

The following text is by Prof. Pascal Decroupet of the Université de Nice, Faculté des Lettres, Arts et Sciences Humaines. Prof. Decroupet provides background information about the 'Studio di Fonologia Musicale' where 'Scambi' was realized in addition to describing the composition itself. This text is an expanded version of his 1997 text: 'Studio di Fonologia Musicale della RAI Milano' in *Im Zenit der Moderne* Freiburg im Breisgau: Rombach Verlag, vol. 2, Chapter VI Elektronische Musik, pp.99-104. Interested readers are advised to consult this publication for more information.

In 1955 Berio and Maderna started their work at the newly established Studio di Fonologia Musicale at the Milan Radio; in 1956 they presented the first results of their activity to the public¹: at first, during the panel discussion at the Darmstädter Ferienkursen, and thereafter by means of a record included with an issue of the radio magazine *Electronica* (this was dedicated to the problems of electronic music). This record also contained some of the first sound examples made in Milan just before the start of substantial compositional work. These included experiments with water drops and railway noises, but also sequences with symmetrical and asymmetrical impulse arrangements in addition to a study on harmonic and inharmonic sound spectra.

The first Milan concert took place on 24.5.1957 as part of the series "Concerti degli Incontri Musicali"; in addition to works by Berio, Maderna and Pousseur, which were realized in Milan, Stockhausen's *Studie II* and *Gesang der Jünglinge* were also played. Afterwards, on 31 May, the Milan compositions were presented in the Radio-Studio Zurich at the festival of the International Society of Contemporary Music (ISCM). On 26 July they were finally performed at the Ferienkurse.

The presentation in Darmstadt was preceded by short explanations by Maderna and

¹ In addition to "concert works" both composers also collaborated on radio plays and film music. One example was the *Ritratto di città* (1955) which also involved the author Roberto Leydi. Comprehensive documentation about the Milan studio in the nineteen-fifties can be found in: Nicolas Scaldaferrì, *Musica nel laboratorio elettroacustico. Lo Studio di Fonologia e la ricerca musicale negli anni cinquanta*, Lucca 1996. Since then, different important publications on the Milan Studio have been published: Veniero Rizzardi and Angela Ida De Benedictis, *Nuova Musica alla Radio. Esperienze allo Studio di Fonologia della RAI di Milano 1954-1959*, Rome, Cidim/ERI-RAI, 2000 and Angela Ida De Benedictis, *Radiodramma e arte radiofonica. Storia e funzioni della musica per radio in Italia*, Torino, EDT, 2004.

Pousseur. Maderna stressed above all else the difference in temporal conception between instrumental and electronic music, a difference which he claimed manifested itself intrinsically in musical thinking. As the composer in the studio was immediately able to check everything that had been realized by ear and could, as a result, organize the repository of produced sounds according to perceptual criteria, he was liberated from the linear development of musical thought; this had decisive consequences for the conception of musical time. Maderna continued by saying that in electronic music time presented itself “as the field of a great number of permutational and organizational possibilities of this produced material”². This fact was important for music in general (first applications already existed in instrumental music), as through it the multi-dimensional nature of each structure was revealed: “from now on a structure can include not only one, but a great number of functions depending on its position within the whole”. It was therefore a matter of a fundamental modification of musical thought: “One does not listen to linear time anymore, but many independent projections of time enter into consciousness, which can no longer be represented as a one-dimensional logic.” As a conclusion to his contribution Maderna read out short notes referring to his own works *Notturmo* and *Syntaxis* as well as Berio’s *Mutazioni* and *Perspectives*.³

The difference to the Cologne works can probably be explained most distinctively by the sound production in Maderna’s *Notturmo*⁴. What sounds like a sequence of internally finely structured sine tones at the beginning of the work - a certain similarity with a flute sound is also obvious, which Maderna liked to emphasize - is extracted from noise by means of very narrow filtering (2 Hz wide). The movements in the sound seem like a single amplitude-modulated sine wave. While Stockhausen developed his theory by means of observing the process of perception in which he took certain acoustic facts and particular serial patterns of thought into account (*Gesang der Jünglinge* for example is based on this) the composers working in Milan emphasized the absolute supremacy of perception. In a sense this was

² Quoted from the tape recording. A transcription of Maderna’s presentation (made by Horst Weber in 1984) is kept in the IMD. All following quotations refer to this tape recording and are presented here in translation.

