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CREAKING APPLES AND SINGING CHAIRS: ON COMPOSING WITH OBJECTS, ACTIONS AND SOUNDS

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In my two compositions *In Paradisum*¹ (2019) and *Empty Chairs*² (2018) I use objects—apples and chairs—and simple everyday actions—eating the apple and replacing the chairs. In both pieces, these actions control a computer patch that produces all kinds of sounds, and this combination results in a composition for objects, actions and sounds. My two pieces *In Paradisum* and *Empty Chairs* came forth from several questions. What are actions and objects to make music with, and what not? How do movements by the performer relate to what is sounding? And when all kinds of actions can be connected to all kinds of sounds, due to the use of electricity, how do I decide which connections to use? To elaborate these questions and thoughts on what kind of interdependencies I try to develop during my compositions I discuss and compare works by three other composers—Nicolas Collins, Chikashi Miyama and Joanna Bailie.

An important starting point for these pieces is what I would like to call ‘the origins of sounds’. These origins can be divided into three categories: the corporeal origins, the physical origins and the imaginary origins. I developed these categories because they are helpful for my compositional work with movements, sensors and sounds.

The corporeal origins can be defined as the movements by the musician causing the musical instrument to sound. With acoustic instruments this is obvious: a musician has to make movements to produce any sounds at all. These might be big movements, such as needed when playing the cello, or smaller movements, such as when playing the clarinet. Non-electronic instruments each demand a specific physical effort from the player (Craenen, 2014, p. 150). Controllers and instruments used to control electronic

¹ Some pictures of *In Paradisum* by Cathy van Eck: <https://www.cathyvaneck.net/in-paradisum/> (Accessed: 1/12/2021)

² A documentation of *Empty Chairs* by Cathy van Eck: <https://www.cathyvaneck.net/empty-chairs/> (Accessed: 1/12/2021)

sounds also demand a physical effort, albeit often with less constraints. In electronic music one can push a button or move a fader to trigger a complex sound. Additionally, the relationship between physical effort and resulting sound is not as linear (or even not linear at all) as is the case for acoustic instruments. Especially when using digital means, the same movement on the same controller could trigger a different sound, depending on how a computer or synthesizer is programmed. But also with these kind of set-ups the claim Craenen (2014) makes is valid: during sound production ‘the visibility of synchronous physical action [...] can augment auditory perception or push it in a certain direction’ (p. 150). The movements visually perceptible when someone makes music influences how the sound is heard.

The second category is the physical origins. These are the movements through which the sound itself is produced. For acoustic instruments these are, for example, vibration by strings, pieces of wood, columns of air, etc. With electronic means these movements are nearly always executed by the diaphragms of loudspeakers. For acoustic instruments these physical origins are often firmly coupled to corporeal origins. The physical origins are defined by the design of the instrument. To bring the instrument into vibration, and thus to produce sounds, is achieved by specific movements of the body of the performer. The corporeal origins are merely predefined by the instrument itself, and thus by the physical origins. It is hard to produce sound by blowing on a violin, and not easy to bring out many sounds by hitting a clarinet either. This is different for instruments using loudspeakers for producing sound: the corporeal origins are not prescribed by the physical origins, but can be designed in many different ways. The physical origins are always the same in electronic music: loudspeaker diaphragms vibrating according to an electric signal. As Thor Magnusson (2019) states, ‘the electronic or digital instrument *has* an interface, whereas the acoustic instrument *is* the interface’ (p. 35). For electronic music you can choose whether you want to blow, hit, or bow the sound. This is much less easy, if not impossible, with acoustic instruments. The same movement always results in the same sound. But as I will argue in this text, this unreliability of the relationships between corporeal and physical origins in electronic music is an appealing feature of composing for movements and sounds.

