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### Permalink

<https://escholarship.org/uc/item/1hj164pd>

### ISBN

978-1-108-48791-7

### Author

Bauer, Amy

### Publication Date

2024

Peer reviewed

*An Explosive Confrontation*  
*Messiaen and the Post-War Avant-Garde*

*Amy Bauer*

‘Who are these agitated young people?’, wondered Antoine Goléa, referring to the hoots and hollers that greeted a performance of Stravinsky’s neoclassical works in 1945. ‘Soon these rowdy listeners were given a nickname: they were called the “messiaeniques”’.<sup>1</sup> The birth of the post-war musical avant-garde is inseparable from the image of Messiaen as mentor and central figure surrounded by a coterie of rapt but independent-minded students, who would go on to define the shape of the European avant-garde for decades to come. Those students included pioneers of *musique concrète* such as Pierre Henri and François-Bernard Mâche, as well as many international students, but most notable are those who forged a post-Webern serial legacy in the late 1940s and early 1950s such as Pierre Boulez, Karlheinz Stockhausen, and Iannis Xenakis. This chapter will trace the influence of Messiaen’s work and teaching on that post-war generation, primarily in the area of rhythmic technique, but it will also suggest ways in which the work of Messiaen’s students came full circle to influence the music and teaching of their mentor.

### The ‘Composition’ Class

The young Messiaen was hired to teach harmony at the Paris Conservatoire in 1941 but invited his best students to attend a private analysis class where they famously studied works such as Stravinsky’s *Le Sacre du printemps* and early Schoenberg. In 1946, all the pupils of Messiaen had signed a petition, asking for his appointment to a composition class.<sup>2</sup> In 1947 the Conservatoire’s director Claude Delvincourt hired Darius Milhaud as

<sup>1</sup> Antoine Goléa and Pierre Boulez, *Rencontres avec Pierre Boulez, avec trois hors-texte* (Paris: René Julliard, 1958), p. 10.

<sup>2</sup> Goléa and Boulez, *Rencontres avec Pierre Boulez*, p. 13.

the Conservatoire's professor of composition, but had the foresight to invite Messiaen to teach his analysis in an official capacity, and so this course in 'super-composition' would continue unabated until Messiaen moved into the composition chair in 1966.<sup>3</sup>

Much of the ferment in the post-war avant-garde can thus be traced back not only to Messiaen's teaching, but to the particular atmosphere created in his classes, which investigated common-practice period works, music from African and Indonesia, and a wide range of twentieth-century compositions. As Mark Delaere notes, the influence of Messiaen's *Sacre* analysis alone can be traced in the subsequent music and theoretical writings of Stockhausen and Boulez, even as those students extended and developed ideas first broached in these analysis seminars.<sup>4</sup>

Messiaen's direct influence on his students and the wider avant-garde can perhaps most clearly be seen in his rhythmic innovations. As Ton De Leeuw notes, Messiaen was the first composer of the twentieth century to consciously assign a primary structural role to rhythm.<sup>5</sup> The development of these procedures in work of the late 1940s and 1950s is clearly presaged by earlier works such as the *Turangalila-Symphonie* (1946–8). The second section of the symphony's introduction juxtaposes six rhythmic patterns that display nearly the full range of these techniques.<sup>6</sup> Second violins and violas provide a four-part harmonic pedal of thirteen pitches set to the Râgavardhana *deçî-tâla*, based on the semiquaver as the basic unit of duration. A five-quaver-long ostinato in pitched percussion, piano, first violins, and second flute appears alongside a five-quaver chordal idea in lower strings, piano, and bassoon. The rest of the woodwinds state a short four-unit motive, while a Chinese cymbal beats out what Messiaen termed a 'chromatic rhythm', one in which each successive duration is either one unit more or less than the preceding: 17 16 15 14 13 12 11 10 9 8 7 8 9.<sup>7</sup> A non-retrogradable rhythm appears in snare drum but repeats in three augmented variations which add identical rhythmic cells, and always sum to a prime number. The fabric as a whole superposes rhythms of unequal length, and superposes repeating patterns of the same length with the

<sup>3</sup> Vincent Benitez, 'A Creative Legacy: Messiaen as Teacher of Analysis', *College Music Symposium*, Vol. 40 (2000), p. 118.

