

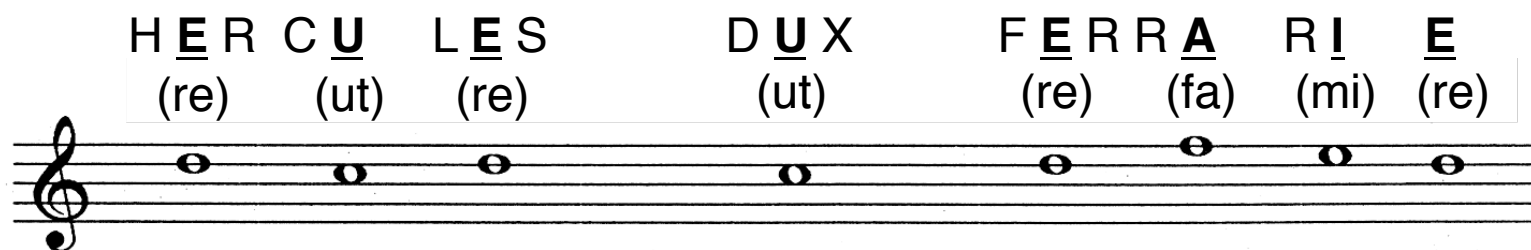
Dodecaphony

(Twelve-Tone Serialism)

Precedents of Dodecaphony

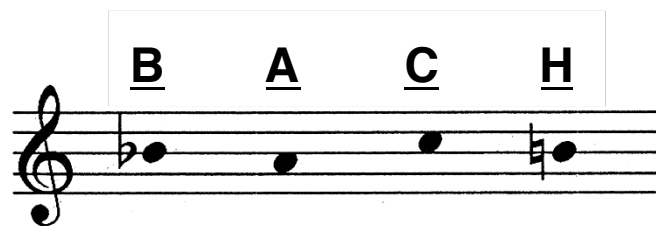
Soggetto Cavato (“Carved Melody”)

Josquin DesPres — *Missa Hercules Dux Ferrariae* (c. 1480):



French solfège syllables are used to represent vowel sounds in name.

“Bach” Motive:



This motive has been used by Bach, Schumann, Liszt, Ives, Schönberg, Shostokovich, et al)

In German, the letter **B** represents **B-flat**, **H** represents **B-natural**, and **S** (“Es”) represents **E-flat**.

Precedents of Dodecaphony

Soggetto Cavato (“Carved Melody”)

Alban Berg — *Kammerkonzert* (1923-25):

*Motto: *) Aller guten Dinge. . .*
Langsame J.

Geige
*(od. Klar. **)*

Horn(F)

Klavier

klingt wie notiert

mit Dpf.

mf

mf

verklungen lassen

ANTON WEBERN

ARNOLD SCHÖNBERG

ALBAN BERG

Dodecaphony

Definition:

“Method of composing with twelve tones related only to themselves.” [Schönberg]

Terminology:

- dodecaphony/twelve-tone composition
- matrix
- permutation (prime, retrograde, inversion, retrograde-inversion)
- combinatoriality
- hexachords, tetrachords, trichords, dyads
- invariance
- partition

Schönberg *Variations for Orchestra*, Op. 31 (1928): tone rows

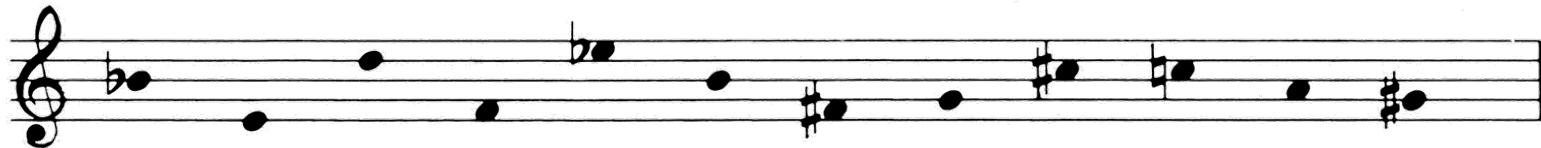
Prime (P):



Retrograde (R):



Inversion (I):



Retrograde-Inversion (RI):



Schönberg *Variations for Orchestra*, Op. 31 (1928): matrix

	I ₀	I ₆	I ₈	I ₅	I ₇	I ₁₁	I ₄	I ₃	I ₉	I ₁₀	I ₁	I ₂	
P ₀	B \flat	E	G \flat	E \flat	F	A	D	D \flat	G	A \flat	B	C	R ₀
P ₆	E	B \flat	C	A	B	E \flat	A \flat	G	D \flat	D	F	F \sharp	R ₆
P ₄	D	A \flat	B \flat	G	A	D \flat	G \flat	F	B	C	E \flat	E	R ₄
P ₇	F	B	D \flat	B \flat	C	E	A	A \flat	D	E \flat	G \flat	G	R ₇
P ₅	E \flat	A	B	A \flat	B \flat	D	G	G \flat	C	D \flat	E	F	R ₅
P ₁	B	F	G	E	G \flat	B \flat	E \flat	D	A \flat	A	C	D \flat	R ₁
P ₈	F \sharp	C	D	B	D \flat	F	B \flat	A	E \flat	E	G	A \flat	R ₈
P ₉	G	D \flat	E \flat	C	D	G \flat	B	B \flat	E	F	A \flat	A	R ₉
P ₃	C \sharp	G	A	F \sharp	A \flat	C	F	E	B \flat	B	D	D \sharp	R ₃
P ₂	C	F \sharp	G \sharp	F	G	B	E	E \flat	A	B \flat	C \sharp	D	R ₂
P ₁₁	A	D \sharp	F	D	E	G \sharp	C \sharp	C	F \sharp	G	B \flat	B	R ₁₁
P ₁₀	G \sharp	D	E	C \sharp	D \sharp	G	C	B	F	F \sharp	A	B \flat	R ₁₀
	RI ₀	RI ₆	RI ₈	RI ₅	RI ₇	RI ₁₁	RI ₄	RI ₃	RI ₉	RI ₁₀	RI ₁	RI ₂	

Schönberg *Variations for Orchestra*, Op. 31 (1928): main theme

Molto moderato (♩ = 88)

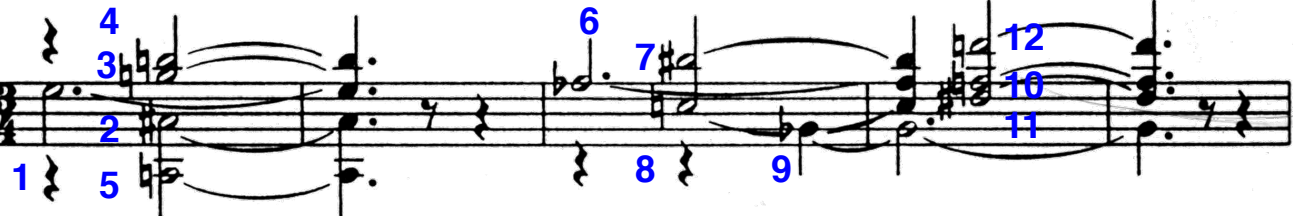
Theme: P-0

Cello

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

p tenderly

Accomp: I-9



Theme: RI-9
(Accomp: R-0)



Theme: R-0
(Accomp: RI-9)



Theme: I-9
(Accomp: P-0)

Violin I

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

con sord.

pp very quietly

poco rit.

Two Possible Applications of a Tone Row

Arnold Schönberg:
Violin Concerto, Op. 36
(1936)

First application of the tone row. The violin part (top staff) plays the first six notes of the row: 1, 2, 7, 8, 1, 2. The piano part (bottom staff) plays the remaining six notes: 3, 5, 4, 6, 9, 12, 9, 12, 10, 11, 10, 11, 3, 4. The piano part is labeled 'P-1' in pink and 'I-6' in green.

Category One:

one version of the row is used at a time; pitches are distributed between parts (**partitioning**).

Second application of the tone row. The violin part (top staff) plays the first six notes of the row: 1, 2, 3, 4, 7, 8. The piano part (bottom staff) plays the remaining six notes: 6, 3, 6, 3, 10, 11, 10, 11, 5, 4, 5, 4, 9, 12, 9, 12. The piano part is labeled 'P-1' in pink and 'I-6' in green.

