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Creative layers and continuities: A case study of Nicole Lizée and the Kronos Quartet

Introduction

The aim of this research is to develop an understanding of the layers and continuities within Nicole Lizée's *Golden Age of the Radiophonic Workshop (Fibre-Optic Flowers)*, written for the Kronos Quartet in 2012, both from the perspectives of composition and history, and from analysis of the interactive, embodied and performative aspects of the piece that emerge during rehearsal. Composition and rehearsal processes are examined using Simon Emmerson's three themes of combination, transformation, and control, and his three "impulses within composition" that combine live and acousmatic soundworlds – integration, antithesis, and co-existence (Emmerson, 2009, pp. 170-172). The findings will help to develop strategies for understanding relationships between gesture and sound, embodiment, technique, and expressivity, for any composer who uses old, analogue techniques or mixed media.

By drawing on insights from performers and the composer-performer dialogue, the study addresses a shortcoming observed by the pianist and scholar, Mine Doğantan-Dack, that

[m]usicological discourse is still dominated by the fundamental assumptions of a work-related philosophy and the interest in studying performances mostly as a reified thing rather than as a process (Clarke 2004: 99), has not led to a similar interest in studying how performers actually make performance events happen (Doğantan-Dack, 2011, p. 246).

The same limitation has been recognised by Taina Riikonen (2008) in her study of Kaija Saariaho's *Lichtbogen* (1986) written for instruments and live electronics. Instead of 'encouraging "collaboration between acoustically and electroacoustically based theorists"' from the perspective of a "musical-work"-centred language' that lingers from the nineteenth-century, Riikonen promotes the 'important ontological idea of music as interaction' (Riikonen, 2008, p. 143). She studies collaboration 'according to the various interactions, social practices and spatial authorities involved in musical performance' (Riikonen, 2008, p. 143) to draw attention to the 'signification of intimacy, authorship and interaction' (Riikonen, 2008, p. 156). The focus on interaction in the present study builds on these ideas, exploring embodiment and the relationship between intimacy and technology, while also extending recent research by Clarke, Cook, Harrison, and Thomas (2005), Östersjö (2008), Bayley (2011), Clarke, Doffman, and Lim (2013), and Clarke and Doffman (2014), that is concerned with how composer and performers communicate, interact, and deal with new challenges when creating and interpreting new music.

Methods

In the case of *Fibre-Optic Flowers*, the investigation considers how a primarily acoustic ensemble familiar with amplification deals with electronic devices with which they are initially unfamiliar and how they overcome the challenges. The performers' perspectives are evaluated from the single rehearsal with the composer and from ethnographic observation from Amanda Bayley who was present at the rehearsal and had arranged for it to be filmed. The rehearsal took place at the BBC Maida Vale studio on July 23, 2012, prior to the world premiere at the BBC Prom concert the following day. The data comprises: the notated score, instrumental parts, field notes from the rehearsal, video and audio recordings of the three-hour rehearsal, and an interview with David Harrington

(leader of the Kronos Quartet) and Lizée conducted by Mark Lawson for BBC Radio 4 on July 23, 2012. Score analysis is followed by deductive analysis that seeks to establish the validity and appropriateness of applying Emerson's categories to the sources. A performative analysis relies on annotated field notes and coded transcriptions of rehearsal discussions relating to the instrumental parts that result in changes made to the score.

Following examples by Clarke, Cook, Harrison, and Thomas (2005), Fitch and Heyde (2007), and Clarke, Doffman, and Lim (2013), first-hand insight and knowledge involves participants as researchers in the creative process. Co-authorship with the composer enables more searching questions to be considered and re-considered through the composer-researcher dialogue than might otherwise have been the case.

Fibre-Optic Flowers imagines a multi-sensory world in which the beauty of the artificial is integrated with the real in an organic way, making it appropriate for considering Emerson's term, combination, for examining the intersection between acoustic and digital soundworlds (2009, p. 170). Here, the digital needs to be viewed more broadly as the electronic sound source, thus introducing the human-machine relationship. Derbyshire spoke in a magazine interview of wanting to "smell the fibre-optic flowers" (http://www.delia-derbyshire.org/interview_surface.php) — a beautiful image that aligns perfectly with the "Golden Age."

