbours are sequenced in the woodwinds to accompany an underlying cello melody at rehearsal 2, mm. 29-37 (example 4-17). The oboes and celli utilise the entire chromatic collection, while horns 1 and 2 are in mode 4⁶, horn 3 is in mode 4³, and horn 4 is in mode 2¹. Further modal projections are emphasised by metric, tonic and agogic accents and repeated pitches: the often doubly-reinforced metric/tonic accents (labeled ↓/M and ↓/T) and repeated pitches (labeled ↓/R) increase the audibility of mode 2, the mode 2² tetrachord subset (C#-D-E-F) in oboe 1 and mode 2³ tetrachord subset (F-F#-A♭-A) in oboe 2. The cello part contains two levels of agogic accents. All note values longer than an eighth form part of a descending chromatic scale (G-F#-F-E-E♭), while those longer than a dotted half are part of the whole-tone mode 1² (G-F-E♭). Each of these pitches is attacked on a downbeat and articulated by a change of bow direction against a backdrop of otherwise slurred notes, with the exception of the F₂ in measure 34, which had already been both attacked and prolonged in measure 32.

²¹¹ Schuster-Craig 1987, p. 25.

The image displays a musical score for measures 29-37 of the piece *Guernica*. The score is written for four instruments: oboe, horn 1&2, horn 3&4, and cello. The key signature is one sharp (F#) and the time signature is 8/8. The score is divided into two systems. The first system covers measures 29-32, and the second system covers measures 33-36. Red dashed boxes group measures 29-32 and 33-36. Blue dashed boxes group measures 30-31 and 35-36. Colored arrows (red, green, blue) indicate specific melodic and harmonic movements. The cello part shows a chromatic descent from G₂ to E_{b2}. The oboe and horn parts show ascending and descending sequences. A clarinet 2 part is also visible in measure 30.

Example 4-17: The chromatic collection and modes 1^2 , 2^1 , 2^2 , 4^3 and 4^6 emphasised through metric, tonic and agogic accents in *Guernica*, mm. 29-37

The passage dually reflects Honegger's pairing of a chromatic descent in the bass with an upper sequential repetition. The chromatic descent from G₂ to E_{b2} delineates the formal boundaries of this short transition section and underlies the ascending sequence in oboe and horn. The principle of overall contrary motion in the guise of symmetrical counterpoint was another favourite technique of Honegger. Keith Waters classifies three gradations of symmetrical movement as they range from abstract to exact. *Contour symmetry*, the least concrete type of mirroring, considers only the inverse direction of the motion between two lines, in other words,

irrespective of interval size. *General interval symmetries* occur when the same interval is traversed in opposition by both voices, but allows for the exact size of those intervals to differ, as in the case of a major third in one voice versus a minor third in the other. *Specific interval symmetries* are of the strictest type, in that the size and quality of the intervals are the same between the two voices, moving in opposite direction.²¹²

In example 4-17 two types of mirrored counterpoint are employed: contour and specific interval symmetries. The first dotted red box contains a simple contour symmetry as the upper three voices move up then down in parallel by semitone while the lowest voice leaps down and then up by a tritone. The second red box that begins in the first system is a more stringently symmetrical sequence of the first. A pair of voices, oboe 2 and clarinet, move by semitone in exact opposition to another pair, oboe 1 and horns 1/2. This specific interval symmetry lies over another contour symmetry of a descending and ascending tritone in horns 3/4. The blue boxes both contain contour symmetry provided by the horns 3/4 underneath two dyads of specific interval symmetry. Horns 1/2 in the first blue box and oboe 2 in the second are ascending segments that do not have contrapuntal mirrors.

The section from Honegger's *Rubgy* shown in example 4-18 most likely served as gestural template for Pépin. The first red and blue boxes correspond to those of Pépin, while the second two are a sequence upwards by ic 2 of the first pair, similar to Pépin's sequence by ic 3 in example 4-17. Pépin builds suspense at the beginning of his excerpt through the repeated pcs in the red boxes whereas the triplet in Honegger's, coupled with its constantly shifting beat divisions, has more of the effect of a stutter. The offbeat entries of the two dyads in the blue boxes of both examples are very similar. The primary difference with respect to symmetry is the intervallic exactness of Honegger's versus the more relaxed version by Pépin.

²¹² Waters 2002, pp. 66-76.



Example 4-18: A section of Honegger's *Rugby* (1928) that may have served as a template for Pépin's *Guernica* (example 4-17)

Mode 2 plays an equally significant structural role in *Le Rite du soleil noir*. John Schuster-Craig has described the form as a 7-part sonata-rondo form (A B A' C A'' B A''').²¹³ Example 4-19 is a reduction of the retransition leading to the final A''' section. This single large block of sound is comprised of the bassoons, brass and string families. Six melodic lines march upwards by step through all three possible transpositions of mode 2.²¹⁴ The brackets above each of the staves indicate melodic projections while arrows indicate harmonic ones.

²¹³ Schuster-Craig 1987, p. 29.

²¹⁴ Schuster-Craig's dissertation mentions the coexistence of all three mode 2 transpositions from mm. 334-336 (p. 47), and it was this observation that prompted me to analyse the remainder of the retransition in terms of its vertical and horizontal modal saturation, shown in example 4-19.

334

hrn. 1

hrn. 2

hrn. 3

hrn. 4

bsn. 1

bsn. 2

trb. 2

all [0358]

all [01369]

all [016]

all [0137]

alternating [02368] / [01367]

[02] dyad: C# and Eb

Example 4-19: All three transpositions of mode 2 used melodically and harmonically in the retransition of *Le Rite du soleil noir* (1955), mm. 334-350

Pépin superimposes two conflicting modes in the first three measures: mode 2^2 and 2^1 . Harmonically however, each vertical chord conforms to a single transposition of mode 2, so that mode 2^2 is heard on strong beats 1 and 3, while 2^1 is heard on weak beats. The final four measures of the first system are especially curious, as all three modes are present melodically, yet still form single-mode harmonies (mode 2^3) on strong beats. The brackets and harmonic arrows in mm. 346-348 in the middle of the second system constitute the only complete agreement between harmony and melody on mode 2^2 .

The pcs $C\sharp$ and $E\flat$ in the last measure of example 4-19 (circled in orange) function as an upper and lower leading tone to the final A''' section of the D-centric work and the return of the primary theme, shown in example 4-20.²¹⁵ This theme projects two different modes. The first four measures form an ascending mode 2^3 subset (D- $E\flat$ -F- $F\sharp$). Only after this first half of the theme are we presented with an E-natural and the remaining pitches of a complete mode 7^4 collection, partitioned into its two [01234] symmetrical chromatic halves.

mode $7^3 = [01234] +$
mode $2^3 [0134]$
 $T_6[01234]$
bassoons & horns

Figure 4-20: the mode 7^3 main theme of *Le Rite du soleil noir*, mm. 358-64

²¹⁵ The $C\sharp/E\flat$ [02] dyad is repeated over four measures following the excerpt before each pc pulls chromatically in opposite directions to converge on D, the centric pc of the work. The next four measures settle the D-centricity in the timpani before the primary theme returns in the bassoon and cello at reh. 8, m. 358.

4.2 After Paris: *Variations pour quatuor à cordes* (1956) and *Quasars* (1967)

Pépin resisted serial composition until his return to Montréal in 1955. Counter to many ardent structuralists who embraced integral serialism in its strictest forms for its potentially expressionless aesthetic, Pépin claimed that he was attracted to serial procedures for the opposite reason, its latent emotional expression. He explained, “I am probably very sentimental at heart and very romantic. That, I think, is really one of the reasons why I went into serial music in the first place, because to me serial music is not at all intellectual. On the contrary, the more I go into it, the more I find that it opens an entire new world of emotional expression.”²¹⁶ He noted

Messiaen’s role in the creation of his first serial work, *Variations pour quatuor à cordes*:

I feel obliged to say that of all of the artists with whom I’ve studied, Messiaen was clearly the one who enriched me the most. I’ll always remember the analysis he made of Alban Berg’s *Lyrische Suite*. I remember he had spent several weeks on this *Lyrische Suite* and then at one point I said to him, “Maestro, the more you talk about this work, the more I detest it.” “Ah!” he replied, “now that’s very interesting. Just the same, we’re going to continue to study it in-depth [...] and you’ll discuss it with me again in a year or two.” [...] I studied it intensely and I’m glad Messiaen encouraged me to get to know this work, since after that, I wrote my second string quartet.²¹⁷

The young Québécois composer indeed studied the *Lyrische Suite* (1925-26) in great detail; in fact, he uncovered many of Berg’s technical subtleties and made reference to them in his own quartet. George Perle, who has written a great deal about Berg’s work, speaks of the row functioning not as a row per se, but as a motive.²¹⁸ More specifically, Berg frequently reorders the content of the two hexachords of the row for purposes of motivic development. Other times,

²¹⁶ Clarke 1964, p. 81.

²¹⁷ Interview with Gilles Potvin, *Anthology of Canadian Music*, vol. 5, Toronto: Radio Canada International, 1980. My transcription of the radio interview is as follows: “Oui, je me souviendrai toujours de l’analyse qu’il avait fait, de *Suite lyrique* d’Alban Berg. Je me souviens qu’il avait passé plusieurs semaines sur cette suite lyrique, et puis un moment donné je lui ai dit ‘Maître, plus vous parlez de cette œuvre, plus je la déteste.’ Alors, il dit ‘bien, ça c’est très intéressant,’ il dit ‘quand-même, nous allons continuer à l’approfondir [...] et puis vous m’en reparlerai dans un an ou deux.’ [...] Moi, je l’ai beaucoup approfondi, et je suis content que Messiaen m’a fait connaître cette œuvre là, parce que après ça, c’est après ça que j’ai écrit mon deuxième quatuor.”

²¹⁸ George Perle, *Style and Idea in the Lyric Suite of Alban Berg*, 2nd ed. Hillsdale, NY: Pendragon Press, 2001.

he partitions the row into three tetrachords, four trichords or six dyads and likewise reorders the pcs within each of those segments for the same reason. For example, the opening measure of the *Lyrische Suite* in example 4-21 outlines three quintal chords that together present the aggregate. I have notated the pcs underneath each chord in the order of ascending fifths (and not in order of register from bass to soprano). When reordered in this way, it becomes readily apparent that Berg attained his chords by cycling through the entire circle-of-fifths from F to B \flat .

Violin I

Violin II

Viola

Violoncello

chords in 5^{ths}:

D	F \sharp	B \flat	B
G	B	E \flat	E
C	E	A \flat	A
F	A	D \flat	D
aggregate			G
			C

Example 4-21: the harmonic tetrachords in the first measure of Berg's *Lyrische Suite* (1925-26) as derived from the cycle-of-fifths

1

Vln. I

Vln. II

Vla.

Vc.

10: 6 7 8 9 10 11 12 1 2 3 4

P0 P5 P10

12

Vln. I

Vln. II

Vla.

Vc.

P3 P8 P1

5 18: 6 7 8 9 10 11 12 1 2

23

Vln. I

Vln. II

Vla.

Vc.

P11 P4 P3

3 4 5

34

Vln. I

Vln. II

Vla.

Vc.

P9 P7 P2

I7: 6 7 8 9

Example 4-22: Ic 5 related overlapping and rotated rows in Variation V of Pépin's *Variations pour quatuor à cordes*, mm. 1-44

Although Pépin did not use quartal/quintal chords per se, he made use of the ic 5 interval between the first and last pcs of his row in a similar manner in Variation V, reproduced in example 4-22. This variation presents a simple melody and accompaniment. The accompaniment runs almost exclusively in eighth notes against the melody that employs longer values. The accompaniment begins in the cello on C₂ and completes the prime version of the row. Its last pc, an F₂, doubles as the first pc of the next transposition, P5, which in turn links to the next P10 row, etc.²¹⁹ Pépin's systematic presentation of the ic 5-linked rows through a cyclical process is similar to the concept of procedural exhaustion employed by Messiaen in his notion of réinterversion. A particular symmetrical permutation can only be reapplied successively upon itself as a réinterversion a limited number of times until the original order of musical elements is re-obtained. When Messiaen did employ symmetrical permutations as réinterversion, he often did continue the process until the full cardinality of that process was completed. In this case, Pépin's movement concludes only once the entire cycle of twelve P-forms has been heard, and the cello once again finds itself upon the same C₂ from whence it started. This marks the beginning of Variation VI, to be discussed later through example 4-27.

The row forms of the accompaniment and melody are in opposition in example 4-22, as the first is comprised of P-forms and the second, of I-forms. The transpositional levels of the I-forms of the melody reflect yet another structural aspect of Berg's *Lyrische Suite*: his secret setting of Stefan George's German translation of Baudelaire's sonnet *De profundis clamavi* that the composer intended to be "a small monument to a great love."²²⁰ The initials of Alban Berg and his forbidden love, Hannah Fuchs-Robettin, are encrypted throughout the *Lyrische Suite* as

²¹⁹ Pépin does not set the expected second pc of P3 (E) in the first measure of the second system in Vln. I. It is possible that he was trying to circumvent the dissonance between that E and the F in Vln. II by expanding the rhythmic values of the D# and B to dotted eighths and thereby filling the expected temporal space.

²²⁰ Perle 2001, pp. 32-33.

the four pcs A – B(H) – B \flat – F. Although Pépin probably didn't decipher the meaning of Berg's secret encryption, he clearly recognised the emphasis that Berg placed upon the [0126] set class. The first pc heard in each of Pépin's melodic rows of Variation V are F \sharp_4 , D $_4$ and C \sharp_4 (circled in green). If we reduce the accompaniment to the pc C—by virtue of it being one large mechanistic loop that composes-out the initial C $_2$ through cyclic motion—and add it to the first pcs of the I row forms, the resulting pc collection (C, F \sharp , D, C \sharp) represents Berg's encrypted [0126] tetrachord, shown in example 4-23. Perle shows that this [0126] Forte set class appears in various permutations and voicings, both vertically and horizontally, at key moments in *Lyrische Suite*.

Example 4-23: Berg's [0126] encrypted set and Pépin's own setting of the [0126] collection by means of the first pc in each structural rotation row form in Variation V (example 4-22)

The melodic row forms I0, I7 and I8 in example 4-22 are rotated so that each commences with pc order numbers 6-12 and then wraps back around to the beginning to obtain order numbers 1-5. This type of rotation is employed by Berg throughout the *Lyrische Suite*, most notably in the third movement "Allegro Misterioso," an excerpt from which is shown in example 4-24. As Perle explains, "the development commences with the last two notes of bar 45. Overlapping statements of the four principal row forms in the unpermuted versions are each

successively transformed by ascending transpositions commencing on successive notes of the series, so that the last transposition commences with the last note of the given row form.”²²¹

Like Pépin’s cyclical transpositions by ic 5 in example 4-22, Berg’s coordinated ic 1 transposition and rotation by 1 position processes through all possible 12 rotations and transpositions in each voice of the quartet before it ends in m. 67. Pépin appears to have been struck by this movement as he employed rotation in several other places of *Variations*. The transposition/rotation pattern devised by Berg also relates to the idea behind Messiaen’s “charms of impossibilities.” Although many of Messiaen’s permutations contained some sort of bilateral or reflective symmetry, the notion of symmetry itself is not dependent upon this mirrored type of replication. Indeed, Berg’s type of rotation is symmetrical in the same way that the réinterversions are, in that the same reordering “rule” is continually reapplied. In example 4-24, each note of the original row is reordered according to the same “rule,” that is, “shift one position to the left.” Also like Messiaen’s réinterversions, Berg’s rotation/transposition is exhaustive, in that every possible transposition and rotation is explored and any further applications of the procedure would reproduce the original rotation/transposition.

²²¹ Perle 2001, p. 14.

45

P5: 1 2 3 4 5 6 7 8 9 10 11 12 (1 2) P6: 2 3 4

P8: 1 2 3 4 5 6 7 8 9 10 11 12 (1 2 3 4) P9: 2 3 4 5

P10: 1 2 3 4 5 6 7 8 9 10 11 12 (1 2 3 4) 5 6 7

P11: 2 3 4 5 6 7

I3: 1 2 3 4 5 6 7 8 9 10 11 12 (1 2 3 4 5 6 7 8)

14: 2 3 4 5 6 7 8 9 10

P6: 5 6 7 8 9 10 11 12 1 ("2" 3 4) P7: 3 4 5 6 7 8 9 10 11 12 1 2 P8: 4 5 6 7 8 9 10 11 12

P8: 6 7 8 9 10 11 12 1 (2 3 4) P11: 4 5 6 7 8 9 10 11

P11: 8 9 10 11 12 1 (2 3 4) P10: 3 4 5 6 7 8 9 10 11 12 1 2 (3 4 5 6 7)

P1: 4 5 6 7 8 9 10 11 12 1 2 3 (4 5)

I4: 11 12 1 (2 3 4) P0: 3 4 5 6 7 8 9 10 11 12 1 2 I6: 4 5 6 7 8 9 10 11 12 1 2 3 (4 5 6)

15: 3 4 5 6 7 8 9 10 11 12 1 2 (3 4 5)

Example 4-24: Simultaneous transposition and rotation in each voice in the “Allegro Misterioso” of Berg’s *Lyrische Suite*, mm. 45-52

While Pépin or Messiaen might have interpreted Berg’s reorderings, in general, as types of symmetrical permutations, George Perle refers to them as *trope*. Trope “is defined by its segmental content rather than by the ordering of its notes.”²²² In the second system of example 4-

²²² Perle 2001, pp. 6-7. Perle writes: “The term ‘trope’ was introduced by Josef Hauer to designate the type of twelve-tone set on which he based his system of twelve-tone composition. Hauer had no influence whatever on the Schoenberg circle and Berg conceived this type of set altogether independently of him.” Hauer’s table of tropes was published in his treatise *Vom Melos zur Pauke*, Wien: Universal-Edition A. G. (Nr. 8395), 1925. Despite Perle’s claim that Hauer had no influence on Schoenberg’s circle of composers, Hauer’s treatise was, in fact, dedicated to Schoenberg, and it was published one year before Berg composed his *Lyrische Suite*.

25, from the introduction of *Variations*, Pépin maintains the hexachordal content of the P0 form of the row, but changes the order of the pcs within each half. Measures 7-8 contain the first hexachord and mm. 9-10 the second. These two hexachords are repeated, the first and then the second, in the following four measures.

The musical score is for measures 1-14 of Pépin's *Variations pour quatuor à cordes*. It features four staves: Violin I (Vln. I), Violin II (Vln. II), Viola (Vla.), and Violoncello (Vc.).

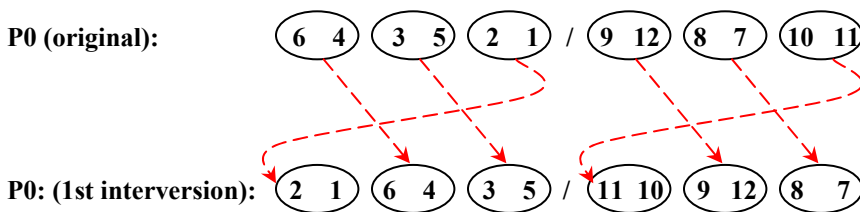
Measures 1-6: These measures introduce the P0 row. Above the staves, the notes are labeled with numbers 1 through 12. Below the staves, the P0 row is defined as: P0: 1 6 9 12 2 11 1 2 1 12 11 2. Various annotations include blue and red dashed boxes, arrows, and green dashed boxes highlighting specific intervals and transformations.

Measures 7-14: These measures show the rotation of pc pairs in the two hexachords of P0. The P0 row is repeated, with the first hexachord (1 6 9 12) and the second hexachord (2 11 1 2) being repeated in different orders. The score includes dynamic markings (mf, p) and articulation marks (accents, slurs).

P0 Row: P0: 1 6 9 12 2 11 1 2 1 12 11 2

Example 4-25: Pépin's rotation of pc pairs in the two hexachords of P0 (mm. 7-14) and voice exchanges (mm. 2 and 5) in the introduction of his *Variations pour quatuor à cordes*, mm. 1-14

I believe that Pépin does not freely reorder the content of the hexachords. Rather, he splits each hexachord into three invariant dyads that move by one position to the right. The dyadic movement is not free. It follows a regular pattern as analysed in example 4-26. The first hexachord in mm. 7-8 contains the dyads (6, 4) (3, 5) and (2, 1). When the hexachord reappears in mm. 11-12, each set of dyads has shifted one position to the right. The pair (2, 1) is wrapped around to the first position on the left. The second hexachord is reordered according to the same procedure (with one internal reordering).



Example 4-26: A reduction of the rotation in mm. 7-14 of example 4-25

While the row is troped into two rearranged hexachords, the hexachords themselves are rearranged by a second process. Renowned Berg scholar Douglas Jarman defines *serial trope* as the inverse procedure of trope: a rearrangement that changes the order of the segments, in this case, the dyads, but maintains the order of the pitches within them.²²³ The only instance in which the order of the dyads is changed in example 4-25 is in the case of the (10, 11) pair that later appears as (11, 10). Pépin's rotation method of serial troping may be considered a type of symmetrical permutation where mm. 7-8 and 9-10 are the original "chromatic gamut" to be reordered, and mm. 11-12 and 13-14 represent the first intversion.

²²³ Douglas Jarman, *Lulu*, New York: Cambridge University Press, 1991, pp. 67-68.

The first system of example 4-25 bears additional technical resemblance to the music of Messiaen and Honegger. There are two different instances of inversive relationships in mm. 2 and 5. In m. 2, violin 1 and viola exchange four pcs in retrograde-invertible counterpoint (shown in blue). This exchange recalls both Honegger's propensity for invertible counterpoint and Messiaen's inclinations towards bilateral symmetry, best exemplified by the forward and backward looking halves of a non-retrogradable rhythm. In this case, the bilateral reflection is twofold about a vertical axis between the two sixteenths, as well as a horizontal one that accounts for the reflection between the outermost and innermost voices of the four-voice harmonic succession. There are three inverted pairs in m. 5; one projected by the upper voices of both violins (red), another by their lower voices (purple), and the third by the viola and cello (green).

The hexachordal rotation seen in example 4-25 is carried one step further in Variation VI where Pépin completes not only a first but a second interversion (example 4-27). Here, the dyad pairs in mm. 5-6 are shown in their original order in the first violin (11, 8) (7, 12) (10, 9), rotated one position to the left in the second violin (7, 12) (10, 9) (11, 8), and shifted one additional position in the viola (10, 9) (11, 8) (7, 12).²²⁴ Since the hexachord is divided into three invariant dyads and therefore is comprised of only three moveable pairs (not six unique elements) the cyclic system forms a modular-3 cycle. Only three distinct rotations are possible.

²²⁴ Of course, the question of which instrument carried, in Pépin's mind, the original pc succession is a matter of opinion. It is equally viable that the viola be considered presenting the original dyad order, violin 2 the first interversion, and violin 1, the second.

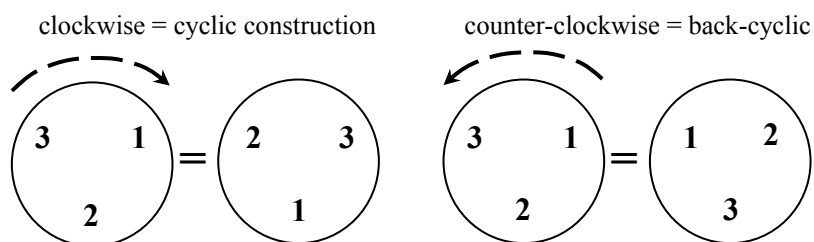
Example 4-27: A full set of réinterversions beginning Variation VI, *Variations*, mm. 1-10

This process of complete réinterversion results in a symmetrical order-3 Latin square. A Latin square is an $n \times n$ table filled with n different symbols, in this case, a 3 x 3 square with 3 different numbers. Each symbol must occur exactly once in each row and once in each column. Put another way, no symbol may occur more than once in any one row or column. Example 4-28a shows how the rotations of the pairs of integers, abbreviated 1, 2, and 3, follow the pattern of such a Latin square.²²⁵ The square in example 4-28a was created by a *back-cyclic* construction as its symbols shift to the left or counter-clockwise within a modular 3 cycle (example 4-28b, right side). We may envision the mod-3 cycle as a clock face with only 3 positions around which the numbers 1, 2 and 3 may rotate. Example 4-25 and the beginning of example 4-27 above use *cyclic* construction (example 4-28b, left side).²²⁶

²²⁵ In Chapter 5 we will discuss an order-6 Latin square in the music of Pépin's student, André Prévost (examples 5-41 to 5-44b).

²²⁶ Pépin's systematic use of trope and symmetrical trope as symmetrical permutations and Latin squares—particularly those featuring cyclic and back-cyclic construction—became integral compositional tools passed on to his student, André Prévost.

