

The 'suspended clarinet' with the 'uncaused sound'. Description of a renewed musical instrument.

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ABSTRACT

Il suono incausato, improvise-action for suspended clarinet, clarinetist and electronics (2005) by Silvia Lanzalone, is a musical piece which proposes an innovative way of using the traditional instrument and adding technology to the music production by creating a unique sound installation for the clarinet. The title – the uncaused sound – instead suggests the generating idea from which the author has developed the musical piece and its related aesthetic choices. The subtitle – improvise-action for suspended clarinet, clarinetist and electronics – gives the listener some hints which anticipate important characteristics: the extempore component joined to a gestural approach of the performance; the modality through which the clarinet is put on the stage as well as the discontinuity between the instrument and the performer; the display of electronic devices.

Il suono incausato has been played in several festivals of contemporary music; it was awarded with the Franco Evangelisti (2006) prize, and it is published by the editor Suvini Zerboni.¹

Keywords

Renewed and augmented instrument, extemporary and gestural performance, interactive sound installation.

1. IDEATION AND PLANNING

During the ideational path the author, who started from the philosophical concept of causality, has gradually reached an imagery level which, far from a lyrical-emotional inspiration, has provided her with a thought extent within which to develop the project of an installation made of a suspended clarinet with uncaused sound.

The title of the piece gets its origin from some reflections on the theme of causality that has been largely investigated from immemorial time through various philosophic statements which extend from the contemporary western thought to the classic one expressed by Hume, Descartes, Saint Thomas and Aristotele, including also the philosophic conceptions implied in some oriental religions. In the history of both western and oriental philosophic thought, the idea of causality has taken different meanings rooted into more rational and deterministic elaborations or into others more metaphysical and transcendent which may slightly differ according to cases.

For the same reason the word "uncaused" is also rich in meanings and it has given important suggestions to the author as well as a strong conceptual reference. This reference is made clear in the musical piece because it is based on the necessity of releasing the clarinet from the traditional relation of cause/effect implied in the link with the executor in order to musically explore other possible criteria of casual connections. Both the ideational and planning

stages strongly reflect the ideas which constitute the base of the author's reflections.

The relation with the instrument is not pursued in the usual logical/temporal connection for which the sound (effect) is produced by the executor (cause) by exciting the air column inside the pipe through the reed. On the contrary, it is produced by applying different criteria which can be obtained by inverting the terms of the relation or by denying them as well as by searching for their interdependence (mutual action).

The planning and assembling stages are strictly related to each other and the technical solutions found out in the course of the experimental stage have optimized both the mechanical and acoustic features of the installation.

The renewed instrument, called by the author "suspended clarinet", is self-sufficient on the acoustics level since, instead of being "played" by the executor, it is "explored" by him through a range of operations mainly aimed at modifying the physical features of the pipe and the combination of open/closed holes in order to create new conditions of the vibrating system.

The sound, pre-existent to the clarinetist's intervention, might become a necessary condition for the acoustics exploration of the instrument. In turn, the acoustics exploration can become the cause of the timbric variations obtained by the clarinet through the given sound. It is possible to identify, being implied in the musical piece, several categories of connections (or disconnections) between actions and events (or absence of actions and/or events).

The breaking of the traditional causal link between the clarinet and the player, carried out through the search of possible relations as well as possible ambiguous links among the two terms, considers therefore the various layers of meanings that might be implied in the idea of cause.

2. THE INSTRUMENT

The clarinet, laying on a stand, appears as if it were suspended.

This kind of installation allows a physical separation of the player from its instrument and also shows with stage effects the autonomy or the interaction of the two ones; furthermore, since the player is free from holding the clarinet with its hands, it is possible for him to perform a larger number of key combinations and to apply additional elements to the instrument. Such handlings contribute with their timbric variations to enhance the explorative path of the original sound. Some devices such as plugs and levers are used for plugging the instrument holes when the player's hands are engaged with several other pivot points of the instrument.

Plugs and levers, both made of cork, are numbered according to the indications shown in the score which foresees a total of seven plugs and three levers. Other devices of the instrument are four frustum of cones; three of them are made of cardboard and one of thin aluminium sheet. Their function is to amplify the sound and

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to magnify some partial sound waves of less intensity in definite zones of irradiation of the instrument such as the bell or some holes.

