



Symmetry and Pitch-Duration Associations in Boulez' *Le Marteau sans maître*

Author(s): Steven D. Winick

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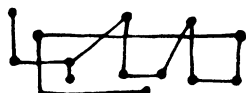
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SYMMETRY AND PITCH-DURATION  
ASSOCIATIONS IN BOULEZ'  
*LE MARTEAU SANS MAÎTRE*



STEVEN D. WINICK

*Le Marteau sans maître* is one of Boulez' most widely known compositions and yet it remains one of his most enigmatic. In contrast to *Polyphonie X* (1951), the two *Études* (1951–52), and *Structures*, book one (1951–52) which immediately preceded *Le Marteau* (1953–54, revised 1957) and whose pitch, duration, dynamics, and modes of attack are strictly serialized and relatively easily analyzed, the compositional processes in *Le Marteau* are obscured by transformed serialization, veiled relationships, and speed and complexity of texture.

One aspect of *Le Marteau* which has been generally overlooked is that of pitch-duration association. This technique usually associates pitches of an ascending chromatic scale with durations which increase arithmetically by small increments, such as a sixteenth note. For example, C = , C# = , D = ,

$D\# = \text{♩}$ , etc. I will refer to this as a pitch-duration association based on C, or a PDA = C. What I will attempt here is to share a few discoveries and observations of my own concerning the use of PDA's and their influence on the overall structure of movement VI of *Le Marteau*.

*Le Marteau's* glassy, ethereal sound of pulverized, constantly changing pitches, dynamics, timbres, and rhythms mirrors the surrealist poetry of René Char upon which the composition is based. This kaleidoscopic soundscape seems as fragmented as the text, and both transmute the irrational chaos of our age into music.

It is well known that Boulez is reluctant to explain his own compositions. When asked to supply program notes for the first performance of *Le Marteau* in 1955 at the Baden-Baden International Society for Contemporary Music, Boulez laconically wrote, as quoted by Friederich Saathen: "*Le Marteau sans Maître*, after a text by René Char, written for alto, flute, viola, guitar, vibraphone, and percussion. The text is partially sung, partially interpreted through purely instrumental passages."<sup>1</sup> In a fashion typical of many writers on this subject, Saathen commented that it was unlikely that anything more could be said and that his own article would provide random reflections and impressions.

In his recent book on Boulez' music, Paul Griffiths notes that *Le Marteau* "resists any kind of conventional serial analysis"<sup>2</sup> and according to Joan Peyser, "the machinery of twelve-note organization [in *Le Marteau*] is so complex that it is impossible to trace the steps which lead from one pitch to the next."<sup>3</sup>

Boulez himself has said that an analysis of *Le Marteau* would be very difficult because



There is in fact a very clear and very strict element of control, but starting from this strict control and the work's overall discipline there is also room for what I call *local indiscipline*: at the overall level there is discipline and control, at the local level there is an element of indiscipline—a freedom to choose, to decide and to reject.<sup>4</sup>

Yet reportedly, Boulez is annoyed at suggestions that *Le Marteau's* success is due



merely to the fact that he had greatly relaxed the rigor of his serialism. On the contrary, he says, it was precisely the serial experience of "Structures" that enabled him to turn at once to the composition of what has proved his first fully mature (and still his best-known) work. "People say it 'sounds well,' but that is not merely because I have a good nose for sound—it is also because the textures and harmonies are absolutely controlled," he explains. "Serialism provided me with a syntax. In '*Le Marteau*,' I used it to formulate thoughts."<sup>5</sup>

The analytic literature is replete with accounts of the development of the serialization of note duration (termed variously as “chromatic rows,” *chiffreage sériel* or *grilles d’enchaînement*), tracing its use from Wladimir Vogel’s *Variétés* (1939–40) to Babbitt’s *Three Compositions for Piano* (1948), and Messiaen’s *Mode de valeurs et d’intensités* (1949) to Boulez’ *Structures*, book one (1951–52). However, only a few analyses of *Le Marteau* discuss the use of pitch-duration associations and they do so only briefly, noting occasional and apparently unrelated examples.<sup>6</sup>

Boulez uses pitch-duration associations with varying degrees of consistency in movements II, VI, VIII, and IX of *Le Marteau*. The technique is used in a most interesting fashion in movement VI, where it is employed throughout. Entitled “Bourreaux de solitude,” the movement is scored for voice, flute in G, xylorimba, vibraphone, maracas, guitar, and viola. It begins with single PDA’s employed for one to three measures each. (Due to the pitchless nature of the maracas part it is necessarily omitted from the pitch-duration association analysis.)

Analytic examination begins easily, with PDA’s on D, G#, A#, C#, A, and E being quite discernible (measures 1–13: see Example 1, pp. 288–89). In measures 1–2 PDA = D. All twelve chromatic pitches and all twelve durations in sixteenth note increments from D = 1  through C# = 12  are utilized.

























From measure 2, last quarter note through the first part of measure 4 in the vibraphone, guitar (D), and viola, the PDA = G#. Again, all twelve pitch-duration associations are utilized although a bit less strictly. Here Boulez exchanges the increments of duration in the case of two pitches: the vibraphone’s F, which should have ten sixteenths has only nine, while the guitar’s D has eight instead of seven sixteenths.

In the last part of measure 3 in the flute, xylorimba, and viola (D) through measure 5 the PDA = A#. As in measures 1–2, all twelve chromatic pitches and all twelve durations from A# = 1  through A = 12  are employed.

In measures 6–8, eight of the twelve notes of PDA = C# are “disguised” by using irrational durational values which do not exactly follow the system of sixteenth note increments. The following chart was constructed in an attempt to discover whether or not Boulez used any apparent method in his employment of these triplet rhythms.