<sup>4</sup> Mark Delaere, 'Olivier Messiaen's Analysis Seminar and the Development of Post-War Serial Music', trans. Richard Evans, *Music Analysis*, Vol. 21 No. 1 (2002), p. 40.

<sup>5</sup> Ton De Leeuw, *Music of the Twentieth Century*, trans. Stephen Taylor (Amsterdam: Amsterdam University Press, 2005), p. 53.

<sup>6</sup> A fuller discussion of this passage can be found in Robert Sherlaw Johnson, *Messiaen* (London: Dent, 1975), pp. 101–15.

<sup>7</sup> Olivier Messiaen, *TRCO*, Tome I (Paris: Leduc, 1994), p. 269; Tome II (Paris: Leduc, 1995), p. 28.

chromatic rhythms that vary the length of each successive rhythmic variation. Messiaen hence not only treats rhythm as a fully independent parameter but creates a kind of meta-polyphony of rhythmic techniques, orchestrated with the same attention previously paid to melody and harmonic accompaniment. Boulez spoke of Messiaen's presentation of such rhythmic elaboration in the 1944 analysis class.<sup>8</sup> Although early works such as the *Toccata* for piano (1944–5) suggest the influence of Messiaen's modes of limited transposition, the serial compositions of Boulez – such as the *Sonatine* for Flute and Piano (1946/1949) – focus on rhythmic structure, specifically the superposition of different rhythms to 'produce the greatest wealth of rhythmic figures without jeopardizing the coherence of the whole'.<sup>9</sup> Boulez took from Messiaen the idea that all the parts of a truly contrapuntal texture should have equal importance, with rhythm as an independent parameter, a position at odds with that of his other primary teacher at the time, René Leibowitz.<sup>10</sup>

As an example, the third movement of Boulez's Second Piano Sonata (1948) opens with a twelve-note row in specific registers, expressed with three rhythmic cells, as shown in Table 29.1. Again, taking the semiquaver as equivalent to 1, we have the following in bars 1–2. Cell B can be explained as a variant of A with Messiaen's *valeur ajoutée*, or added value, as well as compression, while C appears as a shortened version of both cells. This pattern repeats with slight changes in bars 3–5. But in bar 6 the triplet quavers of A appear in an irrational proportion (2:3), while in bars 7–8 cells

Table 29.1 *Initial row of Boulez's Second Piano Sonata as an expression of three rhythmic cells*

	D <sub>4</sub>	A <sub>4</sub>	D# <sub>4</sub>	G# <sub>4</sub>	B <sub>3</sub>	E <sub>3</sub>	F# <sub>2</sub>	Bb <sub>1</sub>	C <sub>3</sub>	C# <sub>4</sub> G <sub>3</sub> F <sub>3</sub>
2	2	2	4	2	1	2	2	12	2	
A					B					C

<sup>8</sup> Pierre Boulez and Célestin Deliege, *Conversations with Célestin Deliege*, trans. Robert Wangermee (London: Eulenburg, 1976), pp. 12–14.

<sup>9</sup> Boulez cited in René Leibowitz, *Schoenberg and His School*, trans. Dika Newlin (Boston, MA: Da Capo, 1970), p. 281.

<sup>10</sup> Pierre Boulez, 'Eventuellement . . .', *La revue musicale*, No. 212 (1952), pp. 127 and 141.