1	2	3
2	3	1
3	1	2



Example 4-28a: The order-3 Latin square formed by back-cyclic pairs in example 4-27

Example 4-28b: Cyclic and back-cyclic movement within a modular-3 cycle

As yet another nod to Messiaen, Pépin integrated Messiaen's modes into the serial fabric of Variation VII (example 4-29). The serial snippets project P7 and I7 forms of the row whose pitch classes are labelled according to their order numbers from 1 to 12. The first hexachord of P7, order numbers 1-6, is heard twice in mm. 1-3 and 7-9. The first hexachord of I7 is found in mm. 14-16. The second hexachord of that same row is heard at the end of the system and at the beginning of the third, mm. 19-21. The first hexachord again appears in mm. 28-29. The hexachords are connected by mode 3 passages in mm. 17-18 (mode 3^3) and mm. 22-26 (mode 3^2). The cello D_2 on the first beat of m. 22 does not belong to mode 3^2 and is most likely a misprint, since Pépin incorporated yet another rotation in this section. As indicated by the dotted diagonal lines, the first violin part is rotated one position to the left to create the viola part, which is rotated another position to the left to yield the cello part. According to this pattern, the violin's $D\flat_4$ in m. 22, beat 3 and the viola's $D\flat_3$ one beat earlier should therefore correspond to a $D\flat_2$ on beat 1 in the cello.

Why might Pépin have thought that a synthetic mode by Messiaen belonged within a composition modeled upon the *Lyrische Suite*? The answer seems to lie in a small octatonic scale collection in Berg's *Andante amoroso* (mvt. II) that is found in the violin I part of example 4-30 (boxed in blue). George Perle has explained the first four entries in mm. 48-50 as a "fughetto" structure and traces the boxed cello and violin I entries as tropes that are cyclic transformations of Berg's original row.²²⁷ The subject in violin I technically ends with the pitch A_{b5}, but the following E₅ that I have encompassed by the dotted portion of the box completes the eight-pc set [0134679T]. Perle notes that "of the two intervening statements of the subject, the second entrance in the viola is not intelligibly analysable in cyclic terms at all, and the third entrance in the second violin only conjecturally so."²²⁸ He suggests that they are best understood "as transformations that serve as a way of modulating from the form given to the subject in its first statement to the form given to it in its last."²²⁹

Example 4-30: Fugal entries in each voice in the *Andante amoroso* (mvt. II) of Berg's *Lyrische Suite*, mm. 48-50

²²⁷ Perle 2001, p. 90.

²²⁸ Ibid, p. 91.

²²⁹ Ibid.

Whether or not Pépin recognised Berg's octatonic collection in the first violin as a cyclic permutation of an original row is again debatable. I would argue, however, that he did hear the process of gradual transformation between the original subject in the cello and the final one in violin I as incrementally developmental. Example 4-31 lists Berg's four entries and illustrates how they are gradually transformed. The transformation from each subject to the next involves an upwards shift of a contiguous pc segment. From the first subject to the second, the last four pcs are shifted up by ordered pitch-class intervals (opci) +1, +2, +3 and +2, respectively. In the second and third transformations, the last six pcs move, at first almost entirely by opci 1, (+1, +2, +1, +1, +1, +1), and then exclusively so. As these transpositional adjustments are minimal, and since the rhythmic imitation is strict, the fugal character of the passage remains readily apparent. Each entry starts with an ascending diminished fifth, followed by a descending pattern of sixteenth notes outlining the same contour.

Entry 1: Vc.	B	F	C	B \flat	A \flat	F \sharp	D	E
				opics:	$\downarrow +1$	$\downarrow +2$	$\downarrow +3$	$\downarrow +2$
Entry 2: Vla.	B	F	C	B \flat	A	G \sharp	E \sharp	F \sharp
				opics:	$\downarrow +1$	$\downarrow +2$	$\downarrow +1$	$\downarrow +1$
Entry 3: Vln. II	B	F	D \flat	C	B \flat	A	F \sharp	G
				opics:	$\downarrow +1$	$\downarrow +1$	$\downarrow +1$	$\downarrow +1$
Entry 4: Vln. I	B	F	D	C \sharp	B	B \flat	G	A \flat (+ E) = mode 2²

Example 4-31: Gradual transformation of the subject in example 4-30

Pépin designs similar subtle transformations as he works towards the mode 3 collections in example 4-29. The violin I part in mm. 4-6 and 10-13, for example, has a descending contour. Notwithstanding the lack of an opening characteristic leap like the B-F in example 4-30, we can still aurally trace the progression of the same pc-outline in mm. 4-6 when it is transferred an octave lower in mm. 10-13. The two boxed scales in example 4-29 are represented in example 4-32, one below the other, as *scale 1* and *scale 2*. The transformation of the intervallic pattern is measured in opcis. Between scales 1 and 2, then, the opcis of the contiguous central segment of three pcs adheres to a uniform +1 as it did in the shift between the viola and cello of example 4-31. The third boxed collection in mm. 22-26 of example 4-29 ascends and its order is reversed in example 4-32 to reflect this change. The shift from scale 2 to the octatonic scale 3 in mm. 22-26 involves a second uniform shift of +1 of the first three pcs.²³⁰

Scale 1: Vln. I	C	B	B \flat	A \flat	G	G \flat	F	E	E \flat
				↓+1	↓+1	↓+1			
Scale 2: Vln. I	C	B	B \flat	A	G \sharp	G	F	E	D \sharp
	↓+1	↓+1	↓+1						
Scale 3: Cello	D \flat	C	B	A	G \sharp	G	F	E	E \flat = mode 3²

Example 4-32: The gradual transformation of the descending and ascending patterns boxed in example 4-29

Pépin's compositional language remained fairly consistent through to the end of the 1950s. His *Symphonie no 2* (1957) has been referred to as “neo-baroque” by Alan Freedman as

²³⁰ I have chosen the cello voice as scale 3 as it leads the mode 3 canon in quarters. Since the cello scale ascends in example 4-29, the order of its pcs has been reversed in example 4-32 to match the descending contour of the previous two scales.

“its three movements, in the fast-slow-fast form of the Baroque concerto, are respectively entitled ‘Toccata,’ ‘Choral’ and ‘Fugue.’”²³¹ Freedman has noted that “the three movements are related by the primary intervallic materials of fourths and half steps, and the outer movements share the motive of rapid repeating pitches.”²³² Freedman compares the symmetrical arch construction of the Toccata to Bartók’s fifth string quartet, but in light of the influence of Honegger upon his Québécois student, it would be much more likely to view this reversed recapitulation form as yet another instance of Pépin adopting Honegger’s symmetrical musical architecture.

In 1962, Pépin composed a rigorous integral serial work, *Nombres*, for two pianos and orchestra. Here the composer utilised the mathematical procedures formulated by Boulez much as Garant did a few years previous in his two *Asymétries*. Not only are the parameters of pitch, duration, accent, dynamic and section length determined by the series and its transformations, but the number and placement of instrumental groups are as well. The orchestra is comprised of twelve groups; ten orchestral plus two pianos. In the first performance, Pépin took advantage of technology by placing microphones around the twelve spatially distributed groups and placing the speakers around the auditorium to surround the audience with sound.²³³

These technological experiments continued throughout the 1960s. Pépin imitated aspects of Pierre Henry’s *Concerto des ambiguïtés* (1950), especially its use of recorded piano tones played in reverse. In his *Monade I* for fourteen strings (1964), Pépin attempted to recreate a similar sound envelope using live string instruments. The timbre was characterised by quiet non-vibrato tone clusters that were held for a significant duration and then followed by a sudden

²³¹ Freedman 1988, pp. 21-22.

²³² Ibid.

²³³ Gilles Potvin, *Encyclopedia of Music in Canada*, 2009.

crescendo and abrupt ending.²³⁴ These clusters often featured quarter tones that would pulsate according to a gradation of dynamics. The dynamic patterns themselves became a basis upon which to build both canons and non-imitative counterpoint.²³⁵

Pépin was once again influenced by Messiaen when he composed *Quasars* (1967), a piece also known as his third symphony. Although this work falls outside the earliest developments in Pépin's career (1951-1956), it deserves mention for its clear development of Messiaen's non-retrogradable rhythms. Like Messiaen, Pépin was extremely concerned with rhythm. At this point in time, he had already made use of serially organised rhythms in *Nombres* and *Monade I* and decided to break away from this path and explore other rhythmic pre-compositional planning methods. The result was the creation of the *Morsiques*. These are rhythms comprised of symmetrical patterns based on the long and short values of Morse code. In a 1987 letter to Alan Freeman, the composer described the Morsiques as follows:

Then there also is the problem of rhythmic patterns. Serial numbers may be used, but are usually rather limited. On the other hand, some rhythms, which I call "Morsiques," have an extraordinary fecundity. It [sic] really stems from the very elementary dichotomy of "la brève et la longue," or so to speak, the relationship of the anacrusis and the accent, or the Iambe (i.e. a short note followed by a long note). The Morse Code is built on this principle. By applying to these rhythms principles of transformations such as augmentation, diminutions, extensions, elimination, etc., you also have there an incredible variety.²³⁶

His explanation recalls Messiaen who paid particular attention to rhythm and highlighted the use of Greek metre—comprised of varying combinations of short and long values—in his own compositions and those of others. Jean Boivin has found that "classnotes taken by meticulous students correspond to Messiaen's presentation in the first book of the *Traité* [...]. In class, using a pencil, Messiaen tapped out successive rhythms on the edge of the piano and

²³⁴ Schuster-Craig 1987, p. 78.

²³⁵ Freedman 1988, p. 30.

²³⁶ Ibid, pp. 27-28. Originally from a letter that Freedman received from Pépin on 3 May 1987.

explained their structure and their distinguishing features.”²³⁷ Rhythmic variation by “augmentation, diminutions, extensions, elimination” and other such techniques were applied to break down larger rhythmic patterns into sections that “corresponded to Greek metre, in themselves subject to inversion, variation or [...] monnayage.”²³⁸

Like Messiaen, Pépin was enchanted by space exploration. As Schuster-Craig has explained, the composer was particularly drawn to “the exotic theory of a Soviet astronomer, Nikolai Kardashev, that the radio waves emitted by a quasar are a coded message originating from an astonishing super-civilization which had existed several million years ago.”²³⁹ It would be a logical next step for Pépin to adopt Morse code to musically represent an encoded message, since like the Greek iamb it has only two simple durations of “la brève et la longue”.

Pépin’s *Morsiques* may be conceived of as a cross between the bilaterally-symmetrical construction of the non-retrogradable rhythms and the guiding premise of limitation behind the symmetrical permutations. Messiaen himself stated that the symmetrical permutation arose from the dilemma he faced when confronted with seemingly endless possibilities of reordering. Perhaps Pépin sought a similar limiting principle in writing his own non-retrogradable rhythms, and as a result, turned to the restriction of only two values per rhythmic pattern, the short and the long.

John Schuster-Craig, who worked with the composer during the writing of his dissertation, describes the *Morsiques* as being “derived from one simple pattern of long and short durational values” that is immediately retrograded.²⁴⁰ Schuster-Craig provides the examples long-short retrograded (♩ ♩ ♩), its unequal augmentation (♩ ♩ ♩), and the addition of

²³⁷ Boivin 2007, p. 149.

²³⁸ Ibid.

²³⁹ Schuster-Craig 1987, pp. 106-107.

²⁴⁰ Ibid, p. 115.

a tie (♭ ♮).²⁴¹ Messiaen similarly altered his non-retrogradable rhythms by unequal augmentation and diminution, as discussed in chapter 2. Schuster-Craig adds that each Morsique “pattern is then altered, by means of *combination*, and by unequal augmentations and diminutions.”²⁴² Although Messiaen certainly applied such techniques to his own non-retrogradable rhythms, Pépin’s type of combination often weakened the symmetry of the pattern, as we shall see in due course. The first type of combination is the overlapping of two simple Morsiques to make a slightly asymmetrical composite. In the second type Pépin sets the composite rhythm amongst two or more different orchestral voices, sometimes additionally exchanging pitches for rests and vice versa. Without access to the complete sketches, the true origin of those combined patterns would be almost indecipherable.

Alan Freedman makes this claim, emphasising the difference between the esthetic mode of analysis employed in his dissertation and the poietic one used by Schuster-Craig. He summarises that some of the pre-compositional ideas in Pépin’s fifth symphony, *Implosion* (1983), “could not have possibly been deduced without Pépin’s help, and the vague sketches which may have served as a conceptual aid add nothing to an analysis of the symphony’s form in all its complexity.”²⁴³ The same is true of Pépin’s composite Morsiques, and I shall demonstrate a simple case in point by commencing from an esthetic analytical perspective and moving towards an increasingly poietic one.

In example 4-33, which shows the first five measures of the first movement of *Quasars* entitled “Morsiques,” only five non-retrogradable rhythmic palindromes are readily evident. Measured in thirty-second note values in red, patterns 1, 3, and 4 (indicated in blue) are comprised of single values only, sixteenth-notes triplets (“2”) and eighth notes (4) respectively.

²⁴¹ Schuster-Craig 1987, p. 115.

²⁴² Ibid. Emphasis mine.

²⁴³ Freedman 1988, p. 2.

Only two patterns use two different durations: Morsique 2 (2, 2, 2, 4, 2, 2, 2) on the first staff; and Morsique 5 (6, 16, 16, 6) at the bottom of the example. At that, the second of these two rhythmic patterns disregards the last tied triplet sixteenth. Note that in both of these Morsiques, the aural ability to detect the symmetry is somewhat hampered by Pépin's composite scoring, in which individual durations are orchestrated across various instruments within each of the two groups.

1
2
3
4
5

Cymb. Susp. (1.)
2 Timbalès
Caisse claire (sans timbres)
3 Tom-toms

2 Bongos
Caisse claire
Tamb. Mil.

2 Cymb. Susp.
2 Plaques metal
Tam-tams

3 Woodblocks

Tambourin
Tom-tom (4.)

6 16 16 6 (6+)

Example 4-33: five non-retrogradable Morsiques in “Morsiques,” from *Quasars* (1967), mm. 1-5

Schuster-Craig writes that the “Morsiques” were sketched over “seven staves of non-imitative counterpoint, with each staff based on a particular treatment of a group of Morsic rhythms.”²⁴⁴ In example 4-34, I have transcribed the seven staves from a sketch held in the Fonds Clermont Pépin at the Bibliothèque et Archives nationales du Québec and boxed the *Morsiques* in blue.²⁴⁵ I have observed that this sketch must be the final pre-compositional template that Pépin prepared before composing *Quasars*. An analysis from a poietic viewpoint demonstrates the difference between the finished product in example 4-33 and this elaborate sketch. In example 4-34, individual durations are measured in thirty-second notes and their totals are tallied in blue.

The majority of the rhythmic patterns use the simple long and short combinations we have seen earlier. The values in line 1, for instance, are formed from the combination of a smaller value and its double. The thirty-second in the first box (1) is equal to the short and twice its value, the sixteenth (2), is the long. In the second box, the sixteenth becomes the short (2) and the eighth (4) becomes the long. The first boxes of lines 2 and 4 have a quarter note (8) as their short; and its quadruple, two dotted quarters plus another quarter (32), as the long.

²⁴⁴ Freedman 1988, p. 122.

²⁴⁵ “Fonds Clermont Pépin,” the Bibliothèque et Archives nationales du Québec, MSS-249/001/7.

Example 4-34: seven lines of *Morsiques*, transcribed from sketch, “Fonds Clermont Pépin,” Bibliothèque et Archives nationales du Québec, MSS-249/001/7

182

doubling, and the outer pair to the inner, by 8-fold. Line 5 is the only one that does not conform to a *Morsique* structure, but is nearly symmetrical. The same values of 1, 2, 8 and 16 are employed, but the penultimate value is 1 instead of 2. One could think here of an elision (by one thirty-second value) as illustrated in green in the example, but as we shall see shortly (in figure 4-1), this “irregularity” is the result of another constructive principle.

The differences between sketch and realization are significant. The only pattern that remains exactly the same between the last sketch and the final draft is Morsique 3. Morsique 1 was composed out into a full measure of sixteenth-note triplets. In the sketch (example 4-34), it appears in both line 1, as a 6-duration pattern, and in line 7 as a 5-duration one. Morsique 2 was taken from line 1 of the sketch, but compositely orchestrated, its central value assigned to the suspended cymbal (example 4-33). Morsique 4 was further elaborated. In the sketch (example 4-34), the central three eighths appear in line 3. However, Pépin did not originally plan attacks for the third beat of m. 2 or the first beat of m. 4—every duration sounding on those two eighth-note beats were conceived of as ties from previous attacks. The outer eighths were added later (example 4-33). Morsique 5 was snipped from the central segment of the larger non-retrogradable pattern in line 7 of example 4-34, transformed and shifted to begin on the third beat of m. 1 (example 4-33).

The biggest difference between the sketch and final version lies not in the surviving Morsiques, but in the number of those that were abandoned or disfigured beyond recognition. The symmetry of the first sketched Morsique in line 2 is all but obliterated by Pépin’s choice to insert the rests shaded in orange in example 4-34. Line 5 of the sketch is absent from the finished score, as is line 4, which was partially redundant to begin with in its doubling of the durations (8, 32, 8) in line 2.

Figure 4-1 below from Pépin's earlier sketches demonstrates three types of composite rhythms employed in the generation of Morsiques using only two different patterns: (1, 2, 2, 1) and (8, 16, 16, 8). The first, boxed in red, corresponds to the idea of composite orchestration. The two rhythms planned for line 4 of the sketch in example 4-34 are shown superimposed. The shorter one (1, 2, 2, 1), shown with its stems up, was planned to coincide with the centre of the longer one (8, 16, 16, 8), its stems down. This Morsique from line 4 of the sketch (example 4-34), accordingly appears in example 4-33, orchestrated between two different voices, but the (1, 2, 2, 1) appears slightly altered as (1, 2, 2, 2).

The Morsique boxed in green confirms the previously proposed use of a "Morsique within a Morsique," akin to Messiaen's method of elaborating non-retrogradable rhythms by either adding a new pattern to its centre, or to each of its outermost ends. This Morsique, consisting of a central (8 16 16 8) framed by two outer (1, 2, 2, 1) patterns, appears in line 7 of example 4-34 with all stems facing up, having been integrated into one instrumental part.

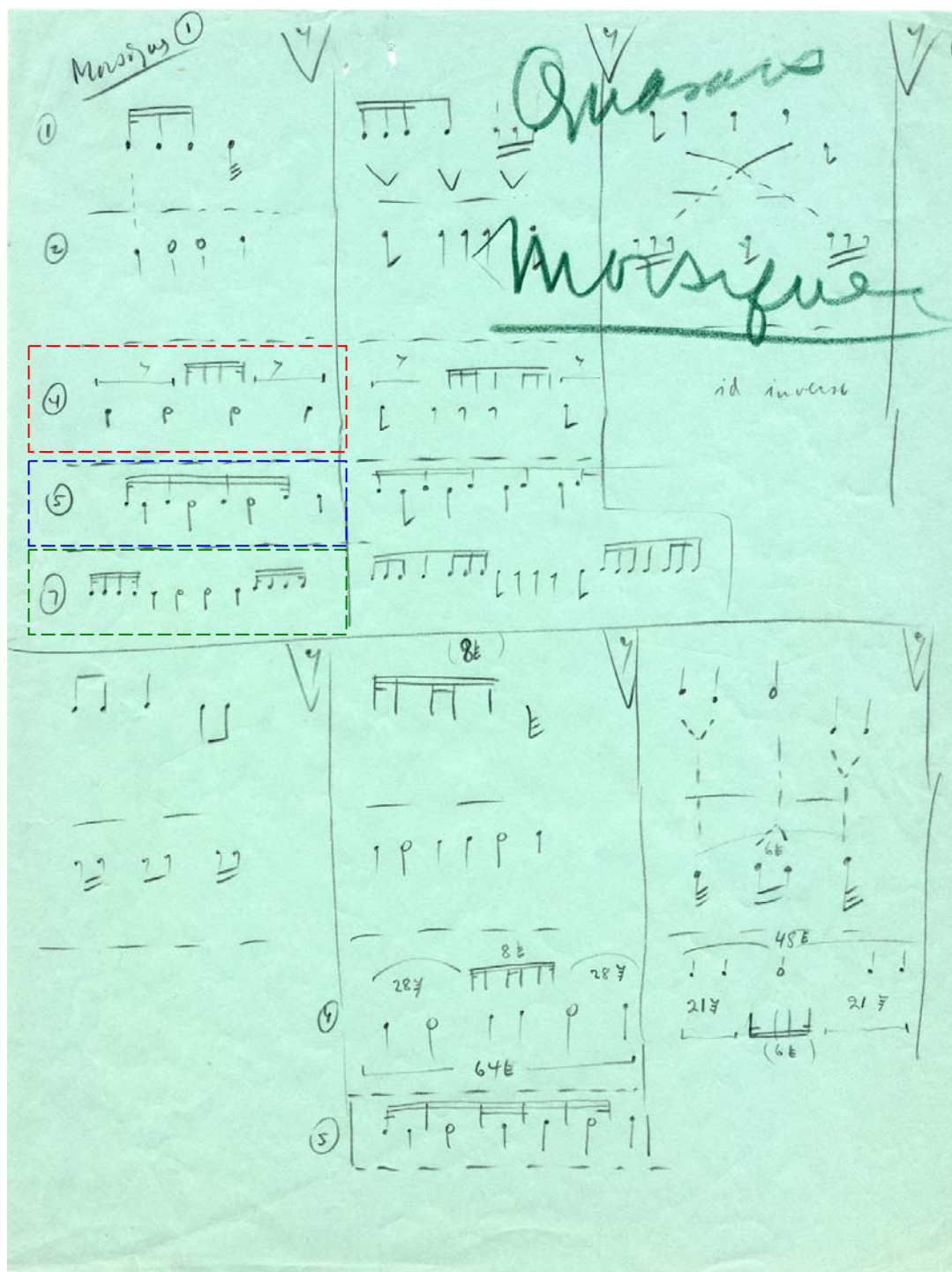
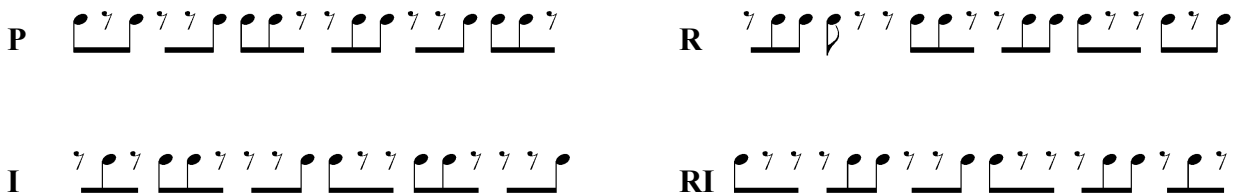


Figure 4-1: early plans for various methods of combining Morsiques, reproduction of sketch, “Fonds Clermont Pépin,” Bibliothèque et Archives nationales du Québec, MSS-249/001/8

Finally, the Morsique boxed in blue demonstrates the deformation of symmetry when the two rhythms are interlocked. The resulting near-symmetrical pattern is then carried to line 5 of example 4-34, with the first value (1) replaced by a rest.

Through his own sketch study, Schuster-Craig ascertained Pépin's use of prime, retrograded, inverted and retrograde-inverted forms of rhythms (example 4-35) in the third movement, "C.T.A.-102."²⁴⁶ He found them in an early sketch by Pépin that I have reproduced below in figure 4-2. Pépin wrote letters "A" and "B" next to the prime and inverted version, and at the bottom of the page, he made a note, "Mardi AM élaborer continuation de série...." (translation: "Tuesday AM work out the continuation of the series"). From this note, Schuster-Craig noticed the two patterns were a forward/reverse pair and saw how Pépin devised the inversion and retrograde of the pattern labelled A, B, A' and B' (P, I, R and RI).



Example 4-35: P, R, I and RI forms of Pépin's rhythmic row used in "C.T.A.-102," *Quasars*

²⁴⁶ John Schuster-Craig, personal correspondence 11 February 2010. In his dissertation, Schuster-Craig refers to the P and R forms of the row in example 4-35 as O and R (Originale and Rétrograde).