The third category is the imaginary origins. Especially in electronic music this category is of much importance. As mentioned above, the physical origins will always be the same loudspeaker vibrations, but the imaginary origins of these sounds can be manifold. When listening to sounds I might recognize different sound sources: I hear drops of water falling, someone breathing or footsteps passing by. Evidently I can never be sure how these sounds have originally been produced, and that actually does not matter much for my perception. As Michel Chion (2010) describes, these imaginary sound sources replace the real sound sources, which are the ways in which a sound has been produced (p. 45). It is easy to simulate the sound of a train with the help of small objects in front of a microphone. Conversely, train sounds could be processed unrecognizably in a piece (Chion, 2010, p. 31). The imaginary origins do not have to refer to already known and identifiable sounds. These can just as well be abstract synthesized sounds. The recognition of imaginary origins is of course partly dependent on the perception of the listener. Whereas one person might identify different sounds as being from the same imaginary source, another person might identify several different imaginary sources. For composers this is of course also one of the big advantages used in many compositions of electronic

sound: one can smoothly transform from one imaginary sound source to another. Many acousmatic pieces use this as a very important feature of their compositional technique. Composers such as Hildegard Westerkamp, Trevor Wishart or Annette Vande Gorne create all kinds of new imaginary origins, which can only exist in sound itself: a voice taking flight in *Red Bird* (Wishart, 1996, p. 166), falling raindrops becoming a musical rhythm (Norman, 2004, p. 80), or the buzzing of insects developing into a melodic line (Vande Gorne, 2021).

In the next few examples I would like to investigate how different compositions connect these different origins, and what kinds of compositional relationships these connections create.

1.1 Using an everyday set-up as the corporeal origin for sounds

In both my compositions I was interested in investigating objects and actions that have the least possible relevance in typical music practices. The objects used should neither be played expressively, nor be able to control electronic sounds in a virtuosic way; rather they should merely be used as they commonly are in their accustomed environment. I envisaged the idea of focusing on very simple actions and using them as the part of the set-up that controls the sound production. On instruments, whether standardized or newly developed ones, a performer can discover sounds and be able to practice, to control sound production very precisely, and eventually become a virtuoso. But I became curious about what would happen if I chose the opposite path: looking for an action that is not at all suitable for playing an expressive musical performance, which does not give me many possibilities for sound control and forces me to move in a certain way. For that reason, I chose eating an apple for *In Paradisum* and moving chairs for *Empty Chairs*. Both are actions with many possible associations. Besides being a very common fruit that is eaten worldwide, the apple has also a long cultural history. Eve in paradise, the judgment of Paris and the fairy tale of Snow White are a few examples. Chairs are very common furniture also used by many on a daily basis. The way chairs are positioned expresses a lot about how they are used. In a row, next to each other, in groups of two or in a circle; all these positions yield different associations of certain types of social gatherings.

A beautiful example of controlling electronic sounds with a very common everyday action is *In Memoriam Michel Waisvisz* (2009)³ by Nicolas Collins (Figure 1.1). In this piece Nicolas Collins uses the light created by the flame of a small candle to control electronic sounds. Michel Waisvisz was a composer and instrument inventor who worked a lot with all kinds of gesture and sensor interfaces, such as the *kraakdoos* (Dutch for cracklebox) (1974). The *kraakdoos* is played by making connections with the skin of your fingers between different parts of the circuitry. In his *In Memoriam Michel Waisvisz*, Nicolas Collins replaces the lively performer with a small candle, and the circuit is controlled by photoresistors that change their resistance depending on how much light they receive from the candle. Besides the candlelight getting closer the more of the candle has burnt down, the position of the flame also influences the sound. To change the position of the flame Collins uses a small fan. Four oscillators producing sounds that resemble

³A video of the work *In Memoriam Michel Waisvisz* by Nicolas Collins can be watched here: <https://www.youtube.com/watch?v=sBIIRdnPciw> (Accessed: 1/12/2021)



Figure 1.1: **In Memoriam Michel Waisvisz (version 2015)** by *Nicolas Collins* (video still) (Video: ©Henrik Jonsson, 2015)

the sonic character of a kraakdoos are controlled by the movements of the flame.⁴ As Nicolas Collins explains: ‘the reason that circuit sounds the way it does is that the four oscillators are tuned in rough unison and when the flame moves around in the field of the four photocells it is detuning each against the others’ (Collins 2021).

What makes the relationship between the movements of the flame and the electronic sound very strong is the connection of two phenomena which are commonly associated with two very different processes: the burning of a candle—an act reminiscent of the age before electricity—and sounds produced by oscillators—not possible without electricity. Evidently there is no such thing as a natural cause between the candle and the sound; here the electronic circuit design makes the analogue changes in flame and electronic sound possible. Even though the flame is of course not a human being, the movements of the flame can be regarded here as replacing the movements of a performer. Due to the synchronous changes in light and sound the corporeal origins of the sound seem to be the movements of the flame. A fascinating and poetic interaction between these two sources is the result.