Category Two:

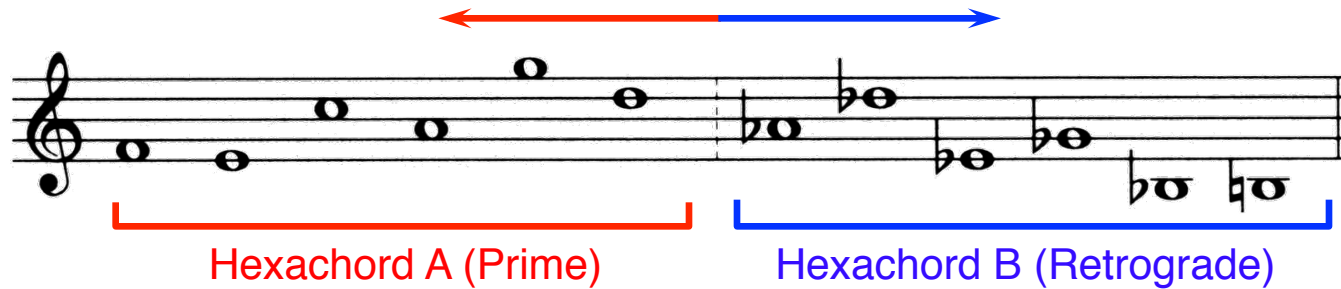
Two or more versions of the row are used simultaneously, usually in separate voices.

Third application of the tone row. The violin part (top staff) plays the first six notes of the row: 5, 6, 7, 8, 9, 10, 11, 12. The piano part (bottom staff) plays the remaining six notes: 4, 5, 6, 7, 8, 9, 11, 12, 3, 4, 5, 6, 10, 11, 12, 10. The piano part is labeled 'P-1' in pink and 'I-6' in green.

Alban Berg's Use of the Row

Three Versions of the Row in Berg's *Lyric Suite* (1925-26)

a. Original form:



b. As two scales:



c. As an ascending circle of fifths:



Alban Berg's Use of the Row

Prime Set of the Violin Concerto (1935):

nested triads (major, minor, augmented, diminished)

The image shows a musical staff with 12 notes, numbered 1 through 12. The notes are: 1 (Bb), 2 (Bb), 3 (Bb), 4 (C), 5 (C), 6 (C), 7 (D), 8 (D), 9 (E), 10 (E), 11 (F), 12 (F). The notes are grouped into nested triads: a red bracket under notes 1-3 (Bb, Bb, Bb), a blue bracket under notes 2-4 (Bb, Bb, C), a yellow bracket under notes 3-6 (Bb, C, C), a green bracket under notes 4-8 (C, C, D), a red bracket under notes 5-7 (C, D, D), a blue bracket under notes 6-9 (C, D, E), and a magenta bracket under notes 9-12 (E, F, F). The magenta bracket is labeled "whole-tone (lydian) sequence".

Violin Concerto, First movement, mm. 11-15:

A tempo (♩ = 56)

The image shows a musical score for the Violin Concerto, First movement, mm. 11-15. The score is in 2/4 time and features a nested triad structure. The notes are: 1 (Bb), 2 (Bb), 3 (Bb), 4 (C), 5 (C), 6 (C), 7 (D), 8 (D), 9 (E), 10 (E), 11 (F), 12 (F). The notes are grouped into nested triads: a red bracket under notes 1-3 (Bb, Bb, Bb), a blue bracket under notes 2-4 (Bb, Bb, C), a yellow bracket under notes 3-6 (Bb, C, C), a green bracket under notes 4-8 (C, C, D), a red bracket under notes 5-7 (C, D, D), a blue bracket under notes 6-9 (C, D, E), and a magenta bracket under notes 9-12 (E, F, F). The magenta bracket is labeled "whole-tone (lydian) sequence". The score includes dynamic markings: *pp* (pianissimo) at the beginning, *p* (piano) at measure 12, and *p espr.* (piano, expressive) at the end. The score also includes the instruction "C.B. Solo" (Cello Solo) and "m.d." (more dolce).



▲ Alma Mahler

▼ Walter Gropius



▲ Manon Gropius in 1933, at the age of sixteen.

BAUHAUS



▲ Walter Gropius: *Bauhaus*, Dessau, Germany (1925-26)

J.S. Bach: Harmonization of chorale, “Es ist genug so nimm, Herr”

Es ist genug; so nimm, Herr

The image displays a musical score for J.S. Bach's harmonization of the chorale "Es ist genug so nimm, Herr". The score is written for a grand staff, consisting of a treble clef and a bass clef joined by a brace. The key signature is D major, indicated by two sharps (F# and C#) at the beginning of the staff. The time signature is common time (C). The melody is written in the treble clef, and the accompaniment is written in the bass clef. The score is divided into two systems, each containing four measures. The first system begins with the lyrics "Es ist genug; so nimm, Herr" above the first measure. The melody features a variety of note values, including quarter, eighth, and sixteenth notes, as well as rests. The accompaniment provides a harmonic foundation with chords and moving lines. The second system continues the musical piece, maintaining the same key and time signature.

J.S. Bach: Harmonization of chorale, “Es ist genug so nimm, Herr”



Anton Webern's Use of the Row

Symphonie, Op. 21 (1928):

Diagram illustrating the use of the row in Symphonie, Op. 21 (1928). The row is shown on a staff with notes: G4, A4, C#4, D4, E4, F#4, G#4, A#4. Brackets below the staff indicate intervals: [0,1,3] P (red), [0,1,4] P (red), [0,1,4] R (blue), and [0,1,3] R (blue). A double-headed arrow above the staff indicates the relationship P-6 = R-0.

Concerto, Op. 24 (1934):

Diagram illustrating the use of the row in Concerto, Op. 24 (1934). The row is shown on a staff with notes: G4, A4, C#4, D4, E4, F#4, G#4, A#4. Brackets below the staff indicate intervals: [0,1,4] P (red), [0,1,4] RI (green), [0,1,4] R (blue), and [0,1,4] I (yellow).

String Quartet, Op. 28 (1937-38):

Diagram illustrating the use of the row in String Quartet, Op. 28 (1937-38). The row is shown on a staff with notes: B4, A4, C4, H4, G#4, A#4, B#4, C#4. Brackets below the staff indicate intervals: P (red), I (yellow), and P-8 (red). A double-headed arrow above the staff indicates the relationship P-9 = RI-0.

Anton Webern: Concerto, Op. 24 (1934)—Movement I

Etwas lebhaft $\text{♩} = \text{ca. } 80$

rit. — — — tempo rit. — — —

Fl.

Ob.

*Cl.

*Tr.

Pf.

sempre con sord.

f *p*

f *p*

f *p*

f *p*

* sound as written

Magic Square

S	A	T	O	R
A	R	E	P	O
T	E	N	E	T
O	P	E	R	A
R	O	T	A	S

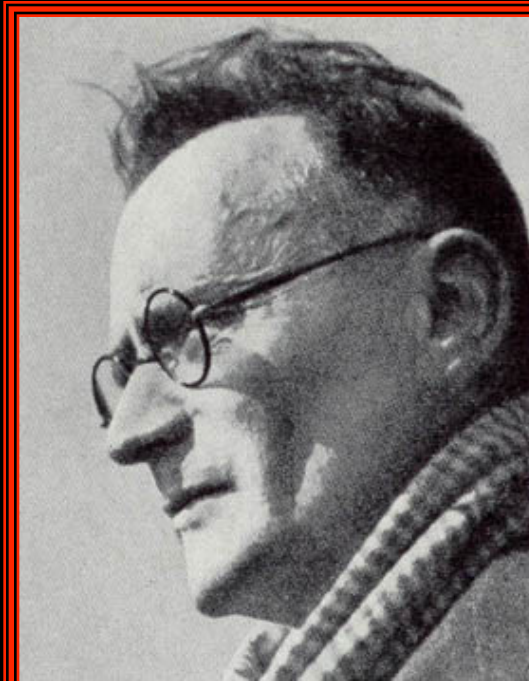
“The sower Arepo keeps the work turning.”

Integral Serialism

Integral Serialism



Anton Webern (1883-1945) was perhaps the most significant influence on the post-WW II generation of composers.



Integral Serialism

Europe after World War II

- Many European artists questioned the role of the artist in society following World War II.
- Composers attempted to remove themselves from the artistic process.
- Rational (intellectual) approaches favored over intuition/emotion.
- Unlike American serialists, the Europeans were concerned with the philosophical implications of serialism.