A and C are juxtaposed, with rests interpolated as the pace of note attacks slows down in bars 9–10. The interplay of rhythmic cells takes precedence over the development of the series. Later Boulez works make use of the full panoply of rhythmic devices; for instance, *Mémoriale* (1985) disrupts the symmetry of a rhythmic canon through the addition of an added value to each of four canonic transformations. Boulez thus took from Messiaen the importance of developing not only rhythm but all musical parameters independently, if in tandem. Pitch motive required an identifiable rhythmic profile, but various rhythmic techniques could determine the formal profile of a work, as in *Anthèmes* (1991–2) where rhythmic canons establish a pulsating *moto perpetuo* that defines section II.<sup>11</sup>

### Darmstadt and Beyond

The birth of the serial avant-garde proper is typically traced to work presented and discussed at the famous Darmstadt summer schools for new music, started in 1946 to introduce young German composers to music that was rarely heard and even less discussed during the war years. Leibowitz had visited in 1948 to preach the gospel of the Second Viennese School, while Messiaen was invited as a special guest in 1949. Messiaen's pivotal role that year was to lead by example. After the first appearance – albeit briefly – of total serialism in the *Cantéyodjayâ* for piano (1949), he famously introduced what came to be called integral serialism in 'Mode de valeurs et d'intensités' (1949), the second of the *Quatre Études de rythme* for piano. Following Messiaen's earlier practice of layering pitch 'colore' with rhythmic 'talea' of differing lengths, 'Mode de valeurs' juxtaposes four series: a thirty-six-note pitch row with a series of twenty-four durational values, twelve articulations and a scale of seven relative dynamic levels. The pitch series divides into three, and each division of twelve maintains the same dynamic value and articulation throughout the work. The pitch series is indeed a 'mode', treated both more freely – by mining motivic connections between divisions – and more strictly – retaining the registral identity of each pitch – than that of a standard dodecaphonic tone row.

Goléa remembers Stockhausen listening obsessively to the 'Mode de valeurs' as a 'revelation of a world' he wished to enter.<sup>12</sup> Stockhausen was introduced to Messiaen's music and ideas by a student he met at

<sup>11</sup> Jonathan Goldman, *The Musical Language of Pierre Boulez: Writings and Compositions* (Cambridge, UK: Cambridge University Press, 2011), pp. 157, 169.

<sup>12</sup> Goléa, *Rencontres avec Pierre Boulez*, p. 78.

Darmstadt in 1951, the Belgian composer Karel Goeyvaerts, who had attended Messiaen's class in 1947–50, and who in turn had been introduced to serialism by his friend Jean Barraqué, a Messiaen student from 1948 to 1951.<sup>13</sup> Stockhausen described it as 'punktuelle' or '“point” music', a style in which all possible characteristics of a sound changed from note to note.<sup>14</sup> Although Messiaen never returned to the strict serialization of parameters represented by 'Mode de valeurs', he returned time and again to the process of interversion represented by 'Île de feu II' (1950). Interverision was the name Messiaen gave to pitch or intervallic permutations, which typically involved swapping the inner terms of a row with the outer terms, or vice versa. 'Île de feu II' is based on a chromatic row of twelve durations based on the semiquaver, with the longest duration a half minim. Given an original pattern, Messiaen takes order number 7 (dotted crochet) as his new number 1, and order number 6 (crochet tied to dotted quaver), as his new number 2; hence an operation on the first half of the series is always followed by a mirrored operation on the second half. The first interversion of the piece is thus 7-6-8-5-9-4-10-3-11-2-12-1.<sup>15</sup>

Stockhausen's *Kreuzspiel* (1951) for piano with percussion trio, oboe, and bass clarinet employs a chromatic duration scale on twelve values, correlated with a twelve-note pitch series, seven dynamic values, and seven registral positions. As in 'Mode de valeurs', Stockhausen marries each pitch to a unique durational value, although he defines duration as the distance between attack points and uses a semiquaver triplet as his base unit. As in 'Île de feu II', he uses interversions to produce subsequent forms of the series beginning with phase 1 (bars 14–20). For instance, in phase 2 (bars 20–6) the first pitch of phase 1 moves to order no. 7, while the last pitch or phase 1 moves to order no. 6, as shown in Table 29.2. The subsequent move to phase 3 features two 'crossings', following the pattern 1-2-2-4-4-6, whereupon every order number pair has been swapped; thenceforth the pattern of pitch crossings reverses 4-4-2-2-1 until the first initial hexachord has been replaced by the second (Phase 12). As each pitch's parameters follow this exchange, higher notes are progressively swapped for those from below (indicated by bold registral numbers), with a corresponding

<sup>13</sup> David Osmond-Smith, 'New Beginnings: The International Avant-Garde, 1945–62', in *The Cambridge History of Twentieth-Century Music*, ed. Nicholas Cook and Anthony Pople (Cambridge, UK: Cambridge University Press, 2004), p. 340.

