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Anne Phillips
(Photo by Judith Kirtley)
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How will it resonate with and respond to the Hudson River sound map being made by Mark Sciuchetti in summer 2017? How do the particular sites a composer records affect the story that is told? How does Sciuchetti's sound map compliment, complicate, reinforce, or refute the overwhelmingly pleasing soundscape Lockwood composed? What story will he tell? In light of the constantly changing nature of a river, can there ever be a complete sound map? These questions will drive the second article.

NOTES

[1] Lorraine Anderson, ed., *Sisters of the Earth*, second edition (New York: Vintage Books, 2003).

[2] I'm grateful to musicologist Sabine Feisst for calling my attention to the 2010 exhibit at the Thomas Cole National Historic Site named "Remember the Ladies: Women of the Hudson River School," which introduced me to ten painters and ultimately provided me with the painting by Harriet Cany Peale that became the cover of the *Skillful Listeners* book.

[3] Bonnie G. Smith, *The Gender of History: Men, Women, and Historical Practice* (Cambridge, Massachusetts: Harvard University Press, 1998).

[4] See Carol J. Oja's book *Making Music Modern: New York in the 1920s* (Oxford, England: Oxford University Press, 2000), 28, and her chapter titled "Creating a God: The Reception of Edgard Varèse" for a discussion of Varèse's "political acumen that was to serve him well over the years," 28-29.

[5] It is worth noting that in 1918, the same year Varèse began *Amériques*, twenty-five-year-old Leo Ornstein was the subject of a biography written by Frederick H. Martens. His impact was so great as to warrant it.

[6] Varèse was a focus of the chapter "Urban Places: Iconic New York" in *The Sounds of Place*, and I wrote an essay on his work *Déserts* titled "'Empty Spaces': The Conceptual Origins of *Déserts*" for the book *Edgard Varèse: Composer, Sound Sculptor, Visionary* (UK, Woodbridge: The Boydell Press, 2006).

[7] For my introduction to this phrase, see Doris Kearns, "Angles of Vision." In *Telling Lives: The Biographer's Art*, edited by Marc Pachter, 91-103. Philadelphia: University of Pennsylvania Press, 1985.

[8] If there is a single thread that pulls through my scholarly life it appears to be that I leave a lot of things to finish later!

[9] Larsen's comments come from personal interviews with the author over many years of the biography project. For their full context readers are encouraged to consult *Libby Larsen: Composing an American Life*.

[10] Leo Ornstein was still alive when Michael Broyles and I began our biography of him in 1998, but he died at 108 years of age soon afterward. We had one in-person interview with him, but most of our personal interactions were with his son, Severo, and daughter, Edith, and extended family members. Given the distance in time between Ornstein's glory days in the teens and twenties and our writing the biography in the early twenty-first century, there was no real opportunity for us to become part of his story except perhaps as part of those interested in bringing him back to life.

[11] In 2012 Sabine Feisst and I were founding co-editors of the *Music, Nature, Place* series at Indiana University Press, part of an effort to provide a forum for scholarly publications in this field.

[12] I'm grateful to the composer for a lengthy telephone conversation, August 10, 2017, during which time she responded to dozens of questions that I had mailed to her earlier. Lockwood's responses are quoted with her kind permission.

[13] Annea Lockwood's note to *A Sound Map of the Hudson River*, Lovely Music, Ltd. LCD 2081.

[14] Lockwood changed that practice with her *Sound Map of the Danube* project. That CD contains interviewees' voices and a large fold out map of the places she'd recorded. In effect, the Hudson River Sound Map CD is only half the length of the original installation because of the absence of the people's voices.

[15] Email correspondence from Annea Lockwood to author, August 6, 2017. Quoted with the composer's permission.

[16] Lockwood's phrase. Telephone conversation with the composer, August 10, 2017.

[17] When I shared with Ms. Lockwood that I repeatedly attempted and failed to locate where the splices occurred, she was pleased no end. Telephone conversation with the composer, August 10, 2017.

[18] A hydrophone is a submersible microphone designed for optimal performance within a dense watery environment.

[19] Ibid.

[20] Telephone conversation, August 10, 2017.

Notation Strategies for Sound-Based Electronic/Acoustic Music

SARAH REID

Introduction

Consider, for a moment, that you have been asked to compose a new quartet for trumpet, cello, modular synthesizer, and laptop computer. How might you approach such a task? In comparison to a purely acoustic ensemble, the compositional palette afforded by mixed electronic/acoustic instrumentation is greatly expanded: electronic instruments are capable of synthesizing or reproducing virtually any sound you can imagine. However, along with an expanded range of sonic possibilities comes a number of interesting challenges and questions: What does a musical score for a mixed electronic/acoustic ensemble look like? How do you notate these new, unconventional, or electronically synthesized sounds? Do the acoustic musicians use one notational system, while the electronic musicians use another, or is a more integrated approach conceivable?