Whereas the connection between the movements of the candle flame and the sound created by the oscillators is continuous, in my two pieces I used a less continuous connection between objects and sounds. I chose two discrete parts of the process of eating an apple for controlling the sound processing: biting into the apple (detected by a contact microphone placed upon the apple) and chewing an apple piece (detected by a contact microphone on a chewing muscle on my cheek). For the chairs the main parameter con-

⁴A description of a similar circuit can be found in Nicolas Collins’ book *Handmade Electronic Music* (2020, p. 100).

trolling the sound processing is whether a chair is moving or not. These movements are detected and sent to a Max patch on my computer by iPhones attached to the underside of the chairs.⁵ All these controls are either simple triggers (biting and chewing) or on and off (chairs moving or not). This kind of control could also be done by a simple knob controller. The difference would be in the constraints added to the movements of the performer by using these objects. Eating an apple asks for a certain amount of time, and whereas a knob can be pushed very often and quickly, each bite of an apple needs a certain amount of chews to be swallowed. Chairs are bulky objects, and carrying and shoving them around also requires a different timing than pushing a button on a controller. The timings of these everyday actions become obligatory musical timings in my compositional process.

1.2 Changing the mapping between the corporeal origins and the imaginary origins

In *In Memoriam Michel Waisvisz* the movement of the flame controlled a different electronic circuit, and therefore completely different sounds. The relationship between corporeal origins and imaginary origins can easily be changed, especially when software is used instead of hardware. A good example of these kinds of changes in mapping between controller and synthesizer can be found in the piece *Black Vox* (2009) by Chikashi Miyama.⁶ He developed his own instruments because he is ‘not so attracted by traditional instruments such as piano or flute, because they are too biased towards the existing musical scale’ (Miyama, 2020). He constructed the Peacock, an instrument with 35 infrared sensors that control more than 300 synthesizer parameters in a PureData patch. The patch is a phase-bash-algorithm-based synthesizer (Miyama, 2010, p. 381). For physical instruments, parameters such as spectrum and pitch or volume and pitch are often coupled to a certain degree. Playing louder on a piano changes not only the loudness, but also the spectral characteristics of the sound. In Chikashi Miyama’s instrument seven sensors in a row control one voice of the synthesizer, resulting in a maximum of five voices. Changes in distance to the performer’s body will make their output value lower or higher (p. 382). All kinds of parameters of the synthesis process can be shaped by the hand and arm movements independently.

What makes Miyama’s set-up significantly different from conventional instruments is that the mapping between body movements and sounds changes during the performance. The same hand movement will yield different results at the beginning, in the middle or at the end of the piece (Miyama, 2010, p. 382). The imaginary origins thus change, although the corporeal origins stay the same. This change of mapping is based on a timeline. Miyama can follow a score in his Pure Data patch, which lets him know both where in the piece he is and what the current mappings are (Miyama, 2020). Due to

⁵There are actually two short moments in the piece where the movement of a chair is controlling an oscillator continuously. This is done by tilting the chair, whereas during the rest of the piece the chairs are carried or shoved. There are also some sections in which the microphone is picked up by the performer and also used to trigger sounds. These sections are omitted from this article for clarity.

⁶A video of *Black Vox* by Chikashi Miyama: <https://www.youtube.com/watch?v=QX1y3v3tk4w> (Accessed: 1/12/2021)



Figure 1.2: **Empty Chairs** by *Cathy van Eck* (Photo: *Marije Baalman*, 2019, CC BY)

the fixed relationships between body movements and sounds in combination with the fixed timeline for the change of these mappings the piece can be rehearsed and every performance will be pretty similar.