Lizée strives towards a new sound and a new chamber music aesthetic by bringing electronic sounds into an intimate chamber music setting and exploring historical, physical, and acoustic dimensions in her writing. Each of these compositional dimensions harnesses a corresponding interpretative layer which will be investigated by both authors. Within her rationale for the piece Lizée will explain how the physical and acoustic dimensions arise from the historical: compositional processes of deconstruction and reconstruction provide a new lens through which to experience the pioneering electronic sounds of Delia Derbyshire's radiophonic workshop from the 1960s. Evidence from the score and discourse from the rehearsal data will illustrate the demands Lizée makes on the players through a combination of prescriptive and descriptive notation (Kanno, 2007). Imitating and operating inanimate objects alongside their own instruments requires performers to engage with a disembodied "other," turning the musical into the literal and vice versa. Bayley will evaluate how the players grapple with these new challenges and how interaction between the quartet members and with the composer during rehearsal result in changes to the score and to the resultant sound.

Compositional elements

Sources of musical expression

One of the creative layers of the piece embraces the historical through unusual sources of musical expression inspired by the BBC Radiophonic Workshop of the 1960s, which is where the presence of an electronic soundworld in the consciousness of the general public began to take shape and, in many ways, was defined for ensuing generations (Niebur, 2010). Delia Derbyshire, who played a seminal role at the Workshop from 1962 to 1973, coaxed a palette of other-worldly sounds from everyday objects, a favourite being a green metallic lampshade that produced a pure ringing tone when struck. The merging of the real with the unreal (on reel-to-reel) imbued this new music with a kind of pre-digital binary sheen, capturing the visionary results of positronic posterity.

While the Radiophonic Workshop did not work with acoustic instruments in the traditional sense, this piece makes the kind of sound that might have been conjured had a string quartet been readily available. Sitting among the electronic bric-à-brac, the strings lie in wait for the moment when Derbyshire might have sneaked in late at night and, in a moment of synergy, melded the wooden with the molten.

This synergy is paramount in *Fibre-Optic Flowers*, responsible for creating continuities while also blurring the distinction between layers: structured as a continuous movement, one sonic event unfurls or morphs into the next, akin to a vinyl record without track breaks. There are analogue sounds derived from hand-held proto-arcade games, turntables, reel-to-reel machines, and four-track tape machines. Beats are played by the most analogue of data-entry devices – the typewriter. In the end, these sounds all exist on equal footing as sources for musical expression in the post-Derbyshire world.

The musical elements of *Fibre-Optic Flowers* could be construed as the hazy, faded, and twisted remnants of the Radiophonic Workshop of the 1960s. Central to its realization is the interaction of musicians with “lost, forgotten, or dead relics” that are re-contextualized and revived: the front page of the score identifies the machines the players are required to operate (Figure 1).

Figure 1. Preface to Nicole Lizée’s *Golden Age of the Radiophonic Workshop (Fibre-Optic Flowers)*.

Lizée’s conception of the piece is both a distillation and an expansion of one or several memories of music that are irrevocably altered by the impermanence of the mind. For example, material in the third section of the piece, from bar 77, marked “Molto legato. Spiralling, hypnotic” (repeated in bar 86, see Figure 2a) was inspired by Derbyshire’s *The Wizard’s Laboratory* (1972). From the following extract on youtube, https://www.youtube.com/watch?v=F9AkSI_UbIE, the first violin part is derived (in spirit, rather than a direct quotation) from the arpeggio figure from 0:07-0:11 and the second violin part from 1:05-1:20. The foot stomps in the quartet (from bar 81, see Figures 2a and 2b) are an oblique reference to the emulation of the low electronic bleeps in the accompaniment. Structured as quasi variations of these short excerpts from Derbyshire, this section acoustically emulates electronic effects. An extended melody is executed on the first violin in bars 90 and 96, simulating a pitch bend effect on a synth (or a synthetic portamento). The viola and cello take on the characteristics of glitch, sporadically cutting in and out, accenting certain points of the melody akin to a gated effect or filter.

Figure 2a. *Fibre-Optic Flowers*, bars 86–91.

Figure 2b. *Fibre-Optic Flowers*, bars 95–98.

Another historical reference is Lizée’s intention behind deconstructing the Dr. Who theme – the soundworld for which Derbyshire is best known – which is to allude to the well-known theme subliminally, in terms of timbre, with the Quartet performing new material written to harness the spirit of the original. Deconstruction of the original, from bars 122–147 (see Figure 3), comprises an acoustic representation of inverting and stretching out the sample, revealing flaws, dropped frames, or dead pixels. Only at the very end of the section (bars 148–150, when the quartet has rests) is a manipulated

three-second sample of the Dr. Who theme heard (see Video Clip S1 in Supplemental Material Online). Barely detectable, almost subliminal, the listener is left wondering whether or not it was indeed the sample. Locating it at the end of the section heightens its impact after being alluded to for a while.