The left column lists the durational values as actually used in measures 6–8 while the right column shows the values as they should be notated to conform to the normal progression of sixteenth-note increments. The center column indicates the fraction of a quarter note by which the left column differs from the right and which of these two durations is the larger. It can be observed that there is no apparent pattern or method by which the durations are altered, yet they conform basically to the PDA = C#. Since this is also the case in a number of other instances it was decided that notes written under triplet signs would be considered as though they were not written under triplet signs, even though a small degree of inaccuracy might occur in the analysis.

PITCH-DURATION ASSOCIATION ON C#

AS USED IN MM. 6-8			DIFFERENCE	AS NORMALLY USED
1 C#		4/12	←1/12	3/12 
2 D		6/12	none	6/12 
3 D#		4/12	5/12→	9/12 
4 E		14/12	←2/12	12/12 
5 F		14/12	1/12→	15/12 
6 F#		18/12	none	18/12 
7 G		18/12	3/12→	21/12 
8 G#		24/12	none	24/12 
9 A		24/12	3/12→	27/12 
10 A#		18/12	12/12→	30/12 
11 B		18/12	15/12→	33/12 
12 C		36/12	none	36/12 

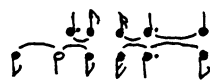
Pitches in measure 8 through parts of measures 10 and 11 belong to the PDA = A. Again, pitches in measures 10-14 conform to the PDA = E if the notes written under triplet signs are considered as though they are not under triplet signs.<sup>7</sup> Thus, in measures 9-12, the vibraphone's

B-D  
Ab -C

printed in the score as



are considered as being written as



with sixteenth note durational values of

8 – 11  
12 – 9.

Similarly,

in measure/s:	the:	pitch/es:	printed in the score as:	is/are considered as being written:	with sixteenth-note durational values of:
11	xylorimba's	E			1
18–19	vibraphone's	C#			12
18	guitar's	A			8
21	viola's	G			2
40–42	flute's	F-C#-E			12-4-10
41	xylorimba's	C-F#			2-1
41–42	vibraphone's	E			11
40–41	guitar's	F A-G-Eb			5-5-10 <sup>4</sup>
40–43	viola's	F-F# D			9-12 12

Beginning with measure 13, at the first entry of the voice, matters become complicated and the clean-cut scheme disintegrates: PDA's are only partially used while, at the same time, new PDA's are introduced. Further inspection shows that Boulez utilizes all twelve possible PDA's *simultaneously* throughout the rest of the movement. At this point, no structural plans or relationships are readily apparent.

Quite startling relationships are revealed, however, by dissecting the movement into its twelve individual pitch-duration associations and examining the pitch order of each. In Examples 2 through 13, pitch names in each pitch-

duration association are listed under the measure numbers in which the pitches begin. Pitches placed vertically are attacked at the same time.

Palindromic, symmetrical, and otherwise ordered arrangements of pitches in most PDA's are now made evident in surprising quantities. In Examples 2 through 13, symmetrical arrangement occurs in pitch order, groups of pitches (cells), and single pitches. This is shown by lines connecting the pitch names. Although a few PDA's possess weak symmetrical tendencies and no apparent symmetry exists for PDA = D, the instances of strong symmetry are far too preponderant and ordered for them to be considered merely coincidental.

What is discovered when the twelve individual PDA's are considered simultaneously, as presented in the music itself? Certain pitches from various PDA's synthesize or cluster to form new, symmetrical relationships on a "macro-level." The effect is somewhat analogous to twelve gears in a machine rotating at different rates, some of whose cycles synchronize from time to time.

Twelve points of synchronization or clusters of PDA's have been identified and are illustrated below as Examples 14 through 25.

These twelve PDA clusters impart a camouflaged, symmetrical structure to the array of pitches, durations, and resultant harmonic and intervallic relationships inherent in the music. A linear presentation of the PDA clusters, (Example 26), allows the symmetrical structure to be readily observed.





Recalling Webern's influence on Boulez, this structure is a logical extension of other symmetrical relationships which permeate *Le Marteau* in various ways. Some representative instances of symmetry are presented in Examples 27 through 31.

As may be seen from the examples above, Boulez' cerebral compositional style employs complex structures not immediately (if ever) perceivable to most listeners. In this musical context, the occasional use of imitation is all the more noticeable and remarkable. I would suggest that the numerous pitch repetitions in movement VI are subtle examples of text painting on the part of the composer. It is interesting to note the relationship between the text of "Sur le cadran de l'Imitation" (On the dial of Imitation) and the conspicuous preponderance of pitch imitation in the section beginning with measure 44 (Example 32).

The "D" in the guitar in measure 44 is imitated by the voice in measure 45, reinforced by the "D" in the xylorimba. In measure 46 the voice's "B" is doubled by the vibraphone. The flute's "B-flat" in measures 46–47 is transferred to the voice in measure 47. The guitar's "E-flat" in measure 47 is echoed in the viola. The vibraphone's "E" in measures 46–48 is repeated after a sixteenth rest by the guitar. In measure 49 the "D" in the vibraphone is imitated by the viola, etc.

If one is immediately attracted by the unique beauty of *Le Marteau's* shimmering sonorities, one must also be intrigued by the realization that, beyond the first or second hearing, there is much more comprehension to "master" in this music.

