



MESSIAEN'S CHORD TABLES: ORDERING THE DISORDERED

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When Heinrich Ströbel commissioned Olivier Messiaen to write a new piece for the Donaueschingen Festival, he took care to specify that the piano and the ondes martenot were to be strictly forbidden. ('Attention, Messiaen! Cette-fois-ci, pas d'onde, pas de piano!')¹ Such a specification is liable to be read as a measure taken to guard against any possible revival of the sound-world of *Turangalîla-symphonie* (1946–8). In an effort to surpass the achievements of *Turangalîla*, however, Messiaen had moved rapidly and decisively in the intervening years. Brief periods of teaching at Darmstadt and Tanglewood led to an obvious surge of experimental works, followed by *Réveil d'oiseaux* (1953), *Oiseaux exotiques* (1955–6) and *Catalogue d'oiseaux* (1956–8), his first attempts at composing primarily with bird songs. With the completion of *Chronochromie* (1959–60), the aesthetic stance of most of the ensuing works was firmly in place.

Among the novelties of *Chronochromie*, the first integrated use of colour-chords and a fully-fledged symmetrical permutation scheme could have been an important cause for Messiaen's reference to it as the result of his latest resurrection.² His detailed discussion of the chords came belatedly in volume VII of the posthumously published *Traité de rythme, de couleur et d'ornithologie*.³ The invention of the symmetrical permutation scheme, unique in its engagement of 32 durations,⁴ enables the astronomical number of permutations ('interventions' in Messiaen's term) derivable from the reshuffling of durations to be reduced drastically. This is evidently an impressive addition to his stock of charm of impossibilities. Commentaries on *Chronochromie* tend to dwell on the permutation scheme, but the colour-chords, used even more widely in his works from *Chronochromie* onwards, are seldom discussed. Messiaen could have felt more inclined to delineate his idea of symmetrical permutation, since it falls more in line with the artistic endeavours of his contemporaries.

Volume III of *Traité* commences with a discussion of this schema, listing all 36 interversions derivable from it.⁵ A series of analyses follows, headed by the obvious choice of *Chronochromie*. As Messiaen embarks on an analysis of strophe I, the structure of the three colour-chord layers played by strings throughout the movement (associated

¹ Antoine Goléa, *Rencontres avec Olivier Messiaen* (Paris: Julliard, 1960), p. 280.

² 'Cette oeuvre est le résultat de ma dernière résurrection'. Goléa, p. 279.

³ His other writings touched upon individual chord names and they were also designated loosely and descriptively as the colour-chords. The present article originates from 'Messiaen and Chord Tables', a paper delivered at the Messiaen 2002 International Conference in Sheffield before the publication of the last volume of *Traité* (Paris: Leduc, 2002). The colour effect of the chords tabled, a topic of great import and complexity, is marginalized in the study.

⁴ His other permutation schemes involve only twelve entities.

⁵ *Traité*, volume III (Paris: Leduc, 1996), pp. 7–38. See also Robert Sherlaw Johnson, *Messiaen* (London: Dent, 1975), pp. 159–60 and 176–7.

with interversions one to three) is delineated for the first time in print (Example 1). The top layer employs 32 revolving chords (*accords tournants*), the middle layer 32 chords of transposed inversions on the same bass note (*accords à renversements transposés sur la même note de basse*) and the bottom layer 32 chords of contracted resonance (*accords à résonance contractée*).⁶

Example 1
Chronochromie, strophe 1, bars 1–2,
 strings only (© 1963 by Alphonse
 Leduc; reproduced by kind
 permission of the publisher)

On this occasion Yvonne Loriod, as editor of *Traité*, inserted the eighth table of the revolving chords, the first table of the chords of transposed inversions and the second half of the twelfth table of the first chords of contracted resonance from the as-then unpublished Volume VII of *Traité* (Example 2).⁷ To my knowledge, Messiaen's chord tables appear here for the first time. The eighth table of revolving chords contains three octads. The first table of the chords of transposed inversions contains four heptads of different pc content, which are reducible to the same set class. In the case of the first chords of contracted resonance, only the second half of the twelfth table is shown, but we can fill in the missing half by referring to the discussion on the same occasion of the genesis of these chords. The completed table contains two heptads or, more specifically, two different seven-note sets. Messiaen described the colours of these chords and added that there are twelve tables of revolving chords just as there are twelve tables each of the chords of transposed inversions and the first chords of contracted resonance.⁸