This article is the second in a three-part series focused on the integration of electronic and acoustic instruments in composition and performance. This installment will begin to address the aforementioned questions, and will provide ideas and strategies for composing with instruments and ensembles that fall outside the traditional acoustic realm. We will begin by loosely defining notation, for the purpose of providing some context to our discussion, and will look at a number of different forms and functions musical notation can hold. To deepen our discussion, we will then look at a few innovative musicians working with unconventional instrumentation and notational systems, unpack their approaches, and discuss their strategies. The article will conclude with an overview of my own approach to composing for hybrid electronic/acoustic ensembles and instruments, along with a few score examples.

The first article in this series discussed the practice of improvisation as a means by which to approach a collaborative electronic/acoustic performance practice. Additionally, the article presented a brief history of electronic music, and discussed a number of fundamental differences in approach between electronic and acoustic instruments.[1] As before, the approaches discussed in this article are experimental in nature, and are presented in order to offer a range of ideas and techniques to serve as the basis for further exploration. My goal is to provide a cursory look into the world of collaborative electronic/acoustic practice with the hope

to inspire and spark further curiosity and inquiry into this area.

What is Musical Notation?

In its simplest form, notation can be understood as a means by which to communicate musical ideas and information. In the Western world we are perhaps most familiar with a 5-line staff, and a basic vocabulary of symbols to delineate pitch, duration, and articulation, among other parameters.[2] But musical notation can take many forms and serve many purposes. For example, Pauline Oliveros's *Sonic Meditations* are scores that use a text-based notation. At times these scores are detailed and lengthy, while at other times they are no more than a single sentence long.[3] For a composer of early tape music, a musical score might be a detailed record of sound sources, tape segments, splice points, and timings (as in *Williams Mix* by John Cage).[4] Indeed, non-traditional notation is certainly not a new practice, and it can be employed for many purposes. Author and music historian Thom Holmes remarks:

> It is interesting to note that even in this early stage in the development of electronic music…some composers insisted on scoring a structure for this material. Was the purpose of the score to allow others to reproduce the work independently of the composer? Or was it merely an organizational aid for the composer who was trying to assemble a complex matrix of many sound objects into what might be called a composition?[5]

In selecting one's notational toolkit, it is useful to consider notational function rather than form alone. The 5-line staff, for instance, is most commonly employed to document and communicate specific organization of rhythm and pitch to one or more instrumentalists for a live performance to take place. The use of such notation in this scenario makes the music relatively quick and efficient to learn and allows for consistent repeatability even with entirely different musicians. However, as evidenced by the work of Oliveros, Cage, and many others, emphasis on pitch and rhythm as determinate musical features is not the only option, and as such, the 5-line staff is not the only viable notational form. This and other possibilities for the form and function of notation include:

1. Notation that serves as instructions on how to execute or reproduce a piece of music. This may take the form of the 5-line staff; a circuit diagram that can be used to build a particular tool or instrument required for the piece (as in David Tudor's *Rainforest IV*,[6] or Douglas Leedy's *Entropical Paradise*[7]); a description of how a particular computer program or process functions (*In The Beginning I [Electronic]* by David Rosenboom[8]); or literal instructions for the performers and/or audience (such as Alison Knowles's "Make a Salad"[9]); and so on.

2. A document or record of a performance and/or compositional process, particularly for fixed media and other pieces in which notation is not required for a live realization to take place (Karlheinz Stockhausen's *Studie II*).[10]

3. A framework for analysis and/or guided listening (such as Rainer Wehinger's listening score for György Ligeti's *Artikulation*,[11] and Heinrich Schenker's analytical notation system).[12] Of particular interest here is the fact that entirely different notational systems may be employed depending on one's role (performer vs. listener) in the piece.