Warsaw

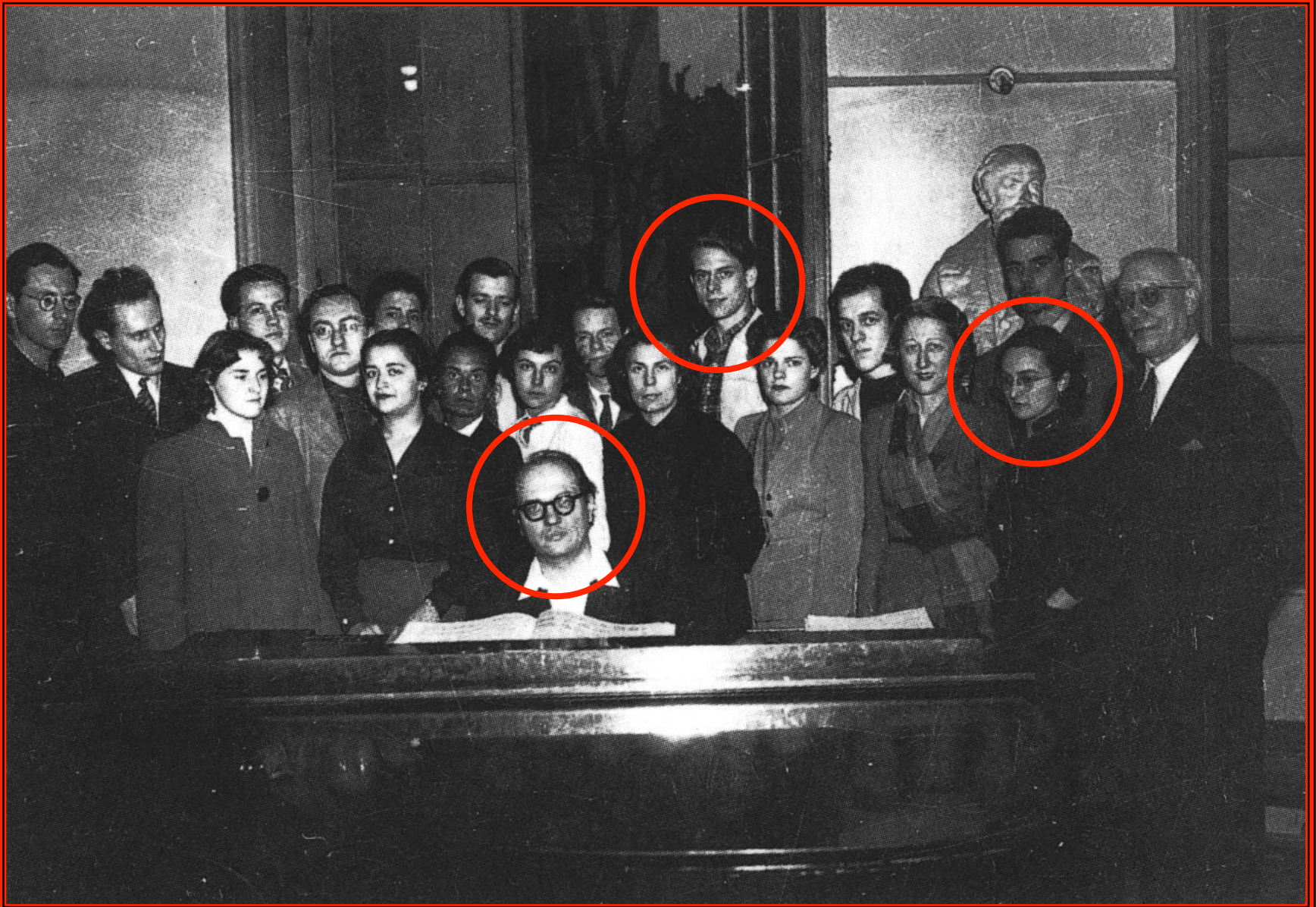


Dresden



Integral Serialism: Early Examples

- Webern's late works were the first examples of serialism extending beyond the pitch realm.
- Milton Babbitt: *Three Compositions for Piano* (1947)
- Olivier Messiaen: *Mode de valeurs et d'intensities* for piano (1949-50)
- Karlheinz Stockhausen: *Kreuzspiel* for oboe, bass clarinet, piano, and two percussion (1951)
- Pierre Boulez: *Structures* for two pianos (1952)



Olivier Messiaen and his students at the Paris Conservatoire, including Karlheinz Stockhausen and Yvonne Loriod (c.1950).

Serial assignments in Messiaen's *Mode de valeurs et d'intensities* (1949-50)

The image displays a musical score for three staves, labeled I, II, and III, illustrating serial assignments and dynamics. The score is organized into three systems, each with 12 numbered measures. Staff I (treble clef) contains measures 1-12, Staff II (treble clef) contains measures 13-24, and Staff III (treble clef) contains measures 25-36. The dynamics are indicated by various markings such as *ppp*, *ff*, *f*, *mf*, *pp*, *p*, *sf*, and *fff*. The notation includes various note values, rests, and articulation marks like accents and slurs. A dashed line above measures 1-7 indicates a specific serial assignment. The final measure of Staff III (measure 36) is marked with *8va* and *fff*.

Staff I (Measures 1-12):

- Measure 1: *ppp*
- Measure 2: *ppp*
- Measure 3: *ff*
- Measure 4: *f*
- Measure 5: *mf*
- Measure 6: *ff*
- Measure 7: *f*
- Measure 8: *mf*
- Measure 9: *ff*
- Measure 10: *pp*
- Measure 11: *ff*
- Measure 12: *p*

Staff II (Measures 13-24):

- Measure 13: *sf*
- Measure 14: *ff*
- Measure 15: *mf*
- Measure 16: *mf*
- Measure 17: *p*
- Measure 18: *pp*
- Measure 19: *p*
- Measure 20: *p*
- Measure 21: *f*
- Measure 22: *f*
- Measure 23: *f*
- Measure 24: *f*

Staff III (Measures 25-36):

- Measure 25: *ff*
- Measure 26: *ff*
- Measure 27: *mf*
- Measure 28: *pp*
- Measure 29: *p*
- Measure 30: *f*
- Measure 31: *ff*
- Measure 32: *mf*
- Measure 33: *ff*
- Measure 34: *ff*
- Measure 35: *fff*
- Measure 36: *fff* (8va)

Olivier Messiaen: *Mode de valeurs et d'intensities* (1949-50)

8 **Modéré**

PIANO

ppp ff f ff mf f pp ff

fff mf mf p pp fff mf mf p

ff

p ff mf ff p ff f

p p f fff f

f mf pp p

ff mf f pp p ppp ff mf

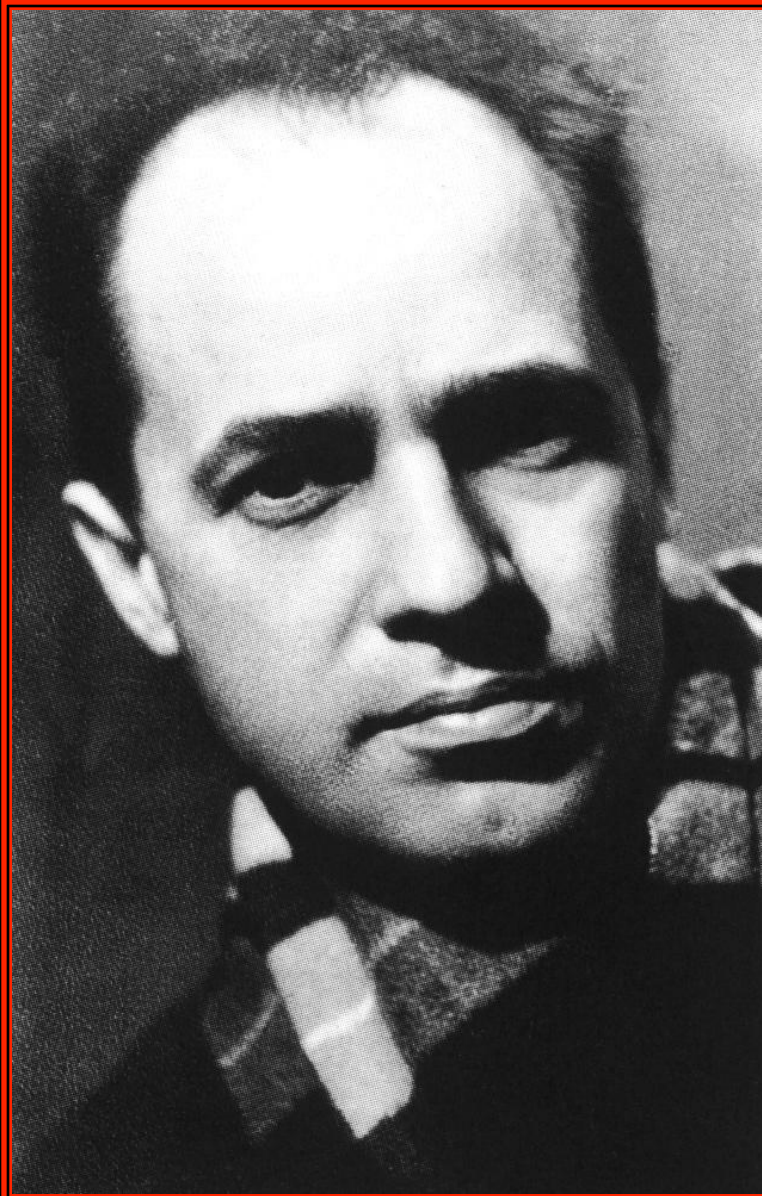
fff mf mf

ff ff ff

Olivier Messiaen: *Mode de valeurs et d'intensities* (1949-50)

The musical score is presented in three systems, each with three staves. The notation includes various dynamic markings and rhythmic values. The first system shows a grand staff with a forte (f) dynamic in the bass line and a fortissimo (ff) dynamic in the bass line. The second system shows a grand staff with a fortissimo (ff) dynamic in the bass line and a fortissimo (ff) dynamic in the bass line. The third system shows a grand staff with a fortissimo (ff) dynamic in the bass line and a fortissimo (ff) dynamic in the bass line.