## NOTES

1. Friederich Saathen, "Le Marteau sans Maître," *Schweizerische Musikzeitung*, 97 (July 15, 1957): 290. Translation by the author.
2. Paul Griffiths, *Boulez* (London: Oxford University Press, 1978): 37.
3. Joan Peyser, *Boulez* (New York: Schirmer Books, 1976): 102.
4. Pierre Boulez, *Conversations with Célestin Deliège*, English translation (London: Ernst Eulenburg Ltd., 1976), 66. First published in French under the title *Par Volonté et par Hasard: Entretiens avec Célestin Deliège* (Paris: Les Editions du Seuil, 1975).
5. Peter Heyworth, "Profiles: Taking Leave of Predecessors—I," *New Yorker* (March 24, 1973): 64.
6. Susan Bradshaw and Richard Rodney Bennett, "In Search of Boulez," *Music and Musicians*, 11 (Aug., 1963): 17–18. The authors state that "the second and sixth movements employ various techniques of 'chiffage *ériel*'" but quote an example from movement IX (measures 79–81).
7. In measures 10 and 11 the duration of the two upper notes in the guitar (D# and F#) should be  and  respectively, instead of  and  as printed in the score. This is printed incorrectly in both the London Universal Edition, copyright 1957 (front cover marked "UE 12652," page 1 marked "Universal Edition Nr. 12450 LW") and the re-engraved Philharmonia score printed in Austria (front cover marked "No. 398," page 1 marked "UE 12.450 LW W. Ph. V. 398," succeeding pages marked "UE 12450-12652 LW").

While we have our correcting pencils handy, we should also correct the mistake in measure 78 in the viola. The London edition score prints this as



Obviously, these two notes are too long in duration to be contained in a  $\frac{3}{4}$  measure. The re-engraved Austrian score attempts to correct the mistake by changing the double-dotted half note to a double-dotted quarter, thus neatly completing the  $\frac{3}{4}$  measure:





However, a careful listening to the recording made with Boulez conducting (Turnabout TV 34081S/TV 4081) reveals that the last note in this measure should be a natural harmonic sounding B, a twelfth higher. Probably it was written originally as



but printed mistakenly as a double-dotted half note rather than as a harmonic with a duration of a double-dotted quarter note.

## VI

## «bourreaux de solitude»

Assez lent ( $\text{♩} = 112^{(*)}$ ) Tempo rigoureux

Flûte en sol

Xylorimba

Vibraphone

Maracas (ou sonnailles)

Guitare

Voix d'alto

Alto avec sourdine

Fl. en sol

Xyl.

Vibr.

Mrc. (nonn.)

Guit.

Alto avec sourd.

suivant les dynamiques, employer baguettes douces ou dures

ppp sempre - nana nuances

arco

(nui D)

5 16  $\Delta$  2 4

The musical score is written for a large ensemble. The top system includes Flute in G (Flûte en sol), Xylorimba, Vibraphone, Maracas (or rattles), Guitar, Alto voice, and Muted Alto. The bottom system includes Flute in G (Fl. en sol), Xylorimba (Xyl.), Vibraphone (Vibr.), Muted Maracas (Mrc. nonn.), Guitar (Guit.), and Muted Alto (Alto avec sourd.). The score is divided into two systems by a double bar line. The first system starts with a tempo marking 'Assez lent' and a metronome indication of 112 beats per minute. The second system begins with a key signature change to G major (G# =) and a tempo marking 'Tempo rigoureux'. The score includes various dynamic markings such as ppp, pp, p, mp, mf, f, and sf. There are also performance instructions like 'suivant les dynamiques, employer baguettes douces ou dures' and 'ppp sempre - nana nuances'. The score ends with a final measure marked with a 7.

\*) Battre les croches pendant deux mesures pour établir le mouvement; battre ensuite la note. Revenir à la croche quand cela est nécessaire.

EXAMPLE 1: PITCH-DURATION ASSOCIATIONS

Fl. en sol

Xyl.

Vibr.

Mrc. (sonn.)

Guit.

Alto avec sourd.

A =

E =

7 16

2 4

pp

mp

p

f

mf

pp

Fl. en sol

Vibr.

Mrc. (sonn.)

Guit.

Voix

Alto avec sourd.