4. A conceptual meeting place or common ground for musical conversation. Certainly, the most subjective and open-ended example, notation of this type is often intended to provide an inspirational spark—a jumping off point—or to provide some kind of form or structure while maintaining an element of spontaneity and improvisation (as in Wadada Leo Smith's *Pacifica*).[13]

As this sampling of possibilities shows, not all notation has the same end goal, but in all cases there is some kind of transfer of knowledge, idea, or inspiration. Over time, as instrument technologies (like adding valves onto a trumpet) and compositional practices have developed, the language of Western notation has likewise expanded to facilitate these new techniques and sounds.[14]

This notational language, however, is only optimal for highlighting particular characteristics of sound. What about all the *other* sounds in the world—those naturally occurring in our environment, produced by new and unconventional instruments, or synthesized electronically? Using traditional approaches, we are equipped to notate a sustained E-flat with a sharp attack and a sudden decay in loudness, but what if we want to hear a fuzzy, intermittent sound, or a squishy sound? Perhaps there is not a traditional acoustic instrument equipped to make the sounds you want to hear. In current practices, one could conceivably use electronic instruments to create these sounds, but as of now there is no universal way of notating for these instruments—nor for these types of sounds. Why is this so?

Less than a century ago, most tools for the creation of electronic music were large, cumbersome, immovable machines only

"Listening to Ladies" by Elisabeth Blair

"Listening to Ladies" is a podcast which first aired on September 26, 2016. The episodes feature excerpts from interviews with composers who are women, interwoven with excerpts of their music. Interviewees include established, emerging, and under-recognized composers from the USA, Canada, Argentina, Israel, Iran, Scotland, England, and Australia. Each interview covers two main themes: the composer's experience of being a woman in this field, and the composer's music and aesthetics. The episodes run an average of 25-30 minutes. Thirteen episodes have been released as of October 2017. The podcast is produced from start to finish by Elisabeth Blair, including research, conducting and recording the interviews, and maintaining the website and social media presence.

Contemporary living composers thus far featured in this series include the following from the USA: Beth Anderson, Elizabeth A. Baker, Augusta Cecconi-Bates, Sakari Dixon, Kaley Lane Eaton, Lainie Fefferman, Whitney George, Mara Gibson, Dorothy Hindman, Mari Kimura, Jessie Montgomery, Andrea Reinkemeyer, Marga Richter, Judith Shatin, Kate Soper, Ingrid Stölzel, Dolores White, Pamela Z. From other countries: Aftab Darvishi, Iran; Emily Doolittle, Canada/Scotland; Djanit Elyakim, Israel; Bobbie-Jane Gardner, England; Lauren Sarah Hayes, Scotland; Anna Höstman, Canada; Jenn Kirby, Ireland; and Nicole Murphy, Australia. An interview has also been conducted with Karla Hartl on the historical composer Vitezslava Kapralova (with additional future episodes on historical composers being planned). Upcoming interviews will take place with Reena Esmail, Patricia Martinez, Renee Baker, and Eleanor Alberga.

available to a very narrow population of composers and musicians.[15] Because rendering electronic compositions was seldom a real-time process, sound-based electronic music did not develop initially as a performance genre, and the need for a notational language by which to communicate to external performers was not particularly urgent. Now that the compositional sound palette has greatly expanded, and electronic instruments are so much more accessible to composers and performers alike, is it our responsibility to develop a similarly expanded system of notation? If so, how?

Developing a notation system that accounts for every discrete sound we encounter or are able to synthesize is certainly impossible, as there are infinite sounds. Even if we were able to define a unique symbol to represent every sound, the task of learning and mastering this notation would be impractical. Some alternatives include:

1. offering a technical reference, a recipe by which a sound can accurately be produced;

2. decomposing the sounds into a set of perceptual parameters (e.g., pitch, loudness contour, complexity of timbre), and notating the individual components, forming a sonic taxonomy;

3. abandoning symbolic notation altogether and instead using text or extramusical references to name or describe the desired sounds;

4. altering our approach to focus on notating more general or conceptual parameters of the music.

It is important to remember that at the heart of this discussion is sound. What is the sound you want to hear? How can you most effectively achieve that sound? Is notation even necessary? If you are imagining a pulsing rhythm, with cleanly articulated punctuations spanning a specific range of pitches, I would most certainly recommend utilizing traditional notation. The tools and vocabulary already exist to notate those features precisely. If, however, the sounds you are imagining are the creak of a wooden floorboard gradually transforming into a small voice coming from within a tin can, you might find one of the above strategies to be more effective.

The following section will introduce three different musicians working with unconventional instrumentation and primarily timbre-based music, each with his or her own unique approach to notation and communicating musical ideas. Entire books should be dedicated to these individuals to properly unpack and analyze their work and contributions, but for this article we will begin with brief overviews and references for further reading.