Integral Serialism















Pierre Boulez (b. 1925)












▲ Boulez (right) with former teacher Olivier Messiaen at the Odéon, Paris (1966).

Rows from Pierre Boulez' s *Structures I* (1952)

Order No.	1	2	3	4	5	6	7	8	9	10	11	12
Pitch	E \flat	D	A	A \flat	G	F \sharp	E	C \sharp	C	B \flat	F	B
Duration												
Attack	$>$	>	\cdot	$\overset{\wedge}{sfz}$		--	--	$\overset{\wedge}{sfz}$	>	--	--	--
Dynamic	<i>pppp</i>	<i>ppp</i>	<i>pp</i>	<i>p</i>	quasi <i>p</i>	<i>mp</i>	<i>mf</i>	quasi <i>f</i>	<i>f</i>	<i>ff</i>	<i>fff</i>	<i>ffff</i>

(The absence of an attack at the fifth order number indicates "normal.")

Order No.	7	1	10	3	4	5	11	2	8	12	6	9
Pitch	E	E \flat	B \flat	A	A \flat	G	F	D	C \sharp	B	F \sharp	C
Duration												
Attack	--	$>$	--	\cdot	$\overset{\wedge}{sfz}$		--	>	$\overset{\wedge}{sfz}$	--	--	>
Dynamic	<i>mf</i>	<i>pppp</i>	<i>ff</i>	<i>pp</i>	<i>p</i>	quasi <i>p</i>	<i>fff</i>	<i>ppp</i>	quasi <i>f</i>	<i>ffff</i>	<i>mp</i>	<i>f</i>

Pierre Boulez: *Structure Ib* (1952)

revenir au T.^o T.^o

quasi f *pppp* *quasi f*

54

revenir au T.^o T.^o

quasi p *p* *mp* *pp* *quasi p* *p* *quasi f*

The image shows a musical score for Pierre Boulez's *Structure Ib* (1952), specifically measures 54 through 57. The score is written for piano and consists of two systems. Each system has a grand staff with a treble and bass clef. The time signature is 3/4. The first system (measures 54-57) is marked 'revenir au T.^o' at the beginning and end. It features a series of chords and melodic lines with dynamic markings: *quasi f* (measures 54 and 57) and *pppp* (measures 55 and 56). The second system (measures 58-61) is also marked 'revenir au T.^o' at the beginning and end. It features a series of chords and melodic lines with dynamic markings: *quasi p* (measures 58 and 61), *p* (measure 59), *mp* (measures 60 and 61), and *pp* (measure 59). The score is characterized by its complex rhythmic patterns and dynamic markings.

Pierre Boulez: *Structure Ib* (1952)

(♩ = 100-120-138)

ralenti
quasi *f*

Lent *poco sfz*
quasi *p*

quasi *p* *poco sfz*
quasi *p*

58

ralenti
f

Lent *fff*
fff

fff

3/4 3/16 4/16 3/16

3/4 3/16 4/16 3/16

Pierre Boulez: *Structure Ib* (1952)

reprendre le T.^o

quasi p *quasi p* *fff* *fff* *poco sf* *mp* *f* *fff*

3 16 4 16

62

reprendre le T.^o *pppp* *ff* *fff* *pppp*

3 16 4 16

pour 6

The image shows a page of musical notation for Pierre Boulez's *Structure Ib* (1952). The page contains two systems of music, each consisting of a piano (right) and bass (left) staff. The first system (measures 62-65) is in 3/16 and 4/16 time signatures. It features a variety of dynamic markings: *quasi p*, *fff*, *poco sf*, *mp*, *f*, and *fff*. The second system (measures 66-69) is also in 3/16 and 4/16 time signatures. It includes dynamic markings such as *pppp*, *ff*, and *fff*. The score is marked 'reprendre le T.o' at the beginning of each system. A bracket labeled 'pour 6' is at the bottom of the second system.

Pierre Boulez: *Structure Ib* (1952)

65

This musical score excerpt for Pierre Boulez's *Structure Ib* (1952) covers measures 65, 66, and 67. The music is written for piano in a 4/16 time signature, with a key signature of one sharp (F#). The score is organized into three measures, each containing a 4/16 time signature and a '3' indicating a triplet. The notation is complex, featuring many beamed sixteenth notes and dynamic markings. The first measure (65) begins with a *poco sfz* marking and includes dynamics of *mp*, *quasi p*, and *ff*. The second measure (66) features *pppp*, *ppp*, and *mf* dynamics. The third measure (67) includes *pp*, *quasi f*, *mf*, and *fff* dynamics. The word 'accélérer' (accelerate) is written above the staff in the third measure. The score is written on two staves, with the right hand on the upper staff and the left hand on the lower staff. The page number '65' is located to the left of the first measure.

poco sfz
mp
quasi p
ff
accélérer
mf
fff
pppp
ppp
quasi f
pp
accélérer
fff
mf
pppp
mf
fff
mf

Pierre Boulez: *Structure Ib* (1952)

[illegible]

Pierre Boulez: *Structure Ib* (1952)

(♩ = 138-160)
Moins lent

quasi *f* pour 6

3 32 *quasi f* 6 32 *quasi f* sempre 4 32 5 32

71

Moins lent (♩ = 138-160)

pour 6 pour 6

3 32 *mf* 6 32 *f* *fff* *f* *fff* 4 32 *fff* 5 32 *pp*

Pierre Boulez: *Structure Ib* (1952)

75

céder

pour 6

5 32 *ppp* *ppp* *ppp* *quasi p* *ppp* *quasi p* *ppp* *quasi p* *3* *32* *quasi p* *f* *5* *32*

céder

ffff *5* *32* *pp* *pp* *ffff* *sfz* *sfz* *3* *32* *sfz* *sfz* *ffff* *sfz* *ff* *ff* *5* *32*

3

Pierre Boulez: *Structure Ib* (1952)