³ *Perspectives* was still a preliminary version which was presented in Milan and Zurich under the working title *8:37 Perspectives*.

⁴ A detailed analysis of this work was elaborated by Scaldaferrri in his study *Musica nel laboratorio elettroacustico*.

distant from any acoustic knowledge of the sound production, and for Maderna it was even the single, final point of reference. Thus, *Syntaxis*, his second electronic composition, originates equally from improvisation on the equipment, which was encouraged by connecting the instruments to nine generators - their ensemble playing could be controlled by direct listening. Ring modulation is also used by Maderna in *Notturmo* because of its sound qualities and not, as in Koenig's *Klangfiguren II*, as a sound transformer allowing prepared sequences of pitches and durations to be realized into different tone colours without further splicing. However, we cannot conclude from this - and Scaldaferrri's analysis of *Notturmo* shows this decisively - that work in Milan was conducted unmethodically, improvised ad hoc in the studio as it were. This interpretation is, as so often happens, the exaggeration of a half-truth. Berio's *Mutazioni* and *Perspectives* play with the identification-thresholds of the different materials. In the former, the swift sequences of short sine-tones turn into different complex sounds (e.g. sine-tone chords or filtered noise frequency bands), however, in the latter the degree of mixing effects the level of the composition as a whole because each of the four sound families are present in each structure: The degree of their presence varies, but it never falls below a certain minimum level.

Pousseur's remarks on *Scambi* are also quite general. Due to the short period of time available to him for the realization of the work (merely six weeks), he focused on material which could be easily produced, material he could shape with real-time processes to reveal the characteristic changes of the material. In this manner of production permanent control by ear was decisive, and he continued to produce new versions of the transformation processes until he was satisfied with the results. So, from the start he did not want to measure, cut and paste, but realize everything in real-time, by immediately reacting to the equipment. By means of a specific process, dynamic filtering, he was able to extract from the elementary material (in this case noise) animated time structures, then to process them further in different parameters, and thus to produce 32 sequences. These sequences could now be arranged by anyone who had access to them and who wished to realize the work, according to certain rules regarding their order and possible overlapping. In the two versions realized by Pousseur - which were subsequently played in the concert - he pursued the aim of an absolutely continuous and organic progression of the sound. Besides the possibility of permutation, each person realizing a version also has responsibility for the

dynamic and spatial balancing and thus for the resulting overall shape. The identity of the work is preserved by the homogeneity of the material which, even in markedly different arrangements, always creates the same general impression. As a more general consequence from this experience, Pousseur described a new way of musical praxis in which the composer provides source materials which are situated on a scale from precise measuring to free improvisation, and which have to be further developed by each performer.

The four parameters taken into account in *Scambi* are - in the order of their fixing during the compositional process - the statistical tempo (from slow to fast), the relative pitch (from low to high), the homogeneity of the sound pattern (from dry to strong reverb) as well as the continuity (from long breaks to continuous sound)⁵ (see figure 1a). By means of dynamic filtering with a special piece of equipment, developed by Alfredo Lietti, the engineer of the studio, Pousseur extracted irregular impulse patterns from noise frequency bands at different fixed pitch levels which, depending on the fine tuning of the filter, extended from a few single impulses to whole impulse swarms. Through mixing and montage of different tapes produced in this way he obtained four basic models in which only one of two parameters respectively is changing, either the tempo or the pitch; these models can also be played backwards. Afterwards they are subjected to a multi-layered reverberation treatment and finally processed again with dynamic filtering in order to cut up the continuous sound up to this point by means of breaks. Since Pousseur executed only a part of the possible combinations in each work process, the resulting 32 sequences possess a limited number of parameter constellations at their beginning and their end (see figure 1b). This happened with the intention to ensure a transition without break from one sequence to the next. From the following two tables follow the processes as well as the start-/beginning- and end-situations⁶.