Daphne Oram - Oramics

Daphne Oram was a pioneer in electronic music and synthesis at large. In the late 1950s, she invented a machine called Oramics that could synthesize sounds from drawings.[16] The machine analyzed hand-drawn graphs to synthesize the sounds she wanted to hear—utilizing not a symbolic representation or abstraction, but a precise drawing of sound's fundamental waveform. Oram would then draw out each parameter of the sound on individual strips of 35mm film, such as pitch, envelope, and vibrato. These graphs were fed through the Oramics machine with a conveyor belt-like mechanism, scanned with light-sensitive resistors, converted into electronic signals, and eventually used to synthesize sound.[17] Oram invented this machine long before computers and analog synthesizers were commercially available—a truly remarkable innovation.[18] The notation that Oram used fits most closely with the first aforementioned "alternative" to notating sound: offering a technical reference, a recipe of sorts by which a sound can accurately be produced. On speaking about her motivations for building the Oramics machine, Oram says: "I am interested in being able to manipulate every subtle nuance of sound. There is no system for notating electronic music…What one has to do is pick out each parameter separately. You need to have a graph for how loud it is at any particular moment and how the vibrato is giving a wavering to the pitch."[19]

In certain respects, Oram's approach is similar to traditional notation, insofar that it defines every parameter of the sound: the pitch, duration, attack, vibrato, and so on. The main difference is that her approach was to notate the exact visual form of the sound as opposed to symbolic references to performance techniques. Oram organized her notation by breaking it into numerous horizontal lines and assigning one component of the sound to each lane. This approach and layout is still very common today in digital audio workstations such as Ableton or Pro Tools, with piano roll-style MIDI editors and automation lanes for effects such as reverb.[20] Although many aspects of Oram's work persist today, the Oramics machine itself was never commercialized. Even so, Oram "succeeded in transcending one of the major obstacles to composing electronic music at the time—writing or notating ideas for synthetic sounds that could be faithfully reproduced by a sound-generating instrument."[21] A further point of consideration is that Oram's notation was never intended to be realized by human performers. The Oramics machine functioned as dual instrument-performer, with Oram at the compositional helm.

Lasse Thoresen - Spectromorphology

The first article in this series provides a brief introduction to the development of tape music and *musique concrète*.[22] As more and more composers were starting to work with magnetic tape to create fixed media pieces, Pierre Schaeffer, pioneer of *musique concrète*, began to author an extremely specific method by which to organize and categorize "sound objects."[23,24] Other composers of the time, however, were more interested in creating "intuitive" music, and as a result Schaeffer's approach was never standardized.[25]

A direct extension from the work of Schaeffer, Lasse Thoresen's Aural Sonology Project seeks to categorize sounds into spectra, scales, and species as a basis for analysis.[26] Spectromorphology, originally coined by Denis Smalley, refers to the study of sonic spectra and their evolution over time.[27] The Aural Sonology Project has extended Spectromorphological practice by introducing an analytical notation system, with the intention of gaining insight into form and structure in the perception of timbre-based music.[28] Unlike

Tania León and The Little Rock Nine

Tania León has been commissioned by the University of Central Arkansas to write an opera about the nine courageous African American students who integrated Little Rock Central High School 60 years ago despite a defiant governor and racist mobs. The university commemorated the anniversary of the event with a performance of excerpts from León's not-yet-completed opera. For additional information, see Michael Cooper's lengthy article, "An Aria for the Little Rock Nine," in the *New York Times* (October 2, 2017).

Oram's notation, which was entirely literal (the waveform drawn is the exact waveform sonified), Thoresen's notations are symbolic. Because this notation is used for analysis of timbre-based music, pitch and rhythm are treated as relative parameters. As such, focus is placed on defining pertinent features of a sound's timbre and its evolution in time. This method of notation fits most closely with the second aforementioned "alternative" to notating sound: deconstructing the sounds into a set of perceptual building blocks (e.g., pitch, loudness contour, complexity of timbre), and notating the individual components, forming a sonic taxonomy.

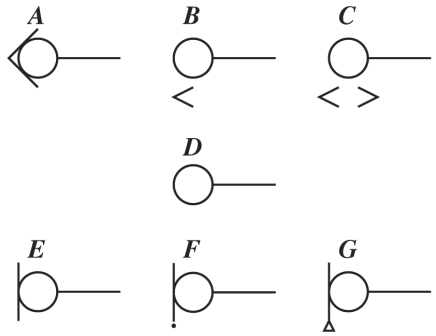

Fig. 1. The spectrum of onset phase genres: A) no detectable onset; B) gradual onset; C) swelled onset; D) flat onset; E) marked onset (accented onset); F) sharp onset (heavily accented onset); G) brusque onset (forceful, abrupt onset).
(Image courtesy of Ryan W. Gaston.)