Figure 3. *Fibre-Optic Flowers*, bars 121–133.

Acoustic/mechanical intentions

From the score alone, it is clear from the outset that the character of the piece is governed by the relationship each player has with his/her acoustic instrument and mechanical device(s) and how that fits with the rest of the ensemble. Forming a second creative layer, the mechanical devices (all of which are operated by the quartet players) are designed to coexist and interact akin to any instrument or ensemble member. In rehearsal, therefore, the first stage is to establish the electronic or mechanical sounds for which each player is responsible (see Video Clip S2 in Supplemental Material Online).

Where acoustic music confronts a disembodied “other” the composer’s demands on the players can be understood through Emmerson’s three themes of combination, transformation, and control that “lie within an overall shell of *performance and composition practice* – how the music is presented (projected or diffused)” (Emmerson, 2009, p. 170; emphasis in the original). The way these themes overlap in *Fibre-Optic Flowers* helps to understand the continuities and layering of acoustic and mechanical/electronic (as opposed to Emmerson’s digital) soundworlds. According to the distinction Emmerson makes between perceptions of source and cause,¹ in Table 1 each signal in the second column requires a human trigger, whereas each event in the first column requires human action in order to be sustained. In the digital universe Emmerson observes how the two seamlessly integrate. For the devices used in *Fibre-Optic Flowers*, however, there remains a clear aural and visual distinction between events and signals. The 1978 Milton Bradley handheld game, Simon™,² is different from the other events because it is interactive, and in relation to Emmerson’s third theme of “control” shows the computer as “cocreator, decision maker, performer” (Emmerson, 2009, p. 171). The dialogue between Lizée and Ziegler in rehearsal (see Video Clip S3 in Supplemental Material Online, discussed later in this article) illustrates the

ambigu[ity] about where the real control in a performance lies. This is a potential source of much frustration between performers and composers [...]; it is not that all performers want total responsibility for the work, but that adequate possibilities of response and control over the unfolding of the work are available to them (Emmerson, 2009, p. 171).

The cellist struggles to integrate the Simon game which risks dictating, and potentially disrupting, the musical narrative.

Table 1. Distinction between events and signals in *Fibre-Optic Flowers*.

Event	Signal
Korg Kaossilator pocket synth	4-track tape machine (2 prepared tapes)
Typewriter	Miniature turntable (1 record prepared with masking tape to create locked groove)
Simon game	Stereo audio track 2 reel-to-reel machines

The relationship between mechanical devices and acoustic instruments is not expected to be easy or smooth; there will be collisions, altercations, and resistance as well as collaboration, harmony, symbiosis, etc. Each machine is physically controlled by the musician who must come to terms with a new instrument, its sounds and notation, and its role within the ensemble, which also affects the audience/listener/viewer, who may be going through similar emotions regarding this new “ensemble member.”

As well as operating machines, the players are required to emulate machine-esque sounds (see Figure 4 and Video Clip S4 in Supplemental Material Online). The overall aim is to create a beat matching/juggling scenario with all four players initiating the machines (actual and metaphorical) and then complementing the resulting loops and textures with amplified strings. Two reel-to-reel tape machines, started by members of the quartet, initiate the entire process, functioning as “pedals” throughout the piece.

Figure 4. *Fibre-Optic Flowers*, bars 1–5.

Instrumental and textural transformations

Bearing in mind the above distinction between signal and event relating to mechanical instruments and their sounds, the layers of structural events and continuities can be usefully presented in the form of an explanatory map that demonstrates how form is articulated by textural and instrumental contrasts and transformations rather than directed by pitch and harmonic progressions (see Figure 5). The overall musical design generates layers of interest between the historical/mechanical and the new/acoustic upon which the embodied, performative elements can be understood. The idea that “theory is less a prior general concept that explains the structure of individual works but more a specific concept generated to interpret specific pieces” (Lochhead, 2006, p. 252) has been explored by Judy Lochhead in her study of Charles Dodge’s *Any Resemblance is Purely Coincidental* (1980), written for piano and computer-generated tape (including a sample from Enrico Caruso singing Leoncavallo’s “Vesti la giubba”) and is useful to adopt for interpreting *Fibre-Optic Flowers*. She addresses the challenges posed by Dodge’s piece regarding what counts as the work’s structural elements by formulating “structural categories and graphic procedures [which] are