<sup>14</sup> Karlheinz Stockhausen and Robin Maconie, *Stockhausen On Music: Lectures and Interviews* (London: Marion Boyars, 1989), pp. 34–5.

<sup>15</sup> Messiaen, *TRCO*, Tome III (Paris: Leduc, 1996), pp. 165–6.

effect on duration and dynamics marked by the woodblock (the only deviation in any of these two parameters is the dynamic exchange between the final Eb and F in phase 12).<sup>16</sup> *Kreuzspiel* extends the reach of both Messiaen's interversions and of his technique of juxtaposing patterns of different lengths, to parameters beyond that of pitch and rhythm.

Jonathan Harvey looks beyond the *Quatre Études* finding a closer precedent for *Kreuzspiel*'s duration scheme in 'Les Yeux dans les Roues', movement 6 of

Table 29.2 First, second, and twelfth serial phases in *Kreuzspiel*: top to bottom rows represent registral, pitch, dynamic, and duration class

*Phase 1*

7	1	1	7	1	1	1	7	7	7	7	1
E $\flat$	D $\flat$	C	D	B $\flat$	F	B	E	G	A	A $\flat$	G $\flat$
sfz	mf	mf	p	ff	pp	ff	p	f	mp	mp	f
11	5	6	9	2	12	1	10	4	7	8	3

*Phase 2*

1	1	7	1	6	1	7	1	7	7	2	7
D $\flat$	C	D	B $\flat$	F	G $\flat$	E $\flat$	B	E	G	A	A $\flat$
mf	mf	p	ff	pp	f	sfz	ff	p	f	mp	mp
5	6	9	2	12	3	11	1	10	4	7	8

*Phase 12*

7	1	1	1	1	7	1	7	7	1	7	7
B	E	G	A	A $\flat$	G $\flat$	E $\flat$	D $\flat$	C	D	B $\flat$	F
ff	P	f	mp	mp	f	pp	mf	mf	p	ff	sfz
1	10	4	7	8	3	11	5	6	9	2	12

<sup>16</sup> As Richard Toop notes, *Kreuzspiel* is also indebted to Goeyvaert's Sonata for 2 Pianos (1950–1), but in the ways noted above is closer in spirit to the *Quatre Études*, despite occasional anomalies in the series' forms: 'Messiaen/Goeyvaerts, Fano/ Stockhausen, Boulez', *Perspectives of New Music*, Vol. 13, No. 1 (1974), p. 159.

Messiaen's *Livre d'Orgue* (1951).<sup>17</sup> This arresting toccata movement again pairs pitch and durations 1 to 12 (units Messiaen referred to as *sons-durées*), although register is free, and the dynamics remain triple forte in manual and quadruple forte in pedals throughout. A different series appears in right hand, left hand and pedals; while the structure of manual rows is more complex, a four-stage transformational pattern determines the interversions in the pedal: (1) outer pitches move to the centre; (2) outer pitches move to the centre in retrograde; (3) inner pitches move to the outside; and (4) inner pitches move to the outside in retrograde; the series at the close of the work is thus a retrograde of the original.<sup>18</sup> 'Soixante-Quatre Durées', the final movement of the *Livre*, combines serial pitch material with a series of sixty-four chromatic durations ranging from one demisemiquaver to a breve (sixty-four demisemiquavers), permuted in groups of four in similar fashion to 'Les Yeux'.