79

T.º

5
32

fff

fff

p subito

pppp *poco sfz sempre*

p subito

p

pppp

pppp

poco sfz

8
32

T.º

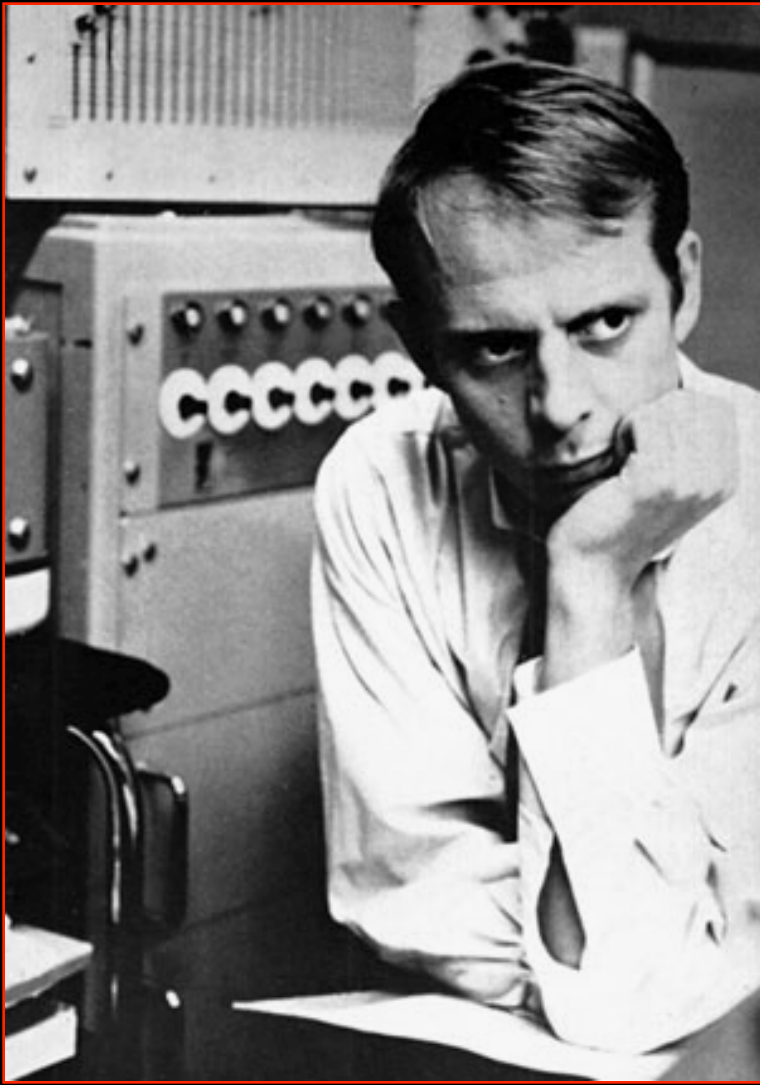
5
32

ff

ff

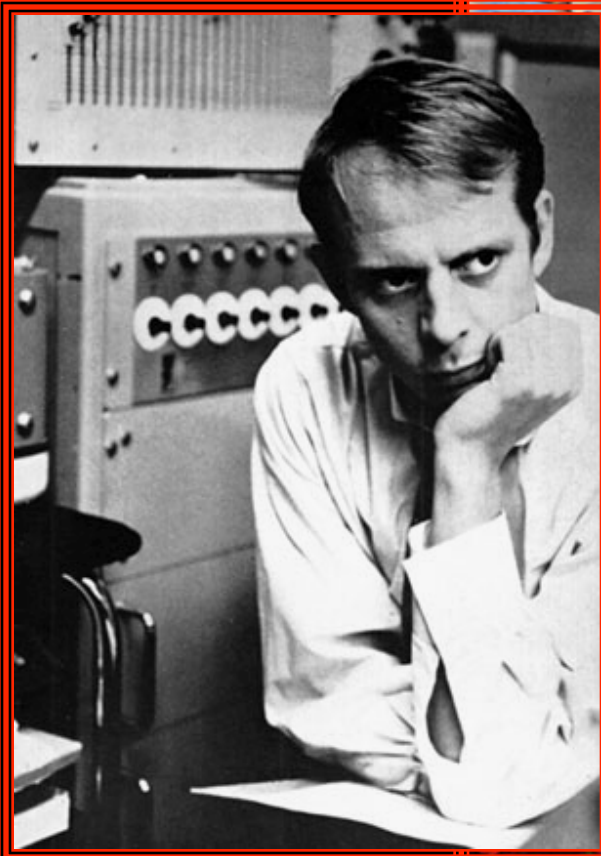
ff

8...



Karlheinz Stockhausen
(1928-2007)





The Beatles: *Sergeant Pepper's Lonely Hearts Club Band*
(1967)

Karlheinz Stockhausen: *Kreuzspiel* (1951)—Rotation of Rows

The image displays a musical score for Karlheinz Stockhausen's *Kreuzspiel* (1951), specifically the section titled "Rotation of Rows". The score consists of 12 staves, labeled I through XII on the left. Each staff contains a series of notes, primarily half notes and quarter notes, with various accidentals (sharps, flats, and naturals). A complex network of diagonal lines connects notes across different staves, illustrating the "rotation of rows" concept. These lines crisscross the staves, showing how a single melodic or harmonic idea is transformed and distributed across the ensemble. The notation is in a standard musical format with a treble clef and a key signature of one flat (B-flat). The overall structure is highly organized and systematic, reflecting the composer's interest in serialism and the twelve-tone technique.

Karlheinz Stockhausen: *Kreuzspiel* (1951)

Oboe

Baßklarinette (sounds as notated)

mp p ff pp mp mf

mp sfz mf mf f sfz

ff f ff

gently depress right pedal so that the strings are resonated by the drumbeats

ff pp sfz f mp f ff p pp

p f pp pp f pp pp p pp pp pp f

30

ooboe and bass clarinet should not alter the dynamic level for the duration of each note; above all, there should be no decrescendo preceding the rest; use as little vibrato as possible

Karlheinz Stockhausen: *Kreuzspiel* (1951)

This musical score is for Karlheinz Stockhausen's *Kreuzspiel* (1951), specifically measures 39 through 44. The score is written for a piano and a four-part vocal ensemble (Soprano, Alto, Tenor, Bass). The piano part is divided into two systems, each with a grand staff (treble and bass clef). The vocal parts are arranged in two systems, each with four staves. The score is characterized by its complex, non-representational notation, featuring a variety of dynamic markings, articulations, and rhythmic patterns.

Measure 39: The piano part begins with a series of chords in the right hand and single notes in the left hand. The vocal parts enter with a series of chords. Dynamics include *mp*, *p*, *ff*, and *f*.

Measure 40: The piano part continues with a series of chords. The vocal parts enter with a series of chords. Dynamics include *mp*, *p*, *ff*, and *f*.

Measure 41: The piano part continues with a series of chords. The vocal parts enter with a series of chords. Dynamics include *mp*, *p*, *ff*, and *f*.

Measure 42: The piano part continues with a series of chords. The vocal parts enter with a series of chords. Dynamics include *mp*, *p*, *ff*, and *f*.

Measure 43: The piano part continues with a series of chords. The vocal parts enter with a series of chords. Dynamics include *mp*, *p*, *ff*, and *f*.

Measure 44: The piano part continues with a series of chords. The vocal parts enter with a series of chords. Dynamics include *mp*, *p*, *ff*, and *f*.

The score is marked with a box containing the number 40, indicating the starting point of the first system of the piano part. The score is written in a complex, non-representational notation, featuring a variety of dynamic markings, articulations, and rhythmic patterns.

Karlheinz Stockhausen: *Kreuzspiel* (1951)

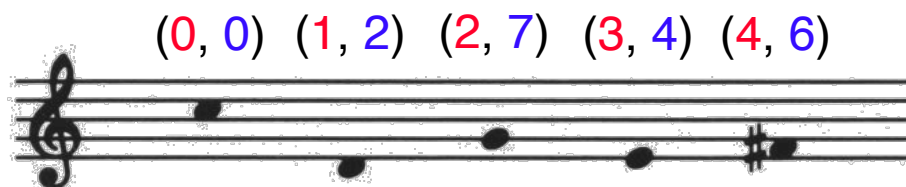
The musical score for Karlheinz Stockhausen's *Kreuzspiel* (1951) is presented in a multi-staff format. The top two staves represent the piano part, with dynamic markings including *pp*, *mp*, *mf*, *f*, and *ff*. The third staff is for the woodblock, with a note that reads "rechte Hand schlägt Woodblock" (right hand strikes woodblock). The bottom two staves represent the percussion part, featuring complex rhythmic patterns and dynamic markings such as *f*, *ff*, *p*, *pp*, *sfs*, and *sfz*. A box with the number 50 is visible in the middle of the score. The score is written in a complex, non-linear fashion, with various rhythmic patterns and dynamic markings throughout.

Serial Nomenclature

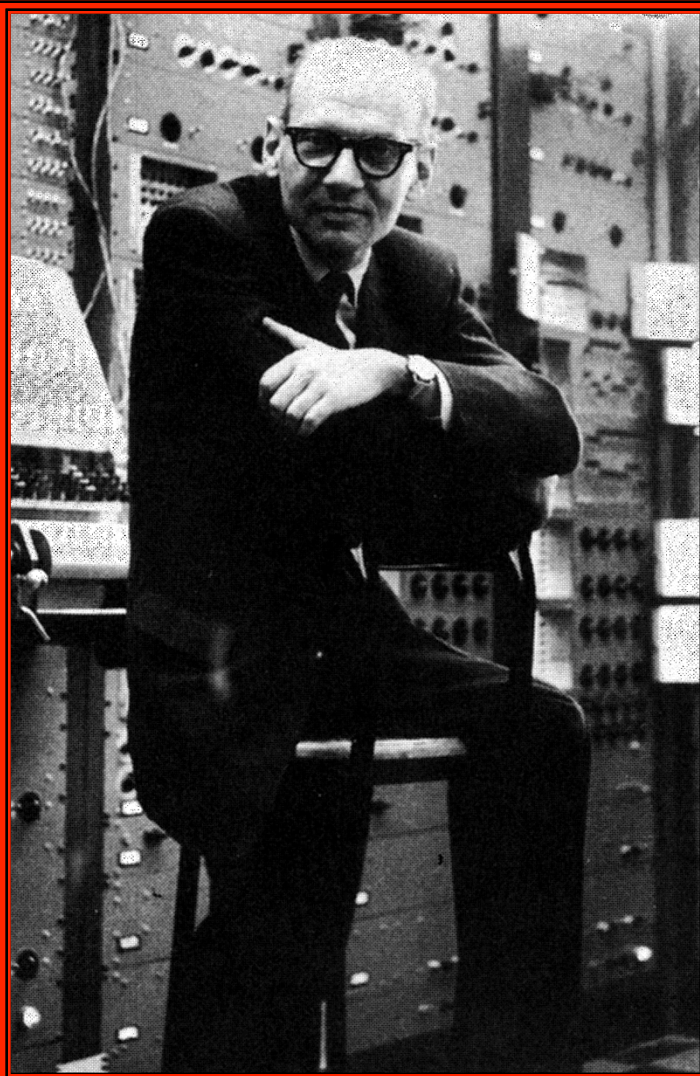
Pitches are labeled with numbers rather than letter names; these **pitch class** numbers do not have the tonal implications inherent to the traditional nomenclature.