12

11

10

9

8

7

6

5

4

3

2

1

cédez - - -

5 16

3 4

pp

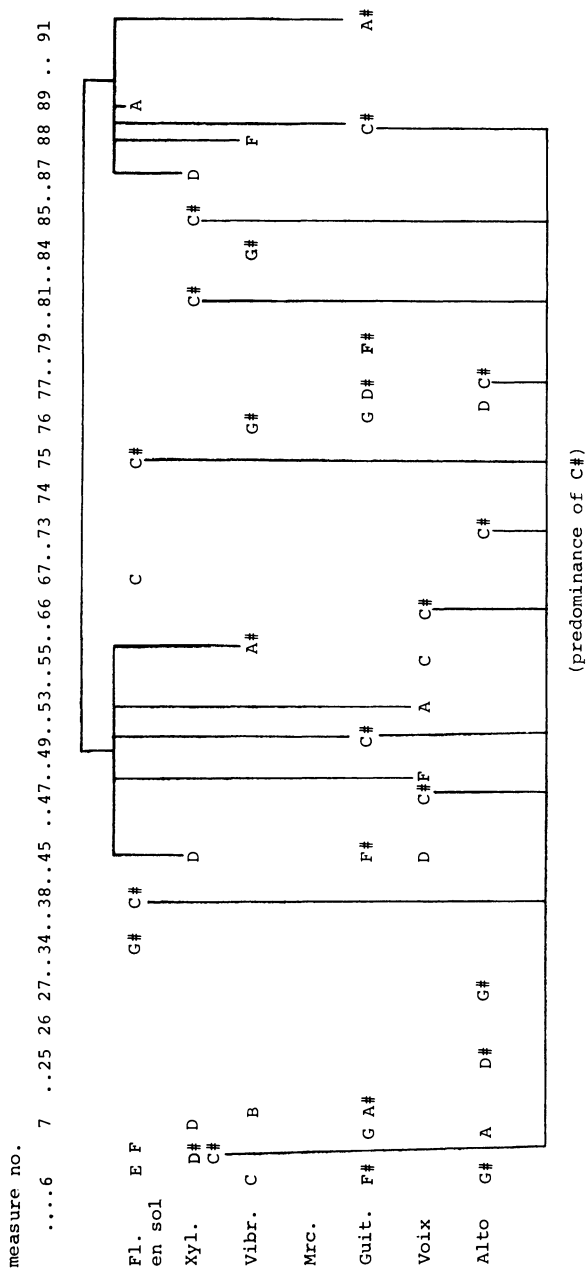
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12	B	C	C#	D	D#	E	F	F#	G	G#	A	A#	12
11	A#	B	C	C#	D	D#	E	F	F#	G	G#	A	11
10	A	A#	B	C	C#	D	D#	E	F	F#	G	G#	10
9	G#	A	A#	B	C	C#	D	D#	E	F	F#	G	9
8	G	G#	A	A#	B	C	C#	D	D#	E	F	F#	8
7	F#	G	G#	A	A#	B	C	C#	D	D#	E	F	7
6	F	F#	G	G#	A	A#	B	C	C#	D	D#	E	6
5	E	F	F#	G	G#	A	A#	B	C	C#	D	D#	5
4	D#	E	F	F#	G	G#	A	A#	B	C	C#	D	4
3	D	D#	E	F	F#	G	G#	A	A#	B	C	C#	3
2	C#	D	D#	E	F	F#	G	G#	A	A#	B	C	2
1	C	C#	D	D#	E	F	F#	G	G#	A	A#	B	1

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EXAMPLE I (CONT.)



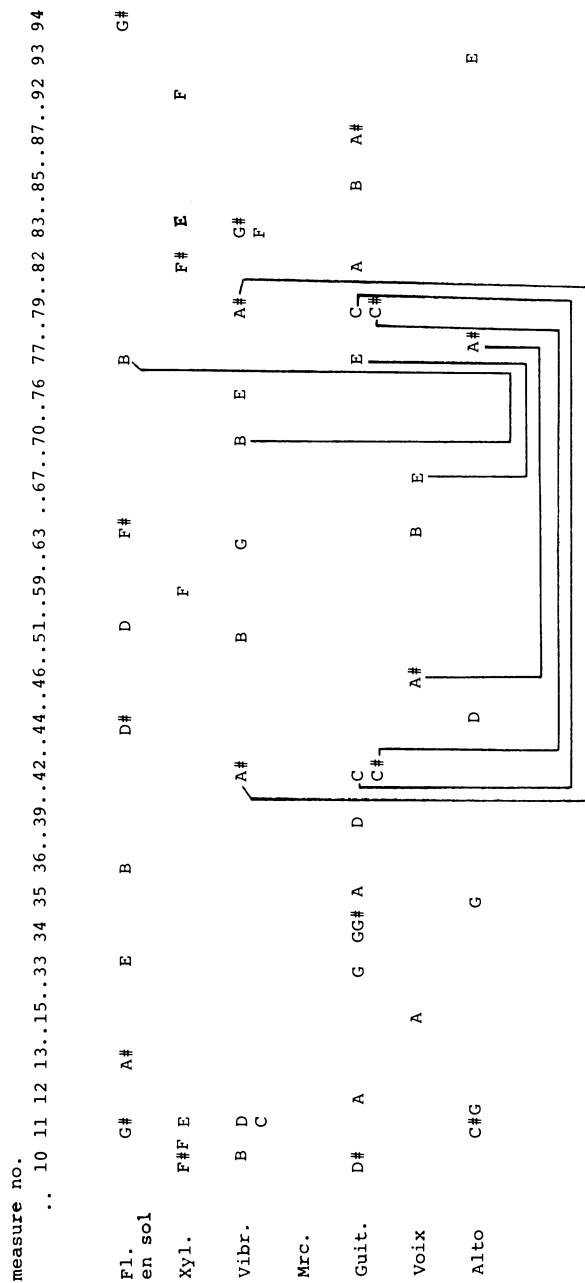


EXAMPLE 3: PITCH-DURATION ASSOCIATION BASED ON C# = 

measure no.																	
1		..16..18..26..34..36..38..41..45..49..65..67	68..71..74	..77..79..81..84	85	86	87..92..94										
Fl.	E	G	F#	A	A	E											
en sol																	
Xyl.	D	D#						D#							D#	D	
Vibr.	A	C#	B	C#	E	G#	B	C					F#E		F#	A	E
						F	C										
Mrc.																	
Guit.	G#		A		A#	F	D#		A	F	F	D		A			
Voix			F				D#		A	D		D#		D			
Alto	A#C		F#														