themselves theoretical constructs generated as part of the overall interpretive goals of analysis” (2006, p. 252). Similarly, in the case of *Fibre-Optic Flowers*, the multi-layered form shown in Figure 5 depicts an interpretative analysis unique to the piece. The horizontal layers and vertical section divisions are demarcated by textural and instrumental shifts and transformations. Each acoustic and mechanical instrument is identified on the y axis with the mechanical instruments listed underneath the acoustic instrument of the player responsible for operating them; for example, the second violinist is responsible for the typewriter and the four-track tape machine (Tascam Portastudio 424).

Figure 5. Structure of *Fibre-Optic Flowers* determined by instrument and texture (drawn to scale)

Fibre-Optic Flowers fits the concept of intermedia composition defined by Paulo Chagas as that which:

explores artistic connections between different media such as sound, image, speech, movement, gesture, and space while interacting with technical and media apparatuses. [...] In contrast to traditional forms in which music is combined with other media, the shaping of intermedia is coupled with technical apparatuses that allow it [to] come into being by accomplishing the crossing of boundaries of the individual media that facilitates their interpenetration. The traces of the apparatus become visible in the formation process and can no longer be separated from the work of art (Chagas, 2014, p. 211).

Lizée’s treatment of the apparatus provides an aural and visual framework for the piece as well as functioning at a more local level. For example, the reel-to-reel tapes (triggered by the second violinist and viola player) and stereo audio track begin the piece and provide continuity throughout. Double bar lines in the score indicate changes of tempo but a new section is not always apparent until the quartet enters, as demonstrated in Figure 6, bars 151-153. Section changes are often very sudden; for example, at the end of bar 41 (see Figure 7), the metaphorical reel-to-reel has finally become “unstuck” without warning, resulting in an abrupt change in sonority at bar 42. Elsewhere, bars (or beats) of rests often delineate new sections, especially where rests indicate areas where the score/schematic has been erased and/or the recorded media cut in and out.

Figure 6. *Fibre-Optic Flowers*, bars 150–153.

Figure 7. *Fibre-Optic Flowers*, bars 38–47.

Of the artistic connections between different media suggested by Chagas, *Fibre-Optic Flowers* fulfills those of sound, gesture, and space, thus complying with the first of “two tendencies [that] appear in intermedia composition: the *differentiation process* whereby new interdisciplinary domains of art come into being,” the second tendency being met by “*interactivity with the apparatus*” (Chagas, 2014, p. 211; emphasis in original). Regarding the latter, the players are preoccupied with data and are steeped in the overall aesthetic, showing how “[t]echnical apparatuses and machinery of information and communication work directly with human subjectivity. They interact with

different kinds of cognitive and emotional domains such as memory, intelligence, sensitivity, and the subconscious in order to produce meaning” (Chagas, 2014, p. 211). Switching between acoustic and mechanical/electronic instruments brings an interactive dimension to the textural transformations. These interactions acquire a certain amount of physical and/or psychological tension and antithesis for the players. Indeed, in the context of an audio recording the absence of visual cues means that the main aesthetic of the composition may be missed, with no real sense of the relationship between instrument, player and mechanical/electronic device (see Emmerson 1994 and 1998).

Having set out the structural features, continuities and layers within the piece, the interactive dimension of the textural transformations will now be investigated with reference to Emmerson’s “impulses within composition”. The analysis proceeds to emphasize the interactive, embodied and performative aspects of the piece.

Analysing types of compositional combination

Emmerson identifies “three impulses within composition that combines [*sic*] the live and the acousmatic sound worlds [*as*] *integration* (based on attraction), *antithesis* (based on repulsion), and *co-existence*” (Emmerson, 2009, p. 172; emphasis in original) with examples from works by different composers. Yet each of these compositional impulses is evident within *Fibre-Optic Flowers*. He explains one of two approaches to integration: “instruments can be performed in an extended manner, using playing techniques not normally associated with Western art music production, exploiting their possibilities for noise and an increased range of timbres” (Emmerson, 2009, p. 172). An increased range of timbres and extended playing techniques are introduced by virtue of combining mechanical devices and electronic soundworlds with strings and requiring the players to operate the devices: Lizée merges the typewriter with a modern day example of technology, the Kaossilator (played by the first violinist), for which she has devised a notation system to ensure that it syncs precisely with the rest of the quartet (see Figure 8, bars 48–51 and Video Clip S5 in Supplemental Material Online).