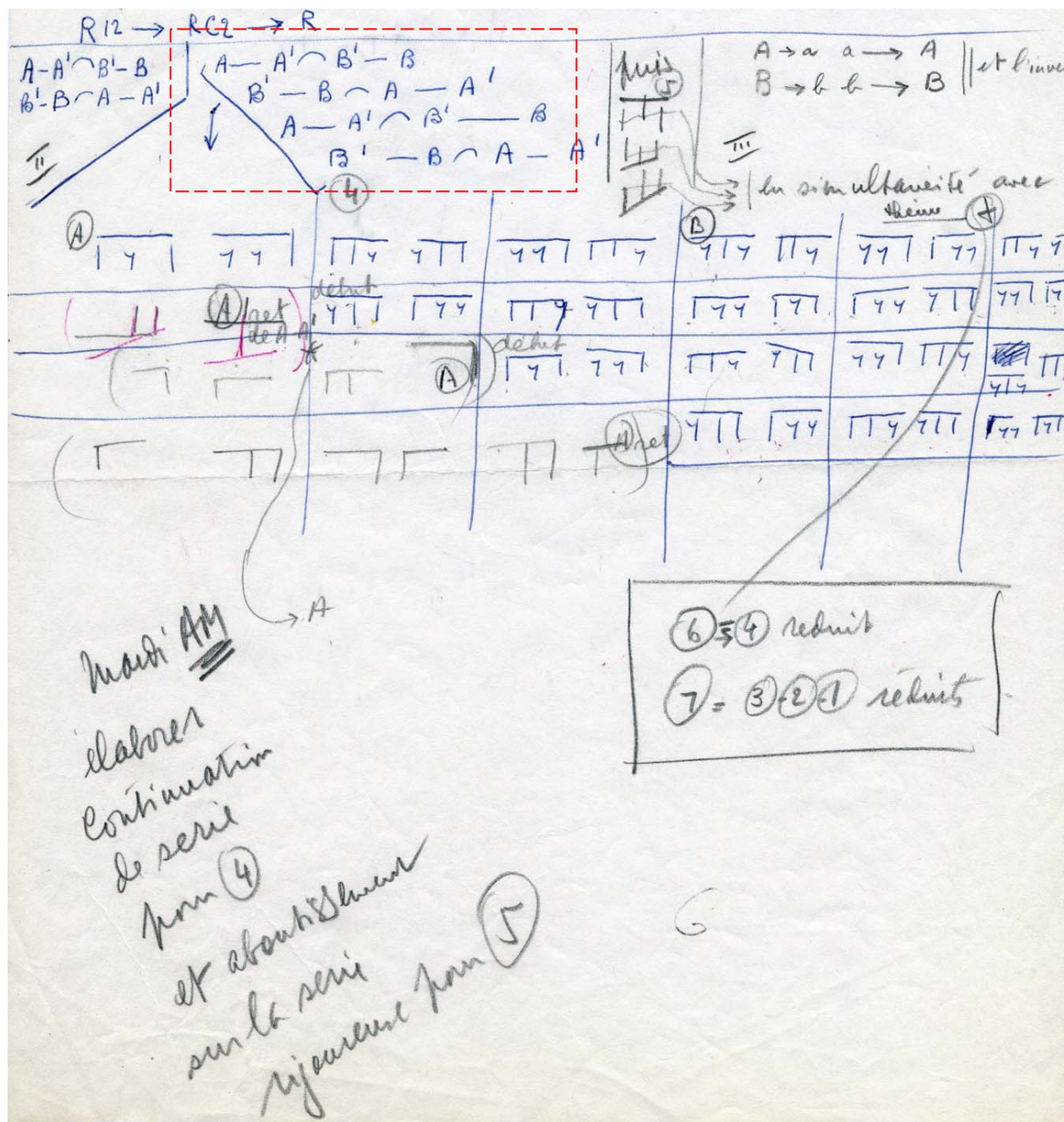
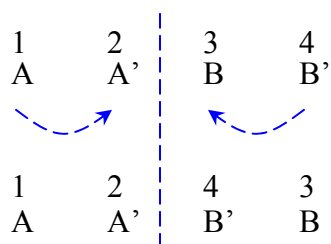


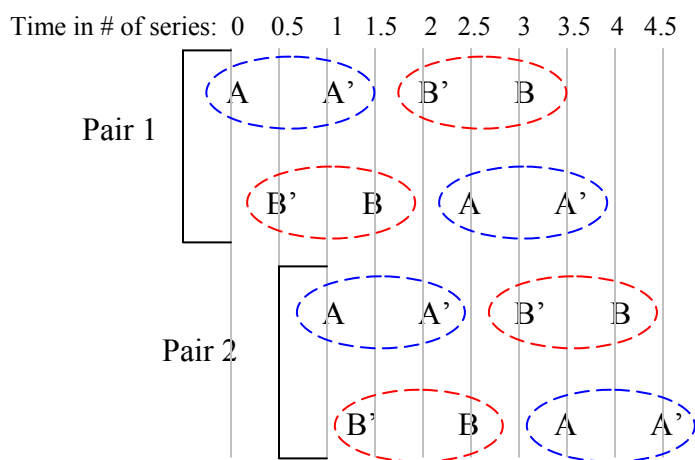
Figure 4-2: sketch of the rhythmic canon, "Fonds Clermont Pépin," Bibliothèque et Archives nationales du Québec, MSS-249/001/16

In figure 4-2, Pépin planned a four-voice canon—a rhythmic technique that Messiaen used often—comprised of his four A, A', B and B' versions of the rhythmic series. Example 4-

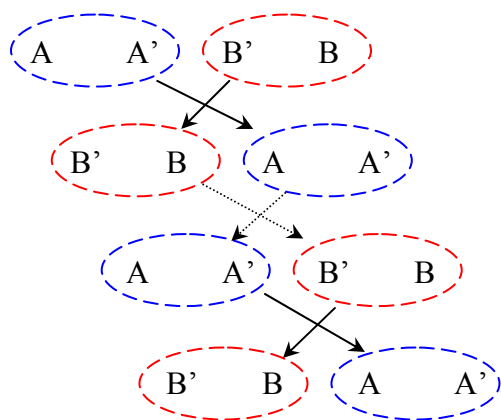
36a shows that the order of the canon's series is in itself a reflective permutation of the original A, A', B, B' order, using the permutation (1, 2, 4, 3) that maintains the ordering of the first pair (1, 2), but reverses the order of the second (3, 4). Extracting the portion of the canon boxed in red in figure 4-2, we may interpret its construction in several different ways. The first, shown in example 4-36b, analyses the canon as two pairs of voices in a traditional contrapuntal relationship. The first pair, the "soprano" and "alto," commence with A and B' respectively. They lead the imitative entry of the second pair below by the duration of one series. We can also view the organizational principle behind the four voices as pairs A / A' (circled in blue) and B' / B (circled in red) that are either reflectively permuting (example 4-36c) or cyclically permuting (example 4-36d). The later cyclical permutation resembles the pairs of pcs that rotate in a modular-3 cycle in the *Variations* in examples 4-26 and 4-27.



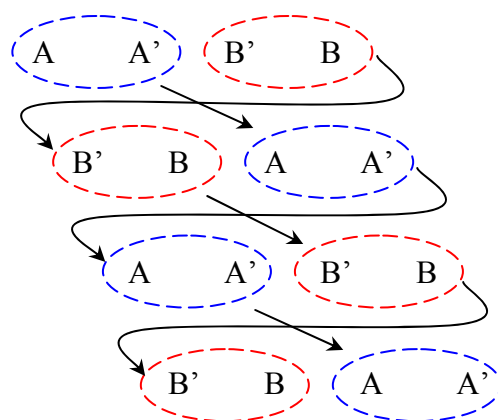
Example 4-36a: reflective (1, 2, 4, 3) permutation



Example 4-36b: Traditional two-voice contrapuntal combination



Example 4-36c: reflective exchanges



Example 4-36d: rotating pairs, mod-2 cycle

Chapter 6: André Prévost

5.1 Pre-Parisian Works: *Soleils Couchants* (1953) and *Mobiles* (1959)

Soleils Couchants (1953), shown in example 5-1, is an early impressionistic work that Prévost composed in 1953 at the CCM under the direction of Jean Papineau-Couture (1916-2000), an eminent Québécois composer who studied with Quincy Porter at the New England Conservatory in Boston and Nadia Boulanger at the Longy School in Cambridge, Massachusetts.²⁴⁷ Although not strictly in mode 2², the melodic soprano lines strongly suggest the octatonic mode with an added pc (A), as their short imitated pc-cells outline characteristic subsets [013] and [0134] of the mode. In this short excerpt, the mirrored counterpoint and symmetrical pc sets clearly foreshadow later stylistic predilections. The upper two soprano voices are involved in an imitation separated by one-and-a-half measures. The static alto and baritone voices are related through their mirrored contour (circled), although the exact quality is not maintained between the parts. The (G[#]₄, A₄, B₄) [013] set in the first soprano part in m. 5 is directly inverted around B to create a mirrored pitch collection (B₄, C[#]₅, D₅) [013] in the second soprano in m. 6. The first of these segments is set melodically so that it is retrograded around its central pitch, similar to the design characteristics of Prévost's later 12-tone rows. In the soprano 2 in mm. 3-4, the line steps up from G[#]₄ to B₄ and back down. The arch is repeated in the first soprano in m. 5, again emphasising the B as a turning point. While in m. 6 the 1st soprano reaches through the B, stepping from G[#]₄ to D₅, the second soprano provides the inverted form of the original arch, stepping down from D₅ to B₄, the axis of symmetry of the collection G[#]₄-A₄-

²⁴⁷ Louise Bail Milot, "Jean Papineau-Couture," *Encyclopedia of Music in Canada*, Historica Foundation 2008, <http://www.thecanadianencyclopedia.com> (accessed 10 February 2008).

Example 5-1: Mirrored contour and mode 2² imitative soprano lines in *Soleils Couchants* (1953), mm. 1-7

example 5-2. Prévost described this piece as his first serial composition, yet he did not use transpositions of prime, retrograde, inversion and retrograde-inversion forms of the original row. Rather, he used only the row at its original transposition (starting on G \flat) both forward and backward, labelled P $_6$ and R $_6$, and the prime (P) and retrograde (R) of the first *intersion* of Messiaen's *éventail ouvert* or open-fan (o-fan) symmetrical permutation, labelled P o-fan and R o-fan. Starting from the central two pitches, E and A \flat , he extracted dyads symmetrically from the centre towards the outsides of the row, reversed them (indicated with (R)/dotted lines), and placed them successively from left-to-right.²⁴⁸

The image displays two musical staves. The top staff is for Violin, measures 1-3, in 6/8 time, showing the original row P $_6$ starting on G \flat . The bottom staff is for Flute, measures 20-24, in 4/8 time, showing the 1st intersion of Messiaen's open-fan permutation. Brackets and dotted lines connect the notes of the violin row to the flute row, illustrating the symmetrical extraction of dyads from the center (E and A \flat) and their reversal. The flute row is divided into two sections: P o-fan (measures 20-24) and R o-fan (measures 25-28). The P o-fan section shows the sequence of dyads: 1R, 2R, 3R, 4R, 5R, 6R. The R o-fan section shows the sequence: 1, 12, 2, 11, 3, 10, 4, 9, 5, 8, 6, 7.

Example 5-2: the original row (P $_6$) in the violin and the 1st *intersion* of Messiaen's open-fan permutation in the flute, *Mobiles* (1959), mvt. II. Prime and retrograde directions are labelled (P o-fan) and (R o-fan). Reversed pairs are indicated with (R)/dotted lines.

²⁴⁸ Messiaen discussed this symmetrical permutation in several places in the third volume of his *Traité*. Visual examples are found in Annex 1 of Chapter 3, beginning on p. 319. The diagrams of *ciseaux ouverts* (open scissors) and *ciseaux fermés* (closed scissors), elsewhere referred to as open- and closed-fans, appear on p. 322, examples 169 and 170. In these two examples, the permutation is applied to a 15-member chromatic gamut. The best example of application to a 12-member gamut is found on pp. 325-326, and titled “*réinterversions sur 12 valeurs, 10 fois interverties*” (réinterversions/reapplied permutations of 12 values, permuted 10 times).

Local pitch collections of movements III and IV are influenced by the pitch symmetries underlying the modes of limited transposition. Mvt. III of *Mobiles* is largely comprised of subsets of the two whole-tone mode 1 transpositions, commencing with three-note fragments and expanding to entire [02468T] collections. In example 5-3, the flute contains an ostinato figure of [0268], itself a symmetrical subset of the larger mode 1² collection, while the other three voices outline conjunct descending scalar fragments of both mode 1 transpositions. The mode 1² scales contained in the viola and cello in mm. 62-63 are a tritone (equal division of the octave) apart, while the violin contains a segment of the opposite whole-tone mode. Mode 1² scales and subsets are indicated by boxes with dotted lines while mode 1¹ is marked with solid boxes. The cello and violin are involved in a voice-exchange at the end of m. 63 so that one completes the scale of the other midway through the passage: the D₄ in the cello moves to its enharmonic C₅ in the violin, while the violin's D₅ is continued in the respective whole-tone scale, stepping down to C₄ in the cello.

The musical score for Example 5-3 shows measures 62-65 of *Mobiles*, mvt. III. The flute (fl.) part features an ostinato figure of [0268] marked with a dashed box. The violin (vln.) part contains a segment of the opposite whole-tone mode, marked with a solid box. The viola (vla.) and cello (vlc.) parts play mode 1² scales, which are a tritone (T₆) apart, indicated by dotted boxes. The score includes markings for 'Accel.' and 'rall.' and a boxed section labeled '[0268]'. A voice-exchange is indicated between the cello and violin at the end of measure 63.

Example 5-3: Voice-exchange completing mode 1¹ and 1² scales with [0268] in the violin, *Mobiles*, mvt. III, mm. 62-65

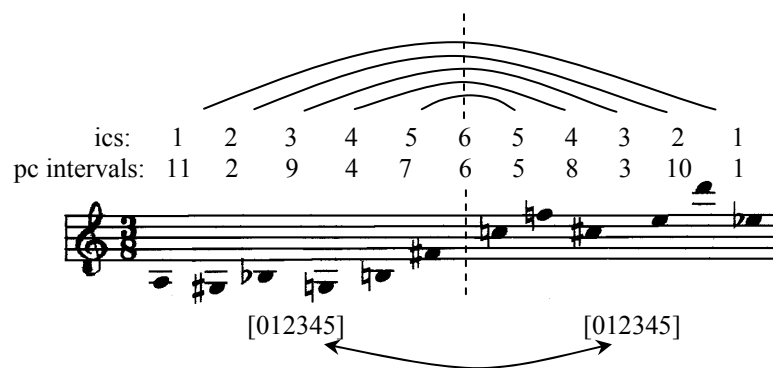
The mode 5^4 retransition in mvt. IV in example 5-4 is similarly divided into smaller composite subsets: in this case, its three [06] structural dyads. In Prévost's music, the smallest discernible pitch unit, the dyad, often undergoes transpositional combination, or Boulez-style multiplication to form larger symmetrical configurations. Frequently, [06] or [01] serves as the original unit that is to be expanded. Here, the three [06] dyads, circled in red, are a semitone or whole-tone apart: ($A\flat_3$, D_4) in the viola, (A_4 , $E\flat_5$) in the violin and ($B\flat_2$, E_3) in the cello. The tritone [06] is transpositionally combined with [012] to form [012678]. A [0167] subset is emphasised through rapid rhythmic figures and doubling in the violin and viola parts in mirrored contour (boxed in blue), adding to the degree of symmetry of these two inner parts.

The image shows a musical score for four instruments: flute (fl.), violin (vln.), viola (vla.), and cello (vlc.). The score is in 5/8 time and features a key signature of one flat. The tempo and mood are indicated as 'Rall. poco a poco e più pesante'. The flute part is marked '(8va)' and 'ff senza sord.'. The violin and viola parts are marked 'ff senza sord.'. The cello part is marked 'pizz. ff senza sord.'. A blue box highlights a mirrored contour in the violin and viola parts, and three red circles highlight specific dyads in each instrument: ($A\flat_3$, D_4) in the viola, (A_4 , $E\flat_5$) in the violin, and ($B\flat_2$, E_3) in the cello. The text '[0167] mirrored contour' is written above the violin and viola staves.

Example 5-4: Mode 5^4 [012678] as three ic 6 dyads (circled), [06] * [012] in *Mobiles*, mvt. IV, mm. 98-100

5.2 In Paris: *Sonate pour violon et piano* (1960) and *Quatre préludes pour deux pianos* (1961)

Prévost composed *Sonate pour violon et piano* at the beginning of his studies with Messiaen. He states in a self-analysis of the work that, “compositional unity is assured, in part, by the form, called *repliement*, of the three movements.”²⁴⁹ Through *repliement*, or folding-back, the violin and piano undergo invertible counterpoint at the midpoint of each movement and perform the first half in retrograde. Each movement then, reflects Messiaen’s interest in bilateral symmetry and is akin to a large non-retrogradable rhythm. The sonata’s all-interval row shown in example 5-5 is a *repliement*. The successive ics from the outsides to the center are equivalent in size but inverted in direction, as indicated by the ordered pitch intervals (opis). If we place a mirror at the centre of the row where indicated by the dotted line, the hexachords map onto one another at R_6 , meaning that either hexachord can reproduce the other by reversing it, or folding it back along that dotted line, and transposing it by 6 semitones.



Example 5-5: Symmetrical properties of the all-interval row in Prévost's *Sonate pour violon et piano* (1960)

²⁴⁹ André Prévost, “Analyse de la Sonate pour violon et piano,” *Le Musicien éducateur* 5/2 (1974) : 29-38. Prévost writes on page 30: “L’unité de la composition est assurée d’une part par la forme dite de ‘repliement’ dans les trois mouvements [...]” Although my analysis was originally undertaken without knowledge of the composer’s self analysis, I later verified my own findings with Prévost’s own conception of the work and found the two to be consistent.

The work's opening figure in example 5-6 is comprised of a [01] dyad expanded into a [0156] tetrachord ([01] * [05]) which is then replicated twice at T_2 ([0156] * [024]). The figure could alternately be understood as two overlapping ic 5 cycles that are separated by ic 1, beginning on G_3 and $A\flat_3$ respectively. However, the first pitch, G, is re-attained at the end of the second measure as part of the $A\flat$ cycle before a $C\sharp$ has appeared to complete the aggregate. The repeated G becomes a goal in that it acts as the basis of a synthetic symmetrical scale with $C\sharp$ oscillating between the octave Gs in m. 3. The full chromatic series could be stated without pitch repetition if the $C\sharp_6$ of the third measure were rotated back to the beginning of the series to create two ic 5 cycles separated by ic 6. Beginning any two concurrent interval cycles of the same type spaced ic 6 apart will prevent pc replication before the resulting cardinality of the combined cycles is exhausted.

[05] * [01] = [0156]

Example 5-6: Transpositionally-combinatorial intervallic pattern, *Sonate pour violon et piano*, mm. 1-3

Although a hypothetical rotation placing any C# before the initial G would destroy the continuity of the gesture's ascending contour, it does appear that from the perspective of pre-compositional planning, C# was initially the first pc of the figure; though Prévost conceived of the first movement as atonal – not serial – I believe that he derived the row of the second and third movements from the rotated version of the violin's opening gesture. This process is explained in example 5-7.²⁵⁰ With C# at the beginning, he reordered the row by means of a *modified* open-fan permutation. Instead of placing the central pairs at the beginning of the row, he alternately placed them at either end. The innermost pair (1) is shifted to the far left in prime order and pair 2 is reversed and placed to the far right, as a mirrored move. As in example 5-2, reversed pairs are indicated with (R)/dotted lines. This process is mirrored, or inverted, as the next most central pair (3) is placed to the next-to-inside right, and paralleled by a move to the left by pair 4. Prévost has made Messiaen's open-fan permutation more symmetrical because every step in his reordering process is balanced on the left and right sides. It serves as a sort of procedural foreshadowing, a smaller model of the large-scale *repliement* formal structures of the following second and third movements.

²⁵⁰ Prévost 1974, p. 30. Prévost explains that the first movement is atonal and constructed somewhat freely, but that ics 1, 5 and 6 are used *somewhat systematically* (emphasis mine, here and in the translation). Other than referring to the repetitive intervallic pattern, he may also have been referring to the reorganisation of that pattern through symmetrical permutations. He writes, "The 1st atonal movement is constructed somewhat freely. It employs the augmented fourth, the major seventh and the minor second in a way that is *quasi systematic*." Original French: "Le 1er mouvement, atonal, est construit assez librement. L'emploi de la quarte augmentée, de la septième majeure et de la seconde mineure y est *quasi systématique*."

Mvt I, m. 1

Mvt III, m. 60

ff

1 4 5 6R 3R 2R

Example 5-7: The row of *Sonate pour violon et piano* is created by means of a modified open-fan permutation applied to the opening violin gesture of Mvt. I. Reversed pairs are indicated with (R)/dotted lines.

In Prévost's words, "the second movement, written in an improvisatory character, is a sort of large violin cadenza, interspersed within two piano appearances. Constructed of a twelve tone series, it prepares the third movement."²⁵¹ The word *prepare* is highly suggestive to the analyst: what exactly in the third movement requires preparation, and how is this accomplished? Keeping in mind that Prévost was studying composition with Henri Dutilleux and Messiaen concurrently, I suggest that the answer is best understood as a creative intermingling of Dutilleux's *croissance progressive* (progressive growth) and Messiaen's symmetrical permutations. Dutilleux described *croissance progressive* as a highly surreptitious method of thematic construction, in that the listener may only perceive the building process retrospectively,

²⁵¹ Prévost 1974, p. 32. Original French: "Le 2^{ème} mouvement, écrit dans le caractère d'une improvisation, est en quelque sorte une grande cadence au violon seul, entrecoupée de deux apparitions du piano. Construit sur une série de 12 sons, il prépare le 3^{ème} mouvement."

once the theme appears in completion.²⁵² Prévost's palindromic second movement is comprised of a series divided into four groups of three trichords that continually shift position with each new row statement, gradually revealing the final trichord arrangement through a *croissance progressive*. In this case, Prévost's twelve-tone series is analogous to Dutilleux's theme, and the symmetrical permutation of the trichords, the means of *croissance progressive*. This teleological reordering process, whose directed motion stems from the prescribed unravelling of the trichords during the retrograde half of the form, *prepares* for the eventual completion of the correct order of the theme, or series, finally obtained by the beginning of the third movement.

Each trichord appears a total of 24 times—4 in the prologue, 16 in the *partie médiane* (middle part), and 4 in the epilogue—according to a pre-determined order.²⁵³ Further, Prévost adds that the individual trichords, which he numbered 1, 2, 3 or 4, may be performed either forwards or backwards, but this choice of direction also complies with the overall palindrome, in that the epilogue is literally the retrograde of the prologue.²⁵⁴ The trichords are used untransposed throughout the movement, drawing the listener's attention solely to the permutation process and mirrored form.

Following Prévost's trichord designations, example 5-8 traces the trichord reorderings and the direction in which each trichord is performed, either forward (→) or backward (←).

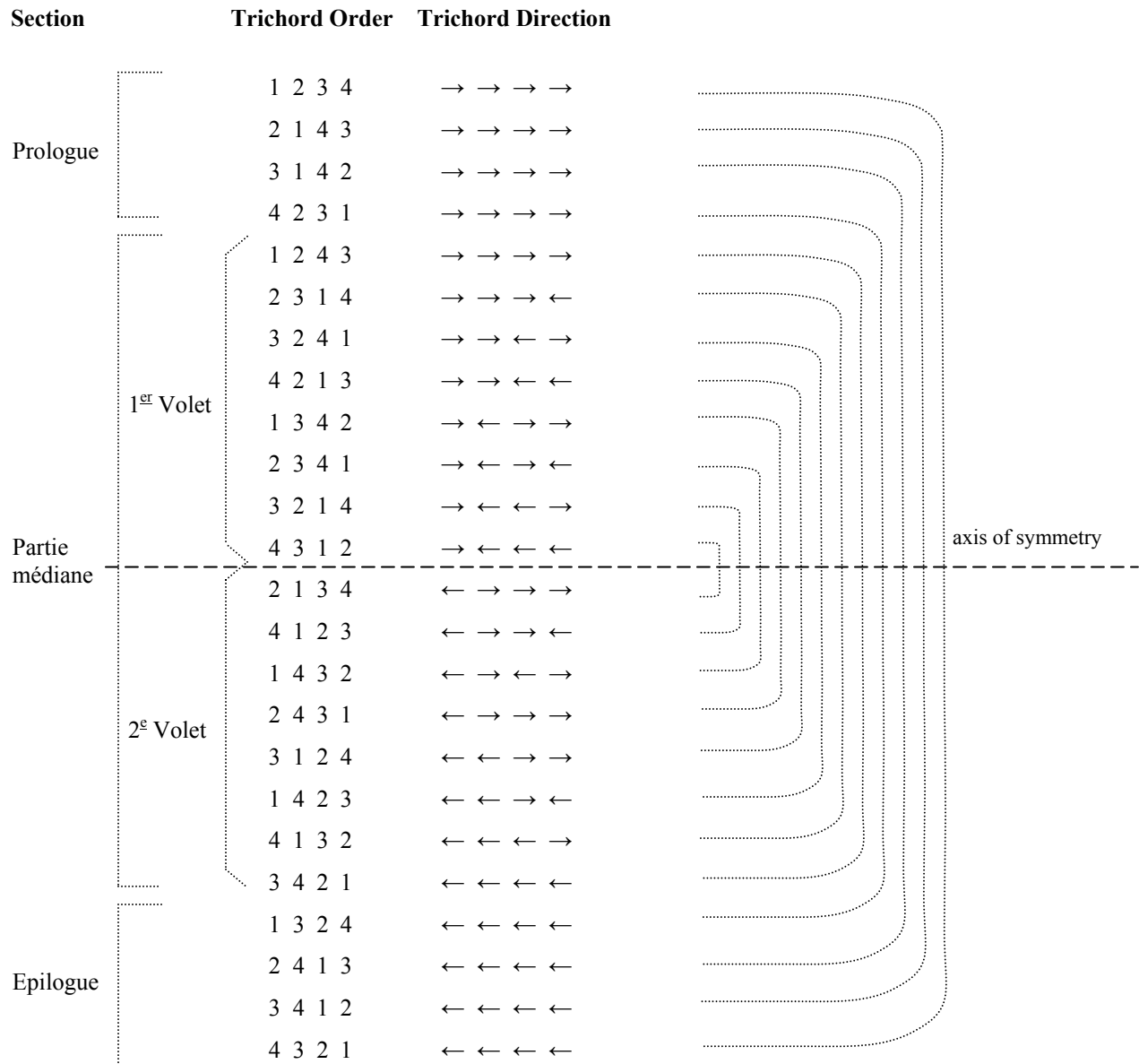
Although identifying the trichords is relatively simple, verifying their internal order is

²⁵² Caroline Potter, *Henri Dutilleux: His Life and Works*, Aldershot: Ashgate Publishing, 1997, p. 100.

