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# CONTEMPORARY MUSIC REVIEW

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## Timbre Composition in Electroacoustic Music

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## Timbre Diversification in Serial Tape Music and its Consequence on Form<sup>1</sup>

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Since their early works, serial composers have attempted to vary their compositions and to strengthen the articulation of form through selections within the range of variability of different dimensions. In electronic music, this strategy was applied to the combination of timbres. Boulez's *Second Study of musique concrète*, Stockhausen's *Gesang der Jünglinge* and Koenig's *Klangfiguren II* provide three different examples of how this general idea could be realised. In addition spatialization became an important tool in clarifying the structuring of serial music. The analyses presented in this paper are based on the composers' sketches and supported by graphic notations of their electronic music.

KEY WORDS Pierre Boulez, Karlheinz Stockhausen, Gottfried Michael Koenig, electronic music, serial form, timbre selection

When Pierre Boulez and a few other young French composers such as Michel Philippot, Jean Barraqué and Michel Fano participated in an introductory course to musique concrète presented by the French Radio ORTF in the autumn of 1951, Boulez was attracted to the various mechanical/electronic instruments and the possibilities they offered which would enable him to expand the serial domain. He had begun to explore serialism in a new way in his recent instrumental compositions:

"The experience of musique concrète [...] seems to me indispensable to the extent that it permits the resolution of certain difficulties presented firstly by the creation of non tempered sound spaces and complex sounds, and secondly by the realization of rhythmic structures in which irrational values are subdivided" (Boulez, 1991, p. 135).

Since April 1951, the studio directed by Pierre Schaeffer had indeed acquired new, technologically advanced equipment consisting of different tape recorders, which replaced the disc-recorders, and of a transposition machine called the *phonogène*. This equipment provided the composer with the technical possibility to realize complex ideas in the realm of rhythm and of polyphony with a maximum of precision. But from the point of view of pitch, the *phonogène* was seriously limited because it transposed only by steps of tempered semi-tones, following the model of instrumental music, and possessed a range of only two octaves. That is no doubt why Boulez initially investigated the new medium in regards to rhythm and

<sup>1</sup> The sketches to Boulez's *Studies* and the edition of Stockhausen's sketches for *Gesang der Jünglinge* have been kindly provided by the Paul Sacher Stiftung, Basel. The graphic notations given here have been realized on the basis of these documents but are not transcriptions of any existing sketches.

polyphony rather than pitch. In his first study, realized in December 1951, Boulez limited the sound material to a single sansa sound transposed onto 72 tempo-levels, thus implying 72 different pitches and durations (pitch and duration being indissolubly linked by the mechanical transposition). The counterpoint of these two dimensions led Boulez to an original conception of time composition:

“... we shall have the possibility of registering duration as we do pitch, but independently of it. And this will lead us either to modify the sound [i.e. to shorten it], or to silence” (Boulez, 1991, p. 127).

Incidentally, a 3-track tape-recorder enabled the composer to superimpose different sound-events by synchronizing them either at their beginning or end, or symmetrically around a central axis. These principles were used both for the building of sound complexes as well as for the polyphony of whole structures. In his second study, dating from March 1952, Boulez turned to the problem of timbre. The recorded sounds he intended to use in his composition were grouped according to a catalogue of six timbre-categories:<sup>2</sup>

A: two rattles, A1 and A2

B: a rolling can

D: attack with resonance: D1 pizzicato [without any further instrumental specification], D2 anvil, D3 piano

E: E1 a “swarm”, E2 compound sound of piano and bell, E3 “counterpoint-whirlwind”

F: low sounds: F1 a Japanese instrument, F2 sansa, F3 compound sound of a low and a high sound [without any further instrumental specification], F4 piano

H: compound sounds of percussion and sansa: H1 percussion-sansa, H2 sansa-percussion-sansa

In each category, the sounds occasionally undergo different transformations: filtering, reverberation, retrogradation and even permutation of the successive parts of the sound, though all these variants do not affect the overall plan of the piece. After an expositional section (the beginning is given in graphic notation in Figure 1) where different combinations of the various members of the six timbre categories are presented in each track, the development focuses on invariable selections from the catalogue: F, A + B and D + E + H.<sup>3</sup> These selections appear once in each track resulting in the following distribution for the whole development<sup>4</sup> (Figure 2; the beginning of the development is given in graphic notation in Figure 3)

<sup>2</sup> The missing letters in this catalogue result from an earlier timbre list from which some items had been discarded. These two categories were: C: a cricket and G: short waves either in melismas or pizzicati.