Vibrato and portamento are standard string-playing techniques, regarded as “varieties of expressive pitch variation” (Clarke & Doffman, 2014, p. 101), normally considered interpretative rather than compositional. However, Lizée prescribes their use for the Kaossilator (and vibrato on the 4-track tape machine) as well as for the stringed instruments so that the physical action and expressive function of “sliding the finger” now have a mechanical context. An important connection is thus made between different soundworlds and their physicalities, as well as with the cognitive and emotional domains of human subjectivity. The “sliding the finger” instruction appears in the Kaossilator part in bar 49 (see Figure 8) and applies throughout that part until bar 67. Vibrato on the Kaossilator can be seen in bars 137-139 (see Example 11). At the end of the piece, “playing” the 4-track tape machine, the second violinist is instructed to “press on tape to create vibrato (or turn pitch control back and forth quickly)” and a suitable descriptive, graphic notation in the part depicts “tape machine madness” from bar 276.

Applying familiar techniques and physical actions such as vibrato and portamento to an unfamiliar domain shows how expressive parameters are employed to enliven an inanimate object. Conversely, the stringed instruments also emulate the sliding, oscillating sounds of machines: from bar 82, machines are emulated by notated glissandi in the first violin part, ‘gradually more vibrato (fast and narrow)’ in the second violin part (see bar 95, Figure 2b), followed by portamento harmonics three bars later.

The challenge for the players is to play expressively on a mechanical instrument and inexpressively on their stringed instruments in instances where they are emulating a machine. This paradox is responsible for the ultimate integration of sounds and for making it hard to delineate aurally the instrumental layers. Such details are picked up in rehearsal: for example, in bar 237 (see Figure 9) there is no vibrato suggested, which prompts Harrington to ask:

DH: Should I try that with more vibrato? Like a theremin kind of sound?

NL: I'm liking the narrow vibrato.

DH: Okay.

NL: But if there were more of it, if it were kept narrow...

DH: [demonstrates]

NL: Yeah.

Figure 8. *Fibre-Optic Flowers*, bars 48–51.

Figure 9. *Fibre-Optic Flowers*, bars 237–241.

Lizée's approach to integration reaches beyond extended playing techniques to include rhythmic and textural means for disguising the distinctions between acoustic instruments and machines. For example, the section from bar 151 (see Figure 6, above) is constructed as a simulation of four malfunctioning reel-to-reel machines: each member of the quartet represents a machine whose part mimics the splicing, stuttering and sudden stops and starts indicative of a damaged machine. A lyrical melody is chopped and distributed between the members of the quartet in a *Klangfarbenmelodie*-like fashion depicting a specific approach to integration. The placement of triplets in the centre of the beat in the main melody performed by the first violin (bar 159, Figure 10) creates an unexpected shift in speed implying acceleration in the reel-to-reel machine. At specific points the quartet actually merges with pointillistic electronic sonorities on the track in the vein of Stockhausen in *Kontakte* (1958-60).

Figure 10. *Fibre-Optic Flowers*, bars 158–161.

Against the backdrop of the reel-to-reel machines (not notated in the score) Lizée creates spontaneous and seemingly non-sequitur interruptions through score manipulation as a compositional tool where each bar of the score is treated as a box or tile to be cut out and reordered. In bars 135 and 140 (Figure 11) the material used to disrupt the flow is directly sampled from the recording of Kronos playing her first piece written for them in 2011: *Death to Kosmische*. The surrounding texture from bars 122-147 (similar to bars 136-139) demonstrates Emmerson's compositional impulse of co-existence: the viola and cello imitate splicing techniques while the violinists operate the Kaossilator and typewriter.

Figure 11. *Fibre-Optic Flowers*, bars 135–140.

Another type of integration occurs when the material is not idiomatic for stringed instruments, which again prompts the performer to approach the part differently. For example, in the section that begins at bar 182 (see Figure 12), the cello material in bar 183 (and viola from bar 189) is written using drum-kit style notation, in terms of the

placement of pitches on the staff – a technique often used by Lizée in her chamber music works. A kit player would automatically be able to read it and assign specific members of the kit to the pitches but here, the pitches are altered (transposed) for melodic purposes. The part is a sample from *Sculptress* (2010), her first work created in homage to Derbyshire.

