Proceedings of the Conference of the World Forum for Acoustic Ecology, Atlantic Center for the Arts, FL, March 23-26, 2023

Forest Listening – An audio-visual installation

Liz K Miller
Royal College of Art, London, UK
hello@lizkmiller.com

ABSTRACT

'Forest Listening' is an artwork that combines the field recording 'Rainstorm Inside Forest Earth' with its corresponding sound visualisation. The visualisation is a diagrammatical investigation that expands the form and function of the spectrogram from the explanatory to the exploratory. This expansion occurs in three ways: translation of the format from digital to analogue; the creation of four diagrams depicting separate levels of volume dynamics; and remaking those four diagrams as cyanotype prints using tonal shades to represent volume dynamics. The field recording 'Rainstorm Inside Forest Earth' is combined with hanging canvas banners, made from the cyanotype prints, to create the multimodal installation 'Forest Listening'. Analysis of exhibiting 'Forest Listening' in the Limnerslease woodland at the Watts Gallery & Artists' Village, Surrey, UK, suggests that the woodland setting augments the multimodal listening experience, drawing attention to both the artwork and the forest itself.

1. RECORDING FOREST RAIN

Rainstorm Inside Forest Earth is an audio record of the first rain in months hitting the forest floor during the 2018 summer heatwave in the Forest of Mar in the Scottish Cairngorms. It reveals a perspective of a rainstorm that humans don't normally experience. Listeners are surrounded by the sounds of raindrops vibrating against dry earth particles, revealing materials in different states, liquid water and solid earth, colliding together. The recording was gathered by burying two hydrophones (microphones that can be submerged in water) just beneath the surface of the earth with the rain hitting them from above. This shift alters the listening position from the human above-ground to a worm or tree root's sensation below-ground. The field recording enables imagination of the embodied experience of a rainstorm from a non-human perspective. By placing hydrophones inside forest earth, the soundscape was restricted and consequently the signal sound of rainfall was augmented. This decision enabled me to use the spectrogram, back in the studio, for close analysis of the frequency of the rain drops as they hit the ground.

2. DIAGRAMMING FOREST RAIN

The digital spectrogram format is ideal for analysing and communicating sonic data. However, I find the digital aesthetic of this diagramming format does not foster personal connection. Personal connection is important within my artwork as I am not simply communicating information, rather I am offering up my perspective of sound. For this reason, I translated the digital spectrogram into analogue handmade diagrams. I retained the form of the spectrogram but incorporated my own interpretation of sonic textures that visually echoed the patterns of rain on a windowpane. Drawing by hand slows down the making process, allowing ideas to percolate and flourish. One such idea emerged whilst drawing the *Rainstorm Inside Forest Earth* spectrogram. The idea was to draw four diagrams each corresponding to a different decibel range. In doing this I could explore the volume dynamics of the soundscape in greater detail without losing the depiction of sound texture, frequency and time (figures 1 and 2 show two examples of different decibel ranges). I chose to omit all measurements from the x and y axes to distance the diagram from a graph with boundaries. During recording, volume was amplified by the hydrophones to levels audible to the human ear, making a measurable decibel level redundant. Following John Drevers premise of *aural diversity* in which "every human hears differently" [1], the four volume levels of the diagrams are about perception and reception, not defined measurements.

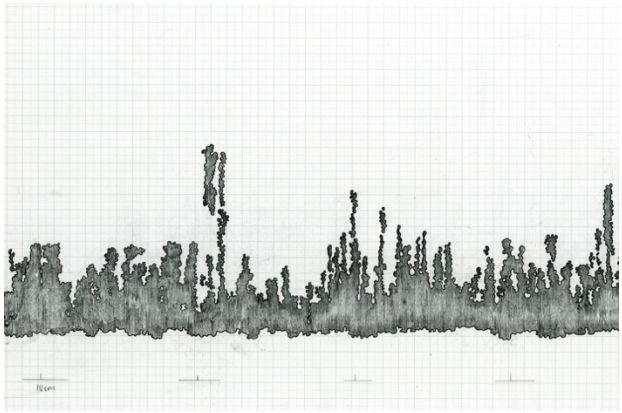

Figure 1. Liz K Miller, detail view, *Rainstorm Inside Forest Earth #2*, 2018. Pencil and pen on graph paper, 59.4 x 84.1cm.

