15. The Ephemeral Materiality of Sound

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Can sound be considered material, even though it is often characterized as ephemeral and intangible? If we take Adam Drazin and Susanne Küchler's definition of material as a starting point, it may seem as if sound is not a material. According to Drazin, materials are specific categories of matter (xxxvii), with matter considered to be all the stuff around us, consisting of atoms and molecules. Sound can be considered the vibration of molecules, usually air molecules, but sound does not consist of these molecules themselves. Instead, sound is the act of vibration rather than a material that consists of atoms and molecules. In other words, sound is energy that makes materials like air vibrate.

Sound, however, does appear to have materiality. Christopher Cox defines sonic materiality as sound's "texture and temporal flow, its palpable effect on, and affection by the materials through and against which it is transmitted" (149). This definition is compatible with Tim Ingold's definition of materiality as the quality of something that manifests itself in the physical world ("Toward an Ecology" 439). Sound can make things happen and enable things to vibrate. As a result, even though sound as such is not material, it does have materiality. Sound itself seems intangible, but it can affect and make other objects and things vibrate, including human listeners. Sound is vibration, which is a temporal phenomenon, and the manner in which these vibrations manifest themselves as resonances constitutes the materiality of sound.

This almost paradoxical nature of sound and its materiality pose particular challenges for those who work with sound. Traditionally, composers have not worked with, or sculpted, sound directly. Instead, they used, and many still use, musical notation to create their musical works. As a result, they do not engage with actual sounds directly but work with visual representations of sounds. Only since the development of recording techniques have musical creators been offered the opportunity to work with and on sound more directly by manipulating recordings of sound.

Digitization has offered musical creators further possibilities to interact with sound in a far more direct way. When working with software programs that allow for sound manipulation, musical creators may experience the sensation of almost literally touching sound. The gestures with which these manipulations are executed

result in a particular affective relationship between musical creators and the sounds they work with.

Moreover, digital technologies have radically changed the material nature of sound. Sound can be considered an intangible thing, where "thing" is conceived "not of an externally bounded entity, set over and against the world, but of a knot whose constituent threads, far from being contained within it, trail beyond, only to become caught with other threads in other knots" (Ingold, "Bringing Things" 4). As a thing, sound leaks, is an excess, and transcends categorization. Digitization, however, has turned sound into a tangible object that can be categorized, manipulated, and understood relatively unproblematically. Sound has become a "completed form" (Ingold, "Toward an Ecology" 439) that can be controlled. As a result, digitization has changed and expanded the affordances of sound for musical creators.

An example of a digital device that has changed the affordances of sound is the Tasty Chips GR-1 granular synthesizer. GR-1 is a sample-based digital device that allows users to load audio samples, feed live audio through it, and manipulate it by dividing it into smaller parts or grains. This process is called granulation and allows for changing the audio in ways that "still represent the original sample to a completely mangled and scattered manipulation of the original. Imagine what it would sound like if you heard thousands of little sound particles (grains) swarming around to reconstruct any sample you present to it [sic]. Depending on what source sample you want to use, results can be lovely, soft, and soothing but also chaotic, aggressive, and unpredictable and everything in between" ("GR-1 Granular synthesizer"). Granular synthesis, which is a digital technology, enables the manipulation of sound in many predictable and less predictable ways.

The YouTube review and tutorial of the GR-1 synthesizer done by Loopop in 2020 offer a good introduction to what this device is capable of and how to operate it. The video begins by providing an overview of the interface of the synthesizer. This interface enables a physical, embodied interaction by the user between the sounds that are created and the users' bodies, with embodied interaction understood as the creation, manipulation, and sharing of meaning through physical relations with artifacts (Dourish 125). An interface is a boundary between two areas or systems (Chatzichristodoulou and Zerihan 1). In the case of GR-1, the interface consists of a screen, twenty-five buttons, fourteen knobs, and eight sliders that together act as a boundary between the algorithms the synthesizer's firmware consists of and its user. This interface enables physical interaction through particular movements called gestures, which are physical actions through which human subjects structure their environment (Leman and Godøy 4) between the sounds and the users' bodies. At the same time, however, all interfaces put constraints on the kinds of choices their users can make.

When looking at the layout of the interface of GR-1, it immediately becomes apparent that the screen is a critical element. This screen enables the visual represen-

tation of the sounds processed in GR-1 and provides the user with visual feedback. Users can see their actions on the sounds, which helps them make musical choices. Between 1:40 and 2:30 in the Loopop video, for instance, the reviewer selects fragments of sound by moving the large horizontal slider located under the screen and, at the same time, looking at the screen, which displays both the waveform and the fragment that is currently selected by moving the slider. Listening seems to play a negligible role in this selection process. As GR-1 allows for the manipulation of sound through a visual representation of sound, the focus seems to be on what can be seen rather than what can be heard. In other words, what users of GR-1 actually manipulate via the device's interface are visual representations of sound in time. Nevertheless, GR-1 enables the manipulation of sound in ways that were impossible before, which is done via embodied interactions with the interface.

In the Loopop video, an example of creating new sounds with GR-1 can be found between 12:29 and 13:29, where the sound of a glass being tapped is transformed into a grainy drone sound. With the aid of GR-1, a short, high-pitched sound has been turned into a sustained, washy soundscape. As a result, the materiality of the sound has changed as well. After all, how a short, high-pitched sound vibrates radically differs from how a grainy, sustained drone sound resonates. The materiality of these sounds, considered as resonances that can be felt, has different affective qualities, with affection understood as the inducement of autonomous bodily reactions when confronted with another entity (Massumi xvi). Sound has these affective qualities not because it represents or signifies something other than itself but because of what it does, how it operates, and what changes it effectuates (Cox 157).

These affective qualities of sound, in turn, are responsible for the performative potentiality of sound, that is, the capacity of sound to instigate a change in the users responsible for creating that very same sound. Therefore, when operating GR-1, two kinds of movement are at play: the conscious movements of users to create sounds by interacting with the interface of GR-1 through gestures and involuntary movements induced through affection by the sounds that are created. Since sound has these affective qualities because of its materiality, its performative potentiality is also a result of its materiality.

The fact that granular synthesis, the type of synthesis that the GR-1 is based on, enables the manipulation of sound in previously impossible ways also results in new affective relations between these sounds and their creators. New sounds entail new vibrations and thus new sonic materialities offering new affective potentialities. Digital technologies thus expanded the possibilities to create new sounds and evoke new sonic affections.

However, expanded possibilities do not automatically imply expanded control. Often, the results of interacting with sound through digital devices such as GR-1 are, to an extent, unpredictable, despite the control the interfaces of these devices seem to suggest. Even when digitized, sound retains its thingly character, a character that

Bill Brown describes as a "story of a changed relation to the human subject and thus the story of how the thing really names less an object than a particular subject-object relation" (4). Sound remains able to both problematize and make explicit the relation between listeners and sound through its potential to leak, subvert, surprise, and transcend categorization.

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