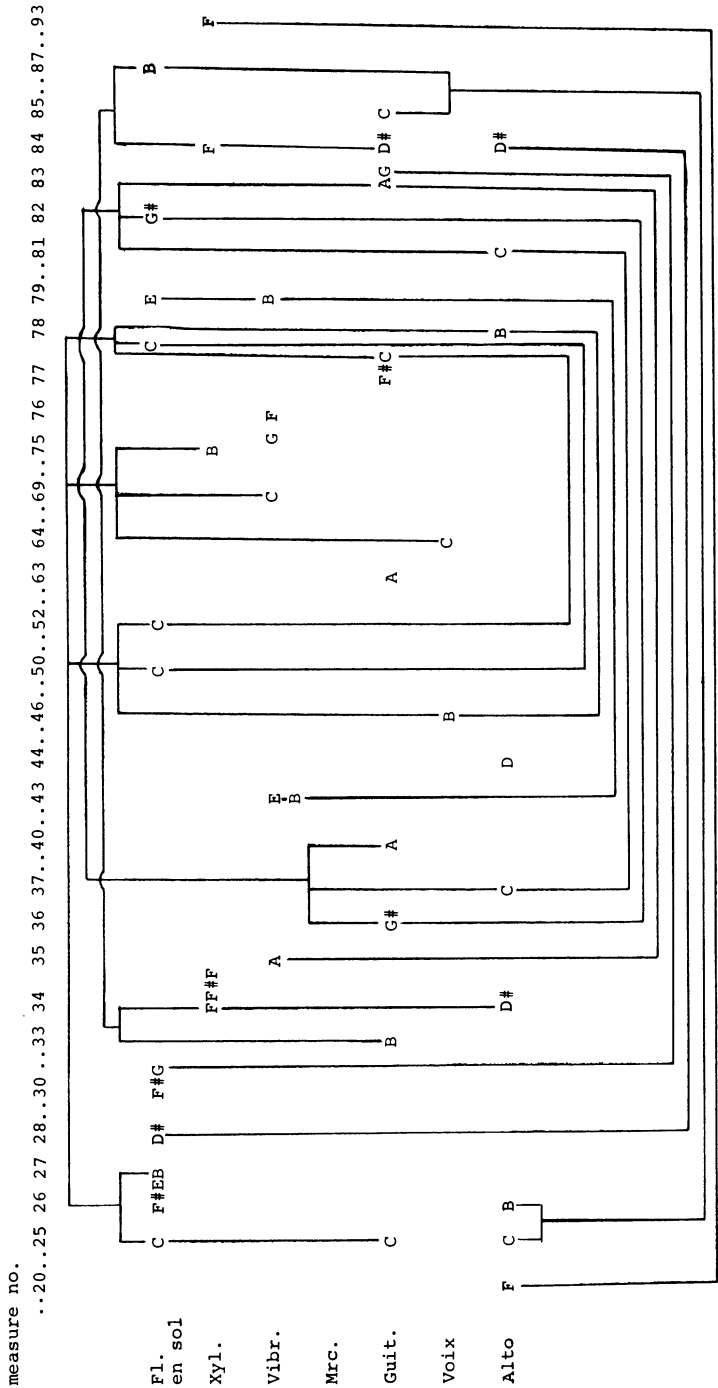
EXAMPLE 4: PITCH-DURATION ASSOCIATION BASED ON D = 



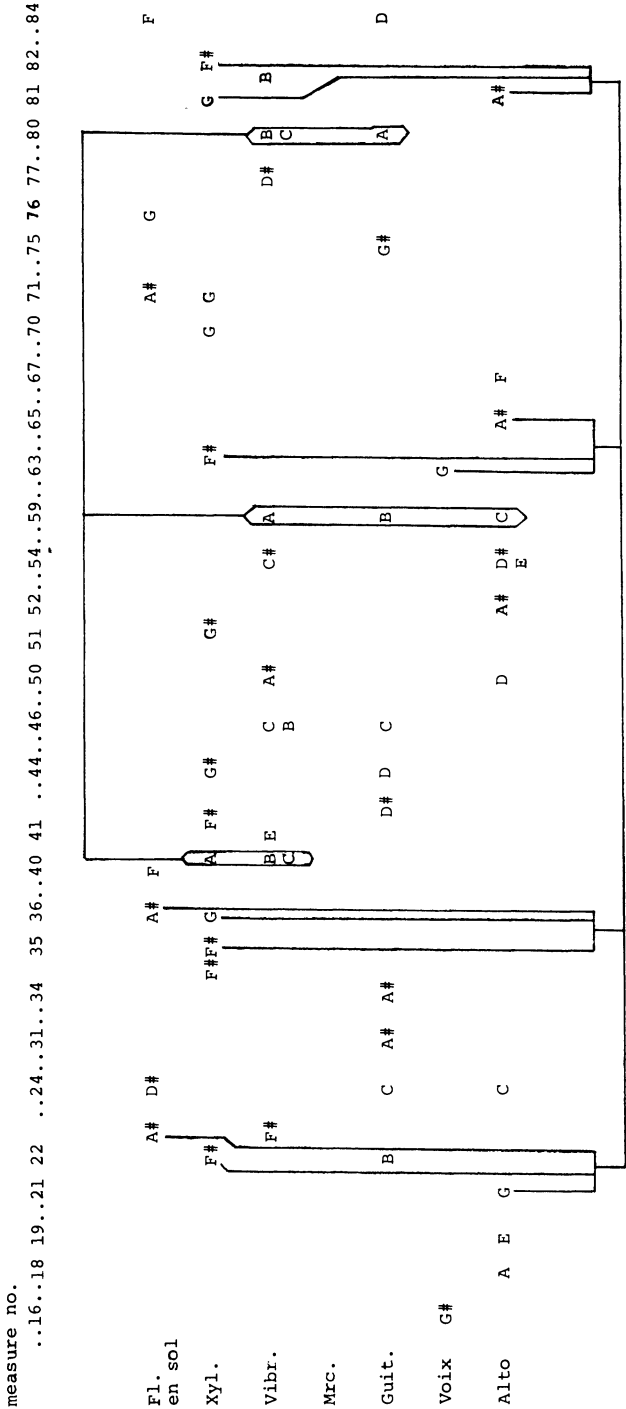


EXAMPLE 6: PITCH-DURATION ASSOCIATION BASED ON E = 



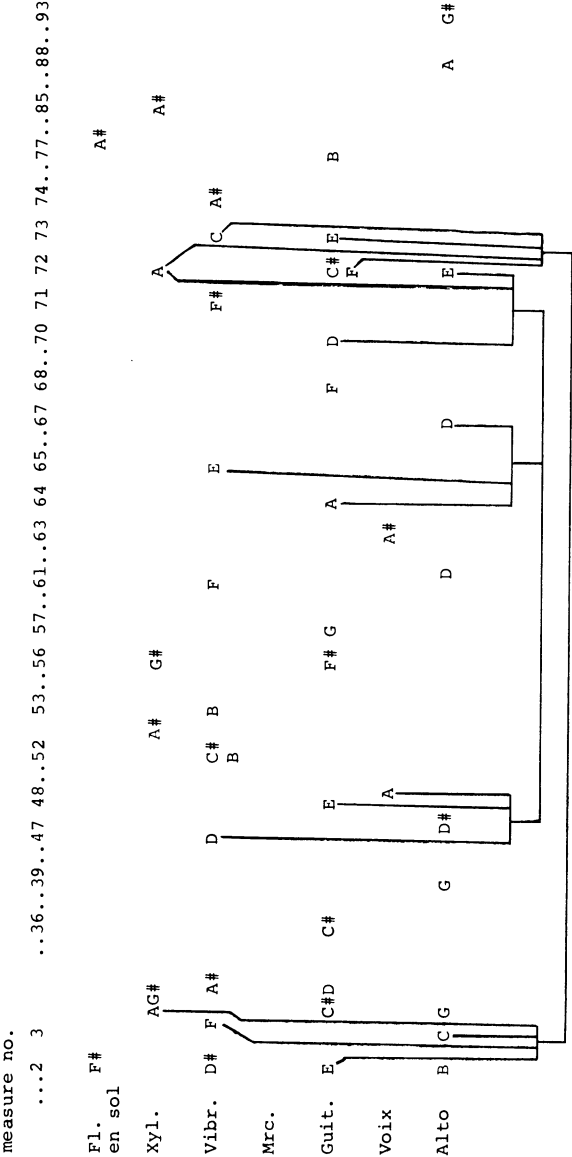


EXAMPLE 7: PITCH-DURATION ASSOCIATION BASED ON F =

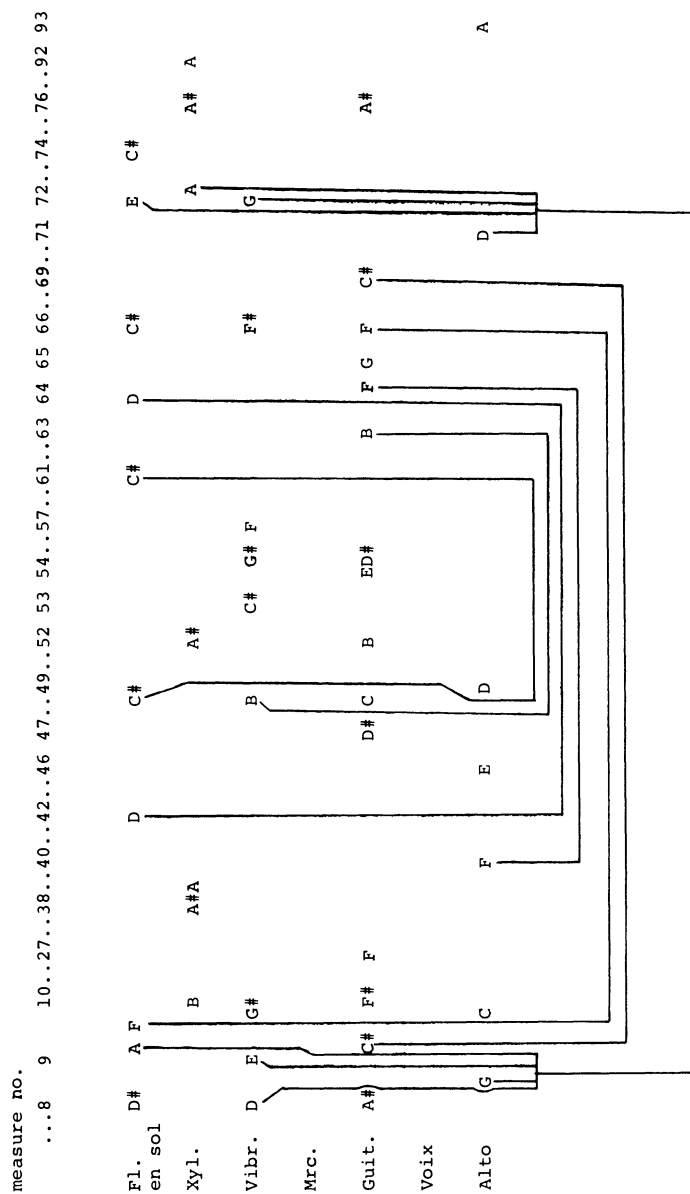


EXAMPLE 8: PITCH-DURATION ASSOCIATION BASED ON F# = ♮



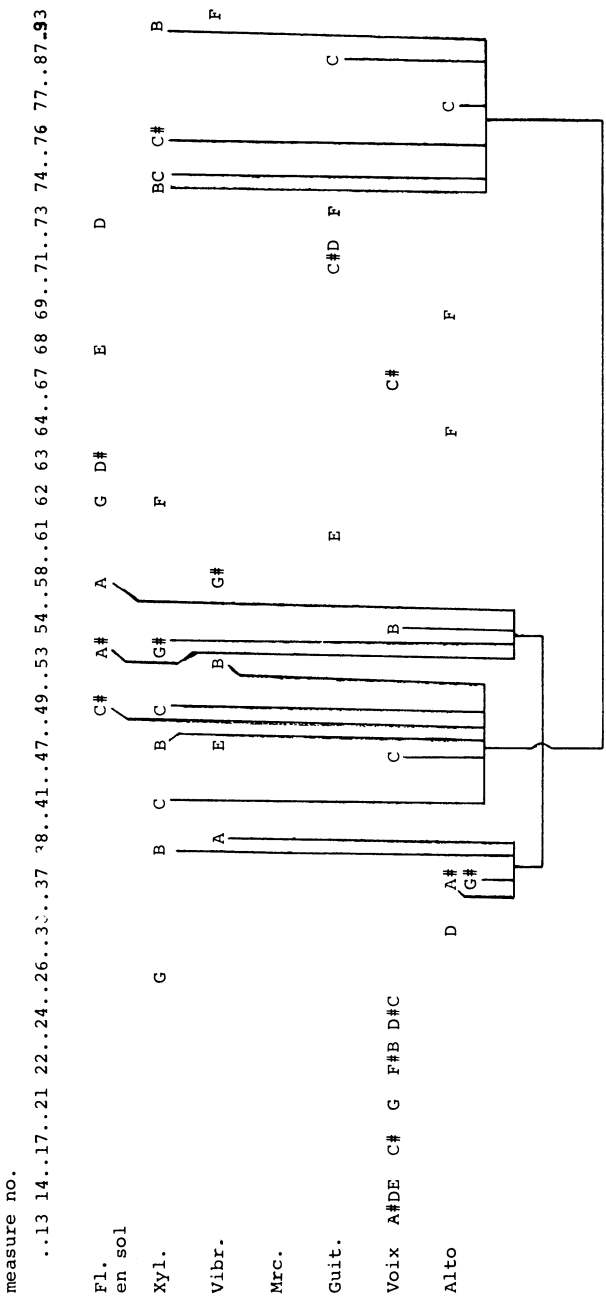


EXAMPLE 10: PITCH-DURATION ASSOCIATION BASED ON G# = ♩



EXAMPLE 11: PITCH-DURATION ASSOCIATION BASED ON A = 





EXAMPLE 13: PITCH-DURATION ASSOCIATION BASED ON B = 





[illegible]

EXAMPLE 15: PDA CLUSTER NUMBER 2 (MM. 34-36 AND 82-84)

36

Fl.  
en sol

Xyl.

39

2 4

58

Fl.  
en sol

Xyl.

Vcl.

Mrc.  
(mar.)

Guit.

Alto  
avec sourd.

Alto  
avec sourd.

PDA = A# (D = 5)

PDA = F# (G = 2)

PDA = F (A# = 5)

PDA = F (C = 8)

PDA = D# (G# = 6)

PDA = D (A = 8)