Figure 12. *Fibre-Optic Flowers*, bars 182–185.

Here, the aesthetic appearance of the score was central to developing the musical material. Referring to schematics and maps, the contour and shape of the pattern to a large extent determined the outcome of the score. An eraser was used as a physical tool to impose brief and unexpected silences in the material, implying dropped or missing data. The natural tendency is for the viola and cello to play at a loud dynamic, whereas a quiet (*mp*) dynamic is imposed, calling for the performers to evoke a sense of calm, peace, tranquility, and control, following the climactic *fortissimo* ending the previous section in bar 179.

Emmerson’s compositional impulse of antithesis is well illustrated in the above example of the Simon game. Emmerson explains that:

Repulsion and antagonism are not new drivers of musical discourse but are commonly found in avant-garde rhetoric. Luigi Nono pitted the lyrical solo soprano against factory noise and political demonstrations and slogans in *La fabbrica illuminata* (solo soprano and tape, 1964 ...). The mutual repulsion of the two worlds is there to make a political point, alienating us with its bold confrontation and gaining our attention. (Emmerson, 2009, p. 173)

Composing with outdated analogue media always presents challenges in that there is never a guarantee that the equipment (now a musical instrument) will be readily available or in a usable state. While there remain enthusiasts and collectors who hoard these archaic relics, much of the outmoded equipment is demolished, sitting in landfills, or gathering dust in basements. Even if one were to discover an unsullied trove of these treasures in a basement or estate sale there is an ever-dwindling part of the populace with the know-how to repair and maintain the instruments that remain in circulation. There is also the danger of such equipment failing during a performance. Contrary to digital device failure, which generally leads to an overall shutdown, analogue devices will behave erratically and unpredictably for some time. A complete failure or shutdown is a last resort – the final breath in a long series of breaths. A great deal of Lizée’s work centres on this period of erratic failure in a machine, aiming to freeze its current condition and exploit it in a musical work before it succumbs finally to the stasis of total failure and obsolescence.

The danger inherent in writing for outdated technology is that one day most physical objects/machines will disappear altogether and it will be impossible to locate a TASCAM 4-track needed to perform this piece. For Lizée that is part of the thrill. Preparation for performance means locating the antiquated devices, machines (in relatively good working order), LPs, etc. (referred to as ‘cratedigging’ and ‘gravedigging’ in Lizée’s liner notes, 2014). Acquiring the necessary devices is as essential to the work’s dissemination as learning the parts; the journey leads down unexpected and

exciting paths, meeting interesting people, etc. She always receives an excited email when any of the specified items is found..

There is a fragility akin to any notated or written work (book, score), prior to computer hardware and software when there was no option of saving or backing up to hard drives and thus no guarantee of its continued existence. The possibility of one device not behaving identically to another, despite the same methods of manipulation (knobs, buttons), epitomizes the celebration of analogue. The element of chance exists on several levels but the work could never become obsolete in and of itself because to some extent, as a last resort, one could use a sampler or midi to recreate the sounds. The work will never be performed identically sonically or visually, and prompts specific memories or moments of nostalgia for an audience member who perhaps used to own a stylophone, seeing it in action for the first time in forty or more years:

Technostalgia for vintage gear [...] does not necessarily mean getting back to a particular past, no matter how ideally constructed, imagined or heard. Instead, for the musicians we interviewed, technostalgia is movement toward both new sounds and new interactions, whether aural, social, or physical, made concrete through combinations of the past and present (Pinch and Reinecke, 2009, p. 166).

By playing with concepts of memory and sound, Lizée contributes to the idea of 'technostalgia'. In addition to using sounds to represent the past, she revives the devices themselves, turning them into instruments, giving them a new purpose and giving players new interactions.

Emmerson's three themes of combination, transformation, and control, and three "impulses within composition" (integration, antithesis and co-existence) have not only contributed to an understanding of layers and continuities in *Fibre-Optic Flowers* but also to an understanding of the actions and interactions, depicted by Lizée's notation and instructions, which are responsible for the mixed soundworlds. While retaining a focus on expressive characteristics, the orientation now shifts towards the relationships between notation, gesture and sound, embodiment and technique. Analysing composer-performer negotiations reveals ways in which future performers might enact and experience the relationship between gesture and sound applicable to other areas of contemporary performance practice.