⁵ Pousseur has explained the compositional process of "Scambi" in detail: *Gravesaner Blätter* 4/13 (1959), pp 36-54.

⁶ The examination of the individual sequences of *Scambi* showed, that contrary to Pousseur's description it is not a matter of 32 different processes, but of 16 progressions, for each of which two variants are available. The following tables are fair copies from sketches of analysis for *Scambi* which Pousseur made in the mid-sixties for the purpose of choosing certain sequences to be processed further on tape for the "prelude on stage" from his opera *Votre Faust*.

a

Family	Sequence	Pitch	Speed	Hom.	Cont.	Dur.
1	1-2	0/1	1/1	1/0	0/0	42"
2	3-4	0/1	1/1	0/1	1/1	42"
3	5-6	1/0	1/1	0/0	0/1	42"
4	7-8	1/0	1/1	1/1	1/0	42"
5	9-10	1/1	1/0	1/0	1/0	30"
6	11-12	1/1	1/0	0/1	0/1	30"
7	13-14	1/1	0/1	0/0	0/0	30"
8	15-16	1/1	0/1	1/1	1/1	30"
9	17-18	0/0	0/1	1/0	0/1	30"
10	19-20	0/0	0/1	0/1	1/0	30"
11	21-22	0/0	1/0	0/0	1/1	30"
12	23-24	0/0	1/0	1/1	0/0	30"
13	25-26	1/0	0/0	1/0	1/1	42"
14	27-28	1/0	0/0	0/1	0/0	42"
15	29-30	0/1	0/0	0/0	1/0	42"
16	31-32	0/1	0/0	1/1	0/1	42"

b

pitch	1	1 1 1 0	1 1 1 0 0 0	1 0 0 0	0
speed	1	1 1 0 1	1 0 0 1 1 0	0 1 0 0	0
homogeneity	1	1 0 1 1	0 1 0 1 0 1	0 0 1 0	0
continuity	1	0 1 1 1	0 0 1 0 1 1	0 0 0 1	0
selected sequences	*	*	* * *	* **	

Fig. 1: Pousseur, Scambi, tables with transformation processes; a: characteristic per sequence; b: all possibilities of characteristics and Pousseur's choice (according to sketches)

In the discussion following the performance, the accusation was soon made, that what was presented was surely nothing but acoustic experiments, and by no means music. Maderna as well as Pousseur dealt with this objection in a factual manner. Maderna underlines that the difficulty of dealing with this new music is not due to its means but, more generally, it is a problem of the mentality which is also becoming apparent in instrumental music. In addition, he could not accept the accusation that the works are mere experiments: *Syntaxis* is, according to himself, his best work so far, regardless of the kind of medium used. Pousseur on his part argues with the development of music since Webern - a topic with which he thoroughly deals in his analysis seminar about Webern's complete works which takes place in the same year in Darmstadt⁷. According to Pousseur, a striking contradiction can be observed between the sounds, the most regular sound events, and the integral asymmetry of Webern's musical language. Today, he continues, one can resolve this conflict between the material and the higher levels of the composition, because electronic music provides all sonic possibilities, from the simplest to the most complex structures, so that, even in asymmetric constructions, between material and form a mutual correspondence can be achieved. The complex sound structures are no longer regarded as impenetrable (according to Pousseur, noise is characterized in this manner in old treatises), because with the new means even their nature can be examined. What finally concerns the problem of associations when listening to electronic music, is not an argument against this form of music. The associations are free according to Pousseur as soon as one leaves the field of traditional sound production, however, the aim remains to listen to the sounds with their material characteristics for their own sake.

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⁷ See *Im Zenit der Moderne* vol. 1, chap. II, "Kontinuität der Moderne?", pp. 249-262 and chap. III, "Konzepte serieller Musik", pp. 363-367.