PDA = C# (C# = 1)

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EXAMPLE 16: PDA CLUSTER NUMBER 3 (MM. 36-39 AND 81-82)

38

Xyl.

Fl. en sol

Xyl.

Vibr.

Mrc. (cogn.)

Guit.

Voix

Alto avec sound.

p

mp

poco cresc.

53

54

2 4

2 4

PDA = B (B = 1)

PDA = B (G# = 10)

PDA = B (A# = 12)

PDA = G (C = 6)

PDA = G (C# = 7)

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EXAMPLE 17: PDA CLUSTER NUMBER 4 (MM. 37-39 AND 53-55)

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Fl. en sol

Xyl.

Vibr.

Mrc. (sona.)

Guit.

Voix

Alto avec accord

PDA = D# (D# = 1)

PDA = D# (B = 9)

PDA = D# (C = 10)

PDA = G (A# = 4)

2 4

Xyl.

Vibr.

Etouffer ces sonorités en jouant ceci avec le plat de la main

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EXAMPLE 18: PDA CLUSTER NUMBER 5 (MM. 38-39 AND 60-61)

The musical score is for 'Le Marteau sans Maitre' by Pierre Boulez. It features a complex arrangement of instruments and vocal parts. The instruments include Xyl. (Xylophone), Vib. (Vibraphone), Mrc. (Maracas), Guit. (Guitar), and Alto (Alto Saxophone). The vocal part is labeled 'Vox.' and includes the instruction 'avec sonnerie'. The score is written in 4/4 time and includes various dynamic markings such as *pp*, *mp*, *f*, and *sf*. The vocal part includes lyrics in French: 'PDA = F# (A = 4)', 'PDA = F# (B = 6)', 'PDA = F# (C = 7)', 'PDA = G (G = 1)', and 'PDA = D# (A# = 8)'. The score is published by Universal Edition (London) Ltd. and includes a copyright notice for 1954 and 1957.

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EXAMPLE 19: PDA CLUSTER NUMBER 6 (MM. 40-42, 57-61, AND 80)



Diagram illustrating musical notation and PDA (Pitch-Distance Analysis) for Pierre Boulez's *Le Marteau sans maître*. The diagram shows various musical staves and their corresponding PDA values.