²⁵³ Prévost 1974, p. 33. "Il en va de même des deux volets de la PARTIE MÉDIANE, les huit dernières présentations (présentations 13 à 20) étant la rétrogradation (repliement) des huit premières (présentations 5 à 12)."

²⁵⁴ Ibid. Original French : "Le morceau comprend un PROLOGUE, une PARTIE MEDIANE et un EPILOGUE. La série est tronçonnée en quatre groupes de trois sons et chacun de ces groupes obéit à une direction déterminée à l'avance. Ainsi, tout au long du mouvement, la série de 12 sons (toujours employée dans sa transposition originale) revêt à chaque apparition un nouvel aspect, les permutations des groupes de trois sons varient sans cesse. La série est répétée 24 fois : 4 fois dans le PROLOGUE (présentations 1 à 4), 16 fois dans la PARTIE MEDIANE (présentations 5 à 20) et 4 fois dans L'EPILOGUE (présentations 21 à 24). De plus les quatre présentations de cette série dans L'EPILOGUE sont la rétrogradation des quatre présentations du PROLOGUE, de sorte que cet EPILOGUE, sauf quelques licences, est le parfait repliement du PROLOGUE : mélodie, rythme, direction des hauteurs, nuances, etc."

significantly more challenging, as they are not always performed linearly on the violin, but sometimes as triple-stop chords. In these cases, it is the palindromic structure that leads us to an answer, for when Prévost composed a triple stop in one of the two palindromic halves, he composed a melodic trichord in the other.



Example 5-8: Palindromic trichordal organisation of *Sonate pour violon et piano*, mvt. II

Examples 5-9 and 5-10 demonstrate additional palindromes in the eight rows of the *I^{re} volet* of the *partie médiane*. The palindromic relationships involved here are not immediately evident as it is not the order of the segments that is mirrored, but rather the permutation process used to determine that order. Example 5-9 shows the trichord content of these eight rows and example 5-10 analyses the trichord orderings according to permutation types. The leftmost column of example 5-10 lists the last eight row forms, A through H (showing the order of the trichords), heard before the piece folds back upon itself and reinterprets these row reorderings as *interversions*, i.e. the way Messiaen obtained reorderings through symmetrical permutation of the trichords.

The second column describes the permutation that maps each *intervention* onto the next one in the chain. These permutations track the movement of the trichords in fixed pairs. The outermost trichords of the original row, 1 and 4 are always traced as an invariant coupling, as are the innermost trichords, 2 and 3.

I define three permutations, as follows: “Skip 1 → left/right pairs” moves the trichords in even-numbered positions into the first and second position, and the trichords in odd-numbered positions into third and fourth position (see first permutation that maps A onto B). “Left/right pairs → Skip 1” (permutation that maps C onto D in the example) is the near-inverse of that permutation, mapping left/right adjacent pairs onto non-adjacent ones, reversing the trichords in one of them (indicated by the dotted line). “Retrograde within pairs” simply reverses the trichords in both pairs.

<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
A G# Bb	G B F#	C F C#	E D Eb

A (1243) B (2314)
C (3241) D (4213) E (1342)
F (2341) G (3214)
H (4312)

Example 5-9: the eight row forms (A-H) featuring trichord segment reordering (1234), *Sonate pour violon et piano*, mvt. II

intversion (trichord order)	permutation type	4-intversion palindromes	8-intversion palindromes
A 	skip 1 → left-right pairs		
B 	retrograde within pairs		
C 	left-right pairs → skip 1		
D 	retrograde within pairs		
E 	skip 1 → left-right pairs		
F 	retrograde within pairs		
G 	left-right pairs → skip 1		
H 			

Example 5-10: An illustration of the 4- and 8-intversion palindromes in example 5-9

There are two palindromes indicated in the third column. The permutations producing *intversions* A through D are a mirror in which the first and third operations are the retrograde of one another, as indicated by the letter **R**, and they flank a central permutation, “retrograde within pairs.” *Intversions* E through H replicate the same permutation pattern. The fourth column casts the complete group of 8-intversions as a larger palindrome. The first and last permutations are each other’s retrograde, **R**, as are the third and fifth. The second and sixth are equivalent, where **P** indicates “prime.” The central “retrograde within pairs,” then, is flanked by

three pairs of permutations in a mirrored arrangement: ***R P R***. Notice that although the row's original trichord segment order (1234) never appears within a single *intversion*, it is nonetheless replicated in a slightly-removed level of the music's structure: if we consider each trichord to be a group and each *intversion*, a 4-segment hypergroup, the first trichords of all the *intversions*, read from top to bottom, project the (1234) ordering at the hypergroup level, twice in succession.

The structure of *Sonate pour violon et piano*, mvt. III is an early example of aspects of Prévost's structural designs that remain consistent throughout his career. The smallest constituent musical elements are integrated on several different formal levels so that each successive level exemplifies the symmetrical properties of the row itself, creating fit of each of these parts into the background formal structure of the entire movement. As in *Mobiles* (example 5-2) and the second movement (examples 5-9 and 5-10), prime (P), retrograde (R), inverted (I) and retrograde-inverted (RI) forms of the row are used only at the original pitch level as a means of focusing on reordering techniques within the series. Instead of a regular segmentation pattern of a fixed set of objects, however, those row forms that are involved in the retrograde process employ both direct and indirect additive/subtractive processes as segmentation procedure. This will be examined next.

I define a direct process as one that preserves the temporal space between repeated fragments by directly replacing pitches with rests of the same value. Example 5-11a demonstrates a direct subtractive process, during which pitches are gradually replaced by rests. Conversely, I define an indirect process as one that does not maintain the total temporal space of the fragment with each of its repetitions. Distinguishing between the two is primarily a matter of the manipulation of silence and its resultant temporal effect as perceived by the listener. If rests

directly replace ordered pitches, the tempo appears to remain constant. However, if additional rests are added, a rhythmic ritardando is inferred. Changes in the placement of rests within fragments also create subtle differences between statements identical in pc content that occupy the same total amount of time. In the indirect subtractive process of example 5-11b, the replacement of pitches with rests coincides with small reduction in total fragment length to keep a rest of approximately 4 eighths between the end of one fragment and the beginning of the next. This results not in an accelerando but is instead sufficient to maintain the passage's linearity or sense of propulsion.

A) Piano

B) Piano

Example 5-11: Subtractive processes that are A) direct; and B) indirect in *Sonate pour violon et piano*, mvt. III, A) mm. 124-135 and B) mm. 421-444

In example 5-12, section A (mm. 1-59) begins with solo violin and can be described as an indirect additive process executed upon O_9 . Since the series of pitches and rests neither fall within regular barlines nor have a stable meter at this point, they are shown in the example in

boxes of pitches and rests. Each new box represents either the beginning of an O_9 segment or the group of rests that follow each of these fragments. All pitches and rests have the duration of one eighth-note value.

A rhythmic *accelerando* starts with a single ordered pitch (I) and gains momentum through the gradual addition of the entire twelve-note ordered series $I-T$ as the space between the fragments (shown as γ , where each γ represents one eighth-note rest) generally decreases. The first three shortest segments are repeated. This repetition is indicated by sets of two dotted brackets encapsulated by a solid one. These sets include ($I, \gamma \times 9, I, \gamma \times 7$), ($I\gamma 23, \gamma \times 3, I, \gamma \times 4$) and ($I\gamma 234, \gamma \times 4$). The first four boxes are repeated as the second four boxes, and so forth. Once internal repetition is abandoned completely, a sense of urgency persists toward the teleological completion of the row. In the example, this process to the completion of O_9 is traced through the entire first section. The nine-fold statement of pitch I at the end of the process serves both as a structural divider and a signal of the completion of the additive process.

Violin (O):

$1 \text{ } \gamma \times 9$	$1 \text{ } \gamma \times 7$	$1 \text{ } \gamma \times 9$	$1 \text{ } \gamma \times 7$	$1 \text{ } \gamma 23$	$\gamma \times 3$	$1 \text{ } \gamma \times 4$	$1 \text{ } \gamma 23$	$\gamma \times 3$	$1 \text{ } \gamma \times 4$		
segment 1				repeat		segment 2				repeat	

m.15

$1 \text{ } \gamma 234$	$\gamma \times 4$	$1 \text{ } \gamma 234$	$\gamma \times 4$	$1 \text{ } \gamma 234 \gamma 56$	$\gamma \times 4$	$1 \text{ } \gamma 234 \gamma 567$	$\gamma \times 4$	$123 \gamma 45678$	$\gamma \times 2$
segment 3					repeat				

m.27

$123 \gamma 456789$	$\times 3$	$123 \gamma 456789t$	γ	$123 \gamma 456789t$	$\gamma \times 6$	$12345678teT$	11111111
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m.39

m.53

Example 5-12: An indirect additive process in the A section of *Sonate pour violon et piano*, mvt. III, mm. 1-59. The letters *t*, *e*, *T* correspond to the order numbers 10, 11, 12, respectively.

In section B (mm. 60-82), the completed series revealed between mm. 60-64 and mm. 83-112 is realised with a non-retrogradable rhythm (example 5-13). Its rhythmic pattern of four eighth notes, one eighth-note rest, and two eighth notes, reverses itself around a central eighth rest.

rhythm: $4 \text{ } 1 \text{ } 2 \text{ } 1 \text{ } 2 \text{ } 1 \text{ } 4$

opis: $+1 \text{ } -2 \text{ } -9 \text{ } -4 \text{ } +5 \text{ } +6 \text{ } -5 \text{ } -8 \text{ } +9 \text{ } +2 \text{ } -1$

Example 5-13: the series set as a non-retrogradable rhythm in *Sonate pour violon et piano*, mvt. III, mm. 60-61

Example 5-14 summarises section B of the movement. Because of the level of rhythmic complexity, only approximate attack points of pitches are given. The violin contains three full I_9 statements and concludes with a series of repeated pitches I and T . The piano, moving in much longer note values, completes only one R_9 row and leaves a $TEt9$ fragment unfinished at the end of the section.²⁵⁵

	m.60		m.67		m.79
Violin (I):	<div style="border: 1px dotted black; padding: 2px; display: inline-block;"> $1234 \uparrow 56 \uparrow 78 \uparrow 9tET$ </div> <div style="border: 1px dotted black; padding: 2px; display: inline-block;"> $1111 \uparrow \uparrow 1234567 \uparrow 89 \uparrow tE \uparrow T$ </div> <div style="border: 1px dotted black; padding: 2px; display: inline-block;"> $1 \uparrow 23333456666789999tETTTTTTTTTT$ 1111111111 </div>				
Piano (R):	<div style="border: 1px dotted black; padding: 2px; display: inline-block;"> $T \quad E \quad t \quad 9 \quad 8 \quad 7 \quad 6 \quad 6 \quad 6 \quad 5 \quad 4 \quad 3 \quad 2 \quad 1$ </div> <div style="border: 1px dotted black; padding: 2px; display: inline-block;"> $TEEE \quad tt \quad 9 \quad 9 \quad 9$ </div>				

Example 5-14: Section B of *Sonate pour violon et piano*, mvt. III, mm. 60-82

The beginning of section C (mm. 83-144) is marked by the establishment of a steady 3/8 meter in both voices (example 5-15). The incomplete piano $TEt9$ fragment ending section B progresses to a five-eighth-note ostinato of 87654 . This ostinato undergoes a direct subtractive process where pitches are gradually replaced with silences of equivalent duration until only one pitch, 5, is left. The piano part is now missing only 321 which is supplied by the violin part near the end of the section, so that both row forms end together. This effectively undoes the additive process of the violin in section A, creating a small quasi-retrograde ternary design. Small retrogrades are also found within the complete I_9 statements of the violin part itself in an

²⁵⁵ A sense of regular 3/8 meter is established by the violin but undermined by a 2:3 hemiola created by the 2/8 meter in the piano (example 5-14). The basic rhythmic pulse is further obscured as the violin moves entirely in eighth notes, while the piano has both eighth and dotted-quarter notes.

internally symmetrical $1234 \uparrow 56 \uparrow 78 \uparrow 9tET$ partition. This can be read in a symmetrical fashion similar to the successive ics and overall contour exploited in row construction.

	m.83				m.93							
Violin (I):	$1234 \uparrow 56 \uparrow 78 \uparrow 9tET$				$1234 \uparrow 56 \uparrow 78 \uparrow 9tET$				$1234 \uparrow 56 \uparrow 78 \uparrow 9tET$			
Piano (R):	87654	87654	87654	87654	87654	87654	87654	87654	87654	87654	87654	87
	cell rep. # (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12→)

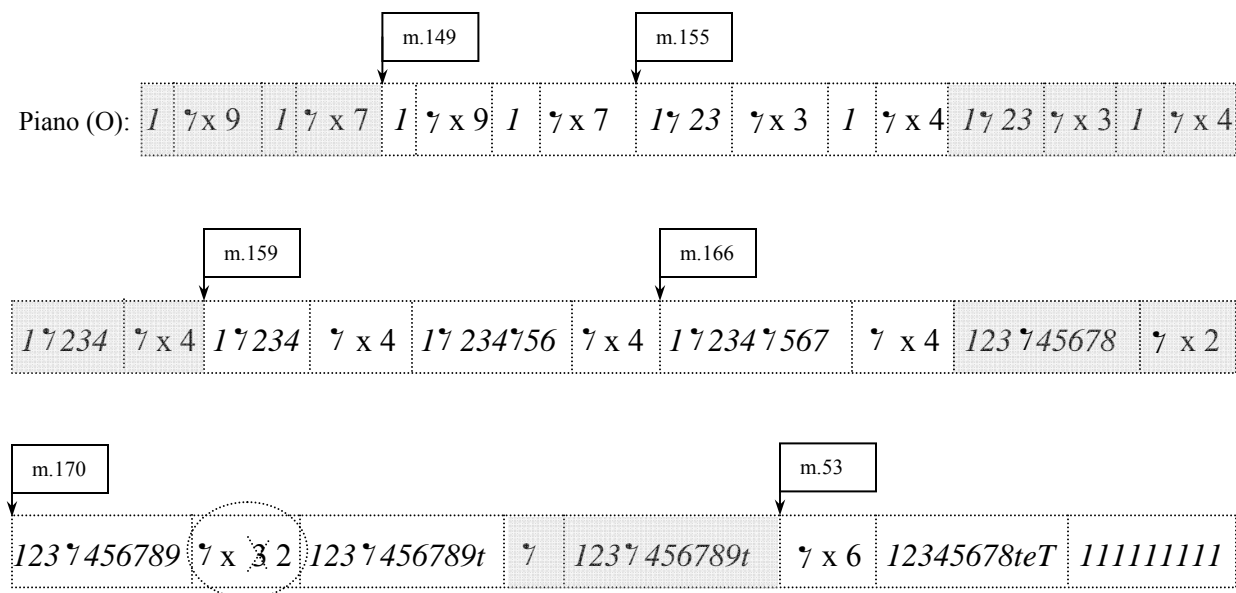
	m.103				m.113				m.122			
Violin (I):	$1234 \uparrow 56 \uparrow 78 \uparrow 9tET$				$1234 \uparrow 56 \uparrow 78 \uparrow 9tET$				$1234 \uparrow 56 \uparrow 78 \uparrow x 5$			
Piano (R):	654	87654	87654	87654	87654	87654	87654	87654	87654	87654	87654	87654
	←(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)

	m.128				m.134				m.142			
Violin (I):	$\uparrow x 5$	1234	$\uparrow x 5$	1234	$\uparrow x 5$	123	$\uparrow x 5$	123	$\uparrow x 6$	12	$\uparrow x 4$	1
Piano (R):	57	87657	87757	87657	87757	87757	87757	87777	87757	87757	77777	77757
	←(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)

Example 5-15: Section C of *Sonate pour violon et piano*, mvt. III, mm. 83-144

Section 5-D (mm. 145-188) is the last of the sections that collectively retrograde around the central, rather free sections, E and F. It is a rhythmic imitation in which the O-form of the row in the piano leads the R-form of the violin by six eighth notes, or two complete measures. Each voice features a complete statement and then immediately begins an indirect additive

process from one pitch (*I* in the piano and *T* in the violin) to twelve, still imitatively separated by two complete measures. This design directly parallels section A but takes approximately only two-thirds of the time if the first full statement before the additive process is omitted. Section A is 59 measures long, while section D is only 37 measures long. This shortening is primarily achieved by the removal of the repeated segments that occurred within the section. These omitted segments have been shadowed in gray below in example 5-16. The one exception is found shortly after m. 170, where only two rests are found within the circled fragment, as opposed to three.



Example 5-16: Comparing sections A and D: the violin part of section A (example 5-12) becomes the piano part of section D, when shaded segments are omitted. Section D, mm. 145-188, *Sonate pour violon et piano*, mvt, III

Section D is followed by two somewhat free sections, E and F (mm. 189-267 and mm. 268-283, not shown). These involve the reordering of the row through dyad and trichord permutations that recall earlier movements (examples 5-8, 5-9 and 5-10). At m. 284, sections A

through D run in reverse order (D to A) with the pcs and rests in retrograde within sections, as well. The original instrument assignments are exchanged so that the retrograde also assumes invertible counterpoint. Example 5-17 offers an abridged chart of the differences between the forward versions of sections A through D and their reversed forms. The most significant alteration occurs during the second iteration of section A. The piano performs the original violin part (mm. 400-458, example 5-12) as expected in retrograde, but the violin adds an ostinato to the texture as an accompaniment figure.

	Forward version	Reverse version (players switch parts)
1	Section D: piano and violin perform example 5-16 in canon	Section D, mm. 284-318, b. 2: first four measures of piano part are omitted.
2	Section C: 6 row statements in the violin	Section C, mm. 318, b. 3-376: 5 row statements in the violin
3	Section C: direct subtractive process in piano from 45678 segment to a single 4	Section C: Violin does not undergo reverse additive process: only repeats ostinato 87654
4	Section A: violin performs example 5-12	Section A: Piano performs original section A in retrograde, as expected, but violin adds an ostinato

Example 5-17: Differences between forward and reverse forms of sections A through D, *Sonate pour violon et piano*, mvt. III

The ostinato serves a practical role. In example 5-18b, the Eb₄ tremolo pedal is decorated by pitches E, 7, and 5. It is derived from the grace notes that began the first entry of the piano in section B, shown in example 5-18a. These grace notes, which were not included in the row analysis of the movement, finally fit into the formal retrograde-canon scheme in the chart of example 5-17, where each “forward version” of musical events is complemented by a “reverse version.”

A

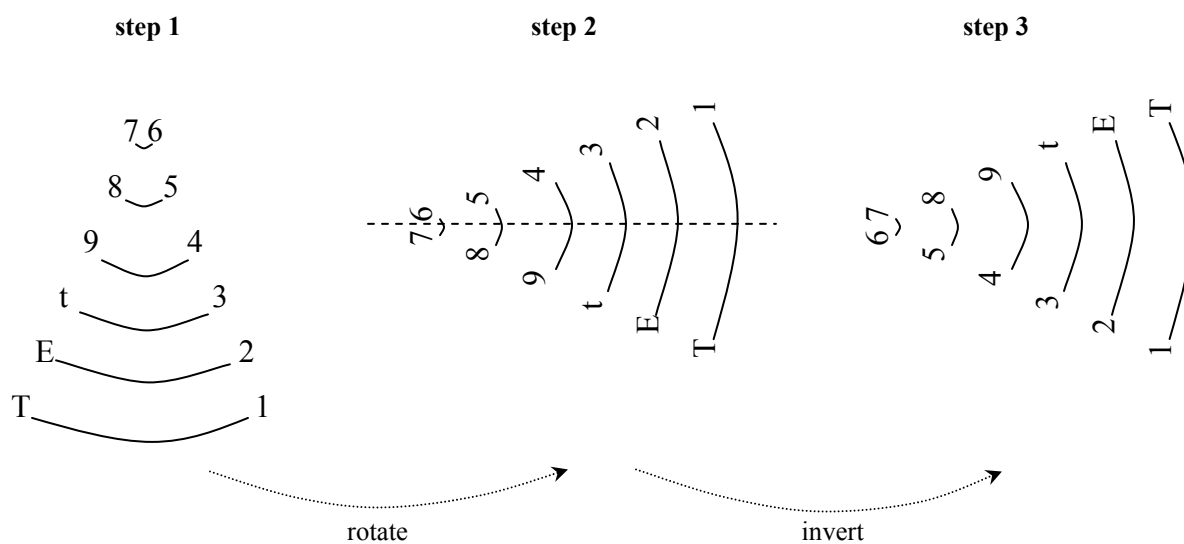
B

“R”

Example 5-18: the grace notes at m. 60 (**A**, at left) realised as the Eb pedal embellishment from mm. 407-53 (**B**, at right) in *Sonate pour violon et piano*, mvt. III

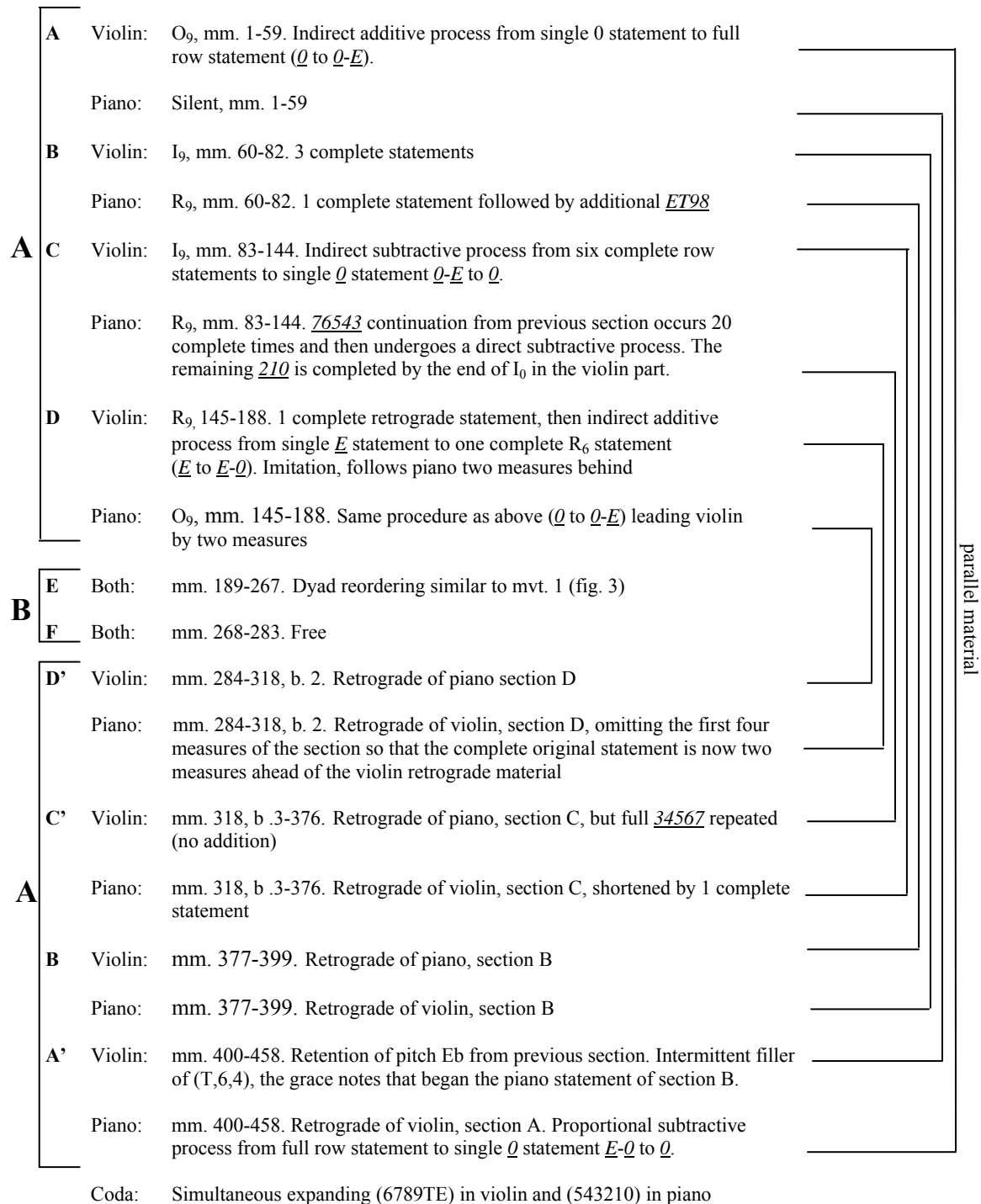
The short codetta in example 5-19a concludes the piece and effectively summarises both the symmetry of the row and the rhythmic presentation of the movement. Two measures of complete silence—the value of half of the row when realised in eighth notes—are followed by six eighth-note dyads. Order numbers (7, 8, 9, t, E, T) in the violin are mirrored by (6, 5, 4, 3, 2, 1) in the piano. The symmetrical piece ends as it begins with another open-fan permutation: the modified open-fan manipulation of the initial violin flourish (example 5-19b) unfolds through *croissance progressive* to form the work’s all-interval wedged series, while the work’s final complementary gesture consists of an inverted open-fan (I o-fan) permutation in the piano. As indicated in example 5-19b, if we rotate Messiaen’s graphic explanation of the open-fan permutation by 90° and invert it around the central axis of its order number pairs (7,6), (8,5), etc., we can reproduce Prévost’s codetta where both symmetrical halves are performed simultaneously by the piano’s two hands.