Messiaen taught the *Livre d'Orgue* in his seminar, writing of the 'Pièce en trio II' that 'even if one finds the music . . . is long, ugly, and useless, it represents one of my greatest rhythmic victories'.<sup>19</sup> As Boulez noted, the titles of Messiaen's works in this period – he cites 'Les Yeux' and movement 3, 'Les Mains de l'abîme' – indexed the conflict between spontaneity and organization that Messiaen was confronting at this time.<sup>20</sup> The year 1951 not only marked Messiaen's explicit embrace of a generalized approach to serialism but was also the year that Boulez borrowed the first twelve notes of Messiaen's pitch series in 'Mode de valeurs' as the foundation for his [first chapter](#) in *Structures 1a* for piano, which he combined with a twelve-duration series in demisemiquavers as an explicit homage. Yet contrary to Messiaen's model, Boulez strove to focus on the varied densities that six serial layers could impart, and added tempo 'transpositions' to his rhythmic arsenal. 'The pitches, durations, timbral profiles and dynamics – the four specific characteristics that I had taken literally from the model provided by Messiaen – were each defined according to their own distinct networks, but each was fashioned according to the same "transpositional" procedure'.<sup>21</sup> Similarly, during the last months of 1951 Stockhausen expanded on Messiaen's models by applying serial procedures to entire melodic and harmonic units in *Formel* (1951).

<sup>17</sup> Jonathan Harvey, *The Music of Stockhausen: An Introduction* (Berkeley, CA: University of California Press, 1975), p. 18.

<sup>18</sup> Messiaen, *TRCO*, Tome III, pp. 213–17. <sup>19</sup> Messiaen, *TRCO*, Tome III, p. 240.

<sup>20</sup> Pierre Boulez, 'Olivier Messiaen', *Orientations: Collected Writings*, ed. Jean-Jacques Nattiez, trans. Martin Cooper (London: Faber & Faber, 1986), p. 414.

<sup>21</sup> Boulez, *Music Lessons*, ed. and trans. Jonathan Dunsby, Jonathan Goldman, and Arnold Whittall (Chicago, IL: University of Chicago Press, 2019), p. 241.



Stockhausen was captivated not only by Messiaen's technical innovations but by his aesthetics, which often, especially in slower through-composed works, demanded a new listening strategy; 'one lingers in the music, without the need to consider what comes before or after in order to perceive the individual present (the individual sound)'.<sup>22</sup> He demonstrated this in the two-movement *Spiel* for orchestra (1953), which further developed the pointillism of *Kreuzspiel*, but which divides the orchestra into four groups with independent temporal structures, each with its own duration scale, determined according to the timbral qualities of individual instruments.

Stockhausen worked on *Spiel* while attending Messiaen's 1952 class, which was also attended sporadically by Iannis Xenakis, who filled his class notebooks with sketches of Hindu rhythmic modes and permutations, the pattern inserted into *Tripli Zyia* for flute, voice, and piano (1952).<sup>23</sup> Like Messiaen, Xenakis worked with additive rhythmic patterns, but expanded Messiaen's use of arithmetic proportions to geometric proportions. *Le Sacrifice* (1953), a brief orchestra work composed as the second movement of Xenakis's Anastenaria cycle and dedicated to Messiaen, demonstrates the master's influence most clearly. A series of eight pitches fixed in register are attached to a scale of durations based on the first eight numbers of the Fibonacci series: 1, 2, 3, 5, 8, 13, 21, and 34. [Example 29.1](#) shows the first presentation of the row in bars 1–23 and the final two presentations of the row in bars 92–103. After bar 38 pitches exchange durations, speeding up and slowing down in a non-linear progression. Each pitch repeats at a varied rate as well, and is integrated into clusters, which changes the sounding length and tonal character of each member of the row. This careful unfolding of a proportional duration series over six octaves suggests to Makis Solomos an image of the acoustic spectrum, making *Sacrifice* a direct precursor of spectral music.<sup>24</sup> Xenakis continued superposing different rhythms based on additive patterns with triplet and quintuplet divisions of a larger unit in his ground-breaking works of the mid-1950s such as *Metastaseis* (1953–5) and *Pithoprakta* (1955–6).

<sup>22</sup> Karlheinz Stockhausen, *Texte Zur Elektronischen Und Instrumentalen Musik*, Vol. 1 (Cologne: M. D. Schauberg, 1963), p. 21.

<sup>23</sup> Anne-Sylvie Barthel-Calvet, 'The Messiaen–Xenakis Conjunction', in *Messiaen Perspectives 2: Techniques, Influence and Reception*, ed. Christopher Dingle and Robert Fallon (Farnham: Ashgate, 2013), pp. 190–1.