⁶ The English translation of these chord names varies. See Claude Samuel, *Musique et couleur: nouveaux entretiens* (Paris: Belfond, 1986), translated by E. Thomas Glasow as *Music and Color: Conversations with Claude Samuel* (Portland, Oregon: Amadeus Press, 1994), pp. 64 and 135–6. The revolving chords and the chords of contracted resonance are also referred to as the turning chords and the chords of contracting resonance. Messiaen's chord nomenclature is also confusing in the case of the chords of contracted resonance, as it may designate either the first or second chords of contracted resonance. A terminological distinction was not established until *Traité*, volume VI, part 1 (Paris: Leduc, 1999). His reference to the first chords of contracted resonance in this analysis of *Chronochromie* was thus clouded by the blurred nomenclature of chords of contracted resonance. In this article I shall distinguish between these two categories of chords from the outset.

⁷ See *Traité*, volume III, pp. 85–8. The chord tables and most of the commentaries reappear verbatim in *Traité*, volume VII.

⁸ The so-called twelve tables of each category of chords are referred to as the twelve transpositions that constitute one table in volume VII.

Example 2

(a) The revolving chords (8th table),
 (b) the chords of the transposed
 inversions on the same bass note
 (1st table) and (c) the 1st chord of
 contracted resonance (2nd half of
 12th table) as shown in *Traité*, vol.
 III, pp. 85–8

Curiously, Messiaen seldom illustrates his chord tables by musical examples. As noted, with the analysis of *Chronochromie*, Lorigod inserted two and a half chord tables; but chord tables as such disappear from the ensuing volumes of *Traité*. Messiaen shows only one further chord table, in volume V (part 2), when analysing *Sept haïkai* (1962). It seems clear that he intended to reserve the discussion of chord tables until volume VII. Before that he is not very systematic in the way he goes about discussing these chord tables. In volumes III and IV of *Traité* he repeatedly explains the structural makeup of the chords of transposed inversions and the first and second chords of contracted resonance, leaving out the revolving chords. Oddly enough, explanations as such disappear from volume V. It is as though Messiaen thinks it no longer necessary to explain the structure of these chords. Instead, when analysing his own music, he puts much emphasis on the use of chords listed in the chord tables and points out the precise structure of each chord by specifying the table number and the position of the chord within the table.⁹ The colours of the chords are described, and since he does not use musical examples to illustrate what he means by all these chord tables, he often adds footnotes to cross-reference the full list of chord tables now published in volume VII.

Messiaen's insistent reference to the chord tables in volume V of *Traité*, together with other relevant information dispersed among his writings and his music, enables us to deduce all the chord tables well in advance of the publication of volume VII. In the course of deduction we realize that there are chord tables for two other categories of chords, i.e. the second chords of contracted resonance (*2^e accords à résonance contractée*) and the chord of total chromaticism (*accord du chromatisme*) (Example 3). To sum up: there are five categories of chords and altogether 60 chord tables, twelve each for the revolving chords, the chords of transposed inversions, the chord of total chromaticism, and the first and second chords of contracted resonance.

Example 3

(a) The 2nd chords of contracted
 resonance (1st table) and (b) the
 chord of total chromaticism (8th
 table) deduced from a comparative
 reading of Messiaen's analyses in
Traité, vol. V

⁹ See, for example, *Traité*, volume V, part 1, p. 354 for a rather extreme instance of this.