Example 5-19a: an I-open fan permutation (6, 7, 5, 8, 4, 9, 3, t, 2, E, 1, T) in the coda of *Sonate pour violon et piano*, mm. 461-463



Example 5-19b: step 1) Messiaen's open-fan diagram from the *Traité*, vol. III, p. 325; step 2) rotated 90° to the right; and step 3) inverted.

In *Sonate pour violon et piano*, symmetry is a holistic guiding principle behind the composition of the entire second and third movements: the symmetry that is prevalent in several of his rows is translated into the background structure of large retrograde-cans shown in example 5-20. Recalling that the row used in this piece is its own retrograde at T_6 (example 5-5), one finds that these movements are similarly their own literal retrogrades, paralleling the symmetrical properties of the original row construction.



Example 5-20: Form diagram of *Sonate pour violon et piano*, mvt. III

Prévost's next Parisian composition was *Quatre Préludes pour deux pianos* (1961). The preludes exhibit retrograde and inversional symmetry on several different formal levels, similar to those in *Sonate pour violon et piano*. In the score notes, the composer characterised the first prelude as "a form of contraction and widening of durations using octaves and chords. It can be described as a study of sonorities and durations."²⁵⁶ Yvon Couture, a composer and employee of Le Centre de musique canadienne/Canadian Music Centre in Montréal, explains the mirror aspects of the prelude in a research paper that he submitted for a research seminar, *Histoire de la musique canadienne*.²⁵⁷ Couture had studied with André Prévost at Université de Montréal immediately before the professor retired. In 1996, the young composer studied the *Quatre préludes* under Prévost's direction in an *Analyse d'œuvre musicales du XX^e siècle* seminar and then prepared his 1997 research paper under Prévost's direction.

Couture notes that like many of Prévost's pieces, the prelude is in a small serial ABA' form whose outer A sections create a structural mirror. A popular feature within Prévost's oeuvre, this formal property is replicated on the smallest and most localised structural level, the series.²⁵⁸ In the work, the composer used two serial hexachords with order numbers 1 through 6, as opposed to a single dodecaphonic series. He described the hexachords, which I have labeled A and B in example 5-21, as alternating augmented and perfect fourths. These two groups are microstructural mirrors of one another; for when one interval in hexachord A ascends, the

²⁵⁶ André Prévost, *Quatre préludes pour deux pianos*, Saint-Nicolas, QC: Doberman-Yppan, 1986, p. 2. "Le premier est un jeu de resserrement et d'élargissement des durées, utilisant octaves et accords. Il peut être décrit comme étant une étude de sonorités et de durées."

²⁵⁷ Yvon Couture, "Analyse d'une œuvre d'André Prévost : Quatre préludes pour deux pianos, Prélude no 1" (research paper submitted for Professor Marie-Thérèse Lefebvre's Winter 1997 research seminar, *Histoire de la musique canadienne*, l'Université de Montréal). A copy of Couture's paper has been deposited at Library and Archives Canada. Stéphane Jean, *The André Prévost Fonds: Numerical List*. (Ottawa, Canada: National Library of Canada, 1997).

²⁵⁸ Ibid, p. 1. "En effet, nous retrouvons ici une pièce de type A-B-A utilisant un langage sériel. Le schéma suivant montre clairement comment le découpage de la partition se présente : Ce qu'il y a de particulier dans cette forme, c'est que les parties A et A' ont été traitées en miroir, un autre grand trait de la musique d'André Prévost. Par ailleurs, pour bien comprendre pourquoi il s'agit d'un miroir, il faut d'abord connaître la série mélodique de base utilisée dans la pièce ainsi que la structure rythmique."

corresponding interval in hexachord B descends.²⁵⁹ These mirror effects of these inverted opis results in inversely-related contour segments (c-segs).²⁶⁰

<p>opis: -6 -5 +6 -5 -6</p> <p>A</p> <p>c-seg: < 5 3 1 4 2 0 ></p> <p>order #: 1 2 3 4 5 6</p>	<p>opis: +6 +5 -6 +5 +6</p> <p>B</p> <p>c-seg: < 0 2 4 1 3 5 ></p> <p>order #: 1 2 3 4 5 6</p>
--	--

Example 5-21: Inversely-related serial hexachords A and B, *Quatre préludes pour deux pianos* (1961), no. 1

In section A, the hexachords are used as the basis of two different cells, *x* and *y*, shown in example 5-22. The cells are bracketed above the system and cell *x* areas are additionally shaded for contrast. Order numbers corresponding to members of cell *x* are set in boldface and italicised type whereas those of *y* are in regular type. The hexachord designation, either A or B, is provided to the left of each staff. Couture notes that cell *x* appears one pc at a time in longer-value octaves and gradually produces hexachord A or B in a disjointed but successive manner. In cell *y*, the outermost voices of the shorter-value chords—the soprano voices of the right hands and bass

²⁵⁹ Couture 1997, pp. 2-3. “Dans l’exemple qui suit, nous constatons que ce qui semble une série de douze sons est en fait deux séries de six sons constituant le total chromatique, autre élément cher au compositeur. Mélodiquement, on voit que Prévost a utilisé alternativement des quartes augmentées et des quartes justes, ascendantes ou descendantes. Ainsi, dans la structure micro, le miroir fait son apparition : lorsque, dans la série 1, une quarte augmentée est descendante, on observe que l’intervalle de quarte augmentée de la série 2 joué simultanément sera ascendant.”

²⁶⁰ Elizabeth West Marvin and Paul A. Laprade, “Relating Musical Contours: Extensions of a Theory for Contour,” *Journal of Music Theory* 31, no. 2 (Fall 1997): 225-67. Contour segments assign order numbers according to pitch height. The digit 0 always represents the lowest pc of the group, and in this case, 5 is the highest. Within a mod-5 cycle then, inversion is calculated by subtracting each digit of the first contour segment <531420> from 5, leaving <024135>, which is the second hexachord.

voices of the left that are boxed in the example—progress through several pcs of either hexachord A or B.²⁶¹

Although Couture conceived the cells as alternating entities of equal structural weight, they actually give rise to distinct formal levels articulated by two concurrent but independent processes. Cell *y* replicates hexachords A and B in a “foreground” manner in that it completes its segments immediately; but the disjunction and temporal separation of members of cell *x* comprise a farther-reaching composed-out middleground projection.²⁶² The foreground layer of the outermost voices, the boxed segments of the right hand of piano 1 (RH 1) and the left of piano 2 (LH 2), undergo a reductive process by which the descending order-number segment 6, 5, 4, 3, 2, 1 loses its first digit on each subsequent iteration, becoming 5, 4, 3, 2, 1 and then 4, 3, 2, 1, until only order number 1 remains. RH 1 contains the pcs of hexachord A, while LH 2 contains those of B. The innermost voices, the left hand of piano 1 (LH 1) and the right one of piano 2 (RH 2), employ the same process in the reverse direction. The segment of ascending order numbers 1, 2, 3, 4, 5, 6 successively lose their first and lowest digit, with hexachord A in RH 2 and B in LH 1. Meanwhile, the middleground articulation of the hexachords interjects between each step of this foreground process, one pc at a time, simply stating ascending order numbers 1 through 6.

²⁶¹ Couture 1997, p. 3. “Le compositeur a utilisé cette série de deux façons différentes dans les sections A et A’. Ces parties sont divisées en six groupes qui se subdivisent à leur tour en deux groupes distincts que nous pouvons identifier comme *x* et *y*. Dans chaque cellule *x* de la partie A, chacun des pianos fait entendre une note de chaque série jouée en octave. Dans la section *y*, nous retrouvons, à la basse et au soprano de chaque piano, les deux séries de six sons avec leur rétrograde. [...] Autre point qui différencie *y* de *x*, est que si dans *x* on entend qu’un seul son à la fois, les six structures s’additionnant pour former la série totale, *y* enlève un son à chaque réapparition pour se terminer sur un seul accord de douze sons.”

²⁶² I have designated cell *x* as a middleground since it reinforces the same projection already resulting from the +1/-1 process within cell *y*. Notice that the first order number of each new foreground cell *y* slowly composes-out the hexachord order numbers, from 1 to 6 or 6 to 1 (i.e. as circled in RH 1 of example 22).

original set (6, 5, 4, 3, 2, 1), for values ≤ 1 and ≥ 6 . This results in (5, 4, 3, 2, 1, 0), of which 0 is not a valid member of the set and so it is dropped, reducing the number of members of the set by 1. The process is repeated upon the resulting (5, 4, 3, 2, 1), (4, 3, 2, 1) etc., until the set is empty. Conversely, the foreground cell y sections of LH 1, RH 2 and all cell x middleground projections adhere to a +1 chain for the set (1, 2, 3, 4, 5, 6), yielding (2, 3, 4, 5, 6, 7), (3, 4, 5, 6, 7, 8), etc., where values ≤ 1 and ≥ 6 are similarly dropped from the set.

The rhythmic process works in a similar fashion. Couture describes a rhythmic process that determines the ordered series of durations; each iteration of cells x and y becomes one sixteenth note less than the previous in the series.²⁶³ The durations, like the hexachords, follow a repetitive chain of -1 operations. The rhythms setting the foreground cell y begin with a dotted quarter and conclude with an eighth, and those corresponding to the middleground cell x span the range of a half note plus a dotted eighth to a quarter plus an eighth. Messiaen explored successfully these types of rhythmic spectra, starting with chains of durations where each is one sixteenth less in value than the previous. Robert Sherlaw Johnson cites *Île de Feu II* and *Chronochromie* as examples of this type of -1 chain. He writes:

A consequence of the addition and subtraction of rhythmic values to be found in Messiaen's later music (from the time of *Vingt Regards*—1944) is the type of rhythm which features progressively increasing or decreasing values. The opening and closing passages of "Regard des prophètes, des Berger et des Mages" and of "Regard de l'onction terrible" both provide examples of this type of rhythm. The first of these pieces begins with a series of durations in the left hand, diminishing from sixteen semiquavers

²⁶³ Couture 1997, pp. 4-5. "Par ailleurs, musique sérielle oblige, le miroir est encore utilisé de deux autres manières. En premier lieu, sur le plan rythmique, la série x montre deux attaques entre les octaves. A chaque nouvelle répétition de la cellule, la différence entre la première attaque et la seconde est, chaque fois, augmentée d'une double croche. Dans le cas de y, le délai entre la première et la deuxième attaque d'un accord débute par six doubles croches auxquelles sera retranchée la valeur d'une double a chaque reprise de la cellule pour en arriver à une différence de cette même valeur entre les attaques. [...] On pourrait également faire mention de la présence dans l'œuvre, d'une construction sérielle des durées. En effet, les notes explicatives contenues dans la partition mentionnent que le premier prélude est 'un jeu de resserrement et d'élargissement des durées'. On constate cela lorsqu'on observe que, dans y 1, la durée des accords est égale à six doubles croches, dans y 2, elle est de cinq et ainsi de suite jusqu'à une seule double croche dans y 6. A' fait évidemment le contraire : y 1 avec une double croche se terminant en y 6 avec six doubles croches pour la durée."

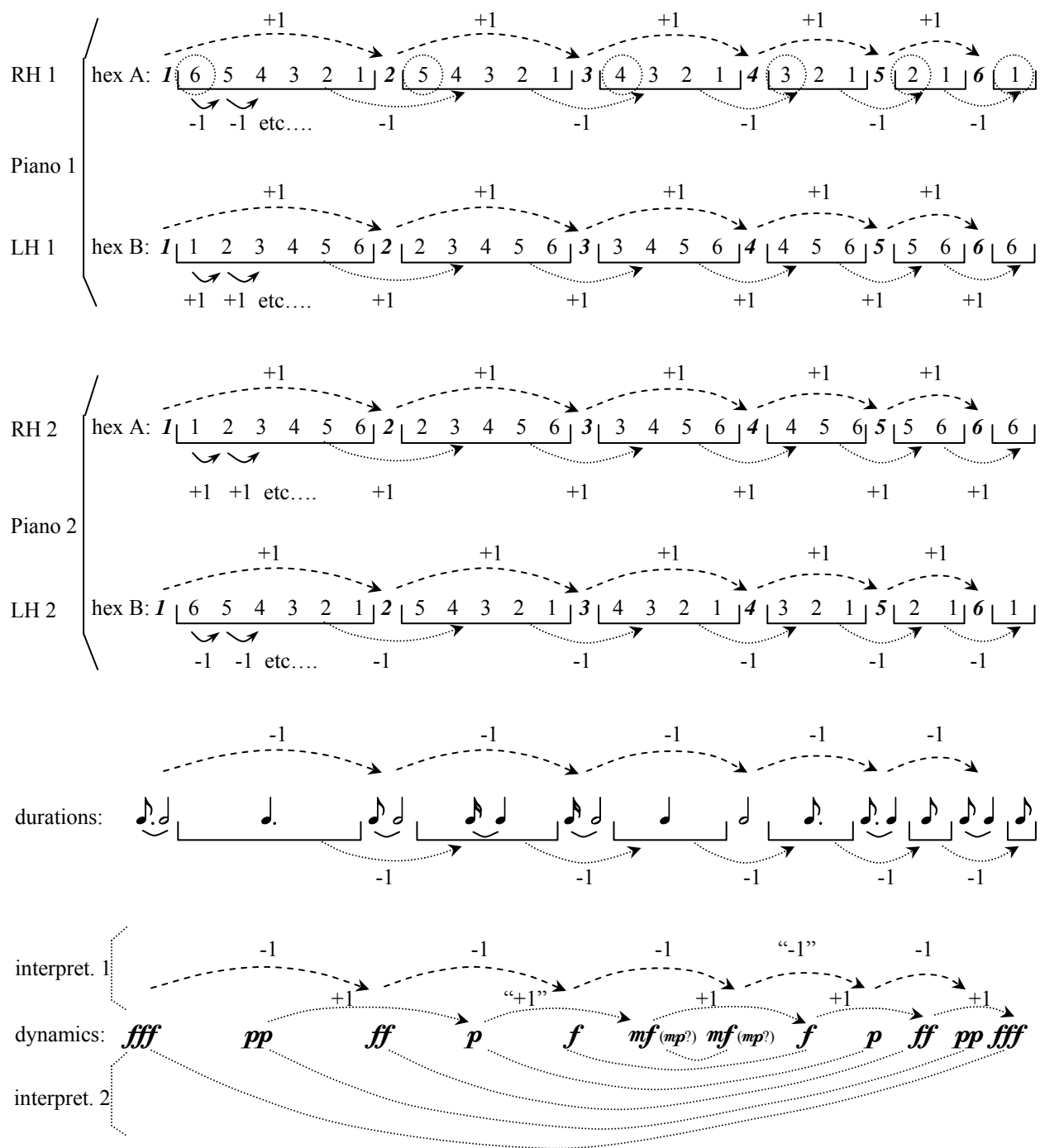
in length to one semiquaver by the successive subtraction of one semiquaver from each value. At the beginning of ‘Regard de l’onction terrible’ the same rhythm is superposed on its retrograde. For Messiaen, the next step was to permute a series of such values to apply the same permutation cyclically until the original series returns one again.”

Ideologically, Prévost has also borrowed the concept of *les réinterversions symétriques*, or “limited symmetric reinterversions”, but applied it in a slightly different manner. As Johnson describes, Messiaen created a chromatic gamut of durations through a -1 chain of sixteenth notes. He then applied symmetric reinterversions to that gamut, which involved the application of “the same order of permutations to what has already been permuted a first time, and begin again the same operation until finding the durations once again in their original positions.”²⁶⁴ Messiaen applied the same symmetrical permutation until its reordering potential was exhausted.²⁶⁵

But, Prévost has not used the -1 chains to create the chromatic gamut of durations that later undergoes permutation; instead he applied the concept of symmetric reintervention to the -1 gamut itself. Therefore, the point of exhaustion is not defined by obtaining the maximum number of unique permutations, but the maximum number of statements of cell *y* that are possible before the set is reduced to a null set with 0 members.

²⁶⁴ Messiaen, *Traité*, vol. I, p. 28. “On peut même appliquer volontairement le même ordre de permutation à ce qui avait déjà été permuté une première fois, et recommencer la même opération jusqu’à retrouver les durées à leurs places initiales.”

²⁶⁵ Messiaen most often applied the principle of limited symmetric réinterversions to his open- and closed-fan permutations, creating ten unique interventions. In his above quote, Johnson mentions two such examples of open-/closed-fan: *Île de Feu II* (1949-50) and *Chronochromie* (1959-60).



Example 5-23: +1/-1 processes working upon the boxed outer voices of example 5-22

Several concurrent hierarchical *repliement* structures are present in the prelude, as they were in *Sonate pour violon et piano*. The +1 and -1 operations are essentially foils of one another. The +1 of LH 1 and RH 2 in a central pitch range mirrors the -1 of the outer RH 1 and LH 2 at the keyboard's extremes. The horizontal axis of symmetry that runs through the middle of both piano parts is replicated on the background level of form, as well. The reductive process typifying section A is retrograded in section A', where the size of the foreground cell y grows from the null set to the full hexachord, one member at a time.²⁶⁶ Couture mentions that the dynamics associated with foreground and middleground hexachord projections in section A are likewise retrograded, along with the +1 and -1 processes, in section A'. He does not, however, discuss any forms of symmetry or process associated with their ordering within each of these sections.

Example 5-23 shows two possible explanations for the duration series. Interpretation 1, above the dynamics, offers a reading that aligns with the reduction process of hexachords A and B on the foreground and middleground level: the foreground level dynamics increase by increments of +1, mirrored by the successive middleground decrease of -1. The only problem with this interpretation is the composer's decision to jump from *mf* to *p* or vice versa, hence the quotation marks around "+1" and "-1". The second interpretation, provided below the dynamics, reads their arrangement as its own arch, inversionally-symmetrical around its middle. This

²⁶⁶ Couture 1997, pp. 3-4. "Dans la partie A', c'est l'inverse qui se produit : on commence par y au lieu de x. On remarque que y ne fait plus entendre d'accords mais bien les notes de la série jouées en octaves. Chaque nouvelle répétition de la cellule y ajoute une nouvelle note de la série. A sa dernière répétition, la cellule y fera donc entendre la série complète. De cela, on peut facilement déduire que x fera entendre des accords de douze sons et qu'à chaque retour de la cellule, ces accords seront basés sur une nouvelle note de la série. Ainsi x fera la série complète, après les six répétitions de la cellule."

second analysis allows for a potential misprint of *mf* in favour of *mp* to fix the inner consistency of the pattern.²⁶⁷

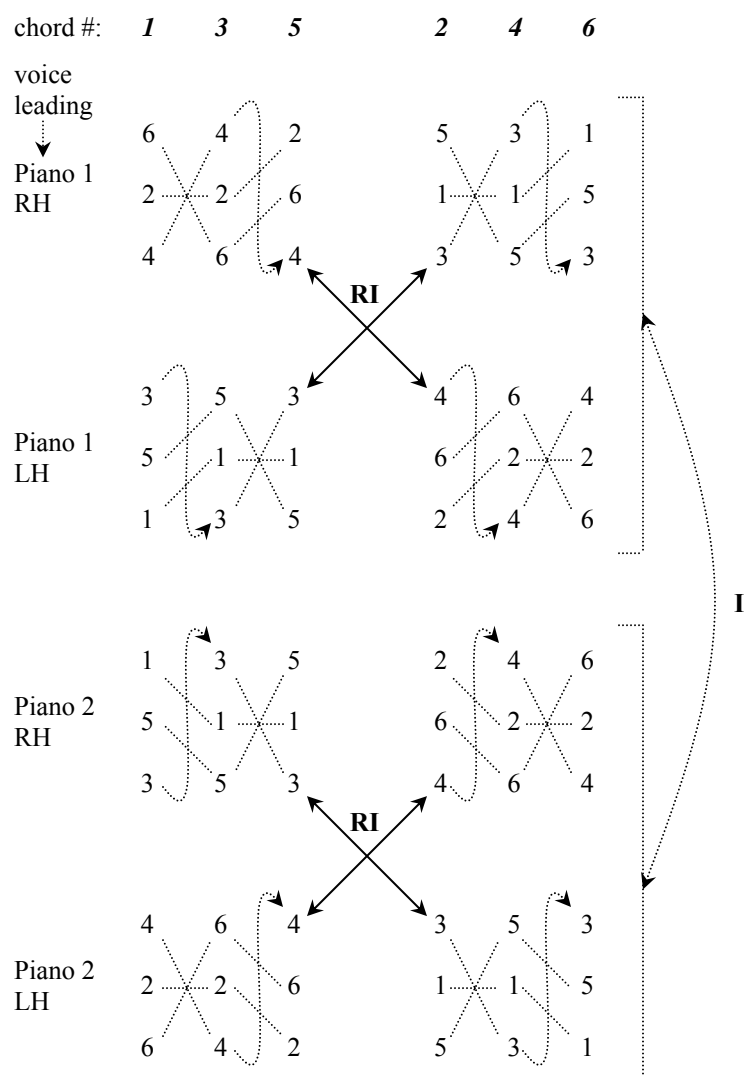
Couture does not mention the inner voices but notes that between the four hands, “each chord contains the complete series of twelve pitches.”²⁶⁸ The aggregate is partitioned into three combinatorial [012] trichords. In the second measure of example 5-22, the left hand of piano 1 contains the trichord (A#, B, C), order numbers 5, 3 and 1 of hexachord B; followed by (E, F, Gb), order numbers 6, 4 and 2 of hexachord B. Together, these two trichords replicate mode 5⁶. The right hand of piano 1 contains the complement, mode 5³, partitioned into trichords (G, G#, A), order numbers; followed by 2, 4 and 6 of hexachord A (C#, D, Eb), order numbers 1, 3, 5. In “Boulez multiplication” then, each hand contains [06] * [012] = [012678], and the hands together produce the aggregate through [03] * [06] * [012].

The voice leading within and between trichords adheres to the same strict degree of multi-hierarchical symmetry as the other previously discussed musical parameters. Example 5-24 traces the “inversion” of each trichord in their two order number groupings (1, 3, 5) and (2, 4, 6) across the first statement of the foreground cell y, mm. 2-3. The six chords in the left and right hands have been verticalised, those in the right hands are shifted back to the left by a dotted quarter through the elimination of the first rest in m. 2. In order to map like trichords onto like, chords 1, 3 and 5 are positioned in the left column, while chords 2, 4 and 6 are positioned to the

²⁶⁷ Couture 1997, p. 4. “D’autre part, en ce qui concerne les dynamiques utilisées, la cellule x commence par un triple forte pour se terminer par un double piano alors que y fait exactement l’inverse. Dans A’, x et y reprendront ces procédés en miroir comme dans le cas des notes et des accords dont il a déjà été question.”

²⁶⁸ Ibid, pp 3-4. “Fait intéressant, chaque accord formé sur les notes de la série donne les douze sons, donc le total chromatique. [...] Toujours concernant la série, un point important est à noter en ce qui concerne le total chromatique des accords : le premier accord entendu à la main gauche de la section y ne contient que six sons mais le total des douze sons est complété par le dernier accord entendu à la main droite de cette même section.”

right. The voice-leading template tracing each trichord's inversion changes in example 5-24 accompanies the outer-voice +1/-1 processes outlined in example 5-23.



Example 5-24: pc mapping of foreground cell y shown in example 5-22, mm. 2-3

In the RH of piano 1, chord *1* is “inverted” to create chord *3*, just as chord *2* is “inverted” to become chord *4*. Chords *3* and *4* both rotate inversions, shifting each of its pcs upwards by one position and cycling the soprano back down to the bass. The LH of piano 1 mirrors the RH with a retrograde-inverted voice leading pattern, its *repliement*.²⁶⁹ On a second level of formal structure, the voice leading of pianos 1 and 2 are one another’s inverse, matching the same inversional relationship of the +1/-1 processes of the outer voices in example 22.

Concerning his second prelude of the *Quatre préludes*, the composer states that it is “a counterpoint in canon form between the two pianos, whose elements are recapitulated in the central part, played very slowly and pianissimo, in contrast to the remainder of the piece. It is in fact a study of imitation.”²⁷⁰ Example 5-25 features three four-note segments *1*, *2* and *3*. Starting in m. 3, the bottom-most staff leads the top, in canon, by one beat. Segment *1* serves a harmonic function in mm. 1-5, while soprano segment *3* echoes the bass segment *2* in inversion. Segments *3* and *2* then exchange places through invertible counterpoint so that *2* echoes *3*. This entire three-voice relationship between accompaniment and imitative voices rotates one position to the right in m. 6 as *2* becomes the harmonic voice in mm. 6-11, while *3* begins by echoing *1* before, again, exchanging roles.