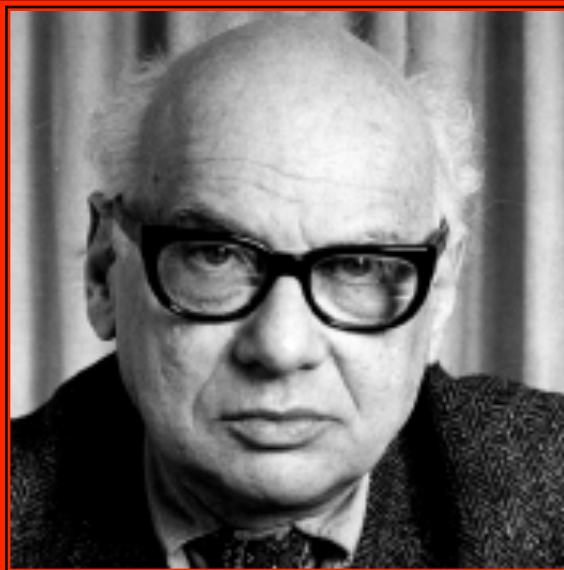
Pitches in a series may be expressed numerically as an **ordered pair**, similar to the x and y coordinates on a two-dimensional graph: the **ordinal** number identifies the placement in the series; the **pitch-class** number identifies the pitch.



Pitches (and placement) are labeled beginning with zero (0), which represents both the first position (in the ordinal number) and the pitch C (in the pitch-class number).

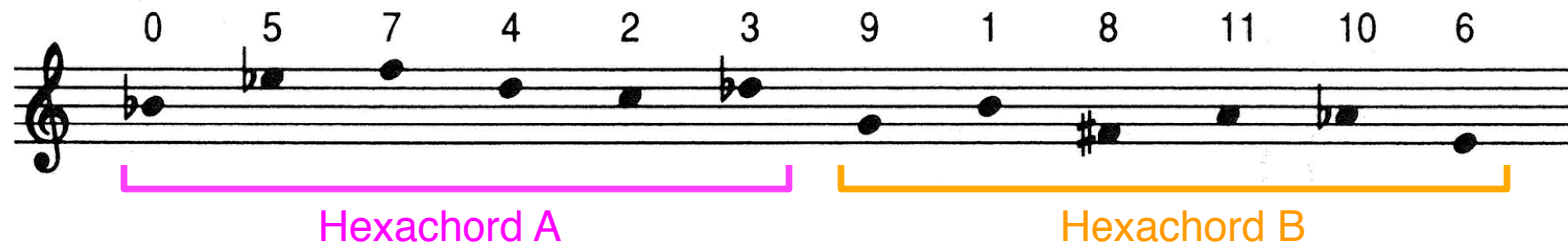


Milton Babbitt (b. 1916)



Milton Babbitt: *Three Compositions for Piano* (1947)

Tone Row (P-0):



Use of Combinatorial Hexachords:

(♩ = 108) P-6

mp Hexachord B

mp Hexachord A

P-0

New Row New Row

Milton Babbitt: *Three Compositions for Piano* (1947)

Tone Row (P-0):

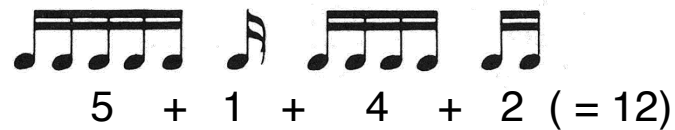


Permutation

Rhythm

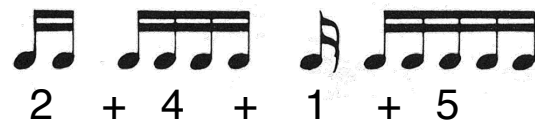
Dynamic

Prime (P-0, P-6)



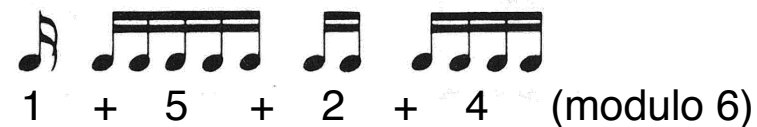
mp

Retrograde (R-0, R-6)



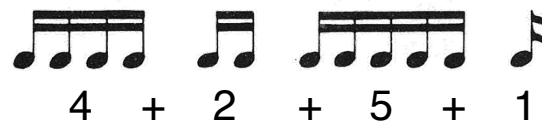
mf

Inversion (I-1, I-7)



f

Retrograde-Inversion (RI-1, RI-7)



p

Milton Babbitt: *Three Compositions for Piano* (1947) — Movement I

(♩ = 108) **P-6** 1 2 **R-0** **mf** 4

mp 5 1 4 2 **RI-1** 2 **p** 4 2

1 5 **RI-7** 4 2 5 1

5 1 **I-7** 5 2 4

I-1 **f** 5 2 4

R-6 1 2 4 1 5

mf 2 4 1

Development of Milton Babbitt's Time-Point System

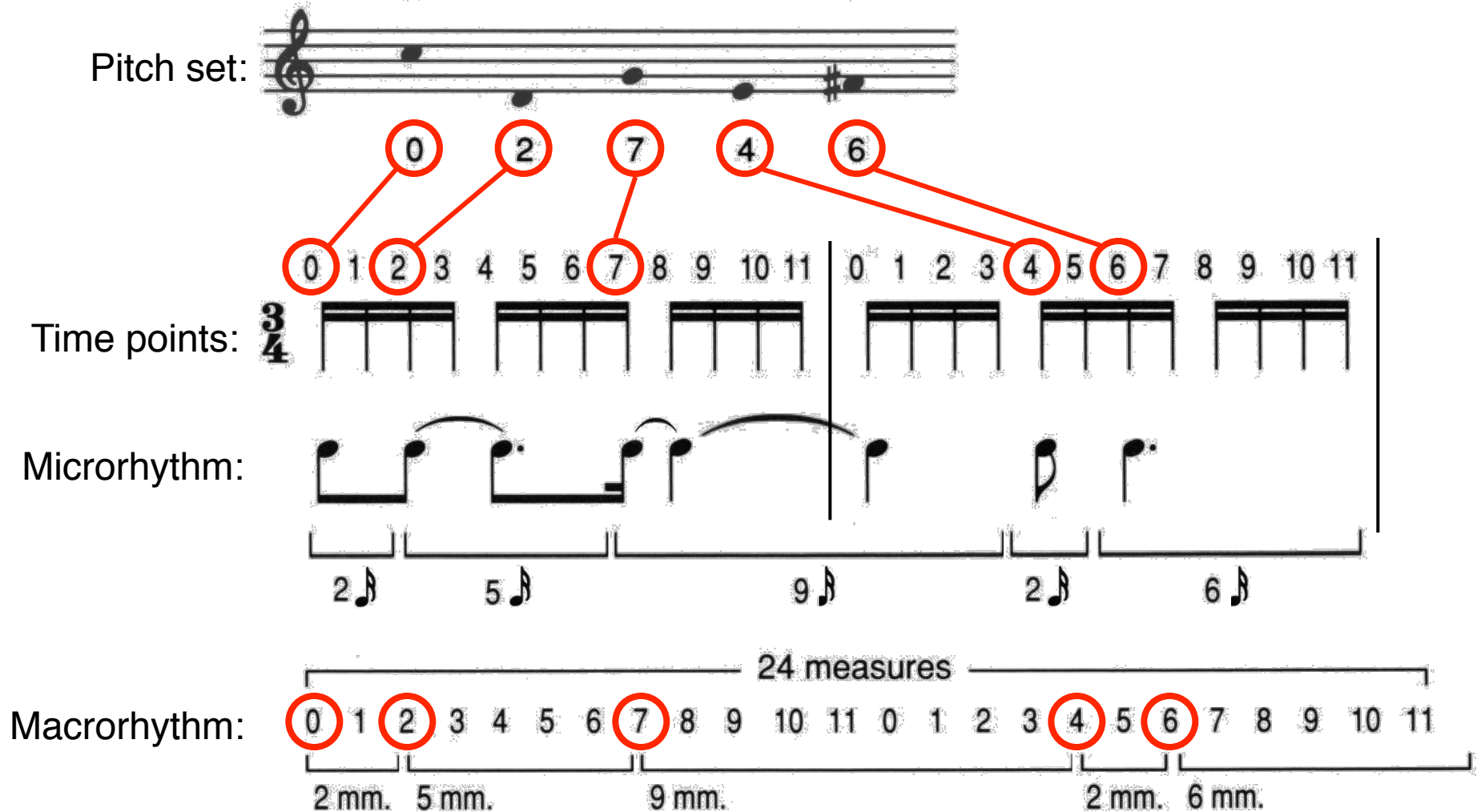
Application of rhythmic cell 1-4-3-2 in *Composition for Four Instruments* (1948):

The musical score for 'The Swan' by Camille Saint-Saëns is presented in two staves. The first staff begins with a tempo marking of 120 M.M. and a dynamic of *mp*. It features a melodic line with various rhythmic values and dynamics, including *f*, *ff*, and *mp*. The second staff continues the melody, marked with *mf*, *p*, *ff*, and *ppp*. Red dashed boxes highlight specific rhythmic units, labeled with numbers 1 through 4, and the text 'as unit' is placed above these units. The score is written in 2/4 time and includes various musical notations such as notes, rests, and dynamic markings.