Layers of the revolving chords, the chords of transposed inversions and the first chords of contracted resonance are superimposed in strophe I of *Chronochromie* to colour interventions 1 to 3 of a sophisticated permutation scheme. Messiaen's penchant for this rhythmic scheme is illustrated by the recurrence of its varying interventions in later works, but the integration of three chord layers and interventions vanished for years before it resurfaced in the fourth movement of *Éclairs sur l'au delà ...* (1987–91).¹⁰ While chord layers based exclusively on the revolving chords persist in the second, fourth and fifth movements of *Sept haïkai* and layers of the chords of total chromaticism, with trills added, are insistently superimposed in the tenth movement of *Éclairs*, the threefold integration of chord layers and interventions remains a distinct hallmark of *Chronochromie* (strophes I and II) and *Éclairs* (fourth movement). The similarities go well beyond this. Of the wealth of 288 chords engaged in the chord layers of *Chronochromie* and *Éclairs*, only one minor spacing irregularity is noted. In strophe I, the treble note of the fourth revolving chord, A natural, could have been a misprint for A sharp, since with this exception all other chords adhere to the spacing patterns set up in the chord tables. The strict convergence of pc content and spacing typifies these pre-composed chords and it seems possible that Pierre Boulez's famed criticism that 'he does not compose – he juxtaposes – and he constantly relies on an exclusively harmonic style of writing' could have referred to cases like this.¹¹

But it is not clear why Messiaen finds it necessary to table these pre-composed blocks. Since each category of chords is transposable twelve times and the twelve tables simply list the twelve transpositions of each category of chords, it seems far too straightforward to be worth the effort of setting up the tables. Were the tables set up in order to facilitate composition and analysis? Or is it because he was fond of this kind of cataloguing? In order to speculate on the motivation behind Messiaen's decision to set up these tables, let us take a closer look at them.

As already suggested, if we focus on only one set of twelve tables, it is terribly straightforward. For example, the twelve transpositions of the revolving chords are entered into twelve tables by following a chromatic sequence. The revolving chords of the first table lie a semitone above the revolving chords of the second table and so on and so forth. But if we compare the five different sets of tables, we become perplexed. It is not at all clear as to why the first chords of the respective first tables should be as they are (Example 4). They do not seem to have anything in common: the treble is different, the bass is different, they do not have even one note in common. The rationale seems to lie elsewhere.

Example 4
The respective 1st table of (a) the revolving chords, (b) the chord of total chromaticism

The image shows two musical examples, (a) and (b), each consisting of two staves (treble and bass clef) with twelve chords. Example (a) shows the first table of revolving chords, and example (b) shows the first table of the chord of total chromaticism. The chords are arranged in a chromatic sequence, with each chord being a semitone higher than the previous one. The notation is complex, with many accidentals and ties, and the chords are often written as dense blocks of notes.

¹⁰ *Éclairs* is Messiaen's last work. *Concert à quatre*, which follows, was left unfinished [although edited for performance by Yvonne Loriod in consultation with Heinz Holliger and George Benjamin – Ed.].

¹¹ Pierre Boulez, *Relevés d'apprenti* (Paris: Editions du Seuil), 1966, translated by Stephen Walsh as *Stocktakings from an Apprenticeship* (Oxford: Clarendon, 1991), p. 49.

Example 4 continued
 (c) the chords of transposed
 inversions, (d) the 1st chords of
 contracted resonance and (e) the
 2nd chords of contracted resonance

The image shows three systems of musical notation, each consisting of a treble and bass clef staff. System (c) shows a sequence of chords with various accidentals. System (d) shows a sequence of chords with a key signature change to two flats. System (e) shows a sequence of chords with a key signature change to one flat.

The literature did not give us any musical examples of the chord tables until volume III of *Traité*, but the chords of transposed inversions, the first and second chords of contracted resonance and a close replica of the revolving chords were in fact listed among the musical examples of Messiaen's first treatise, *Technique de mon langage musical*. The chord of transposed inversions was there called the chord on the dominant (*accord sur dominante*) and was formally discussed in the text of the earlier treatise.¹² Nevertheless, the inclusion of the first and second chords of contracted resonance and the revolving-chord-like progression in *Technique* remains relatively unknown (Example 5).

288 à 293 EXEMPLES PLUS RAFFINÉS.*

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The image shows a piano piece with two systems of chords labeled A and B. The first system is marked with a piano dynamic (p) and the second system is marked with a forte dynamic (f). The chords are complex and feature various accidentals.

289

*Illis d'arcs-en-ciel,
 pour l'Ange
 qui annonce
 la fin du Temps*

The image shows a piano piece with two systems of chords. The first system is marked with a forte dynamic (ff) and the second system is marked with a piano dynamic (p). The chords are complex and feature various accidentals. The second system is labeled '8^a bassa'.