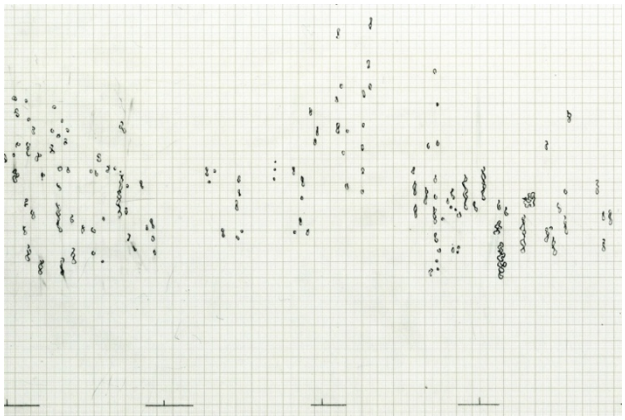

Figure 2. Liz K Miller, detail view, *Rainstorm Inside Forest Earth #4*, 2018. Pencil and pen on graph paper, 59.4 x 84.1cm.

3. PRINTING FOREST RAIN

I used tone to differentiate between the four *Rainstorm Inside Forest Earth* volume dynamics diagrams. I did this by printing them using the photographic cyanotype technique (rather than the spectrograms standardised colour range). Cyanotype is an analogue photography technique in which a solution of iron compounds is painted onto paper (or other naturally absorbent material) and dried in the dark as the solution renders the paper light sensitive. When dried, objects or negatives are placed onto the paper and exposed to ultraviolet light (such as the sun or UV lamp). The objects, or black ink on the negative, block the light, keeping those areas of the cyanotype soft. Where light hits the photo-sensitive emulsion, it hardens. After exposure, the paper is washed with water, and any soft areas of emulsion, unhardened by light, are washed away, revealing the white of the paper, whilst areas of emulsion hardened by light turn blue. Therefore, the image of the print is white and the background blue. The completed image is then dried. It is possible to control, to a certain degree, the density of both the blue background and the white image areas, resulting in an image with a blue tonal range and high levels of detail. With this technique I could retain the hand drawn aesthetic of my diagrams but modify the intensity of the classic cyanotype blue to show decibel level. The deepest blue depicted the loudest (for close and large raindrops) and the lightest depicted the faintest (for distant and small droplets) (figures 3 and 4 demonstrate this variation in tone).

The cyanotype process was also chosen for its historical links to my subject matter. Just one year after the technique was invented by Sir John Herschel, in 1842, the botanist and photographer Anna Atkins used the process to document the ferns and seaweed in her collection of botanical specimens. Over 10 years she created three volumes of organic photograms titled *British Algae: Cyanotype Impressions 1843-185* [2, p. 19]. Use of the cyanotype process became widespread from the 1880s to the 1950s by engineers and architects to reproduce detailed plans and drawings in the form of blueprints [3, p.18]. These two historical uses of cyanotypes, recording indicate details of botanical specimens and hand-drawn diagrams, link strongly with my investigation of forest flora and diagrammatical making processes. I had not intended the classic Prussian blue colour of cyanotypes to be a significant element of the images, however a frequent comment from viewers was that the vibrant blue brought rain and water to mind.