Despite the fact that the tetrachords in this movement are not symmetrical, the layering of the ascending melodic figures and static accompaniment creates a somewhat regular pattern of rotation that constitutes the middleground level of transformation. In this case, the rotation is not applied to a discrete element or ordering of elements but to the contrapuntal combinations formed by the temporal overlap and relative staff positions of the tetrachords at any given time. The rotation is equivalent to the technique of invertible counterpoint. The subject and

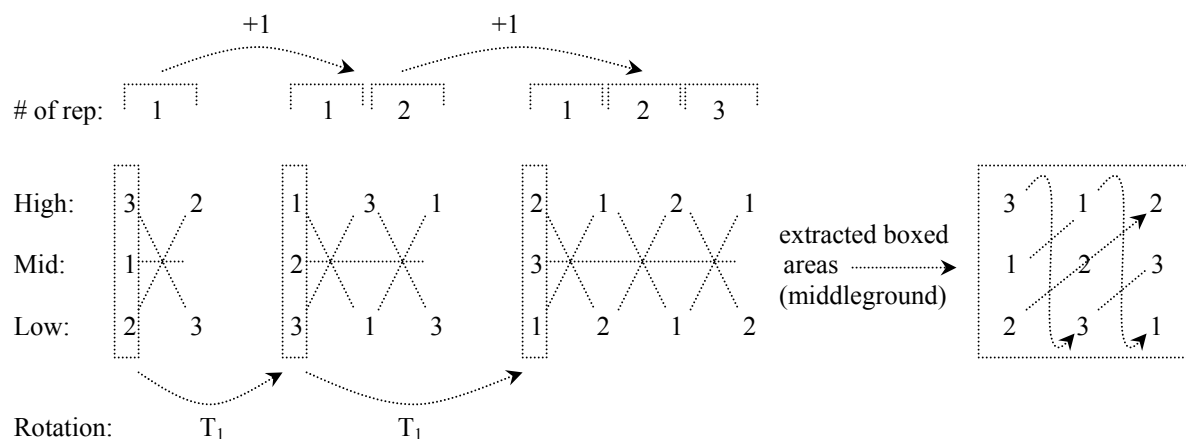
²⁶⁹ The inversions of the LH may also be thought of as a rotation of those in the RH. Reading from the bass upwards, the RH1 chord 1 (2, 4, 6) is shifted one position to the right in the LH 1 chord 2 pattern, for example.

²⁷⁰ Prévost 1986, p. 2.

countersubject switch positions and are regulated by the regular rotation pattern discussed in example 5-26.

<i>1</i>	<i>2</i>	<i>3</i>
1 2 3 4	1 2 3 4	1 2 3 4
E F G Bb	B Ab Eb C	C# F# A D

Example 5-25: Tetrachord segmentation in *Quatre préludes*, no. 2, mm. 1-8



Example 5-26: Rotation to the right (T_1 transposition) of contrapuntal combinations of example 24 on foreground and middleground levels

The first section of the excerpt, explained as a three-voice contrapuntal combination in example 5-26, is heard as a static inner voice sustaining the 1 tetrachord of the row; the highest voice performing tetrachord 3 followed by 2, and the lowest voice in the texture mirroring the highest by reversing its order of tetrachords, 2 followed by 3. The first box and x-shaped voice leading exchange represents this three-voice combination on the foreground level of structure. The second and third combinations are a rotation one tetrachord up/to the right (T_1) of the original, within a modular-three cycle.²⁷¹ Each rotation/new contrapuntal combination adds one additional invertible counterpoint exchange of the outer voices as a second developmental process of the material. The first combination contains one exchange; the second, two; and the third, three.

The boxed combinations that initialise each new section of the prelude are extracted to the right. These extracted combinations represent the middleground level of structure that is

²⁷¹ The term modular refers to the base of a numerical system. Just as the twelve-hour clock repeats its cycle of numbers after twelve hour increments, a mod 3 system would repeat its cycle of three numbers after three increments. Here, if we add 1 to each of the three digits, 1 becomes 2, 2 becomes 3, and 3 is rotated back to 1. Conversely, a rotation to the left, or down, would be equivalent to T^{-1} .

projected through the regular T_1 rotation process. The middleground and foreground are connected replications by virtue of their symmetrical properties of continuous process; although the process of rotation itself does not involve a reversal or mirror of a set of objects, it is nonetheless symmetrical by means of its predictable regularity and resulting balanced proportion.

The series of the third prelude in example 5-27 is very similar to that of *Sonate pour violon et piano* (example 5-5) in several ways. The row contains symmetrical ordered pitch intervals (opis) from its outer edges to its middle, but the direction of these opis are not inverted, so the row must not only be retrograded but also inverted as well to reproduce itself. Symmetry, in this case, is represented by the same contour direction and value between each pair of pitches in the series, matching a corresponding value equidistant from the other end of the row. The row consists of an ABA design of three [0123] segments, the first of which is identical in pc content to the first tetrachord of the *Sonate*. The pcs begin and end in a wedge formation, although this is somewhat obscured by the chosen octave designation. The two outer tetrachords map onto one another in pitch space (ps) at RI_9 .

ics: 1 2 3 4 1 1 1 4 3 2 1
 opis: +11 +2 +9 +8 -11 +13 -11 +8 +9 +2 +11

[0123] [0123] [0123]

RI_9

Example 5-27: symmetrical series in *Quatre préludes*, no. 3

The most salient feature of the third prelude is the employment of Hindu rhythms within a large-scale *repliement* form. As the composer states, “the third prelude, slow and meditative, is punctuated with [*sic*] persistent notes and reveals [...] durations and sonorities. Varied Hindu rhythms are featured here and are given the composer’s personal treatment.”²⁷² Archival sketches, such as the one reproduced in figure 5-1, shed light on the composer’s methodology.²⁷³ Specifically, they clarify the combination of three *tâlas* – *lakshniça*, a favourite rhythm of Messiaen, *varnagâti* and *kaladhvani*.²⁷⁴ The numbers written next to each name (88, 100 and 113) match those provided in Messiaen’s list—the same list that Garant used when choosing the *Candrakalâ tâla* for his 1952 *Variations pour deux pianos* (example 3-16). Prévost assigned an attribute to each of his three rhythms. *Lakshniça* is used to represent the descent of a goddess’ peace and calm, *varnagâti* demarcates the ends of melodic fragments, and *kaladhvani* accompanies very quiet sonorities.²⁷⁵

²⁷² Prévost 1986, p. 2.

²⁷³ *Les Fonds André Prévost*, Ottawa, ON: Library and Archives Canada, MUS 264/D4,18

²⁷⁴ Johnson 1975, p. 34. Johnson spells “*lakshniça*” as “*lackskmîça*”.

²⁷⁵ Over *lakshniça*, Prévost has written, “Paisible comme la paix qui descend de la déesse;” over *varnagâti*, “l’arrêt de la mélodie;” and over *kaladhvani*, “sonorité très douce.”

The image displays four musical rhythms, labeled A, B, C, and D, each on a single staff with a treble clef. Brackets above the notes indicate the constituent parts of each rhythm.

- Rhythm A:** In 10/8 time. It consists of a 10-beat sequence. Brackets indicate it is composed of Lakshniça (beats 1-4), Kaladhvani (R) (beats 5-8), and Varnagâti (R) (beats 9-10).
- Rhythm B:** In 10/8 time. It consists of a 10-beat sequence. Brackets indicate it is composed of Varnagâti (R) (beats 1-4), Kaladhvani (R) (beats 5-8), and Varnagâti (R) (beats 9-10).
- Rhythm C:** In 9/8 time. It consists of a 9-beat sequence. Brackets indicate it is composed of Kaladhvani (R) (beats 1-3), Varnagâti (R) (beats 4-5), Kaladhvani (R) (beats 6-7), and Varnagâti (R) (beats 8-9). A 5:9 ratio is indicated between the first and second measures.
- Rhythm D:** In 10/8 time. It consists of a 10-beat sequence. Brackets indicate it is composed of Varnagâti (beats 1-4) and Varnagâti (beats 5-8).

Example 5-28: combination of lakshniça, varnagâti and kaladhvani tâlas creating rhythms A, B, C and D in *Quatre préludes*, no. 3

Rhythm A is primarily an overlap of the augmentations of lakshniça (forward) and kaladhvani (retrograde), minus its last duration. The rest could be explained by an extra layering of varnagâti (retrograde augmentation: $\text{♩} \text{♩} \text{♩} \text{♩}$), minus one of the values of a dotted eighth. In this case, the dotted-eighth rest stands in for the second duration, and working backwards, the two dotted quarters follow. Rhythm B is the augmented/retrograde combination of varnagâti and kaladhvani described above. Rhythm C is a repeated figure that runs through the middle B section of the ABA' form. It appears to have been created through an inexact rendition of retrograde versions of kaladhvani and varnagâti. In the second measure of C, the short-short-

long-short-long (SSL) of kaladhvani runs backward from the sixteenths, a point of overlap with varnagâti, which runs backward from the end of the following short-short-long-long (SSL) pattern. This interpretation gains further support from Prévost's intention to use the varnagâti tâla as a termination figure as shown in the sketch in figure 5-1, and the fact that an inexact augmentation of the varnagâti rhythm is used prominently elsewhere. The inexact augmentation of varnagâti in the first measures of rhythm D is actually used much more frequently in the prelude than the exact augmentation in the second measure.

Example 5-29 is a rhythmic reduction of the two main voices of the prelude. It shows that of the total 38 statements of rhythm D, the exact augmentation appears only 5 times (marked with an asterisk). The inexact version nonetheless retains its varnagâti identity through preserving the characteristic long-long-short-short (LLSS) pattern. The characteristic rhythms A, B and C are transcribed on the upper staff against D, a varnagâti rhythmic pedal, on the lower staff. Rhythms A and B demarcate the A and A' sections flanking the central internally-symmetrical B section. In this B section, rhythm C affects a decelerando and accelerando against the varnagâti pedal, as its 5:6 rhythm is progressively expanded to 5:10 at the section's centre and then speeds up again to a 5:6 ratio. This movement is also a *repliement* form. The A and A' sections, shown in example 5-30, are a quasi-retrograde-inversion of one another. Each rhythm A in the first section of the ternary form becomes its "opposite" rhythm B, and vice versa.

$\text{♩} = 80$
 Rhythms A, B, C (5 times)
 Rhythmic pedal D
 D x 38 etc.

A B
 A, B, C
 Pedal D

A B
 A, B, C
 Pedal D

C x 10
 A, B, C
 Pedal D

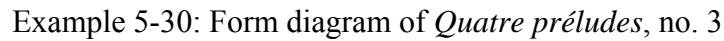
A B
 A, B, C
 Pedal D

B B
 A, B, C
 Pedal D

A A
 A, B, C
 Pedal D

B
 A, B, C
 Pedal D

Example 5-29: Rhythmic reduction of *Quatre préludes*, no. 3



Messiaen explains that A and B are both non-retrogradable rhythms. In the cello part, the bracketed A cell contains three values and B contains two groups that share a central overlap of four eighths. The piano pedal is a combination of “râgavardhana interprété”, Candrakalâ and lakṣmīṣa.²⁷⁶ By *interprété*, I suggest that Messiaen is referring to not only the retrograde of the râgavardhana tâla in the first measure of the piano pedal but also its subdivision into a *monnayage*, the same type of rhythmic exchange through which Serge Garant’s two variations of the Candrakalâ pattern in example 3-16 are derived. Here, the augmented dotted quarter of the original rhythm would become a dotted half, and the total value of that dotted half has been exchanged for three quarters that maintain the same total duration. For that matter, the bracket indicated below the piano pedal offers another interpretation, as râgavardhana rhythm, this time

235

accomplished through the augmentation of its first part (eighth, dotted eighth, eighth) but not its second, which is another tripartite *monnayage* division that trades the original dotted quarter for three eighths. Several smaller three-note palindromes are evident in the piano pedal, as well, including the two halves of its first measure, and the first and second three-note groups of its second measure.

The image displays musical notation for a cello and piano part, with rhythmic analysis. The cello part is labeled 'cello' and shows a sequence of notes: A (quarter), B (dotted quarter), and a group of three eighth notes (labeled 'B' with a bracket and a plus sign). The piano part is labeled 'piano' and shows a sequence of notes: 'râgavardhana interprété' (quarter), 'candrakalâ' (dotted quarter), and 'lakskmiça' (quarter). Below the piano part, three specific rhythmic patterns are shown: 'lakskmiça (#88)' (quarter), 'râgavardhana (#93)' (dotted quarter), and 'Candrakalâ (#105)' (quarter). The piano part also includes a bracketed section labeled 'râgavardhana interprété' (quarter) and a bracketed section labeled 'candrakalâ' (dotted quarter).

Example 5-31: Messiaen’s rhythmic pedals from “Liturgie de cristal” (in black) from *Quatuor pour la fin du temps* as analysed in his *Traité*, vol. II, my suggested interpretations (red), and the original three lakshniça, varnagâti and kaladhvani tâlas from Sharngadeva’s numbered list of 120 deçî-tâlas.

Prévost’s rhythms A, B, C and D in example 5-28 share many commonalities with Messiaen’s rhythmic pedal in example 5-31. Aside from their aforementioned combinatory nature and inexact augmentation, they contain several internal palindromes and instances of

added and subtracted values. Rhythm A is a non-retrogradable rhythm with a subtracted value: its first duration is “missing” a sixteenth. Likewise, rhythm C is a palindrome with an added value – its second sixteenth. Embedded or internal non-retrogradable rhythms are also present. Rhythm B contains an embedded central dotted quarter, dotted half, and dotted quarter.

The fourth prelude is very similar to the beginning of the second movement of the *Sonate pour violon et piano*. It superimposes a gradual increase in dynamics from *ppp* to *fff* with an indirect additive process very similar to the one explained in example 5-11b and diagramed in example 5-12. Like in the other preludes, the completion of the coupled gradual dynamic increase and indirect additive process is complemented by a retrograde *repliement* procedure to conclude.

5.3 After Paris: *Triptyque* (1962), *Célébration* (1966), *Terre des hommes* (1967) and *Hommage* (1971)

Prévost's compositions remained preoccupied with symmetrical permutations, mirrored contrapuntal procedures, modal collections and other small symmetrical sets that may be created through Boulezian multiplication. The opening four measures of *Triptyque* (1962) are composed in mode 4³. The mode, a symmetrical [01236789] octachord, is spaced non-symmetrically in the piano part between the right and left hands of example 5-32. The red [0147] of the right hand and blue [0156] of the left are transferred directly into the flute and oboe parts, respectively. As shown in the analysis of the contour segments (c-segs), the oboe inverts the contour of the flute motive.²⁷⁷ The F# in m. 2 of the flute and the opposing C in the oboe are upper and lower neighbors, working within the symmetrical contrapuntal framework of the two melodic lines.

²⁷⁷ For an explanation of c-segs, see footnote 252.

The image shows a musical score for three instruments: flute, oboe, and piano. The score is in 4/4 time and features contour-symmetrical counterpoint (c-segs) of mode 4³ tetrachords. The flute and oboe parts are marked with 'ff' and 'pp' dynamics. The piano part is marked with 'p' and 'ff' dynamics. The tempo is marked 'allegro' with a quarter note equal to 120 beats. The score includes annotations for 'c-segs' and 'T₁' transposition. The piano part is marked with 'p' and 'ff' dynamics. The score includes annotations for 'c-segs' and 'T₁' transposition. The piano part is marked with 'p' and 'ff' dynamics. The score includes annotations for 'c-segs' and 'T₁' transposition.

Example 5-32: Contour-symmetrical counterpoint (c-segs) of mode 4³ tetrachords in *Triptyque* (1962), mm. 1-5

In example 5-33, the opening figure of *Célébration* (1966) for orchestra, Prévost combines [048] with its T₁ transposition. Here, contrapuntal lines of the brass fanfare consist of a symmetrical [048] as the primary figure and [01] * [048] = [014589] as the ascending flourish that follows. The individual pitch levels for each of the contrapuntal lines create [0167] vertical sonorities. Only mm. 2 to 3 are shown here, but the fanfare continues in this fashion until m. 12, and is then repeated with the addition of the strings. These figures and three symmetrical sets dominate the piece until m. 26, where the fanfare ends.²⁷⁸

²⁷⁸ The original [048] trichord is projected on a level farther removed from immediate surface figuration. Specifically, the melodic fragment shown within each instrumental part in mm. 1-3 (example 5-33, where m.1 is a whole rest in all parts) of the score is repeated again from mm. 6 to 9 at T₄ and then concludes with a final fermata, whose pitches are transposed up an additional major third, which is T₈ from the original segment of mm. 1-3. In this way, the longer durations of the fanfare also project [048], harmonised vertically by [0167].

all linear m.2
[01] * [048] = [014589]

all linear m. 3
[048]

all verticals, m. 2/3
[0167]

[048]

sans timbres

ff

Example 5-33: Linear [048] trichords transposed by [01] and harmonised vertically by [0167] in *Célébration* (1966), mm. 2-3

Prévost began a setting of Michèle Lalonde's poem *Terre des hommes* in 1964 and completed his work of the same title for the 1967 World Exposition in Montreal. Lalonde's poem represented the Expo theme "Man and His World" by acting as "a sort of screen onto which the crucial preoccupations, the high hopes and the acute anxieties of contemporary man could be projected in a succession of violently antithetic metaphors."²⁷⁹ Prévost's angst over the cyclical nature of man's cruelty towards fellow man is represented by a highly internally-repetitive symmetrical Latin square. In another self-analysis, *Formulation et conséquences d'une*

²⁷⁹ Frank Daley, "Gala Program Kicks Off Expo Entertainment Binge" (Ottawa, *The Ottawa Journal* 1 May 1967)

hypothèse, he stated that the piece is based on a “fundamental hypothesis,” the Latin square reproduced in figure 5-2.²⁸⁰ He explained that “the numbers (1 to 12 and 12 to 1) constitute the four sides of my square, since I wished to work within a *closed circuit* in order to avoid a huge number of possibilities and I wanted the same controlling principle acting horizontally and vertically.”²⁸¹ Prévost’s words echo those of Messiaen who employed a “closed circuit” in his modes of limited transposition to “reduce the number of possible transpositions.”²⁸²

²⁸⁰ André Prévost, “Formulation et conséquences d’une hypothèse,” *Musiques du Kébèk*, ed. Raoul Duguay, Montréal: Éditions du Jour Inc., 1971: 172-89, p. 174. “En utilisant les chiffres de 1 à 12, j’ai formé ce que l’on appelle en mathématiques un “carré latin” ou encore un “carré magique”, ce carré représentant mon hypothèse fondamentale.”

²⁸¹ Ibid. “Cette série de chiffres (de 1 à 12 et 12 à 1) a constitué les quatre côtés de mon carré, car je voulais travailler en circuit fermé” afin d’éviter un trop grand nombre de possibilités et aussi parce-ce que je désirais que la verticale et l’horizontale soient régies par un même principe.”

²⁸² Messiaen, *Traité*, vol. VII, p. 51. “Each mode of limited transposition has a special colour, lending precisely to this impression of a closed door, or closed circuit, and also to the combinations of various sounds that when read reduces the number of transpositions.” Original French: “Chaque Mode à transposition limitée a sa couleur particulière, due précisément à cette impression de porte close, de circuit fermé, et aussi aux combinaisons de sons diverse, que lui confère son nombre réduit de transpositions.”



- XII – Intervalles de septième majeures (en 1 tronçon de 12 sons)
- XI – Intervalles de septième mineures (en 2 tronçons de 6 sons, à distance de 7^e maj.)
- X – Intervalles de sixtes majeures (en 3 tronçons de 4 sons, à distance de 7^e min.)
- IX – Intervalles de sixtes mineures (en 4 tronçons de 3 sons, à distance de 6^{te} maj.)
- VIII – Intervalles de quintes justes (en 5 tronçons alternés, de 2 et 3 sons, à distance de 6^{te} min.)
- VII – Intervalles de quarts augmentées ou de quintes diminuées (en 6 tronçons de 2 sons, à distance de 5^{te} juste)
- VI – Intervalles de quarts augmentées ou de quintes diminuées (en 6 tronçons de 2 sons, à distance de 4^{te} juste.
- V – Intervalles de quarts justes (en 5 tronçons alternés, de 2 et 3 sons, à distance de 3^{ce} maj.)
- IV – Intervalles de tierces majeures (en 4 tronçons de 3 sons, à distance de 3^{ce} min.)
- III – Intervalles de tierces mineures (en 3 tronçons de 4 sons, à distance de 2^{de} maj.)
- II – Intervalles de secondes majeures (en 2 tronçons de 6 sons, à distance de 2^{de} min.)
- I – Intervalles de secondes mineures (en 1 tronçon de 12 sons)

Figure 5-2: Prévost's Latin square from *Terre des hommes* (1967), reproduced from his self-analysis of the work in *Formulation et conséquences d'une hypothèse* (1970), p. 177

In his order-12 (12 x 12) square, the numbers 1 to 12 represent the notes of an ascending chromatic scale, where 1 is equal to C, 2 to C#, and so forth. The permutation creating each row is an interval cycle of the same variety as in Garant's *Variations* (example 3-13), but Prévost has made the size of the cycled intervals equivalent to the row number. Row 1 is a semitone cycle beginning on 1, which Prévost explained as "intervalles de secondes mineures en 1 tronçon de 12 sons" or "minor 2nd intervals in 1 segment of 12 pitches."²⁸³ By the same logic, row 2 is a major 2nd cycle beginning on 2, comprised of 2 segments of 6 pitches, spaced a minor 2nd apart.

Example 5-34 reproduces a set of Messiaen's interval cycle permutations from his *Traité*.²⁸⁴ The first permutation is a cycle of thirds, followed by a cycle of seconds, a cycle of alternating fifths and sixths, and finally, a cycle of fourths. The two central permutations involve retrograde, and the five *interversions* form an inversionally-symmetrical design in which *interversions* I and V are equivalent, as are II and IV. In figure 5-2, Prévost obtained the twelfth row through cyclic major 7ths but he might have also obtained the same pattern through inversion: minor seconds in retrograde. Therefore, row 12 is the retrograde equivalent of row 1, row 11 is the retrograde of row 2, etc., resembling Messiaen's arrangement.

²⁸³ Messiaen, *Traité*, vol. VII, p. 176.

²⁸⁴ Ibid, vol. III, pp. 324-5.

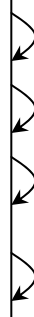
order #	1	2	3	4	5	6	7	8	9	10	11	12
I)	1	2	3	4	5	6	7	8	9	10	11	12
= II)	1	4	7	10	2	5	8	11	3	6	9	12
= III)	1	6	11	5	10	4	9	3	8	2	7	12
= IV)	1	4	7	10	2	5	8	11	3	6	9	12
= V)	1	2	3	4	5	6	7	8	9	10	11	12

(1) 4 7 10 || 2 5 8 11 || 3 6 9 (12)
de 3 en 3, groupes de 4

(1) 10 8 6 4 2 || 11 9 7 5 3 (12)
de 2 en 2 par mouvement rétrograde

(1) 6 11 5 10 4 9 3 8 2 7 (12)
de 5 en 5 par mouvement droit et de 6 en 6
par mouvement rétrograde, en alternant

(1) 5 9 || 2 6 10 || 3 7 11 || 4 8 (12)
de 4 en 4, groupes de 3



Example 5-34: A symmetrically arranged set of five *interversions* from Messiaen's *Traité*, vol. III, pp. 324-325.

Further, Prévost's square is a retrograde-invertible *repliement* that can be refolded along its vertical and horizontal axes. Rosemary Bailey, Professor of Statistics at Queen Mary and Westfield College, University of London, has examined this particular square and explains its properties:

This [square] is *symmetric*, because it is unchanged if you reflect it in the diagonal from top left to bottom right. It is also *reverse-symmetric*, because it is unchanged if you reflect it in the diagonal from top right to bottom left. It is *reflective*, because in each row each pair of numbers equidistant from the middle adds up to the same total. It is *complete*, because every pair of different numbers x and y has the property that y occurs exactly once immediately to the right of x , exactly once immediately to the left of x , exactly once immediately to the North of x and exactly once immediately to the South of x .²⁸⁵

Because of the resulting retrograde-invertible symmetry of this square, any one quadrant may be used to derive the remaining three when read as four quadrants of a Cartesian plane. This can be illustrated by dividing the square into top and bottom halves and retrograding the rows in the top half. The top half may then be inverted, or folded down upon the bottom half. This

²⁸⁵ Prof. Rosemary A. Bailey, personal correspondence by email, 12 February 2007. Italics mine. Bailey is a joint-author, along with D. A. Preece and P. J. Zemroch, of "Totally Symmetric Latin Squares and Cubes," *Utilitas Mathematica* 14 (1978): 161-170.

relationship, known as *sigma-symmetry* in mathematics, divides the square along both diagonal axes into two inversionally-symmetrical triangles.²⁸⁶ Prévost was aware of these properties: he traced dotted lines throughout figure 5-2, where each constitutes a non-retrogradable rhythm.

Example 5-35 applies Messiaen's and Prévost's permutations to the chromatic collection and compares the results. In set B, if Messiaen referred to his own permutation as "de 3 en 3" or "3 in 3," he might have described Prévost's innovation by the inclusion of only one additional descriptor, "de 3 en 3 *sur* 3," or "3 in 3 *starting on* 3." Notice here that Prévost has almost completely maintained the pitch content and order within segments, but reversed the order of those segments themselves, as indicated by the arrows. He has literally *mirrored* Messiaen's symmetrical permutations.