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*Fouillis d'arcs-en-ciel,
 pour l'Ange
 qui annonce
 la fin du Temps*

The image shows a piano piece with two systems of chords. The first system is marked with a forte dynamic (ff) and the second system is marked with a piano dynamic (p). The chords are complex and feature various accidentals. The second system is labeled '8^a bassa'.

Example 5
Technique, Exx.288–90 and 299
 (Ex.288 © 1944 by Alphonse Leduc;
 Exx. 289–90 © 1942 and Ex.299
 © 1950 by Editions Durand, Paris
 (France); reproduced by kind
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¹² See *Technique*, volume I, p. 43, and volume II, examples 201–7 (Paris: Leduc, 1944).

¹³ Composed in 1943 but not published until 1950, *Visions* post-dated the ensuing *Technique* (1944), *Vingt regards sur l'Enfant-Jésus* (1947), *Harawi* (1949) and *Cinq rechants* (1949).

299
*Amen des Anges,
 des Saints, du chant
 des oiseaux*

Modéré, presque vif, joyeux.

Piano

Example 5 continued

Grouped under the heading of '*exemples plus raffinés*', example 288 of *Technique* introduces the first and second chords of contracted resonance, though the chords remain anonymous at this stage. Their future importance is not yet in evidence. With examples 289–90 of *Technique* Messiaen notes very briefly their derivation from the seventh movement of *Quatuor pour la fin du temps*. A footnote added to the heading of '*exemples plus raffinés*' points out his lavish use of these chords in *Visions de l'Amen* for two pianos,¹³ Messiaen's latest work at the time of *Technique*, suggesting that they were then prominently used only in this composition. With one exception (see p. 25), all the footnotes of *Technique*, volume II refer to the as yet unpublished *Visions*, which comes first among his works dedicated to Lioriod and to a generous use of these invented chords (Example 6).¹⁴

Going back to the question of what determines the pitch level of the chords to be entered into the first table in each case, my speculation is that Messiaen simply sets up the first and second chords of contracted resonance shown as example 288 in *Technique* as the respective first table. The outstanding eleven transpositions, chromatically arranged, fill up the rest of the tables. As for the chords of transposed inversions, the models set up as example 204 in *Technique* also assume special importance. The first table of the chords of transposed inversions contains exactly the same chords, although the appoggiaturas no longer resolve.¹⁵ As already mentioned, example 299 of *Technique* shows a close replica of the revolving chords – and these, with the treble duly adjusted, reappear as the eighth table. The eighth table of the chord of total chromaticism also contains the most used transposition of that chord.

Example 6
Visions de l'Amen, seventh movement, p.88 (© 1950 by Editions Durand, Paris (France); reproduced by kind permission of the publisher)

Un peu plus vif (♩=138)

1^{re}

Un peu plus vif (♩=138)

2^e

¹⁴ As shown in example 6, tables 1 and 3 of the first chords of contracted resonance completely fill the first piano part (bars 2 and 4).

¹⁵ See 'Rediscovering Messiaen's Invented Chords', *Acta Musicologica*, Vol. 75, No. 1 (2003) for more details.

* Le 1^{er} piano plus fort que le 2^e. Le 2^e piano joue le thème *ff* (notes graves de main gauche).

Example 6 continued

In attempting to answer the question as to why the twelve transpositions of each category of chords should be written out as twelve tables, it becomes clear that a number of factors may have been in play. The disparate ways in which Messiaen categorizes these chords might have led him to write out all chord tables. While the twelve transpositions of any one category of chords are entered into twelve chord tables by following an orderly chromatic sequence, we do not know what determines whether the second table should lie one semitone above or one semitone below the first table. There seems to be no standardized practice: two of the five categories of chords have tables that trace a chromatic descent, all other chord tables trace a chromatic ascent.

Visions de l'Amen is the earliest work to have used a substantial number of the first and second chords of contracted resonance and in it the first tables of these chords assume special importance. Similarly, most revolving-chord-like progressions used in works from the 1940s are set at the pitch-level of the eighth table. This suggests that Messiaen used only selected transpositions of these chords in the 1940s and that the later use of all twelve transpositions could have prompted him to set up the tables.