A spectromorphological analysis might include defining the attack of a sound relative to a predefined spectrum of "onset phase genres," such as sounds with a swelled onset, marked onset, or no identifiable onset. Figure 1 illustrates a pure tone (represented by a white circle) with seven different onset phase genres, arranged in a spectrum from softest to hardest onset. The horizontal prolongation line extending from the circle is an indication of the tone's duration.[29]

A spectromorphological analysis might also include the definition of a sound's "spectral gait": its variation in relative brightness and darkness over time. Figure 2 illustrates a few different examples of this concept. In these examples, the black square denotes a complex sound with a highly dense inharmonic spectral structure. Such a sound has no identifiable fundamental pitch. The line extending upward from the black square terminating in a parenthetically-contained white circle indicates the presence of an accentuated region within the complex sound's spectral structure. Ornaments placed on this white circle's prolongation line indicate variation in the region of spectral focus; the two dots on either side of the prolongation line indicate that such variation is periodic and continues until otherwise noted.[30]

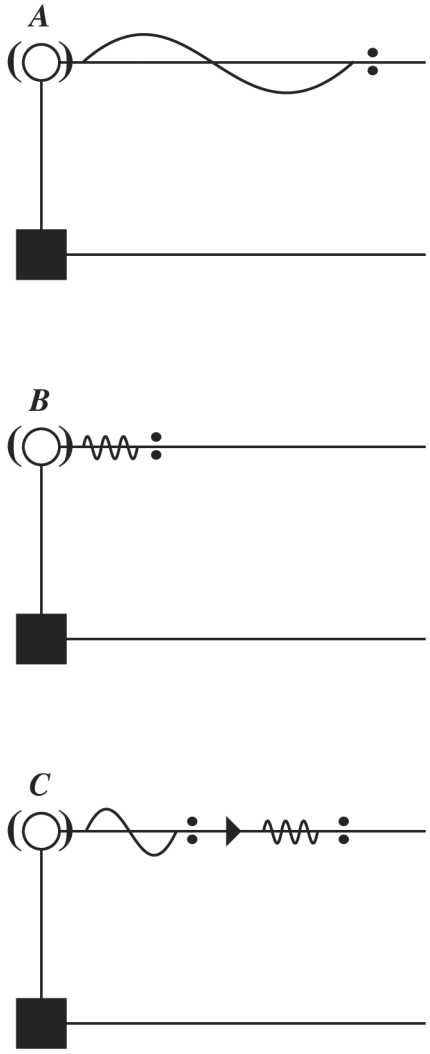

Fig. 2. Examples of spectral gait: A) A complex, sustained sound with slow, relatively broad spectral gait; B) A complex, sustained sound with rapid, but narrow spectral gait; C) A complex, sustained sound with spectral gait that increases in speed while decreasing in intensity.
(Image courtesy of Ryan W. Gaston.)

There are, of course, many other characteristics of sound addressable by this notation system. It is interesting to note that Thoresen's spectromorphological notation was constructed for analytical use, and not for musical composition or performance. However, because it is concerned with addressing qualities of sounds themselves without concern for how they were produced, its concepts could prove useful in developing a notation system for sound-based music that is applicable to all instruments.

Wadada Leo Smith - Ankhrasmation

Unlike the two previously-discussed approaches to notation, which break down sound into objective building blocks, Ankhrasmation is an intentionally subjective and enigmatic musical language. This approach, developed over many years by Wadada Leo Smith, falls into the final aforementioned "alternative" to notating sound: altering our approach to focus on notating more general or conceptual parameters of the music.

At the core of Ankhrasmation is the relative relationship of rhythm and sound, organized into shorter and longer groupings called Rhythm Units. These are not rhythmic patterns as we may be familiar with in traditional notation, but instead are structural markers for how the music of one moment relates to another: this is long, this is a little longer, and now this is shorter, and so on. There is no metronome or meter to maintain these rhythmic relationships—it is the responsibility of the performer and ensemble to stay true to their own internal understanding of long and short relative to the notations they see on the score. This kind of relative relationship appears in other aspects of Ankhrasmation, such as velocity units and pitch range. In an interview with Wadada Leo Smith, author Lyn Horton summarizes the concept of Rhythm Units as follows:

> Rhythm Units are non-metrical and therefore no counting is needed, but a keen sense of proportional measurement that is connected with the motion of the musical elements is a performance. The rhythm-unit concept is one that accepts a single sound or rhythm, a series of rhythm-sounds or a grouping of more than one series of rhythm-sounds as a complete piece of music.[31]