<sup>24</sup> Makis Solomos, 'Xenakis's Early Works: From "Bartókian Project" to "Abstraction"', *Contemporary Music Review*, Vol. 21, No. 2–3 (2002), p. 27. I have extrapolated the chart in [Example 29.1](#) from descriptions of Xenakis's process found in Solomos, 'Xenakis's Early Works', p. 29 and Barthel-Calvet, 'The Messiaen–Xenakis Conjunction', pp. 195–6.

Example 29.1 The first and final two presentations of the row in *Le Sacrifice*

The musical score consists of two systems, each with a treble and bass staff. The first system (measures 1-23) shows the first presentation of the row, with measures 1, 3, 8, 20, and 23 marked. The second system (measures 92-103) shows the final two presentations, with measures 92, 95, 96, 97, 99, and 103 marked. The score includes various rhythmic markings such as 8x, 13x, 16x, 23x, 64x, 34x, 38x, 42x, 17x, 9x, 5x, 4x, 5x, 5x, 5x, 4x, 3x, 4x, and 3x.

The Hungarian refugee György Ligeti would join this great flowering of the compositional avant-garde when he accepted an offer from Stockhausen to work at the electronic studio of the West German Broadcasting company (WDR) in Cologne in 1958. While there, he published an influential analysis of Boulez's *Structures 1a* and pondered the inherent contradictions and paradoxes inherent in the serial composition, as they applied to multiple dimensions of musical structure.<sup>25</sup> Ligeti was fascinated by Messiaen's

flexible rhythm . . . the entirely new and interesting rhythmic configuration in his music. Messiaen would choose a number of different time-measurements and arrange them in sequence with the result that metrical pulsation disappears and a floating kind of music takes its place. But taking twelve time-measurements, that was nonsense, I thought.<sup>26</sup>

<sup>25</sup> György Ligeti, 'Pierre Boulez: Decision and Automatism in Structure 1a', *Die Reihe*, Vol. 4 (1960), 33–63, and 'Metamorphoses of Musical Form', in *Die Reihe: Form-Space*, Vol. 7 (Bryn Mawr, PA: Theodore Presser Co., 1965), pp. 5–19.

<sup>26</sup> György Ligeti, *Ligeti in Conversation with Péter Várnai, Josef Häusler, Claude Samuel and Himself*, trans. Gabor J. Schabert, Sarah E. Soulsby, Terence Kilmartin, and Geoffrey Skelton (London: Eulenburg, 1983), p. 36.

Stockhausen correlated the inherent timbral qualities of instruments with their corresponding durational series, while Xenakis employed the duration series to express a timbral spectrum as form. But Ligeti's micropolyphonic technique superimposes narrow canons at the octave or unison, each with its own 'elastic talea'. Hence in Ligeti's works of the early 1960s such as *Atmosphères* (1961) and the *Requiem* (1963–5), his durational series in effect became timbre, working beneath the audible surface – as did the grand inversions that drove Messiaen's *Chronochromie* (1960) – to effect shifts in a listener's large-scale perception of form. Later Ligeti works, such as the *Études pour piano* (1985–2001) and the *Concerto for Piano and Orchestra* (1985–8), continue to show the influence of Messiaen's modes of limited transposition, while the piano concerto and opera show the clear influence of the rhythmic technique Messiaen derived from Stravinsky, his *personnages rythmiques*.<sup>27</sup> Ligeti would in turn teach Messiaen's works in his own composition seminars, as both a harmonic and rhythmic model.<sup>28</sup>

### Teacher as Student

Speaking generally of his students, Messiaen observed that 'their questions compelled me to undertake studies I might not have dreamt of, had it not been for them', an observation reiterated by Boulez, whom Messiaen considered the greatest musician of his generation and his successor in the field of rhythm.<sup>29</sup> Over the years Messiaen taught the music of Boulez, Stockhausen, Xenakis, and Ligeti in his classes, and drew on their innovations in his own works. His massive *TRCO* cites the works of all four composers for their rhythmic innovations. Boulez's Second Piano Sonata introduces the *reprise négative*; 'everything that is sound becomes silence, all that is silence turns into sound', while Boulez's music in general is lauded for its exploration of 'smooth' and 'striated' time and diagonal rhythms.<sup>30</sup> Stockhausen's exploration of irrational rhythmic values and their superimposition in the *Klavierstücken* and also *Zeitmasze* (1955–6) are also discussed, but Messiaen identifies