There is another important change in the way Messiaen uses these chords. At the time of *Technique*, the component chords of a table are usually articulated as a progression. *Chronochromie* brings a drastic change in this regard, for the chord layers of strophes I and II frequently use the component chords as discrete entities. In the uppermost chord layer, for example, Messiaen chooses from the twelve tables of altogether 36 revolving chords and then subjects the chosen ones to reshuffling. If we accept that numerology is one of Messiaen's major concerns, it seems unlikely that the 32 revolving chords that make up the uppermost chord layer are chosen at random. The setting up of twelve tables each for the five categories of chords could have affected his choice of chords in instances like this.

In conclusion, we may well ask what the chord tables, and the chords tabled, tell us. These chords stand out in importance in the sense that they, but no other chords, are formally tabled in *Traité*. The chord tables show also that mirror inversions are not treated as equivalent. For example, the twelve tables of the revolving chords list only the twelve transpositions of the three referential octads; the mirror inversions of these are not included. In the special case of the chords of transposed inversions, not only the pc content but the spacing of chords also determine the tabling of them. The twelve tables of the chords of transposed inversions are occupied by 48 chords although there are only twelve chords of distinct pc content. Each of these twelve chords, differently inverted, appears in four different tables. The creation of 48 chords thus rests on the factor of chord inversion, which boils down to spacing.

Messiaen's admission that he chose among the tables for chords to be entered into the chord layers of strophes I and II of *Chronochromie* is suggestive of an approach that falls much in line with his listings of Greek metres, Hindu rhythms, the interversions of his symmetrical permutation scheme and bird songs. One is under the impression that Messiaen's working habit is such that he has all these tables or lists ready, from which he chooses freely. The setting up of chord tables seems to have come at a time when he turns to engage a wider range of transpositions of these chords and also to use the component chords of the tables in isolation. Chords previously launched as integral parts of distinct progressions have come to be used separately, probably because this will greatly increase the number of colours available.

In *Chronochromie* the schematic use of these chords appears for the first time in Messiaen's music. Significantly, it goes hand in hand with his first extensive use of a symmetrical permutation scheme,¹⁶ parts of which resurface in *Sept haïkai*, *Couleurs de la cité céleste* and *Éclairs sur l'au delà ...*. *Chronochromie* thus marks off an important phase in Messiaen's artistic development. In the years leading up to this ambitious orchestral canvas he had experimented with more primitive kinds of symmetrical permutation in *Mode de valeurs et d'intensités* (1949), *Île de feu II* (1950) and *Livre d'orgue* (1951). Intensely at work with what was then perceived as an inevitable pursuit of serialism, at the time of *Quatre études de rythme* and other experimental works that followed the *Tristan* trilogy he was in fact going through a period of tremendous uncertainties.¹⁷ In retrospect he openly admitted that the then-acclaimed *Mode de valeurs et d'intensités* is essentially an experi-

¹⁶ The scheme is first used in 'Le merle de roche' (*Catalogue d'oiseaux*) in a passage marked 'cortège de fantômes de Pierre, transportant une femme morte', but only the first interversion is involved.

¹⁷ Added to the artistic crisis was the death of Claire Delbos in 1959 after years of confinement to a sanatorium.

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ment of little artistic worth ('musically it's next to nothing').¹⁸ Nevertheless, the way this Darmstadt piece superimposes three twelve-note series, with durations, attacks and dynamics all fixed in advance, is reminiscent of the chord-layers of *Chronochromie* and *Éclairs*, where not only the chords, but also the timing of their entrance into the scene, are strictly pre-composed.

The extent to which *Chronochromie* relies on the tabled chords as the ultimate source of harmonic colours is astounding. Apart from strophes I and II, where they form a veiled background against which delightful bird songs burst forth, they also colour the medleys of bird-songs and solemn chanting that fill antistrophes I and II. The highly unified harmonic colouring of the paired strophes and antistrophes leads eventually to the épode, where all pre-existing chords are purged in celebration of a world of liberating birdsongs. The rigour with which Messiaen adheres to the tabled formats of these harmonic blocks remains, nonetheless, an important imprint of all ensuing works. While there is evidence that he treats the chords with rather more flexibility, they remain relatively immune to changes, just as Messiaen grew ever more steadfast in his pursuit of sounds and ideas that challenged the most eminent musical minds of the 20th-century.

¹⁸ Samuel, *Music and Color*, p. 47.