Also at the heart of Ankhrasmation is an emphasis on imagination. This notation can be considered, in certain respects, as the starting point for a much larger musical exploration, but it is not to be written off as incidental either. By composing in this way, Smith is able to create structure

and form by leveraging certain conceptual and creative ideas that are accessible to all musicians, regardless of instrument type. At the same time, he leaves much to the performers: he offers inspiration and trusts that the performers will pursue it.[32,33]

These three musicians were discussed because of the unique ways in which they each handle the organization and communication of sound. Despite being quite different in both form and function, their notational approaches all share one common thread: interface neutrality. The ideal of interface neutrality dismisses notation specific to performance technique or instrument type, and instead reduces all music to simply "sound." Interface neutral notation endeavors to address the qualities of sound rather than the means by which sound is produced. Rather than being simply reductive, however, this is a positive step toward the formation of an integrated electronic/acoustic performance practice. As much as it is important to understand the differences between electronic and acoustic instruments in order to learn how to discuss and work with them, it is equally important to move away from the electronic vs. acoustic dichotomy if a truly collaborative and integrated practice is the ultimate goal.

Forming a Personal Compositional Practice

I am a composer of both acoustic and electronic music. Most often, the music I write involves some combination of both acoustic and electronic instruments, or makes use of hybrid electronic/acoustic instruments. I am fascinated by the intersection of acoustic and electronic sound, and in finding ways to pull instruments away from their typical genres, techniques, or traditions in favor of exploring their capabilities on the fundamental level of sound.

As a composer of this type of music, I often find myself considering how best to communicate a particular musical idea to an entire ensemble, regardless of instrument type. I tend to focus predominantly on illustrating what a given gesture should sound like, rather than how it should be executed. This manifests as a mostly graphical notation with occasional elements of traditional Western notation. This method of notation is interface neutral, focusing on the qualities of a sound, rather than the means by which it is produced. Moreover, I choose to focus on certain characteristics or parameters of sound that are common to all instruments, such as density or presence, rather than specific pitch or rhythm. My goals for this approach are twofold: 1) to lessen the divide between electronic and acoustic instruments by simply considering them as instruments of sound at its most fundamental level; and 2) to pull performers into a more subjective, conceptual creative space, in which they are forced to listen and consider sound in a new way. I am hopeful that my musical scores serve as a collective meeting place or focal point, from which creativity and inspiration can emerge. (See Figure 3.)

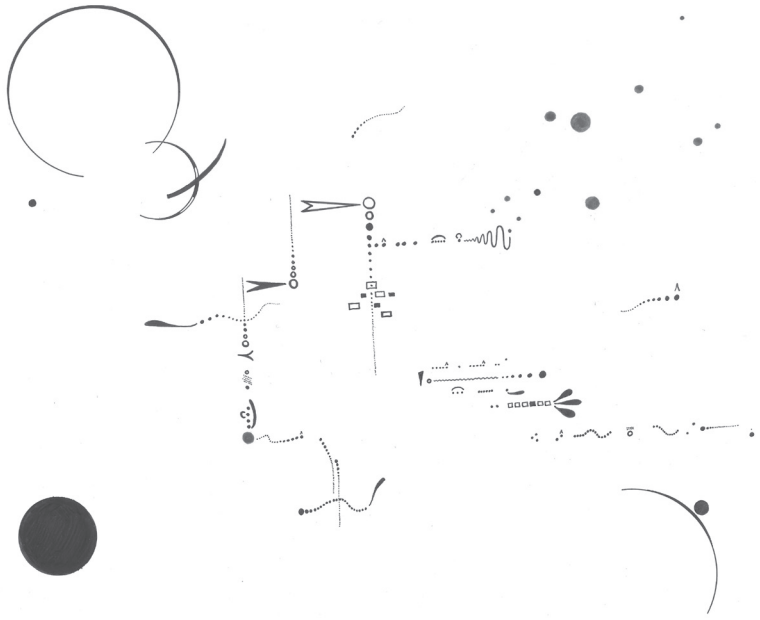

Fig. 3. Score for *[Spectral][Impulse]*, for 2–4 players. Reid (2016).

The primary pictographic elements of my notation are simple geometric forms, such as dots, lines, polygons, and so on. I choose to work with these shapes because they are relatively easy to identify and remember, they are distinct from traditional Western notational symbols, and simply because I find them to be aesthetically pleasing. While making a score, care and consideration is given to the make-up of those elements themselves, as well as their relationship to one another. The following section details select parameters commonly addressed in my compositional practice and how I notate them. Additionally, I will provide a number of examples to illustrate these concepts, however, the examples are not definitive and countless other interpretations are possible. The method of interpretation is indeterminate and personal, but it must be disciplined. The following parameters exist on a spectrum and may relate to both the spectral and temporal aspects of a piece of music.