Performers' interpretations: the gestural structure of sounds

Imitating and operating inanimate objects requires performers to engage with a disembodied "other," turning the musical into the literal and vice versa. Thus when elements of "electronica," "tech," "machina," and "glitch" intersect with acoustic instruments, conventional approaches to composition and performance, and notation and sound, are challenged. Eric Clarke's and Mark Doffman's observation that "conventional notions of expressiveness are called into question as the musical materials and processes that underlie performance become more disparate and complex" (2014, p. 100) echoes that made by Murray Schafer in the 1970s: "The dilemma of conventional musical notation today lies in the fact that it is no longer adequate to cope with the meshing of the worlds of musical expression and the acoustic environment" (Schafer, 1977, p. 124). In this context musical expression is not an attribute to be imposed freely by a performer but, as already noted, is carefully prescribed by the composer and discussed in rehearsal. Figure 7 and subsequent

examples show how Lizée addresses “the dilemma of conventional musical notation,” its role shifting from prescription towards the realization (description) of acoustic emulation of machine-generated sounds. In an interview on BBC Radio 4 she explained that “to mimic machines using acoustic instruments, hiss and machine failure and machine stuttering and things like that was a process, to try and find the right way to try and convincingly reproduce this sound ... using the quartet.” (Interview with Mark Lawson, July 23, 2012).

Rehearsal with the composer gave the players the opportunity to discover how to interpret unfamiliar characteristics of the notation and instructions.³ It also enabled the players to contribute towards finding the most appropriate notation, instruction, or articulation to achieve the desired sounds. For example, there were instances where the players influenced the shaping of the dynamics, such as when Harrington proposed a crescendo through bar 41 into bar 42 at the end of the first section (see, Figure 7 above, where it now appears in the score, and see Video Clip S6 in Supplemental Material Online). The rehearsal also provided the opportunity for the composer to add a crescendo fulfilling a similar function at the end of the second section from bars 71–74 where there was previously none (see Video Clip S7 in Supplemental Material Online⁴).

From bar 122 (see Figure 3, above) the viola player, Hank Dutt, had already altered his part, erasing the rests and triplet brackets to make it easier to read (see Figure 13). Lizée’s notation (in Figure 3) specifies note lengths but Dutt explains that: changing the notation (rhythm) was to help [him] read, understand, and play [the] passage in the quickest amount of time. By changing this particular passage, which is not difficult compared to other parts of Nicole’s piece, I see it quickly, understand the rhythm and can play it well (H. Dutt, personal communication, August 27, 2015).

Within the same email Dutt makes the more general comment: “When on stage, I find it better to have a clear part, with simpler notation.”⁵ Rather than reading a more complex rhythm with rests, he has added staccato and half tenuto signs to indicate note lengths. Despite Dutt’s preferred notation, Lizée decided not to change her score because she wants to illustrate the precision of where the note should end and the rest begin for subsequent performances with different players, particularly as the typewriter is interspersed between the viola and cello. She accepts that players can always change their parts to suit their personal preference but there is an argument for consistency in terms of her notational decisions.

Figure 13. *Fibre-Optic Flowers*, bars 121–124.

This notational discrepancy did not arise in the rehearsal discussion, which focused on sound, but it contributes to ongoing questions surrounding compositional integrity and performance practice in contemporary concert music that demand further investigation. Video Clip S8 in Supplemental Material Online shows Dutt asking Lizée about the note lengths in bar 123.⁶ Their conversation results in him adjusting the bowing to achieve the abrupt sound of chopped and spliced tape. Another example of the type of sound quality required is the discussion of vibrato at bar 182 (see Video Clip S9 in Supplemental Material Online and Figure 12, above).

Following discussion in rehearsal (see Video Clip S10 in Supplemental Material Online and Figure 14), in bar 221 the first violinist, David Harrington, suggests that glissandi start earlier than marked, which Lizée preferred. Figure 14a shows the bars from the original score and Figure 14b shows how the part was marked up in rehearsal.

Figure 14a. *Fibre-Optic Flowers* violin 1, bars 221–222.

Figure 14b. *Fibre-Optic Flowers*, violin 1, bars 221–222, with Harrington’s recommendations regarding the relocation of glissandi.