In accordance with the several means of connection between action and result, the handlings on the suspended clarinet mentioned above as “explorations” perform a wide range of functions such as: amplify or lessen some specific resonances, add some timbric rhythms to the fundamental sound, act by imitation or contrast in respect to a particular modality of vibration of pre-existing sound, be of no effect, might not act at all.

The basic feature of the instrument so arranged is the absence of a mouthpiece, and hence of a reed: the instrument is connected to a system for exciting the air column controlled in real time by a computer. In fact to the instrument pipe, at the barrel height, is applied a device made of a loudspeaker inserted in a soundproof frustum of cone, whose function is to conduct into the clarinet the air and the sound produced by the mechanical movements of the membrane of the loudspeaker. The narrower opening of the cone is fitted to the pipe like a fennel to channel both sounds and air into the clarinet; the loudspeaker through the mechanic vibration of its membrane causes not only a transmission of the sounds but also a substantial variation of the air pressure inside the instrument.

The acoustic material fed to the loudspeaker is produced by an algorithm of real time sound synthesis and elaboration made with the software Max/MSP, controlled by the performer – the clarinetist – through a MIDI pedal.

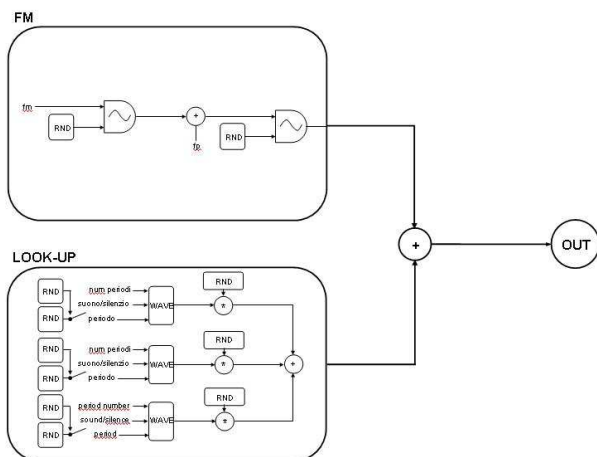


Figure 1. *Il suono incausato* – algorithm.

Speaking in terms of physics, no sound can be really “uncaused”. Therefore, the classic relation between sound/instrument/player is in any case overturned; since the loudspeaker is not a visible part of the instrument. Scenically, the clarinet is “on its own” on the stage and the player comes into relation with it once sounds are emitted by the instrument. The want of visible loudspeakers and the contribution of an electro-acoustics technology perfectly integrated to the classical instrument opportunely modified leads inevitably to a concept innovation of contemporary musical opera.

The opera “the uncaused sound” appears as an interactive sounding installation in which the player acts either with musical or theatrical gestures aimed at creating a continuous and variable

dialectic relation between instrument and player. All that highlights a new aesthetic concept: the technologic instrument instead of imposing itself to the sound of the traditional instrument to modify it with algorithmic artifices, takes part with it in the whole structure to give birth to a new instrument.

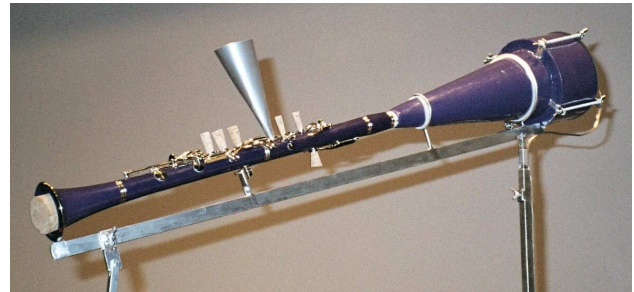


Figure 2. *Il suono incausato* – suspended clarinet.

3. TIMBRIC RESEARCH

The timbric research is of main importance in this piece. The quality of the sounds coming out of the suspended clarinet not always reflects what we are used to hear from the classic one.