Density

Density can refer to the quality of a particular sound or collection of sounds, or to the pace at which material unfolds or changes. For example, high-density sounds could include a burst of white noise, or a rapidly articulated passage of notes. A high-density sonic form could be notated as a solid black shape, a mass of smaller objects with minimal interstitial space, or similar. Figures 4A and 4B are examples of how these types of high-density forms may be notated. In contrast, a low-density form may be notated as a single row of points orbiting a central object or following an otherwise orderly trajectory, as in Figure 4C. Such sounds could include an airy whistle or irregular tapping.

Fig. 4. Examples of sonic forms with varying density: A) highest density form; B) mid-high density form; C) low density form.

The density of a sound should be considered relative to its surrounding notations, and is not exclusively linked to the surface area it encompasses: a solid, small circle may have greater density than a similar large circular form constructed out of numerous fine points with ample white space between them.

Presence

Presence can be employed in contradiction or as a complement to density. It is perhaps most easily understood in relation to time, where a high-presence sound

is one that is constantly audible (but animated enough to remain within the perceptual present), and a low-presence sound is one that is intermittent. Alternatively, presence may be defined by other qualities of a sound, such as timbre, pitch, and loudness. For example, a pure tone in a high, piercing register would be more present than a tone with identical dynamic profile and harmonic content, but voiced in a lower register. Two tones with equal fundamental pitch and dynamic profile may differ in presence based on their harmonic content (the sound perceived as being brighter, in this instance, is more present than the darker one).

Presence is represented visually by surface area, relative to surrounding objects. Combining density and presence yields interesting results, because the two are not directly linked: a highly present sound can have low density, as in the aforementioned high piercing tone. Conversely, a high-density sound can be scarcely present, such as soft radio static or a distant fluttering of wings. Figure 5 illustrates how this type of relationship may be notated.

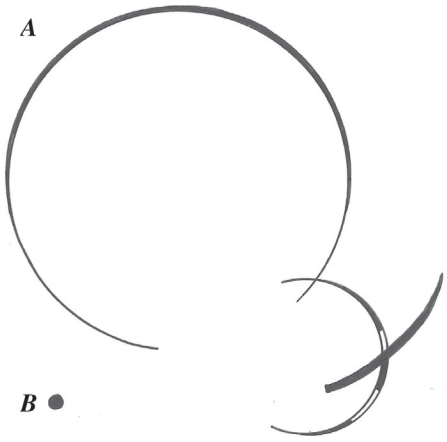

Fig. 5. Example of density and presence in opposition: A) highly present, low density (fragmented) sound; B) high density, low presence sound.

Silence

White space is not simply incidental, but is to be considered as important as the notation itself. Silence surrounding sounding gestures should be active and proportionate in length. This relationship is determined by the performer in any given moment and performance. This establishes a personal rhythm both for discrete gestures and for the overall pacing of a piece. Silence can also be understood as an articulator of presence. For example, when an air conditioning unit turns off in a room, the air conditioner's presence may only then be brought to attention. The act of silencing provides new context to the sound itself, and calls into focus certain elements that may otherwise go unnoticed.

Color

Color is mapped onto other notational elements, and is perhaps the most subjective parameter. As with Smith's Ankhrasmation, specific meaning or action is not prescribed onto specific colors, but instead it is the responsibility of the performer to carefully consider—even research—each color in the score as part of its preparation for the piece. This research strengthens the performer's relationship with the given colors, imbuing the ideal performance with greater depth and commitment.

In an ensemble setting, each performer should research and prepare his or her own associations with the colors in their respective part or score. These associations need not be shared among the ensemble. If the performers approach this process with commitment, the colors act as a unifying element in the ensemble, even if each performer forms a different association with the same color.

Conclusion

The absence of a standardized approach to notating synthesized, unconventional, and/or electronic sounds is simultaneously a challenge and an opportunity for composers. On the one hand, the absence of formalized notational tools means that there is no universal way by which to disseminate musical ideas to performers. Each newly devised notational system must be learned, which is certainly not a small task. On the other hand, composers are free to imagine and construct their own sound worlds and notational languages in ways that best serve their unique compositional voices and ideals.