Rhythms derived from pitch classes in *Composition for Twelve Instruments* (1954):

The figure shows two musical staves. The top staff, labeled 'P-0:', contains 12 notes with pitch bends indicated by numbers above them: (0,0), (1,1), (2,4), (3,9), (4,5), (5,8), (6,3), (7,10), (8,2), (9,11), (10,6), and (11,7). The bottom staff, labeled 'P-2:', contains 12 notes with pitch bends indicated by numbers above them: (0,2), (1,3), (2,6), (3,11), (4,7), (5,10), (6,5), (7,12), (8,4), (9,1), (10,8), and (11,9). Below the bottom staff, a legend shows a quarter note followed by the text '= unit:', and a dotted quarter note followed by a beamed eighth note.

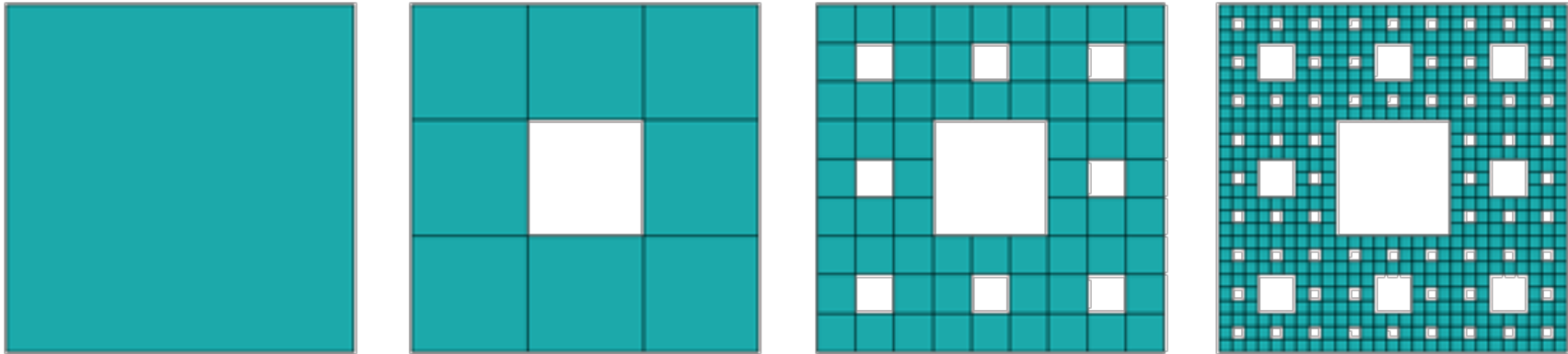
Development of Milton Babbitt's Time-Point System



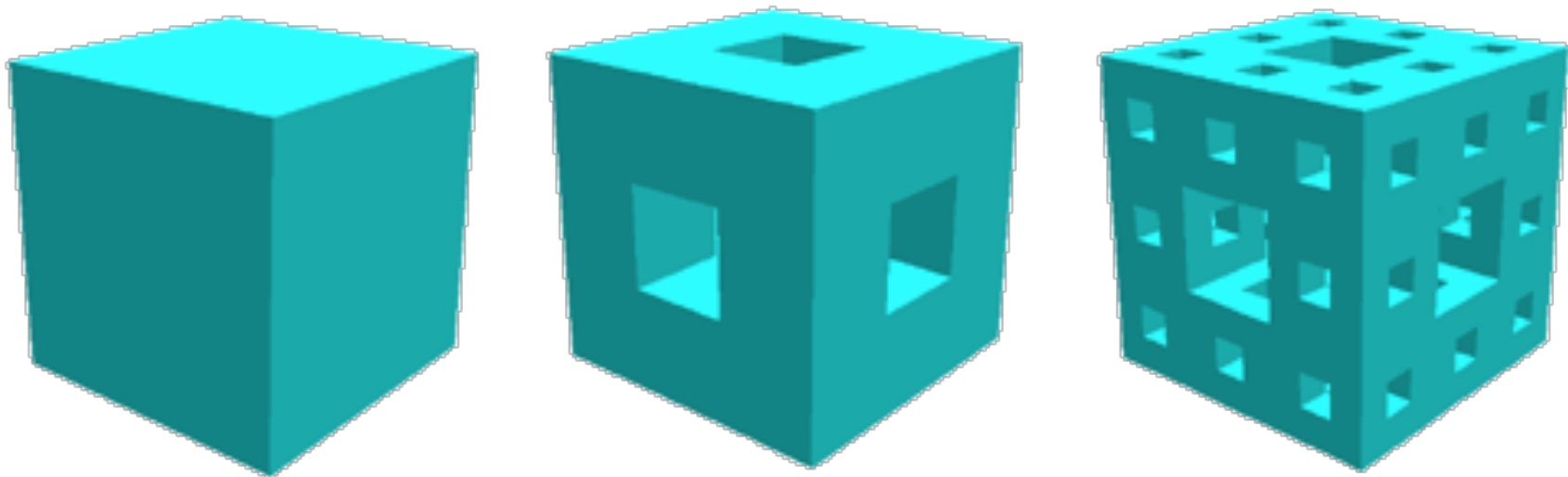
Each group of measures may be distinguished by a significant change in some parameter: e.g., dynamic, timbre, register, texture, density, tempo, etc.

Recursive Processes

The Sierpinski Carpet (2-dimensional):

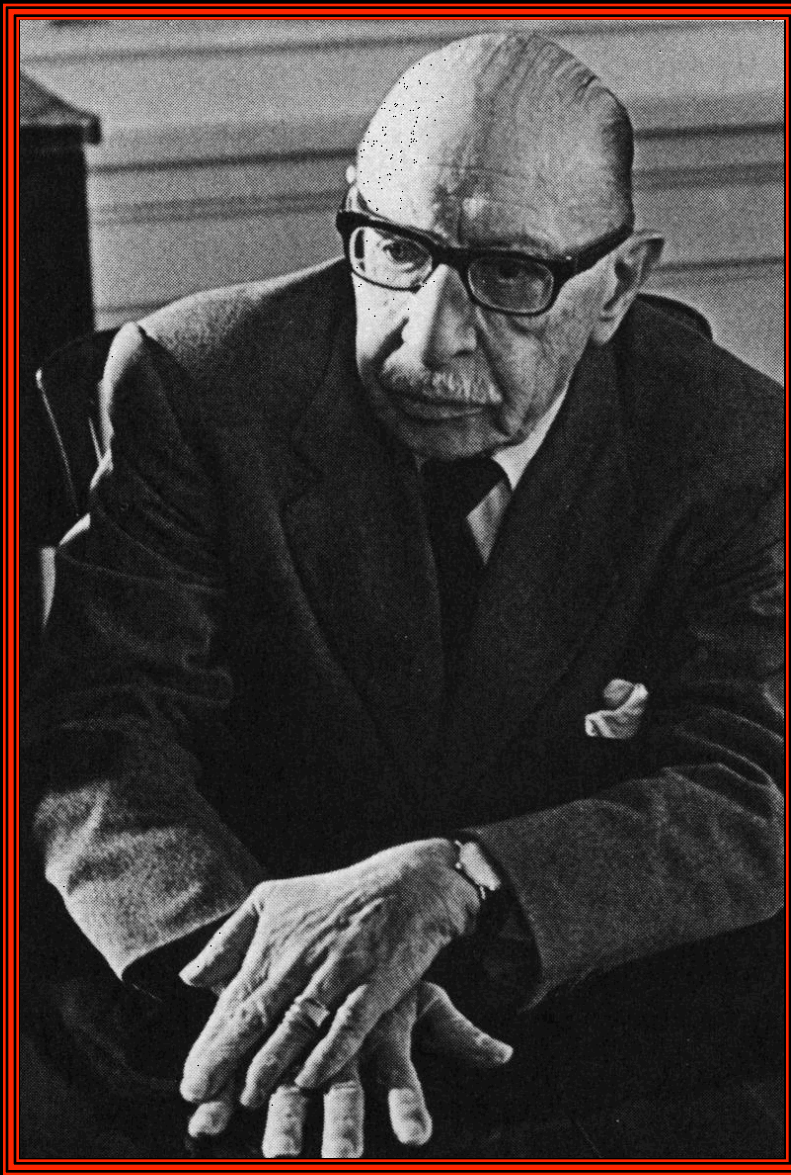


The Menger Sponge (3-dimensional):