A	Messiaen –	Intersion II) de 2 en 2 par mouvement rétrograde:	(1) 10 8 6 4 2 || 11 9 7 5 3 (12)
	Prévost –	row XI – "de 2 en 2 <u>sur</u> 2" par mouvement rétrograde:	11 9 7 5 3 1 || 12 10 8 6 4 2
B	Messiaen –	Intersion I) de 3 en 3, groupes de 4:	(1) 4 7 10 || 2 5 8 11 || 3 6 9 (12)
	Prévost –	row III – "de 3 en 3 <u>sur</u> 3," groupes de 4:	3 6 9 12 || 2 5 8 11 || 1 4 7 10
C	Messiaen –	Intersion IV) de 4 en 4, groupes de 3:	(1) 5 9 || 2 6 10 || 3 7 11 || 4 8 (12)
	Prévost –	row IV – "de 4 en 4 <u>sur</u> 4," groupes de 3:	4 8 12 || 3 7 11 || 2 6 10 || 1 5 9

Example 5-35: A direct comparison between similar permutations used by Messiaen and Prévost, applied to the same original chromatic collection

⁵⁰ Sigma-symmetry was first defined by P. J. Owens, "Solutions to Two Problems of Dénes and Keedwell on Row-Complete Latin Squares." *Journal of Combinatorial Theory* 21 (1967): 299-308.

Hommage (1970-71), for chamber orchestra, combines symmetrical counterpoint on several concurrent horizontal and vertical planes and furthers Prévost's experimentation with symmetrical permutations and Latin squares. The piece is based on the first eight notes of the chromatic theme of Beethoven's *Grosse Fuge* in Bb Major, Op. 133, shown below in example 5-36.²⁸⁷ The successive ics are reflective around a central axis (ics 1-3-1-4-1-3-1). Likewise, the opis are symmetrically distributed, except for between G₄ and A₄, which is inverted. This half of the theme serves as Prévost's primary motive in *Hommage*. The second half containing a permuted BACH segment becomes a secondary motive.

opis: +1 +9 -1 -8 +1 +9 +1

[0123]
BACH motive

H C B A

f

[012345] [012345]

Example 5-36: Beethoven op. 133, second thematic variation, mm. 12-17, internal mirrored structure in the first half (Prévost's primary motive) and BACH motive in the second (Prévost's secondary motive).

In example 5-37, Prévost transposes his motive to ten different transpositional levels, so that a motive begins on every pc of the aggregate except E and F. The staves are numbered from 1 to 14 and connected with brackets to the left of the score, and the appearances of the motive have been circled and numbered. The most readily discernible type of symmetry is the pairing of

²⁸⁷ André Prévost, introduction to *Hommage* (Saint-Nicolas, QC: Doberman-Yppan, 1996). The notes accompanying the score explain that, the work is based on the *Grosse Fuge*, Op. 133, by Beethoven. It was the intent of the composer to "pay homage to that great musician on the two-hundredth anniversary of his birth."

mirrored melodic lines that may be heard symmetrically from the utmost top and bottom towards the center. The last four statements, 4a, 4n, 5a and 5b, pay special homage to the [0123] tetrachord beginning the second half of the theme (example 5-36), the musical anagram for B-A-C-H.

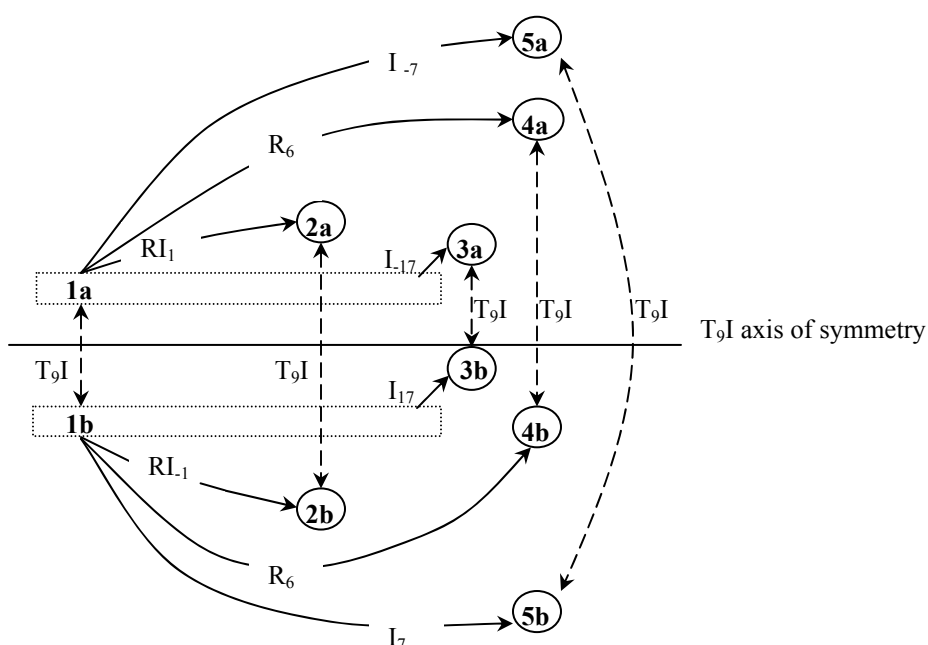
Here, Prévost uses the theme not only in the traditional sense, as a motive performed linearly by a single voice, but also as a middleground transpositional determinant: the first and last pc of each of these concurrent motives spells the BACH motive. This tetrachord is set symmetrically by Prévost, in that the first and second pitches are given to the highest and second-to-highest voices, respectively, while the third and fourth pitches are given in inversion, to the lowest and second-to-lowest voices, an inversion of the upper pair. Other direct influences of the Beethoven include the rhythmic augmentation that occurs in statements **1a** and its mirror, **1b**. These longer and equal note values are representative of the third thematic variation of the Beethoven, where it comprises mm. 18-26.

The musical score for Example 5-37, titled "Hommage", measures 31-35. It is a symmetrical counterpoint piece. The score is written for Violin I (Vln I), Violin II (Vln II), Viola (Vlc.), and Cello (Cb.). The key signature has one flat (B-flat). The score is divided into measures 31, 32, 33, 34, and 35. The dynamics are marked as (dim.), pp, cresc., (p), (mp), (mf), and (p). The motives are labeled 1a, 1b, 2a, 2b, 3a, 3b, 4a, 4b, 5a, and 5b. The score shows a complex interplay of these motives across the instruments, with some motives appearing in both the upper and lower staves of a pair, creating a symmetrical effect.

Example 5-37: symmetrical counterpoint in *Hommage*, mm. 31-35

The remaining levels of symmetry coalesce within the design principles that relate pairs of motives. In example 5-38, “a” motives appearing above the axis of symmetry are related to the

original by RI_1 , I_{-17} , R_6 , and I_{-7} , calculated in exact ps, while the “b” motives project the inverse relationships, RI_{-1} , I_{17} , R_{-6} , and I_7 . The entire design is inversionally-symmetrical around T_9I so that each opis “action” has an “equal and opposite reaction” between B and B \flat , or A and C. Most notably, then, the section is a symmetrical setting of B-A-C-H, where the name is used as a palindrome representing the axes of symmetry reading from the outside of the name toward the center.



Example 5-38: T_n , I_n and RI_n transformations contained in example 5-37, *Hommage*, mm. 31-35

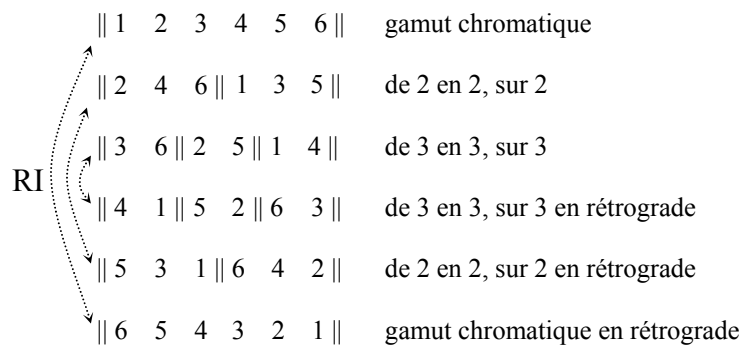
Elsewhere in *Hommage*, Prévost combines his primary and secondary motives from Beethoven’s theme (example 5-36) to derive another chromatic hexachord containing the BACH motive, this time in the correct order of (B \flat , A, C, H). Example 5-39 shows the primary motive

and its inversion transposed to B \flat . I surmise that Prévost eliminated the repeated pcs (crossed-out in the inversion) and extracted the remainder, order numbers 1=B \flat , 2=A, 3=C, 4=C \sharp , 5=G \sharp , 6=B, as a third version of the motive.

The image shows two musical staves. The first staff, labeled 'theme', has the intervallic sequence 'opis: +1 +9 -1 -8 +1 +9 +1' written above it. The notes are B \flat , A, C, C \sharp , G \sharp , and B. The second staff, labeled 'inversion', has the intervallic sequence 'opis: -1 -9 +1 +8 -1 -9 -1' written above it. The notes are B \flat , A, C, C \sharp , G \sharp , and B, with the first and last notes crossed out. Below the 'inversion' staff, the notes are labeled with order numbers and names: 'order #: 1 2 3 4 5 6' and 'B A C H'.

Example 5-39: derivation of base of order-6 Latin square setting from the [012345] hexachord, *Hommage*

I have found that Prévost uses this third motive as the base material of an order-6 (6 x 6) Latin sigma-symmetric square like the one in *Terre des hommes*, and this is shown in example 5-40. If we analyse the construction of this 6 x 6 square in light of the details Prévost provided regarding his previous one, the one in example 5-40 appears to follow the same principle of reflectively-organised symmetrical permutations discussed in examples 5-35 and 5-36). Example 5-40 illustrates how the first row may be interpreted as Messiaen's *gamut chromatique*, the second as “de 2 en 2, sur 2,” and the third as “de 3 en 3, sur 3.” Rows 4, 5 and 6 reverse both the order of the numbers within each row, and the order of appearance of the rows themselves, as row 4 is akin to “de 3 en 3, sur 3 en retrograde,” row 5 to “de 2 en 2, sur 2 en retrograde,” and finally, row 6, the chromatic gamut in reverse order. This again yields a sigma-symmetric design of symmetrical permutations and order numbers.



Example 5-40: Latin square analysed as an RI series of symmetrical permutations in *Hommage*

As a further development upon Prévost's square in *Terre des hommes*, he continued to subject his *Hommage* square, as a whole, to the same set of symmetrical permutations from mm. 44-60. In other words, the symmetrical permutations first applied to create the foreground sequence of integers in each of the square's six rows and columns are then applied to the square as a whole to create six squares. Example 5-41 demonstrates this reapplication. Square 1 at the far left represents the application of the *gamut chromatique* upon each of its rows (or column). Since the order numbers (1, 2, 3, 4, 5, 6) preserve the structure of the pre-existing squares, its application is the identity function of the process.

Next, the first true reordering *intversion* || 2 4 6 || 1 3 5 ||, the sequence of order numbers of square 1's second row/column, is applied to each row (or column) of square 1 to create square 2. This process continues, using the third line of square 1 as an *intversion*, followed by the fourth, fifth and finally, the sixth.

square 1		interversion 1		square 2		interversion 2		square 3
1 2 3 4 5 6	.....>	|| 2 4 6 || 1 3 5 ||	.....>	2 4 6 1 3 5	.....>	|| 3 6 || 2 5 || 1 4 ||	.....>	3 6 2 5 1 4 etc.
2 4 6 1 3 5	.....>	|| 2 4 6 || 1 3 5 ||	.....>	4 1 5 2 6 3	.....>	|| 3 6 || 2 5 || 1 4 ||	.....>	6 5 4 3 2 1 etc.
3 6 2 5 1 4	.....>	|| 2 4 6 || 1 3 5 ||	.....>	6 5 4 3 2 1	.....>	|| 3 6 || 2 5 || 1 4 ||	.....>	2 4 6 1 3 5 etc.
4 1 5 2 6 3	.....>	|| 2 4 6 || 1 3 5 ||	.....>	1 2 3 4 5 6	.....>	|| 3 6 || 2 5 || 1 4 ||	.....>	5 3 1 6 4 2 etc.
5 3 1 6 4 2	.....>	|| 2 4 6 || 1 3 5 ||	.....>	3 6 2 5 1 4	.....>	|| 3 6 || 2 5 || 1 4 ||	.....>	1 2 3 4 5 6 etc.
6 5 4 3 2 1	.....>	|| 2 4 6 || 1 3 5 ||	.....>	5 3 1 6 4 2	.....>	|| 3 6 || 2 5 || 1 4 ||	.....>	4 1 5 2 6 3 etc.

Example 5-41: Recursive application (symmetric reinterversion) of interversions creating 6 lines to the square as a whole, resulting in 6 squares in *Hommage*

Measure 44 then begins with square 1, followed by squares 2, 3, etc. until square 6 is completed in the middle of measure 55. Following Prévost's penchant for retrograde structures, squares 6 through 1 are then performed backwards, ending in m. 60. The setting of the first two squares and part of the third is diagramed below in example 5-42. Each row of the square is given to a different string instrument so that columns become chords and the squares are performed one at a time, from left to right.

Example 5-42: realisation of the first two Latin squares and the beginning of the third in *Hommage*, mm. 44-48

From the perspective of structural hierarchy, the implications of this design are very significant. The relationships among the rows of the original square are now replicated among the six squares. This recursive permutation pattern consists of a foreground performance of each square in succession, and a middleground enlargement of each column of the first square, replicated by the first column of each new square with every sixth pc after the downbeat of m. 40. My analytical interpretation of the reapplication of the same symmetrical permutations was confirmed by archived sketches of the work. In figure 5-3, Prévost has written Roman numerals I, II and IV to indicate the beginnings of the squares (circled in red). One can recognise double barlines between all six squares. The first column of each square, the middleground projection of the first square, is highlighted by yellow boxes.

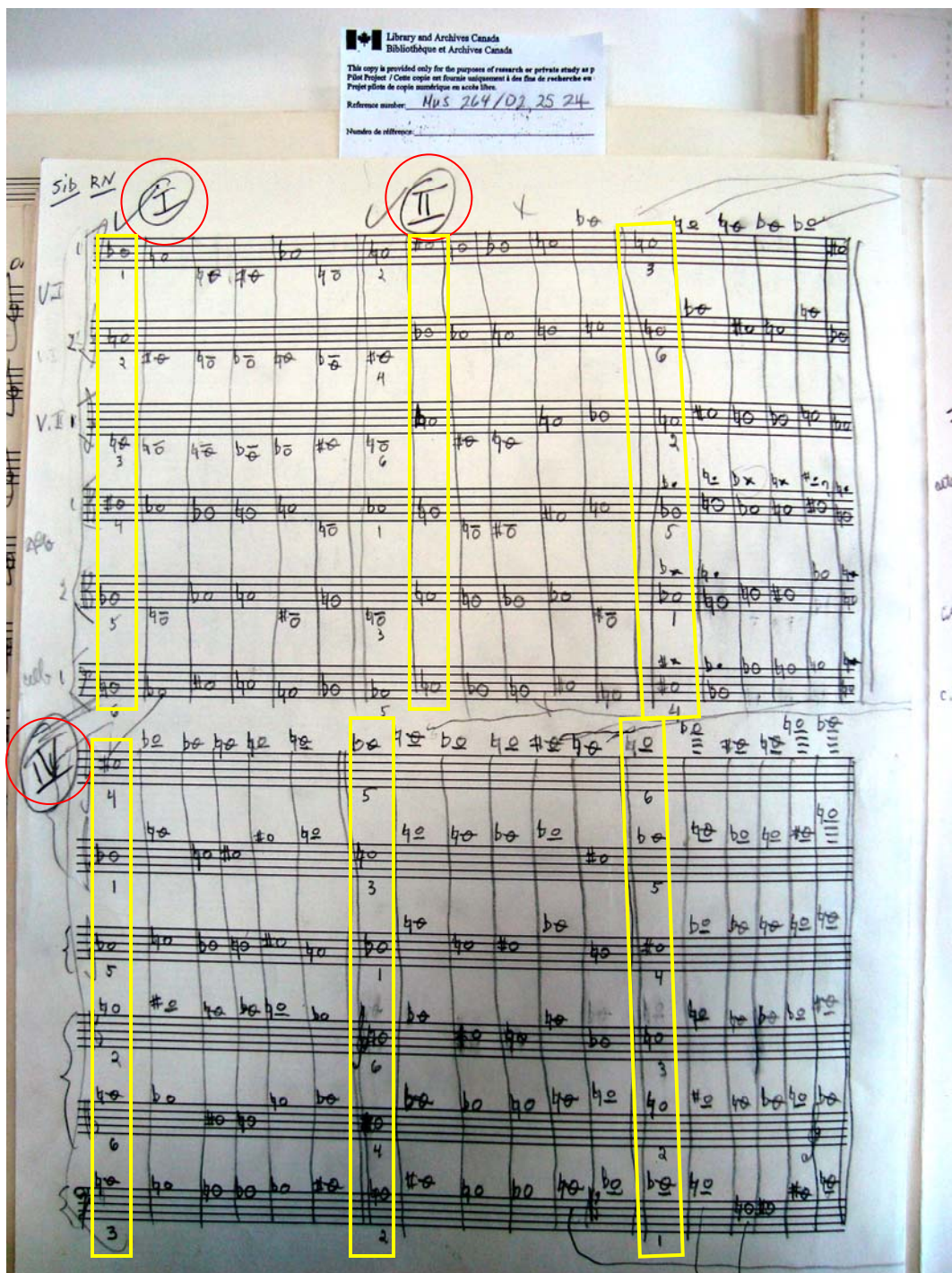


Figure 5-3: Sketch of Prévost's six Latin squares for *Hommage*, Library and Archives Canada, MUS 264/D2, 25 (folder 24)

This recursive replication process has a precedent in the *symmetric reintervention* application of the +1/-1 permutation chains applied to foreground cell y in the first of the *Quatre préludes*; it resulted in a multi-tiered projection of the same musical material. Here, the result is a replication that may be modeled as a Latin cube (example 5-43a): the foreground projection of the hexachord (1, 2, 3, 4, 5, 6) consists of six 2-dimensional Latin squares, one played after the other; the middleground is projected by the first line or column of each of these squares stacked one behind the other, reaching back into the third geometrical dimension. The analogy of 6 x 6 Rubik's Cube may perhaps be helpful as a visualisation aid. Between mm. 44-60, we are hearing the Rubik's cube performed one slice at a time. The p axis is pitch, from high to low, and orchestrated in this order as well. The T (upper case) axis across the bottom is the time it takes to perform one square, and the t (lower case) axis that runs from front to back is a second time axis that measures multiples of T.

The recursively-applied transformation is explained by the chart below in example 5-43b. This chart summarises the relationships between 1-, 2- and 3-dimensional order-6 geometrical formations. Each pc or each order number in Prévost's square is a point. The first row of his square is a single line, $6^0 = 1$, with $6^1 = 6$ points. When we recursively replicate the 6-point line by squaring it: $(6^1)^2$ points = 6^2 or 36 points, we obtain an object with 6^1 lines, and our 1-dimensional line recurses into a 2-dimensional square. If we recursively replicate it once more, we create a single (6^0) 3-dimensional cube with 6^1 squares, 6^2 lines and 6^3 points, or in the case of music, pcs.²⁸⁸

²⁸⁸ Rosemary Bailey 2008. This Latin cube created through recursion has also kindly been verified by Prof. Bailey.

1 2 3 4 5 6	2 4 6 1 3 5	3 6 2 5 1 4	4 1 5 2 6 3	5 3 1 6 4 2	6 5 4 3 2 1
2 4 6 1 3 5	4 1 5 2 6 3	6 5 4 3 2 1	1 2 3 4 5 6	3 6 2 5 1 4	5 3 1 6 4 2
3 6 2 5 1 4	6 5 4 3 2 1	2 4 6 1 3 5	5 3 1 6 4 2	1 2 3 4 5 6	4 1 5 2 6 3
4 1 5 2 6 3	1 2 3 4 5 6	5 3 1 6 4 2	2 4 6 1 3 5	6 5 4 3 2 1	3 6 2 5 1 4
5 3 1 6 4 2	3 6 2 5 1 4	1 2 3 4 5 6	6 5 4 3 2 1	4 1 5 2 6 3	2 4 6 1 3 5
6 5 4 3 2 1	5 3 1 6 4 2	4 1 5 2 6 3	3 6 2 5 1 4	2 4 6 1 3 5	1 2 3 4 5 6

square 1
(black)

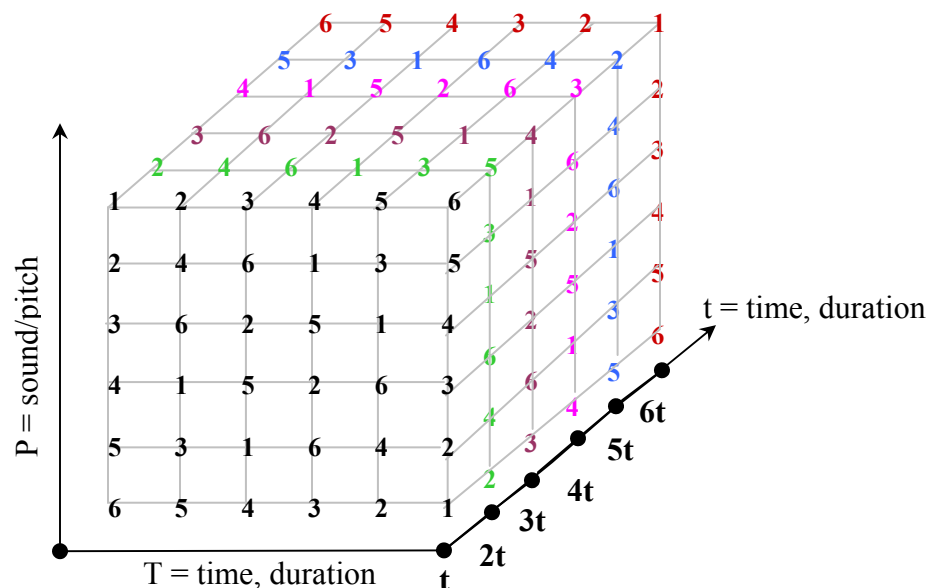
square 2
(green)

square 3
(purple)



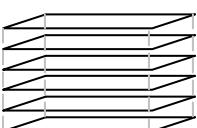
square 4
(pink)

square 5
(blue)

square 6
(red)



Example 5-43a: Hearing the faces of a Rubik's cube one slice at a time in *Hommage*

shape	# of p	# of l	# of s	# of c	diagram of unique points, rows, squares, cubes
point (p)	$6^0 = 1$	0	0	0	
line (l)	$6^1 = 6$	$6^0 = 1$	0	0	6 points in a line 
square (s)	$6^2 = 36$	$6^1 = 6$	$6^0 = 1$	0	6 lines in a square 
cube (c)	$6^3 = 216$	$6^2 = 36$	$6^1 = 6$	$6^0 = 1$	6 squares in a cube 

Example 5-43b: A chart of the exponential increase of the points (p), lines (l), squares (s) and cubes (c) of an order-6 musical series (line) under recursive replication.

Chapter 6: Conclusion

As shown in the summary of example 6-1, of the three composers Garant used the majority of Messiaen's techniques examined in this dissertation, added rhythms being the only element listed he did not employ. However, his use of these compositional tools was very short-lived. As outlined in chapter 3, Garant's early music evolved at a rapid-fire pace. Only four years elapsed from the time he was a self-taught composer, then a student commuting to his first lessons in Montréal, to his year in attendance of Messiaen's classes alongside the most eminent composers of his own generation. Most of Garant's Messiaen-inspired writing occurs in the pieces *Concerts sur terre*, mvts. I and II, *Et je prierai ta grâce*, and *Variations pour deux pianos*, all composed during the year 1952, before he had even arrived back in Québec.

Garant's earliest two Parisian compositions *sound*, or are most *esthetically* similar to, the music of Messiaen. In terms of harmonic language, verticalities resembling the chords of contracted resonance and the turning chords are heard in mvt. I of *Concerts sur terre* and *Et je prierai ta grâce*. The modes of limited transposition are not used verbatim but are intimated in these two works, as well as Messiaen's melodic emphasis on pcs 1 and 6. In particular, the use of the recitation pitches B \flat and E in mvt. II of *Concerts sur terre* has a clear correlation to the alternation of those same pcs in Messiaen's "L'escalier redit, gestes du soleil," and to the G \sharp and D in "Syllables," both from *Harawi* (1945). Garant's *Et je prierai ta grâce* makes use of a rhythmic canon within a sparse, two-voice texture. Since the entries are only a sixteenth apart, the result sounds like an echo or slight phase-shift, as opposed to true imitative counterpoint. The canon, as such, is quite easily gauged by the listener.