<sup>27</sup> Amy Bauer, *Ligeti's Laments: Nostalgia, Exoticism and the Absolute* (Farnham: Ashgate, 2011), p. 165.

<sup>28</sup> Andre Hajdu, 'A Galaxy Called Mikrokosmos – A Composer's View', *Tempo*, Vol. 62, No. 243 (2008), p. 26; Manfred Stahnke, 'The Hamburg Composition Class', in *György Ligeti: Of Foreign Lands and Strange Sounds*, ed. Louise Duchesneau and Wolfgang Marx (Woodbridge: The Boydell Press, 2011), p. 233.

<sup>29</sup> Claude Samuel, *Music and Color: Conversations with Olivier Messiaen* (Portland, OR: Amadeus Press, 1994), p. 176, 182; Pierre Boulez, 'Préface' to Messiaen, *TRCO*, Tome I, pp. v–vi.

<sup>30</sup> Messiaen, *TRCO*, Tome I, pp. 49–50, Tome III, pp. 352–5.

*Momente* (1962–9) as the younger composer's most personal work, as well as the closest that he had come to Messiaen's own timeless music 'that evolves moment by moment, minute by minute, fragment of time by fragment of time'.<sup>31</sup>

Messiaen analysed *Metastaseis* in his class of 1965–6, before introducing Xenakis's concepts of stochastic music alongside other works.<sup>32</sup> Elsewhere Messiaen credits Ligeti – who he considered one of the greatest composers of the twentieth century – with inventing the 'rhythmic modulation', a progressive transformation by successive durations that effects a subtle, sometimes imperceptible shift from one harmonic colour to another.<sup>33</sup> He was known to consult orchestral scores by Ligeti while composing, and sketches for the opera *Saint François d'Assise* reference Boulez, Xenakis, and Ligeti.<sup>34</sup> Boulez, Stockhausen, and Xenakis all spoke of two important lessons they had taken away from Messiaen. In terms of technique, his music modelled a synthesis of rhythmic procedures from different types of Indian music, and from the past and the present, an 'explosive confrontation' his students brought to bear on every parameter of music.<sup>35</sup> But more than just a source of technique, Messiaen served as a 'permanent model' for Boulez, among others, for he always maintained a specific point of view without renouncing other opinions, 'a sort of principle of incertitude' that ensured an ever-evolving modernity in music.<sup>36</sup>

<sup>31</sup> *Zeitmasse* is discussed in Messiaen in *TRCO*, Tome II, pp. 428–30; Samuel, *Music and Color*, p. 187.

<sup>32</sup> Jean Boivin, *Le Classe de Messiaen* (Paris: Christian Bourgois, 1995), p. 8.

<sup>33</sup> Samuel, *Music and Color*, p. 200; Messiaen, *TRCO*, Tome IV, p. 454.

<sup>34</sup> Peter Hill and Nigel Simeone, *Messiaen* (New Haven, CT: Yale University Press, 2005), pp. 284, 325.

<sup>35</sup> Stockhausen, 'Every Day Brings New Discoveries', in *The Voice of Music: Conversations with Composers of Our Time*, ed. Anders Beyer (Farnham: Ashgate, 2000), p. 169, and see also Iannis Xenakis, 'Pour saluer Olivier Messiaen', *Opéra de Paris*, 12 (November 1983), p. 6.

<sup>36</sup> Goléa, *Rencontres avec Pierre Boulez*, p. 17, Pierre Boulez, 'Une sorte de principe d'incertitude', in *Olivier Messiaen: le livre du centenaire*, ed. Anik Lesure and Claude Samuel (Lyon: Symétrie, 2008), p. 52.