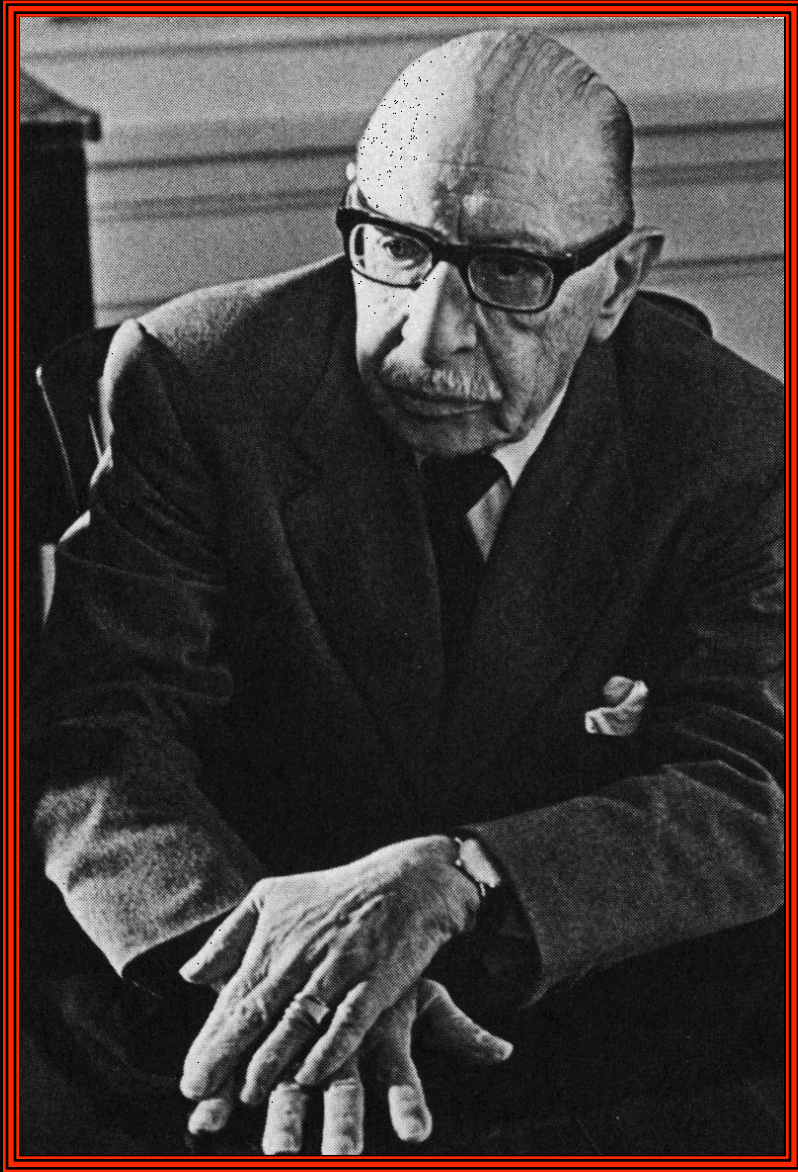


Influences of Serialism

Igor Stravinsky (1882-1971)



Igor Stravinsky (1882-1971)

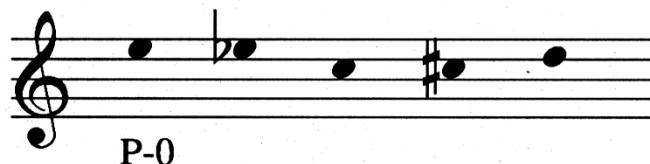


- Completed last “neoclassical” work (*The Rake’s Progress*) in 1952.
- Became interested in Webern-style dodecaphony upon Schönberg’s death in 1951.
- Developed his personal serial technique throughout the 1950s.
- Major works from this period include:
 - *Agon* (1952-54): transitional work from neoclassicism to serialism.
 - *Cantata* (1952): first use of serialism.
 - *In memoriam Dylan Thomas* (1954): first completely serial work (5-tone row).
 - *Canticum sacrum* (1955): first use of 12-tone row.
 - *Threni* (1957): first completely 12-tone work.

Igor Stravinsky: *In Memoriam Dylan Thomas* (1954)

- Composed after the sudden death of Welsh writer Dylan Thomas (1914-1953).
- The number 5 is significant in this work: tone row, meter, and instrumentation of *Song*.

5-note row:



Matrix:

	0, 0	1, 11	2, 8	3, 9	4, 10
0, 0	E	E \flat	C	C \sharp	D
1, 1	F	E	C \sharp	D	E \flat
2, 4	A \flat	G	E	F	F \sharp
3, 3	G	F \sharp	E \flat	E	F
4, 2	F \sharp	F	D	D \sharp	E



- Structured in three parts: a central *Song* (tenor and string quartet) flanked by two *Dirge-canons* (string quartet and trombone quartet).
- Thomas' poem "Do not go gentle into that Good Night" is the basis of the *Song*.

Igor Stravinsky: *In Memoriam Dylan Thomas* (1954)

M.M. ♩ = 100-102

I Tromboni tenori II Tromboni tenori III Trombone basso IV

Theme Inversion Riversion R.Inv.

Th. Th. Th. Th.

mp *etc. sim.* *mp* *etc. sim.*

Th. Inv. *etc. sim.*

M.M. ♩ = 100-102

Violino I Violino II Viola Violoncello

Igor Stravinsky: *In Memoriam Dylan Thomas* (1954)

The musical score is divided into two systems. The first system includes parts for I, II, III, Trb. IV, Vln. I, Vln. II, Vla., and Vo. The second system includes parts for Vln. I, Vln. II, Vla., and Vo. The score features various musical notations, including notes, rests, and dynamic markings.

System 1:

- I:** *etc. sim.* (etcetera, similar)
- II:** *R.* (Ritardando)
- III:** *R. Inv.* (Ritardando, Inverted)
- Trb. IV:** *come sopra* (as above)

System 2:

- Vln. I:** *marc. cant.* (marked cantabile)
- Vln. II:** *marc. cant.* (marked cantabile)
- Vla.:** *marc. cant.* (marked cantabile)
- Vo.:** (Vocal part)

The score is written in 12/8 time and features various musical notations, including notes, rests, and dynamic markings. The key signature is one flat (B-flat).

Igor Stravinsky: *In Memoriam Dylan Thomas* (1954)

Inv. Inv. **C**

I come sopra

II R. Inv.

III R.

Trb. IV Th. come sopra **C**

Vln. I d = d

Vln. II { marc. ma p

Vla. { marc. ma p

Vo.

Igor Stravinsky: *In Memoriam Dylan Thomas* (1954)

System 1:

- Vocalist I:** Starts with a D major chord (D) and a half note. The melody begins with a half note G, followed by a half note F, and then a half note E. The melody is marked *R. Inv.* and *Th.*.
- Vocalist II:** Starts with a D major chord (D) and a half note. The melody begins with a half note G, followed by a half note F, and then a half note E. The melody is marked *R.* and *R. Inv.*.
- Vocalist III:** Starts with a D major chord (D) and a half note. The melody begins with a half note G, followed by a half note F, and then a half note E. The melody is marked *R. Inv.* and *Th.*.
- Tuba IV:** Starts with a D major chord (D) and a half note. The melody begins with a half note G, followed by a half note F, and then a half note E. The melody is marked *R. Inv.* and *come sopra*.

System 2:

- Violin I:** Starts with a D major chord (D) and a half note. The melody begins with a half note G, followed by a half note F, and then a half note E. The melody is marked *Inv.*.
- Violin II:** Starts with a D major chord (D) and a half note. The melody begins with a half note G, followed by a half note F, and then a half note E. The melody is marked *Inv.*.
- Viola:** Starts with a D major chord (D) and a half note. The melody begins with a half note G, followed by a half note F, and then a half note E. The melody is marked *Inv.*.
- Cello:** Starts with a D major chord (D) and a half note. The melody begins with a half note G, followed by a half note F, and then a half note E. The melody is marked *Inv.*.

Performance Instructions:

- come sopra* (appearing above the vocalists and tuba parts)
- pp* (pianissimo, appearing below the tuba part)
- attacca subito* (appearing at the end of the score)

Igor Stravinsky: *In Memoriam Dylan Thomas* (1954)

Tenore

dolce

Do not go gen-tle in-to that good night,

Violino I

M.M. ♩ = 60

{dolce}

Violino II

{dolce}

Viola

{dolce}

Violoncello

pizz.

sul G

Igor Stravinsky: *In Memoriam Dylan Thomas* (1954)

Ten. *f* *meno f* (h)

Old age should burn and rave at close of day; Rage, rage a - gainst the dy

Vln. I 1

Vln. II

Vla. (h) pizz. arco *f* *meno f*

Vc. arco *f* *meno f*