<sup>3</sup> These selections transpose the serial grouping device on the level of timbre-combination in accordance with the mechanical instruments Boulez had at his disposal. The tape recorder had three tracks, so the system of density (number of simultaneous sounds) used all the possibilities from the simplest, one, to the maximum of three. In the development, Boulez worked on one more level, thus utilising a maximum of nine tracks.

<sup>4</sup> This graph is a transcription of an original Boulez sketch.

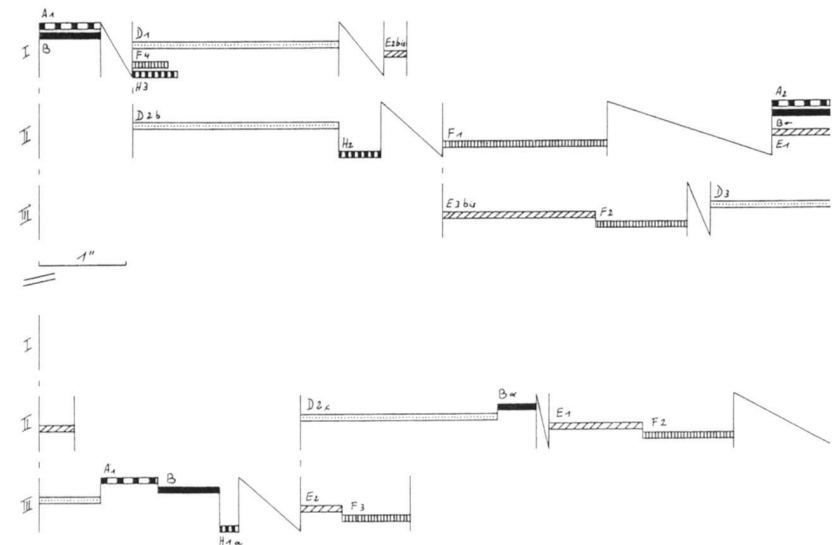


Figure 1 Beginning of Boulez's *Second study of musique concrète* in graphic notation.

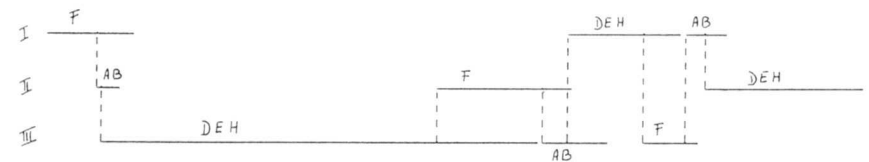


Figure 2 Boulez's *Second study of musique concrète*: Repartition of timbres in the development.

A few months later, Boulez reported on his experiments with tape music in a letter to Henri Pousseur.<sup>5</sup> In order to go beyond the results already obtained by Boulez, Pousseur proposed that in the future the material be reduced to the elementary sine wave, as it is produced by a generator in an acoustic laboratory.<sup>6</sup> This perspective is confirmed by Boulez as being the goal for further research:<sup>7</sup> during his journey through Germany in September 1952, Boulez had the opportunity to listen to the first examples of electrically generated music produced

<sup>5</sup> Boulez's letter to Pousseur from the middle of March 1952. The complete correspondence between these composers is also accessible at the Paul Sacher Stiftung, Basel.

<sup>6</sup> Pousseur's letter to Boulez dated 14th September 1952.

<sup>7</sup> Boulez's letter to Pousseur dated October 1952.