Techniques/Features	Serge Garant	Clermont Pépin	André Prévest
Chords (CCR/TC)	<i>Concerts sur terre</i> , mvt. I (1952) <i>Et je prierai ta grâce</i> (1952)		
Melody (characteristic intervals, recitation tones)	<i>Concerts sur terre</i> , mvts. II & V (1952 & 1956) <i>Et je prierai ta grâce</i> (1952)		
Asymmetric enlargement	<i>Variations pour deux pianos</i> (1952)		
Modes	<i>Concerts sur terre</i> , mvt. II (1952)	<i>Suite pour piano</i> (1951, rev. 1955) <i>Guernica</i> (1952) <i>Le Rite du soleil noir</i> (1955) <i>Variations pour quatuor à cordes</i> (1956)	<i>Mobiles</i> (1959) <i>Triptyque</i> (1962)
Hindu rhythms	<i>Variations pour deux pianos</i> (1952)		<i>Quatre Préludes pour deux pianos</i> (1961)
Rhythmic pedal	<i>Variations pour deux pianos</i> (1952)		<i>Sonate pour violon et piano</i> (1960) <i>Quatre Préludes pour deux pianos</i> (1961) <i>Quatre Préludes pour deux pianos</i> (1961)
Augmentation and diminution	<i>Caprices</i> (1954)		
Rhythmic canons	<i>Et je prierai ta grâce</i> (1952)	<i>Quasars</i> (1967)	
Monnayage	<i>Variations pour deux pianos</i> (1952)		
Added rhythms		<i>Quasars</i> (1967)	
Non-retrogradable rhythms	<i>Variations pour deux pianos</i> (1952)	<i>Quasars</i> (1967)	<i>Sonate pour violon et piano</i> (1960)
Symmetrical permutation	<i>Variations pour deux pianos</i> (1952)	<i>Variations pour quatuor à cordes</i> (1956)	<i>Mobiles</i> (1959) <i>Sonate pour violon et piano</i> (1960) <i>Quatre Préludes pour deux pianos</i> (1961) <i>Terre des hommes</i> (1967) <i>Hommage</i> (1970-71)
Other symmetrical sets	<i>Concerts sur terre</i> , mvts. II & V (1952 & 1956)		<i>Mobiles</i> (1959) <i>Célébration</i> (1966)
Self-replicative aggregate completion / derived series	<i>Concerts sur terre</i> , mvt. V (1956)		<i>Sonate pour violon et piano</i> (1960) <i>Quatre Préludes pour deux pianos</i> (1961)
Form by process/exhaustive processes	<i>Et je prierai ta grâce</i> (1952) <i>Variations pour deux pianos</i> (1952)	<i>Variations pour quatuor à cordes</i> (1956)	<i>Sonate pour violon et piano</i> (1960) <i>Quatre Préludes pour deux pianos</i> (1961) <i>Hommage</i> (1970-71)
Other general symmetries (mirrors/opposites/inverses)	<i>Variations pour deux pianos</i> (1952) <i>Asymétries no 2</i> (1959)	<i>Guernica</i> (1952) <i>Le Rite du soleil noir</i> (1955)	<i>Sonate pour violon et piano</i> (1960) <i>Quatre Préludes pour deux pianos</i> (1961) <i>Triptyque</i> (1962) <i>Terre des hommes</i> (1967) <i>Hommage</i> (1970-71)

Example 6-1: Overview of the use and further development of Messiaen's techniques by Garant, Pépin and Prévest

Variations pour deux pianos moves away from Messiaen's typical chords and modes, and instead gravitates towards certain of his rhythmic and permutation techniques, including, in particular, asymmetrical enlargement. Thus, although *Variations* resembles the music of Messiaen much less from an esthetic standpoint, it more closely approximates his pre-compositional poietics through a wider use of his technical devices. These are evidenced in the sketches that show the application of a regular symmetrical permutation pattern to rows A, B, and C: "de 4 en 4, groupes de 3," "de 2 en 2, groupes de 6," and "de 3 en 3, groupes de 4;" and the creation of a hypothetical "de sept en sept, groupes de quatre" permutation employed to reorder a *candrakalâ* Hindu rhythm. The sketches additionally planned for a rhythmic pedal and non-retrogradable rhythms.

Upon his return to Québec, Garant quickly moved away from the clear influence of Messiaen, most likely leaving his *Variations pour deux pianos* incomplete because of the rapid development of his musical language at the time and due to his pivotal role as an advocate for New Music in Québec. Only two instances of Messiaen's influence are apparent in Garant's music after 1952: in *Caprices* (1954), his first serial work, employing exact and inexact augmentation and diminution of rhythmic cells; and in mvt. V of *Concerts sur terre* (1956), which features a melody proliferated with ics 1 and 6 that provide stylistic continuity with the previously composed movements.

After these two works, Garant moved steadily towards integral serialism, as we have seen in the analysis of his *Asymétries no 2* from 1959. The rigour associated with Garant's "intellectual plans" became one of his trademarks and typified his mature output. Garant's works from then on are based on a series of proportions or ratios which govern durations, tempi,

registers, and timbres.²⁸⁹ Concerning his mature language, Keith MacMillan and John Beckwith write:

Garant is a confirmed subscriber to the principles of serialism. Not unlike his idol of student days, Pierre Boulez, he finds happiness in musical mathematics. Besides using twelve-tone series and the basic intervallic materials in most of his works, he frequently applies mathematical logic to such parameters of sound as duration and amplitude, or organises the relative proportions of his compositions, the degrees of sonic densities, or the choices of instrumental timbres according to pre-programmed numerical systems.”²⁹⁰

Garant also wrote for various newspapers and magazines including *L’Autorité/The Authority* and served as a music critic/host on two of the Canadian Broadcasting Corporation’s (CBC) radio shows, “La Revue des arts et des lettres/Review of Arts and Letters” and “Musique de notre siècle/Music of Our Century.” He was both a founding member of the Société de Musique Contemporaine du Québec/Quebec Society of Contemporary Music (SMCQ) and its first musical director (1966-86), as well as the musical director of the Série Contemporaine of the Orchestre Métropolitain (1985-86). He began teaching composition and analysis at l’Université de Montréal in 1967 and remained on the faculty until the time of his death.²⁹¹

Garant garnered critical acclaim for his role as a conductor and composer, receiving two Canada Council grants: the first (summer 1969) to study with Boulez in Basel; the second, (1972) to travel to Bali. A scholarship (1973) from the Canadian Cultural Institute in Rome allowed him to spend a year in Italy. Garant conducted the Montréal Symphony Orchestra on

²⁸⁹ This is especially true of his series *Offrande I* (1969), *II* (1970), and *III* (1971) and *Circuit I* (1972), *II* (1972), and *III* (1973), all based on the intervallic series of the theme of Bach’s *Musical Offering*. Garant discusses the rigorous structures of his works in his program notes, reprinted in Lefebvre 1986, pp. 185-205. For example, an earlier group consisting of *Anerca* (1962, rev.1963) *Enneade* (1964), and *Ouranos* (1963) use “mobile forms” in that their respective segments can be performed in any order. Otherwise, these works are strictly serial. Garant described his last two works, *Quintette* (1978) and *Plages* (1981) as similarly rigorous, and added that *Quintette* is a “large arch, therefore completely symmetrical,” and that *Plages* “is organised from a ‘block’ of five pitches, that, through their successive inversion and transpositions, give rise to a network of pitches covering six octaves, with the tritone F-B as its centre” (ibid.).

²⁹⁰ MacMillan and Beckwith 1975, p. 78.

²⁹¹ Hélène Plouffe, Gilles Potvin and Marie-Thérèse Lefebvre, ‘Serge Garant,’ *The Encyclopedia of Music in Canada*, The Historica Foundation 2009, <http://www.thecanadianencyclopedia.com> (accessed 8 October 2006).

several occasions. In 1968 and 1979, he conducted his work *Phrases II*, in 1977, Gilles Tremblay's *Fleuves*. The CBC television network broadcast a half-hour program, "Portrait de Serge Garant," in 1979. Other awards include a Canadian Film Festival Etrog for *Vertiges* (1969), the Canadian Music Council Medal (1971), ProCanada's William Harold Moon Award for the promotion of Canadian music abroad (1978), the Prix de musique Calixa-Lavallée (1979), and the Jules Léger Prize for New Chamber Music (1980). He was made an Officer of the Order of Canada (1979), named performer of the year by the Canadian Music Council (1984), and elected to the Royal Society of Canada (1986). He was a member of the Canadian League of Composers and an associate composer at the Canadian Music Centre.²⁹²

When compared to Garant or Prévost, Clermont Pépin used a much smaller number of Messiaen's techniques. However, those that he did use were employed both extensively and exactly as Messiaen himself would have done. Five of Messiaen's seven modes of limited transposition are found in Pépin's output between 1951 and 1956, namely, modes 1, 2, 3, 4, and 7. "Allegro Leggiero," the first movement of *Suite pour piano* (1951, rev. 1955) uses chromatic sets, mode 1 and mode 2 subsets, while the third movement, "Danse Frénétique," makes use of modes 2³ and 3⁴. Mode 2¹ also appears as part of a bass line ascent that articulates a point of formal arrival.

In *Guernica* (1952), Pepin systematically shifts through all three transpositions of mode 2 as the primary theme in the bassoon unfolds throughout the symphonic poem. He shifts down by semitone from mode 2³, through 2², arriving at mode 2¹. He also borrowed the cascading woodwind mode 2² scales from Messiaen's *Turangalîla Symphony* that had been taught in class the previous year. Like Messiaen, Pépin superimposes different modes and modal transpositions

²⁹² Plouffe, Potvin, Lefebvre 2006.

in discrete instruments. In *Guernica*, he combines modes 1^2 , 2^1 , 2^2 , 4^3 , 4^6 , which in addition to the chromatic collection, are emphasised through metric, tonic, and agogic accents.

Le Rite du soleil noir (1955) features many of these techniques. Although, like *Guernica*, its modal content draws heavily from modes 2 and 3, the main theme of *Le Rite* is composed in mode 7^3 and is initially presented in two parts, its two symmetrical [01234] halves. This main theme of the A section of the seven-part sonata-rondo form is reintroduced by a retransition in which all three transpositions of mode 2 appear concurrently, both melodically and harmonically.

Variations pour quatuor à cordes (1956) is noteworthy for its use of mode 3^2 and 3^3 scales, as they are inserted within what is otherwise a completely serial composition. This work also uses a rotation of the dyads within each hexachord as a type of symmetrical permutation. The result of a complete set of réinterversions is a back-cyclic completely symmetric order-3 Latin square.

After the 1950's, Pépin experimented with other techniques, including integral serialism (*Nombres*, 1962) and music inspired by electroacoustic music (*Monade I*, 1964). His work continued to exhibit the influence of Honegger, which was duly noted by his peers. In reviewing Pépin's *Monologue* (1961), Serge Garant wrote somewhat facetiously that "the orchestration is confused, tortured and the influence of Honegger is unfortunately too obvious. I wish that Pépin would rid himself, once and for all, from the influence of this composer."²⁹³

Pépin's work in the 1970's appears to have moved back towards Messiaen, and in particular, his use of birdsong in the 1960's. As Schuster-Craig recounts, "in *Monade III* (1972),

²⁹³ Lefebvre 1986, pp. 109-110. Originally published in the July-August 1962 edition of *Canadian Art*. Garant's full original review comment reads: "Monologues de Clermont Pépin est l'œuvre la plus méditative et sentimentale qu'il ait écrite; mais elle produit plus bruit que d'émotion; s'efforçant d'être contemporaine dans l'expression, elle ne réussit finalement pas à dépasser le langage du 19^e siècle. L'orchestration est confuse, torturée et l'influence d'Honegger est malheureusement trop évidente. Je souhaite que Pépin se dégage une fois pour toute de l'influence de ce compositeur."

Pépin originally intended to use taped birdsongs. Technical difficulties prevented this, and passages for the Ondes Martenot were substituted for the birdsong.”²⁹⁴ In composing *Quasars* (1973), the composer made a definitive return to what he learned from Messiaen, featuring both non-retrogradable rhythms and their expansion through combinatory addition. The main difference between Messiaen’s original non-retrogradable rhythms and Pépin’s Morsiques is the former’s employment of Hindu rhythms versus the latter’s use of Morse code as source material.

Schuster-Craig also notes Pépin’s experiments in *Interactions* (1977) that dispensed with a traditional score in favour of graphic notation.²⁹⁵ The composer’s moving from one method of writing to another is described by Gilles Tremblay as “creative evolution” that “displays the intellectual development of one who is anxious to understand his century, searching to exploit fully the expressive possibilities of an art freed from traditional frameworks and enriched by new techniques.”²⁹⁶

Pépin’s busy compositional career was balanced by teaching at the Conservatoire de musique du Québec à Montréal and the Conservatoire de musique du Québec à Québec (1978-87), and by his work in administration. He founded the Centre d’études prospectives du Québec in 1963 and worked as program-consultant at the Ministère des Affaires culturelles du Québec for three years (1974-77). After first serving as a member of the administrative council of CAPAC (Composers, Authors and Publishers Association of Canada Limited), he became the group’s vice-president (1966-70), and later the president (1980-82). He also functioned as the national president of Jeunesses musicales of Canada (1969-72). Les Éditions Clermont Pépin, his own publishing company, was founded in 1981. Through it, he published his own complete works. The composer was awarded the Prix de musique Calixa-Lavallée (1970) and was made an

²⁹⁴ Schuster-Craig 1987, p. 9.

²⁹⁵ Schuster-Craig 1987, pp. 102-103.

²⁹⁶ Gilles Potvin 2009.

Officer of the Order of Canada (1981) and the Ordre national du Québec (1990). He remained involved in academics throughout his life and was the Michener Visitor at Queen's University in 2003-04. Like Garant, Pépin was an associate of the Canadian Music Centre and a member of the Canadian League of Composers.

André Prévost used almost as many of Messiaen's techniques as Garant, but employed them over a much longer span than had either Garant or Pépin. His earliest compositions, *Mobiles* (1959), *Sonate pour violon et piano* (1960), and *Quatre Préludes pour deux pianos* (1961), use many of Messiaen's techniques practically verbatim, as did Garant in his works from 1952 and Pépin throughout his career with respect to the modes of limited transposition. Prévost employed the non-retrogradable rhythms, symmetrical permutations, Hindu rhythms, and rhythmic pedals as taught by Messiaen. His employment of the modes, however, was not nearly as clear or prolific as in the work of Pépin. Prévost projected modes as the result of his predilection for smaller symmetrical sets under Boulez multiplication, as in *Mobiles* (1959), where mode 5⁴ [012678] is projected as three ic 6 dyads ([06] * [012]); or as a product of symmetrical counterpoint, as in the case of *Triptyque* (1962), with its two dissimilar mode 4³ tetrachords.

Later, Prévost's use of symmetrical permutations went beyond simple borrowing, instead becoming an inspiration from which to grow. Even early on, Prévost used the symmetrical permutations with a twist, and each incidence of modification became part of a larger string of innovation that would come to characterise his own personal language. For example, Prévost's very first use of open-fan symmetrical permutation in *Mobiles* (1959) led to his creation of a modified open-fan permutation in *Sonate pour violon et piano* (1960). The symmetrical

permutations became the underlying basis of two completely symmetrical Latin squares in *Terre des hommes* (1967) and *Hommage* (1970-71).

Prévost was an extremely prolific composer throughout his career. Like Pépin, his interests were divided between creating music and teaching, but he was much less involved in administrative positions with the exception of his role as president of the Groupe Nouvelle-Aire (1973) and his time on the board of directors of the Canadian Music Centre (1971). Prévost began his teaching career in 1962, first at the Séminaire de Joliette and later at the Collège des Eudistes de Montréal. After winning the Prix d'Europe for composition in 1963, he returned to Paris in the summer of 1964 to study electronic music with Michel Philippot at the Office de la radiodiffusion-télévision française. He joined the Faculté de Musique of the Université de Montréal as a professor in 1965 and worked there until shortly before his death in January of 2001. He received several awards, including the Canadian Music Council Medal (1977), the trophy of the Society of Composers, Authors, and Music Publishers of Canada (1985), and was made an Officer of the Order of Canada (1986).²⁹⁷ His *Cantate pour cordes* (1987), commissioned by Yehudi Menuhin and premiered under his direction, was followed by the award-winning CBC documentary "Menuhin - Prévost, une aventure créatrice" in 1990.²⁹⁸

Garant, Pépin, and Prévost each also used certain techniques that were not directly Messiaen's yet certainly in line with the principles underlying them. Prévost composed with symmetrical sets that did not represent synthetic modes, per se, but could be expanded into entire modes via Boulez multiplication. For example, while the trichord [012] could be multiplied by [048] to obtain Messiaen's mode 3, it could also be multiplied by [0369] to yield the aggregate. Prévost generated both modes and the aggregate in this manner. In *Mobiles* (1959) mode 5⁴

²⁹⁷ Pierre Rochon 2008.

²⁹⁸ Prévost 2000.

[012678] is projected as three ic 6 dyads ([06] * [012]) as mentioned; whereas in *Quatre préludes*, no. 3 (1961), the derived series of three self-replicative tetrachords ([0123] * [048]) completes the aggregate.

All three composers utilized repetitive processes in line with the idea behind Messiaen's concept of réinterversion, in that once established, the processes were continued to their completion or the point of exhaustion. Pépin explored this feature the least, as the analyses in this dissertation show, with the sole example of an exhaustive process being his dyad rotation in *Variations*, noted above. By contrast, Garant and Prévost employed repetitive, exhaustive processes to the point that they generated their own self-contained formal structures that I refer to as "form by process" in example 6-1. Not unlike in the music of the original so-called "Minimalists" (LaMonte Young, Phillip Glass, Steve Reich, and Terry Riley) a process continued until it was completed.

The notion of symmetry, in its guises of reflection (bilateral symmetry), rotation, or repetition, was also prominent in the work of all three composers. Pépin and Prévost favoured symmetrical arch forms, which in the case of Prévost were often generated via symmetrical generative processes or structural *repliements*. In Prévost's music, the smallest symmetrical musical elements are replicated at every structural level of a composition, from the smallest trichords and tetrachords to the formal design of larger structures. The idea of related levels of structure in the composer's music has been hinted at by Véronique Robert in the official biographical notes released by Prévost's publisher. She explains that, "Prévost's musical vocabulary reflects an essentially personal style rather than any specific school. He uses

contemporary techniques but the structures of his works develop from the inherent logic of the ideas presented as to create a sense of organic inevitability.”²⁹⁹

MacMillan and Beckwith summarised that in the music of Garant, “various manifestations of the concept of symmetry, including its antithesis, asymmetry, play a decisive role in many of his structures.”³⁰⁰ Garant was a self-professed ardent structuralist who purported that “the personal design of a work is articulated on every level and its essential element is precisely that structure.”³⁰¹ In other words, the most basic musical elements that permeate each structural level are reflected in such a manner that the whole succinctly summarises the sum of its parts. This replication is, in itself, a form of symmetry. Although he had not yet explored such systematic techniques in his earliest works—this was yet to come in his most well-known series of *Offrande I, II, III* and *Circuit I, II, III* (1969-73) that are based entirely on proportions derived from the theme of Bach’s *Musical Offering*—we can see the beginning of these thoughts in *Asymétries no 2* (procedure of selecting numbers from matrices by snaking back and forth on them).

Prévost and Garant have further commonalities in their adherence to rigorous structural planning and their propensity for carrying-through each step of their carefully devised poietics to the end of the finished composition. As we have seen, although Pépin often made elaborate plans, he often deviated from his musical blueprints during the following compositional stages. This has been noted by Alan Freedman and is studied in the present dissertation in response to my own inability to correctly pinpoint, through esthetic analysis, the Morsiques in the first five measures of *Quasars*.

²⁹⁹ Véronique Robert, *André Prévost: Biography and Works*, Saint-Nicholas: Dobermann-Yppan, 1999, p. 5.

³⁰⁰ MacMillan and Beckwith 1975, p. 78.

³⁰¹ Pilette 1978, pp. 45-46.

One might ask how Messiaen's influence could be so strong yet diverse. Prévost and Garant both answer this question with an apparent paradox, as they felt that Messiaen was most influential in his aim not to be influential. Instead, his insistence on individuality created a plurality of influence. Prévost explained that "Messiaen never wanted to create disciples. He always encouraged us to be ourselves."³⁰² Garant conveyed a similar picture when he concluded that "a great teacher is one who never imposes on his students but succeeds in leaving his mark on them. This mark is not necessarily stylistic, moreover, since Messiaen's teaching does not make you want to compose Messiaen's music, but rather the music that he awakens in you."³⁰³

³⁰² Prévost 2000.

³⁰³ Boivin 1995, p. 359.

Compositions by Serge Garant³⁰⁴

Orchestra

“Ode ‘Ta forme monte comme blessure du sang.’” Score. 1950.

“Ouranos.” Score. 1963.

“Ennéade.” Score. 1963.

“Phrases II.” Score. 1968.

Offrande II. Montreal: Canadian Music Centre, 1978.

Plages. Saint-Nicolas, QC: Doberman-Yppan, 1986.

Soloist(s) and Orchestra

“Musique pour saxophone et harmonie.” Score. 1950. Revised for orchestra, 1951.

“Adagio et Allegro.” piano and orchestra, incomplete. Score.

Chamber Music

“Fantaisie” for clarinet and piano. Score. 1950.

“Musique pour la mort d'un poète” for piano and strings. Score. 1954.

“Nucléogame ‘In memoriam Anton Webern’” for septet and tape. Score. 1955.

“Canon VI” for ten performers. Score. 1957.

“Pièces pour quatuor.” Score. 1958-9.

“Asymétries No. 2” for clarinet and piano. Score. 1959.

Anerca for soprano, flute, clarinet, bassoon, violin, viola, violoncello, harp, and percussion. Don Mills, ON: BMI Canada, 1967.

“Phrases I” for mezzo-soprano, piano, celesta, and percussion. Don Mills, ON: BMI Canada, 1969.

“Amuya” for twenty performers, from the film *L'Homme et les régions polaires*. Score 1968.

“Jeu à quatre” for four instrumental ensemble and sixteen performers. Score. 1968.

“Offrande I” for eighteen performers and pre-recorded soprano, originally titled “Cérémonial du corps”. Score. 1969.

Offrande III for 3 violoncello, 2 harp, piano, 2 percussion. A. Verrecchia, 1971.

“Circuits I” for six percussionists. Score. 1972.

“Circuits II” for fourteen performers. Score. 1972.

“Circuits III” for eighteen performers. Score. 1973.

“... chant d'amours” for sixteen performers. Score. 1975.

Rivages for baritone, chamber ensemble. Saint-Nicolas, QC: Doberman-Yppan, 1991.

Quintet flute, oboe, violoncello, piano, percussion. Saint-Nicolas, QC: Doberman-Yppan, 1990.

“Quartet” for four saxophones, lost.

³⁰⁴ The titles of published compositions are typeset in *italics* and the titles of unpublished ones are given within quotation marks, according to conventions outlined in the Chicago Manual of Style.

Voice and Piano

“Un grand sommeil noir.” Score. 1949.
“Concerts sur terre” no. 1-2. Score. 1952.
“Et je prierai ta grace.” Score. 1952.
“Caprices.” Score. 1954.
“Concerts sur terre” no. 3-5. Score. 1956.
Mélodies. Saint-Nicolas, QC: Doberman-Yppan, 1996.
Cage d'oiseau. Saint-Nicolas, QC: Doberman-Yppan, 1997.

Piano

“Sonatina.” Score. 1950.
“Musique rituelle.” Score. 1954.
“Variations.” Score. 1954.
Asymétries No. 1. Montreal, Canadian Music Centre, 1958.
Pièce No. 1. Montreal, Canadian Music Centre, 1959.

Film Music

From *L'Homme et les régions polaires*. Score. 1967.
From *Vertiges*. Score. 1969.

Compositions by Clermont Pépin

Stage

Les Portes de l'enfer, ballet scored for orchestra (also reduction for two pianos). Score. 1953.
Athalie, incidental music for woodwind and brass. Score. 1956.
Le Malade imaginaire, incidental music for xylophone, viola, violoncello, and percussion. 1956.

Orchestra

“Variations symphoniques.” Score. 1947.
“Symphony No. 1. in B Minor.” Score.
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Chamber

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Compositions by André Prévost

Orchestra

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 "Chorégraphie IV." Score. 1978.
 "Le Conte de l'oiseau." Score. 1979.
 "Cosmophonie." Score. 1985.
Ouverture. Saint-Nicolas, QC: Doberman-Yppan, 1986.
Scherzo. Saint-Nicolas, QC: Doberman-Yppan, 1988.

Célébration. Saint-Nicolas, QC: Doberman-Yppan, 1989.
Cantate pour cordes. Saint-Nicolas, QC: Doberman-Yppan, 1996.
Hommage. Saint-Nicolas, QC: Doberman-Yppan, 1996.
Ouverture 1991. Saint-Nicolas, QC: Doberman-Yppan, 1999.

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“Terre des homes” for orchestra, three choruses, and two narrators. Score. 1967.
Pyknon for violin and orchestra. New York: Okra Music, 1970.
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Concerto pour violon et orchestre. Saint-Nicolas, QC: Doberman-Yppan, 1997.
Hiver dans l'âme for baritone and orchestra. Saint-Nicolas, QC: Doberman-Yppan, 1997.
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“Missa de profundis” for mixed chorus and organ. Score. 1973.

Improvisation V for voice and piano. Toronto: Canadian Music Centre, 1976.

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