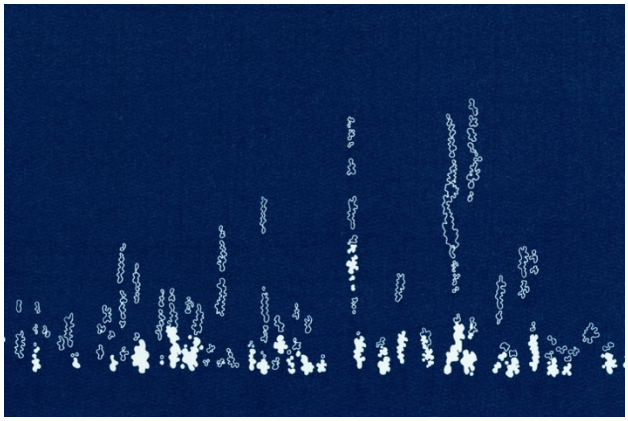

Figure 3. Liz K Miller, detail view, *Sound Sketch – Forest Rain #1*, 2019. Cyanotype, 77 x 34 cm.

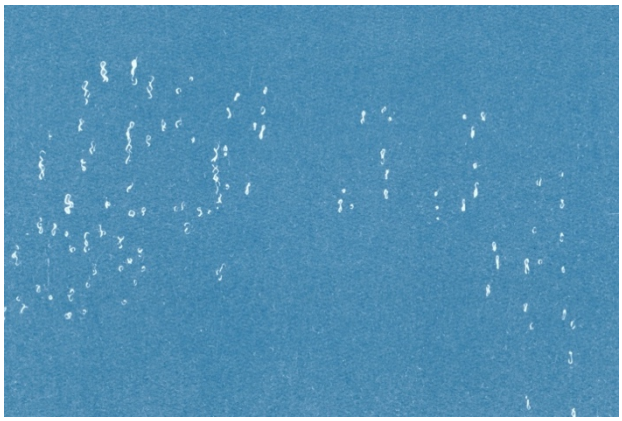

Figure 4. Liz K Miller, detail view, *Sound Sketch – Forest Rain #4*, 2019. Cyanotype, 77 x 34 cm.

4. AUDIO-VISUAL FOREST RAIN

The four *Rainstorm Inside Forest Earth* sound diagrams were exhibited in *What on Earth* at The Koppel Project, TKP Exchange, Piccadilly Circus, London (2nd to 24th July 2021) as *Sound Sketch – Forest Rain.* When evaluating the exhibition of these works on paper I felt the limitations of my sound visualisations were their inability to explore both a sense of space and the temporal experience of listening to a soundscape. I concluded that the visualisations could not replace the original soundscape as a still image cannot reflect sound's temporal and spatial qualities. Therefore, for the diagrams to function as an exploration of sound, I needed the visuals and the soundscape to be presented together in a single artwork.

Following this line of research, I combined the field recording and the diagrams of *Rainstorm Inside Forest Earth* to make the audio-visual installation *Forest*

Listening. In this format the cyanotype prints evolved from small-scale works on landscape-format paper measuring 77 x 34 cm, into eight hanging canvas banners. Each banner was a vertical section of the cyanotype diagrams (measuring 4 x 21 cm) enlarged to human height (38 x 190 cm) to surround the listener, echoing the perspective of the soundscape from below ground. The result was a magnified and fragmented version of the cyanotypes. The essence of the original diagram remained, with the frequency springing upwards, the range of four blue backgrounds indicating volume dynamics, and the drawings' watery texture (figure 5).

Figure 5. Liz K Miller, *Forest Listening*, 2020. One of eight canvas banners, each 38 x 190 cm. Limnerslease woodland, Watts Artists' Village, UK (7 September – 4 October 2020).

5. *FOREST LISTENING* IN A WOODLAND

As a featured artist in the Surrey Hills Arts 2019-2020 program, I was invited to exhibit *Forest Listening* in Limnerslease woodland in the Watts Gallery & Artists' Village, Surrey, UK from 7th September to 4th October 2020. In the press release for the exhibition Ellen Love, the Community Program Curator, commented on why *Forest Listening* had been selected:

> The Limnerslease Woodland, which surrounds the home and studios of the founders of Watts Gallery, George and Mary Watts, acted as a source of inspiration to both artists. The couple named their house and the woodland Limnerslease because 'Limner' is the Old English word for artist, and 'lease', to glean hope for the future, so it is all the more fitting that artists, like Liz, exhibit work in the woodland [4].