Regardless, this field is rich with potential and deserving of further exploration. The ideas introduced in this article and the specific examples presented are exploratory and experimental in nature. They are intended to broaden the current scope of discussion and inquiry surrounding music notation and form a basis from which further dialogue may emerge. I will conclude with a reminder, once again, that at the heart of our conversation is sound. What sound do you imagine? How can you best communicate that sound? Composing for an ensemble of acoustic and electronic instruments may seem complex and daunting, especially if you are new to the world of electronic music and instruments. It is important to remember that all instruments—whether acoustic, electronic, or a hybrid thereof—are fundamentally instruments of *sound*. Focusing on composing the sounds you desire as opposed to the process by which to produce them can empower both composer and performer to explore new means of listening to and producing sound.

NOTES

[1] Sarah Reid, "Approaching Electronic/Acoustic Performance Practice Through Improvisation," *Journal of the IAWM* 23, no. 1 (2017): 2–7.

[2] Mark McGrain, *Music Notation* (Boston, MA: Hal Leonard Corporation, 1990).

[3] Pauline Oliveros, *Sonic Meditations* (University of Michigan: Smith Publications, 1974).

[4] John Cage, *Williams Mix* (Edition Peters, 1962).

[5] Thom Holmes, *Electronic and Experimental Music: Technology, Music, and Culture* (New York: Routledge, 2015), 54.

[6] Ibid, 396–399.

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One Thousand and One Nights to Heal the Heart

ELIANE ABERDAM

I composed *The Heart of Shahrazad* as a modern re-telling of the story from *One Thousand and One Nights* (also called *Arabian Nights*), a collection of folk tales from Persian, Arabic, and Indian cultures, compiled in Arabic during the Islamic Golden Age. The story, however, relates to all times and cultures, even our present. It addresses the issues of violence against women, including rape and murder, as well as the healing process through story-telling, endurance, forgiveness, and remembrance.

The Heart of Shahrazad, a monodrama in one act with five scenes, is scored for soprano, actress, and harp, and it was written, produced, and performed by women. Its genesis can be traced back to the Festival of Women Composers (February 13-16, 2014) at Indiana University of Pennsylvania, where my piece, *Deux Poemes Océaniques*, scored for soprano, violin, and harp, received its world premiere performance. The encounter gave birth to a new friendship with two of the performers, soprano Lara Cottrill and harpist Marissa Knaub; our musical chemistry sparked the idea for *Shahrazad*.

Eliane Aberdam

Lara emailed me four months later with an idea for a commission from her performance company, Amiche, which was planning a new show on the themes of betrayal and healing based on the stories of Shahrazad. She invited me to compose the music and said that her business partner, Sarah Carlton, would write the text. On August 12, 2014, the libretto arrived. Sarah remarked that a few years earlier she had read the book *Shadow Spinner* by Susan Fletcher, and it created a new perspective for her of the story of Shahrazad. At the time, Sarah was concerned with what it meant to forgive and how to deal with betrayal. A paragraph from the program notes describes our concept of the plot:

> We imagined…a story from the past that had much to say about our current world and those who currently live in the midst of violence. The news is often filled with stories of violence, both locally and around the world, from rape to domestic violence, from kidnappings to human trafficking. And though violence impacts everyone, women bear the primary brunt….This performance wrestles with what we do when we live in the midst of violence or have been the recipient of violence…. We believe stories matter, the stories we tell and the ones we write with our lives. It is our hope that this performance connects our audience with their own stories, but also reminds us of the helpers in the world who are bringing light to the dark places of violence.

The composition process involved many challenges. First of all, a musical work with "Shahrazad" in its title automatically recalls the gorgeous *Scheherazade*[1] symphonic suite by Rimsky Korsakov (1888), and this can be intimidating and humbling for any composer. Another challenge was that the libretto refers to many characters and has different settings and various moods, implying a full operatic cast and myriad kaleidoscopic orchestral timbres; the monodrama, however, is scored for a cast of only three: actress (Sarah Carleton), soprano (Lara Cottrill), and harp (Marissa Knaub).

L to R: Marissa Knaub (harp), Lara Cottrill (soprano), Sarah Carleton (narrator)

The solo singer has two roles: she serves as the emotional mirror of the story through powerful and dramatic as well as lyrical arias that portray the passion of individual characters. Her second role could be compared to the "Greek chorus" (as put by one critic), since her arias provide reflective, contemplative comments on the action. The singer embodies the concept of "Story," the allegory of the healing process. She is both the muse of the unfolding story and its process. As explained in the libretto, she sings about "stories in their various forms as they manifest and change—across time and cultures—weaving together the power