

Playing with Numbers: Serialism

Dodecaphony organizes one element of sound: **pitch**

What about the other elements?

Olivier Messiaen (1908-92)



- Organist and composer; devout Catholic
- Held as POW in WWII; composed "Quartet for the End of Time" (piano, violin, cello, clarinet)
 - Premiered in prison camp, winter 1940

Quartet for the End of Time

"In homage to the Angel of the Apocalypse, who raises his hand to the heavens and says, 'There will be no more Time.'"

- Explores various notions of time: finite, infinite, measured ...
- Bird sounds (blackbird & Nightingale): pulse but no meter
 - Cello & piano: complex duration patterns

Look at the pitches of the Cello. Do you see any repetition?

C – E – D – F-sharp – B-flat
(5 pitches in the series)

Now look at the durations. How many eighth-notes is each note worth? When does the pattern repeat?

4 3 4 4 1 1 3 1 1 1 1 3 1 1 4

Medieval Music does the same thing:

Color = a repeating melody

Talea = repeating rhythmic pattern

Messiaen:

5 pitches in the pitch row (color)

15 durations in the duration row (talea)

C	E	D	F#	Bb	C	E	D	F#	Bb	C	E	D	F#	Bb
4	3	4	4	1	1	3	1	1	1	1	1	3	1	1

Cello:

It takes 3 pitch cycles to get through one rhythm cycle $15:5 = 3:1$

(5 is a common factor, remove it to find the simplest proportion)

Piano:

cycles are more complicated
29 chords in the pitch row (color)
17 rhythmic durations (talea)

*There is no common factor here
(they are both prime numbers!)*

The two will only come into alignment again after 29 repetitions of the rhythm or 17 repetitions of the chords (or 4147 measures of music!)

- 1946-48: *Turangalila-Symphonie* experimented with applying 12-tone row technique to rhythmic values
- 1949: composed *Mode de valeurs et d'intensités* at Darmstadt (important summer course in new music)
 - 36 pitches, each with specific duration and dynamic level
 - Did not systematically apply rows—some freedom in ordering of elements
 - Served as important model for students: Pierre Boulez and Karlheinz Stockhausen

**Messiaen—not a serialist!**

- Did not continue with serial experiments
- Enjoyed playing with inherent limitations, but not with strict serial procedures
- Later works:
 - Uses “non-retrogradable” rhythms (palindromes)
 - Additive rhythms
 - Pitch “modes” of his own invention

Serialism (Integral Serialism)

- application of 12-tone technique to all parameters of sound (duration, timbre, register, pitch)
 - Allows for total control over musical material
 - Demands extremely precise notation and performance (electronics became ideal for some)
 - Allows for a closed musical system—entire pieces may stem from a single musical “kernel”
 - No longer use row as a “theme”, but as generating principle

Pierre Boulez (b. 1925)

- Developed Messiaen's serial ideas further
- Extremely critical of Schoenberg for:
 - Using series as a theme
 - "ugly" use of rhythm
 - Confusing use of tonal forms with pitch series



Structures 1a (1952)

- Used Messiaen's first row as his pitch row:



Transpositions, inversions etc. applied to pitches *and* to rows of articulation, dynamics, and duration

Result is a "pointillist" sound

Milton Babbitt (b. 1916)



- Extremely influential figure in development of serialism
- Interested in purely mathematical relationships: set theory
 - "sets" of numbers may generate the musical material based on underlying mathematical properties

P⁰: (0 e 3) (4 8 7) (9 5 6) (1 2 t)

Divides into "sets"

Each set (trichord) contains: minor second + major third

You can "pack" each set as tightly to the left as possible by changing the order of pitches then transposing to begin on '0':

0 e 3 ————— e 0 3 = [014]

Sets become the basic building block of larger compositions

- Provides level of unity and coherence not otherwise possible in atonal music
- Creates an integrated *system* in which all operations emerge from characteristics of the initial row (or its individual sets)
- When applied to other parameters of sound, allows *total* control