The 'hope for the future' that Love referred to was hope for the ecological crisis but could also have been a reference to the global situation directly affecting us at the time of the exhibition. During the autumn of 2020 we were in between the spring-summer and autumn-winter UK lockdowns of the Covid-19 pandemic. At the time, gathering outdoors was the safest way to attempt normal socializing and Watts Gallery were particularly keen to attract visitors to their outside space (18 acres of grounds) to continue their exhibition program during the pandemic. As this installation was outdoors, visitors were able to explore the artwork whilst maintaining social distancing measures.

The significant change we made because of the lockdowns was to the meet-the-artist weekends. We had hoped these would take place in the Watts Gallery Clore Learning Studio throughout the exhibition for visitors to learn more about the project. As Covid-19 social distancing measures did not allow face-to-face activities, we decided that a suitable replacement would be a short introductory film for the Watts YouTube channel describing how the artwork was made and my intentions for the project, as well as a film responding to public responses and feedback about the project. Questions and comments were submitted to Watts Gallery, Surrey Hills Arts, and me, via social media and email. Considering the unprecedented circumstances, the films worked well as a public outreach method with ample engagement and feedback from visitors to analyze and evaluate the effect of *Forest Listening* in the Limnerslease woodland. I will refer to feedback from visitors and Watts Gallery throughout this analysis.

At Limnerslease, visitors could listen to *Rainstorm Inside Forest Earth* on their personal mobile device via the Surrey Hills Arts website and the Smartify app. This app is an established tool for the gallery with visitors using it regularly to access information about exhibits. The result of listening to the soundscape via the website or app was that visitors could choose either a personal listening experience through their own headphones or a group experience by playing the soundscape aloud. One visitor commented on how listening to the soundscape enabled them to attune to both the forest and themselves:

> The act of listening… [was] a very focused experience… once we had adjusted (sort of attuned) to our surrounding and the integration of forest noises, our breathing, and forest listening audio layer, then the experience made us slow down [5].

The hi-fi woodland audio environment provided opportunity to identify, locate and appreciate subtle and quiet sounds. It prompted this question from the public: "The very low frequencies that I can hear in the sound recording, what produces that sound in the forest floor?" [6] to which I responded in my Q&A film: "when you're listening to [a] rainstorm from beneath the ground there's so much more surface area for the sounds to vibrate within and perhaps that's what produces those low tones" [6]. Here, the listener was considering the phenomena of rain from a novel non-human perspective leading to thoughts of materials and how sound is produced.

The banners were spread throughout the woodland, hanging from trees with their positions dependent upon the heights of the branches. The woodland has paths through densely growing trees and shrubs as well as more open clearings. The banners were spread out just far enough that it wasn't possible to see them all at once, so visitors needed to delve deeper into the woodland and venture off the main path to find them all (figure 6). One visitor commented on this experience: "It was cool to see a flash of blue from the road when we didn't know where exactly the installation was then the excitement of discovery going along the path" [7]. In the woodland visitors could walk around and amongst the banners viewing them from all sides. The format of the original sound diagrams, taken from the form of the spectrogram, represented time in a linear progression. In Limnerslease, this was replaced with the spatial dimension of the woodland. Breaking away of the linear progression of time was an intentional expansion out of the restrictions of this diagrammatical format. My aim was to create a multimodal listening experience in which the audience was in amongst the audio of the field recording, the visual of the banners, and the physical environment of the forest, with the frequency of the raindrops springing up all around the visitor both aurally and visually. This recreated on a human scale the physical space in which the hydrophones had been buried when making the recording: in the dry earth with rain pounding down all around them.

Figure 6. Liz K Miller, *Forest Listening*, 2020. Five of eight canvas banners, each 38 x 190 cm. Limnerslease woodland, Watts Artists' Village, UK (7 September – 4 October 2020).