The relationship between the performer's movement and the resulting sound—and thus between corporeal and imaginary origins—changes too during *Empty Chairs* (Figure 1.2). I mainly place three chairs in different positions on stage. In the beginning I position the chairs similar to how one would place chairs in a space used for a conference. During the piece the chair positions signify other social gatherings: placed close to the audience, or all three next to each other at the back of the stage, or two together and one alone—and by the end of the piece the three chairs form a circle. These different set-ups of the chairs control completely different sonic structures. In the beginning of the piece the sound of my footsteps is recorded every time I pick up a chair (the movement of the chair triggers the recording to start). When the chair is put on the floor again (and thus stops moving), this recording is played back at irregular intervals through the loudspeaker attached to the chair. The origins of these footsteps recordings are easily identifiable here, since the production has just been heard and seen before. During the piece the movements of the chairs control all kinds of different sound processes, starting with sounds close to the chairs itself, such as the sounds of chairs being shoved, but soon moving away from that recognizable sound by changing the parameters of a polyphonic sampler of more abstract

sounds, and ending with acoustic feedback. The corporeal and imaginary sources diverge more and more during the piece. In many instrumental pieces the performer's movements can be heard in the sound. The corporeal origins are therefore often mirrored in the imaginary origins: fast body movements result in fast-changing sounds, slow movements in slow-changing sounds. In contrast to this instrumental practice, the sounds I control in *Empty Chairs* change much more than my actions would suggest. The imaginary origins are manifold, compared to what one would expect from the corporeal origins.

1.3 Composing structures for imaginary origins of sounds

The interweaving of different kinds of imaginary origins can be found in many of Joanna Bailie's compositions, for example 'Artificial Environment 5' from the piece *Artificial Environments 1-5* (2011).⁷ As in many of her compositions, Bailie uses field recordings in combination with live playing of instruments in this piece. She describes her way of combining field recording with instruments as being based on '[...] a kind of Cageian/Duchampian belief in the power of *framing*, the act of transforming real-life non-art into art through placing it in an artistic context or by just seeing or hearing it in a different way' (Saunders, 2012). At the beginning of this part I recognize cheerful barrel organ music and the noise of happy children's voices. But then the sound of bells starts passing by in a similar rhythm to cars on a road. Since the former movement of the piece, 'Artificial Environment 4', starts with clearly recognizable recordings of cars passing by, my ears are already trained for this sound. I therefore easily recognize the car-passing rhythm in the bell sounds. These sounds are accompanied by acoustic instruments, which are often playing downward glissandi, similar to a Doppler effect, and therefore enhancing the effect of a car passing by. Pretty soon, though, I not only hear bells passing by as if they were cars, but also the barrel organ I heard before, and I seem to recognize some car horns. Then the rhythm returns to the barrel organ once more.

Listening to this mixture of very precisely composed sounds I am in constant doubt of what I am listening to. This sonic amalgam can only be created through sounds themselves; I can hear sonic events through structures that seem remnants of other sonic events. When listening to this piece, I find myself oscillating between first being able to categorize or recognize what I hear, and then not. It would be impossible to compose any corporeal origins for these imaginary origins. In my view, these 'imaginary sound sources' (Chion, 2010, p. 45) would immediately be reduced in their compositional possibilities and perceptible interpretations by 'the visibility of synchronous physical action' (Craenen, 2014, p. 150). To come back to the citation by Paul Craenen at the beginning of this text, in this piece, the corporeal origin would diminish the auditory perception and impoverish the acoustic fluidity of the sonic materials.

In *In Paradisum*, on the contrary, I try to work with these impoverishing qualities of the performer's movements: all kinds of different sounds are connected to one simple movement: chewing. Starting with just amplifying the common sounds of chewing an apple with every new bite in the apple, other imaginary origins appear. At the beginning

⁷A video with score of *Artificial Environments 1-5* by Joanna Bailie: https://youtu.be/UWrsqDSL_eU (Accessed: 1/12/2021). The piece contains many more elements than described here. An important element is a spoken voice, which I left away in my analysis since it is not used in this particular fragment.

of eating the apple these are barely audible soft-pitched sounds, but during the performance the apple chews get many different kinds of imaginary origins: they are loud and percussive, or long filtered noises. The changes in the corporeal origins are minimal: I chew a bit more regularly when triggering the percussive sounds, or I chew more slowly when triggering the long filtered noises. One of the main aims of my composition is to compose this discrepancy between the movements of the performer and the resulting sounds. By creating essentially simple movement-sound relationships (every bite is a change in imaginary origin, every chew is a new sound) the changes in this relationship become my main focus. These ambiguities between what is heard, what seems to have caused the sound, and what is visually happening are all part of composing connections between corporeal and imaginary origins. How can the same movement be connected to completely different sounds? How musical can chewing an apple become? By composing relationships between objects, actions and sounds I try not to answer these kinds of questions. I try to raise these doubts through composing the origins of the sounds.

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