**Staves and PDA values:**

- Vibr. (Violoncelle): PDA = C (E = 5)
- Mrc. (Morceau): PDA = C# (C# = 1)
- Guit. (Guitar): PDA = C# (F = 5)
- Vibr. (Violoncelle): PDA = E (A# = 7)
- Mrc. (Morceau): PDA = F (B = 7)
- Guit. (Guitar): PDA = B (C = 2)

**Other musical elements:**

- Fl. en sol (Flute in G)
- Xyl. (Xylophone)
- Vibr. (Violoncelle)
- Mrc. (Morceau)
- Guit. (Guitar)
- Vibr. (Violoncelle)
- Alto avec sonde (Alto with probe)

**Annotations:**

- PDA = C# (F = 5) is missing from mm. 77-79.
- Alto avec sonde

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EXAMPLE 21: PDA CLUSTER NUMBER 8 (MM. 46-48, 77-79, AND 87-88)





PDA = D# (G# = 6)

PDA = G# (A = 2)

PDA = G# (E = 9)

PDA = A (D = 6)

The musical score is for Pierre Boulez's *Le Marteau sans maître*. It features several parts: Fl. en sol, Xyl., Vib., Mrc. (sosa.), Guit., and Voix. The score includes various musical notations such as notes, rests, and dynamic markings like *pp* and *mf*. There are also tempo markings like *Alto avec sonnerie*. The PDA annotations are placed above the vocal line, with lines connecting them to specific notes in the score. The annotations are: PDA = D# (G# = 6), PDA = G# (A = 2), PDA = G# (E = 9), and PDA = A (D = 6).

Fl. en sol

Xyl.

Vib.

Mrc. (sosa.)

Guit.

Voix

Alto avec sonnerie

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EXAMPLE 23: PDA CLUSTER NUMBER 10 (MM. 48-50 AND 63-66)



**Meno lento** ( $\frac{1}{4} = 60$ )

Fl.  
en sol

Xyl.

Vib.

Mec.  
(sena.)

Guit.

Alto  
avec sound.

PDA = C# (C# = 1)  
PDA = D (D# = 2)  
PDA = D (E = 3)  
PDA = D (F# = 5)  
PDA = D# (F# = 4)  
PDA = D# (G# = 6)  
PDA = A# (D = 5)  
PDA = A# (F = 8)

82

Fl.  
en sol

Xyl.

Vib.

Mec.  
(sena.)

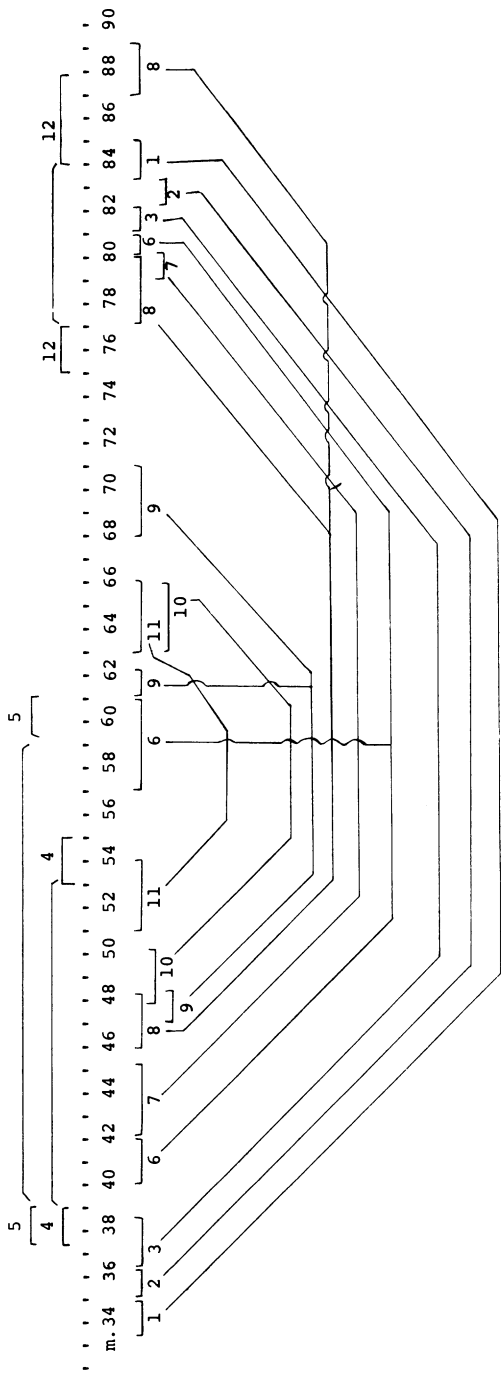
Guit.

Alto  
avec sound.

5 8 Δ 2 4 3 4 2 4

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EXAMPLE 25: PDA CLUSTER NUMBER 12 (MM. 75-77 AND 84-87)



The numbers 1–12 correspond to Examples 14–25 (*Le Marteau*, movement VI, mm. 33–89).

EXAMPLE 26: SYMMETRY OF PDA CLUSTERS

Flûte en sol

Flg.

4 4

9 4

5 8

3 8

7 8

3 4

per 4

per 6

mp

mp

mp

Voix d'Alto

3 8

7 8

3 4

6 8

8

mp

pp

du

clou

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EXAMPLE 27: MELODIC STRUCTURE IN MOVEMENT III, MM. 9–15

m.7

4 8

Claves:

8

9

6 8

10

4 8

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EXAMPLE 28: RHYTHMICAL SYMMETRY, MOVEMENT VIII, CLAVES PART





mm. 128-33

mm. 134-40

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EXAMPLE 31: MOVEMENT IX, FLUTE IN G, PITCH REPETITION



*Bourreaux de solitude*

Le pas s'est éloigné le marcheur s'est tu  
Sur le cadran de l'Imitation  
Le Balancier lance sa charge de granit réflexe.

*Hangmen of solitude*

The step has receded the walker has killed himself  
On the dial of Imitation  
The Pendulum thrusts its load of reflex granite.

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EXAMPLE 32



[illegible]

59

Fl.  
en sol

Xyl.

Vibr.

Mre.  
(sonn.)

Guit.

Voix

Alto  
avec sord.

pp

mp

p

mf

f

pizz.

arco

pp

lan

3  
4

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