In the first part of the piece, for example, a clarinet sound evolves in the direction of a sound/noise similar to a timbre of an electronic instrument, even though with a “spectral imprint” resulting from the sounding resonances which the instrument imposes to the incoming sound. Hence, it arises once more a play over allowed levels of shadiness, but referred to a different parameter: the timbre. The timbre modification in the suspended clarinet takes rise from a perfect integration between electronic and mechanical part. The clarinet confers to the incoming sound produced by the loudspeaker a consistent contribution in conformity to its physical-acoustic characteristics which is in turn modifiable either with changes in the pipe structure, by plugging/opening the holes, or extending the pipe past the bell with cardboard cones.

An interesting intervention on the instrument is carried out by the insertion of a cardboard frustum cone in one of the holes from which air is released with higher energy, and consequently with the loudest sound in terms of acoustic spectrum.

It is known that the clarinet holes differ from one to the other in size and spacing, and therefore the pipe reacts in a different manner to the various frequencies of excitation. The sound is irradiated through the different holes with a distinctive harmonic sequence: the lowest component emerges from the first open hole, the following five or six harmonics come out of the second and third hole, and the remaining part from the subsequent holes. The holes of wider diameter are comparable to the end opening of the pipe which consequently becomes shorter when the largest holes are opened; while the medium size holes shorten it to a smaller extent, and the smallest ones have only the function of exalting the highest modes of vibration. As a general rule, the initial part of the pipe before the first open hole plays a substantial role in determining the timbre; in fact it acts as a filter pass-high for the vibrations of highest strength, and therefore the first hole irradiates the lowest frequency (frequency cut) of such filter, while the energy of the highest frequencies is released by the next holes (it is known that the frequency cut can be modified by the musical instrument manufacturers in accordance with

elaborated schemes, taking also in consideration sizes and spacing of the holes. Generally, for a specific acoustic spectrum the larger are the holes and the clearer is the timbre due to the higher frequency cut. On the contrary, a darker timbre is obtained by smaller holes which lower the frequency cut).

In relation to the cardboard frustum cone, it comes obvious that the narrower opening of the cone matches the corresponding hole of the instrument. If, for example, a hole irradiates a low frequency of a definite timbre (not necessarily corresponding to the pitch heard) the insertion of the cardboard cone in such hole will probably have the effect of exalting it since the cone acts as a pass band filter; whereas the insertion of the same cone in a different hole might have the effect of exalting one or more higher frequencies of the same spectrum, so putting them in evidence. All that works in the same way as if it were used a magnifier lens on the sound which allows to hear some parts better than others, but according to physical-mechanic criterions and without using digital filters which can be obtained through electronic instruments. In fact, the cone is a family component of the so called "Bassel's trumpet" and along with a cylinder is normally used as a core for making wind instruments. It shoves all the even frequencies of resonance as regard to the fundamental and therefore, as in the case experimented on the suspended clarinet, it acts as an additional resonance box fitted to the instrument. Besides, the timbre of a wind instrument is rather strongly influenced by the core inside the pipe and by the openings or closures to its end more than by the material used to manufacture it. Therefore, considering that the internal hollows caused by the holes in the pipe make the entire structure more elaborated compared to the Bessel's one of simpler shape, and since such changes certainly bring their contribution to the sound configuration (even though the mathematic calculations become highly elaborated in this area); it follows that the insertion of the cone in a clarinet brings extra modifications to its core and on the timber pattern. A cardboard cone of about 30 cm inserted in the open end of the pipe, following the criterion above mentioned, causes a lengthening of the pipe (from 67 to 97 cm) as well as a substantial modification of the conic shape of its bell which normally acts as a filter high-pass for the low tunes, replacing in this way the lacking holes and at the same time assuring a sound timbric homogeneity to the tunes of higher registers. The cone inserted in the bell modifies the bell shape and acts on the natural timbre of the clarinet. To make successful the cone placement, it is necessary to close all the holes of the pipe and to act on the opening/closure of the end holes near the bell, thus achieving very interesting timbric variations. Another feasible intervention on the bell (there are many others, but I only mention a few of them) is made by moving up and down the hand's span over the bell in such a way as to obtain an effect similar to a damper "wha-wha" on the sounds which have a strong irradiation just in that area of the instrument (since the damper causes changes to the bell shape, it acts on the timbre of the instrument without modifying the tune which is related only to the first three quarter of the clarinet total length). Some of these changes have better performance when sound and air channelled in the suspended clarinet bring much energy, since a larger number of the highest frequencies with more significance are involved in the process. Even for this reason it was necessary to try many different adjustments before reaching the correct balance between sounding intensity, air energy and a definite physical and acoustic pattern of the instrument.