Forest Listening drew visual attention while blending sympathetically with the landscape. It did not shout its presence. Unless visitors came through the woodland looking for it, it could be easily overlooked and passed by – echoing the hidden and unnoticed subtlety of the original soundscape. The banners neither imposed on the woodland, nor disappeared within it. The landscape was neither a backdrop nor a plinth; my intention was to create an unimposing artwork that encouraged curiosity and fostered an attentive engagement with the forest.

6. CONCLUSION

The audio-visual artwork *Forest Listening* created new avenues for attunement with the woodland. In Limnerslease, the three elements of the installation – the soundscape, the banners, and the site-specific spatial install – all worked collaboratively to create a sensory experience that provided a novel perspective of forest rain, leading to enhanced perception of, and curiosity about, elements of the forest previously unnoticed or filtered out.

By exhibiting *Forest Listening* in a woodland, the subject matter and the context for the installation aligned, working together to foster curiosity about both the artwork and the forest. The audio-visual nature of *Forest Listening* expands the listening experience, using the visual element to take the act of listening beyond just the auditory. I consider this multimodal listening as a method for generating alternative perspectives that move towards considering woodlands not as an ecosystem service (for the use and exploitation by humans) but as complex, interconnected life forms, whose vibrant processes are worthy of celebration and auditory focus.

7. AFTERWARD – *FOREST LISTENING* AT WFAE 2023

At the World Forum for Acoustic Ecology in March 2023, *Forest Listening* was installed in the sculpture studio at the Atlantic Center for the Arts in Florida, USA (figure 7). The studio is spacious with a high ceiling and filled with natural light. But the challenge of the space was that it was not possible to suspended artwork from the ceiling, nor attach it to the walls. However, there were large movable panels onto which the banners could be installed. I arranged the panels to create a circular listening space that echoed the feeling of a woodland glade of trees. Light from the upper windows cast shadows on the banners, reminiscent of a woodland's dappled shade. For the audio element of the artwork, the studio provided an opportunity to play the forest rain soundscape from stereo speakers, filling the space with the drum beat of rain. The combination of the listening glade spatial arrangement, the natural light from the surrounding forest filtering in through the workspace windows, and the envelope of repetitive soft drumming

sound filling the room, created a meditative environment. Delegates at the conference commented that they were able to take time out from the stimulating schedule to recharge in the restful ambience of the audio-visual *Forest Listening* space.

Figure 7. Liz K Miller, *Forest Listening*, 2023. Eight of twelve canvas banners, each 24 x 126 cm. Sculpture Studio, Atlantic Center for the Arts, Florida, USA (23 – 26 March 2023)

Acknowledgments

Forest Listening was made in partnership with Surrey Hills Arts, hosted by Watts Gallery & Artists' Village, and funded by the UK Arts and Humanities Research Council doctoral training programme Techné.

7. REFERENCES

[1] J. L. Drever and A. Hugill. *Aural Diversity* [Online]. Available: *http://auraldiversity.org/index.html* (accessed March 9 2020).

[2] B. Brian and M. Haworth-Booth, *A Guide to Early Photographic Processes.* London: Victoria & Albert Museum, 1983.

[3] M. Ware, *Cyanomicon – History, Science and Art of Cyanotype: Photographic Printing in Prussian Blue*, 3rd ed. Buxton: Self-published, 2020.

[4] E. Love. (2020, Sep 10). *Surrey Hills Arts Forest Listening Project,* [Online]. Available: https://surreyhills.org/surrey-hills-arts-forest-listening-project (accessed 13 February 2023).

[5] Melanie Lenz, email to Liz K Miller, 20 October 2020.

[6] L. K Miller. (2020, Sep 17). "Forest Listening: Questions from Visitors," Watts Gallery – Artists' Village. *YouTube.* Video recording [Online]. Available: https://www.youtube.com/watch?v=Dahd7XDjmNM (accessed 13 Mar 2023).

[7] Kumar Kolar, email to Liz K Miller, 6 October 2020.