The author has initially carried out the experimental stage through systematic tests and then with free explorations in order to acquire a sound knowledge of the new instrument with reference to the typology of actions, the sounding material, and a consequential predictive capacity which is essential to the musical composition of the piece. The rehearsals conducted with the clarinetist Massimo Munari have allowed a check and a further examination of the instrument. Thanks to the improvised approach of the execution, in relation to the operation of microstructure, the performer was able to suggest the author some executive solutions which were later transcribed in the score.

4. IMPROVISE-ACTION

The opera *Il suono incausato* was termed an improvise-action by the composer to emphasize its contemporary character and, at the same time, the theatrical lay-out of the execution. The piece without the visual and the theatrical component cannot be understood in its wholeness; since the clarinetist plays a decisive role as far as the management of the sounding material and the temporal flow of events are concerned. The interpreter interacts with the instrument following an extempore modality which is restricted to three levels of interaction: the microstructure variations of the sounding material into the formal units; the timing or the duration choice of each formal unit; the action arrangement of theatrical character. The extemporaneousness of the piece promotes a more lively interaction between the suspended clarinet and the clarinetist; since the uncaused sound of the suspended clarinet suggests modes and action times on the instrument configuration, and the clarinetist's free actions can be conducted with the spirit of exploration and discovery. All the intervention levels on the clarinet are guided by written instructions in the score stating the range into which the interpreter ought to operate; so it could be possible to talk of an improvisation inside a prearranged formal scheme. Therefore, the score acquires the character of an outline which defines the more significant happenings as far as the form construction and the material connotation. The score is divided in 23 frames each describing the clarinet configuration, the typology of the clarinetist's actions, and the approximate duration ranges. The clarinet configuration is depicted in a precise way; while the clarinetist's action on the instrument is illustrated in an incomplete way to allow the executor a range of free intervention within each frame.

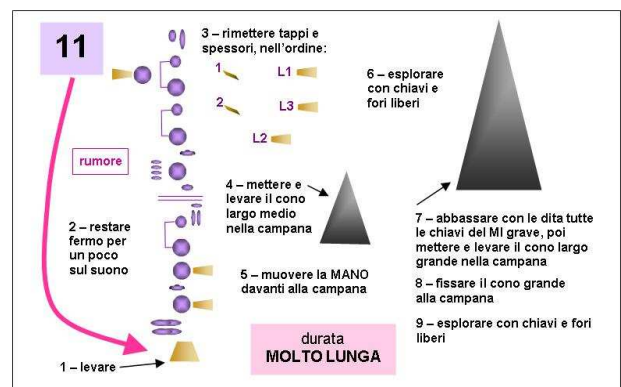


Figure 3. *Il suono incausato* – frame nr. 11 of the score.

5. CONCLUSIONS

Digital algorithms of simulation or elaboration of instrumental sounds are habitually used by the composers of today, including the author of this paper, to write musical operas defined as “electroacoustics” or with “live electronics”. In these cases the digital machine or the calculating algorithm is not characterized as a direct emitter of the acoustic signal; since it cannot be audible unless being previously connected to a DA conversion, and then to loudspeakers. In fact the electroacoustic chain, despite the considerable technological improvements of past decades toward the highest linear frequency response, still confers a final change to the sound due to the electromechanical type of its components. Therefore it imposes to the sound an “acoustic personality”, even if on a small scale. The electronic sound, even in a different extent according to circumstances, remains unrelated to its real source – the instrument – from an acoustic, visual and corporal point of view, and therefore it dwells in the virtual range.

The piece *Il suono incausato* is a model of intermedial art characterized by sounding, visual and theatrical components in which the sound is either electronic or acoustic; since it is produced by an extended instrument: the suspended clarinet which enters into a relation of dialogue and interaction with the clarinetist’s action. The suspended clarinet is not only an installation but a composition in which the music and the executive trait, the electromechanical instrument and the digital system of sound elaboration are perfectly integrated in a coherent structure.

6. ACKNOWLEDGMENTS

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7. REFERENCES

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