Greater challenges for the players seem to arise from the machines they have to play. For example, at bar 102 the cellist, Jeffrey Zeigler, lays down his instrument to pick up the Simon game. For this melding of worlds to succeed, he must detach himself from the ensemble and become immersed in Simon’s world. He must communicate with and adhere to the device’s instructions in order to operate the device successfully, otherwise the section will fail. The cellist must also manipulate – or almost hack – Simon. To synchronize with the rest of the quartet he has to resist the natural tendency to follow the game’s tempo and instead follow the imposed tempo of the piece while simultaneously adhering to Simon’s rules, or risk losing the game. Here is where the device transforms into a musical instrument (see Figure 15). The composed, forced error (Zeigler hitting the wrong button) causes the game to end, the impact of which is heightened by the subsequent five bars of rest from bar 117 (for the ensemble only, as the tracks are still continuing).

Figure 15. *Fibre-Optic Flowers*, bars 114–117.

The difficulty of this part was discussed by Zeigler and Lizée during rehearsal (see Video Clip S3 in Supplemental Material Online). The physiology of the device (resistance of the buttons) requires following its “gameplay rules” while also working against it, in order to integrate into the chamber music lexicon of bar lines, rhythmic notation, and pitch. The quartet accompaniment was written in such a way as to ensure a conjunct harmony no matter which pattern emerged. However, one button pushed incorrectly or too late would mean aborting the part, as it would be impossible to continue with what was notated. Therefore, while the part is meticulously notated, certain facets of its behaviour are impossible to predict presenting both a paradox and an element of chance. This makes Simon a unique member of the chamber music world.

Having notated glitch, malfunction, and error, there seems to be an extra (subconscious) effort to avoid errors in performance, probably because the notion of error is something that performers spend their lives trying to avoid. (Written) error is central to a successful performance of *Fibre-Optic Flowers* but for any individual player actually to make an error would significantly offset the aesthetic. The players are collectively playing the same errors so this would break the artifice.

Requiring the players to operate devices other than their instruments means they have to mediate between two different soundworlds and their associated physicalities. This process can be explained in terms of Trevor Wishart’s imposed and intrinsic morphologies (1996). To paraphrase Wishart: for sounds where there is a continuous

input of energy (e.g., violin sounds), the continuation is due to the imposed morphology, whereas for sounds where the continuation is due to the physical properties of the sounding medium (e.g., the Kaossilator, or the Simon game) continuation is achieved through intrinsic morphology. Wishart states: “The reason for making this distinction is simply that the imposed morphology tells us something about the energy input to the system and ultimately relates to ... the gestural structure of sounds” (Wishart, 1996, p. 178).

The awkward relationship between energy input and resultant sound generates an element of discomfort or tension/repulsion for the players that reflects Emerson’s ‘antithesis’ and invites Aden Evens’s idea of the ‘resistance of the instrument’, the instrument in this case being the stringed instrument or the mechanical/electronic device (Evens, 2005). Another challenge – to play machine rhythms rather than body rhythms – is described by Harrington:

The machine aspect of this piece is the hardest thing to do. Like that very opening, the rhythm [see Figure 4, above]. It’s not that the notes are tough; it’s that the bowing is really confusing. It’s the mechanical aspect and the way that you are essentially cutting tape. And so they’re not body rhythms, but machine rhythms, out-of-body rhythms, something like that. Trying to find a body language in order to play the unbody or out-of-body rhythms is the trick (Interview with Mark Lawson, BBC Radio 4, July 23, 2012).

Out-of-body rhythms apply both where the strings are emulating electronic effects and where the players operate their devices. A similar challenge is articulated by the guitarist Stefan Östersjö in response to the repertoire of theatrical gestures demanded by Rolf Riehm’s *Toccata Orpheus* (1990): ‘[t]he challenge for a classical performer is to master the theatrical modes of expression that the gestural material asks for’ (Östersjö, 2008, p. 277). Riehm (like Lizée) expects the performer to learn the actions prescribed in the score resulting in Östersjö’s experience of embodying the piece and ‘mak[ing] it part of his or her own expressive tool’ (Östersjö, 2008, p. 277). While there are significant differences between Riehm’s and Lizée’s compositional objectives the point of the comparison is how the performer enacts and experiences the relationship between gesture and sound. Östersjö proposes that “*thinking-through-performing* [...] reaches far beyond mere sound production on the instrument, demanding a term of its own, perhaps ‘embodied interpretation’” (Östersjö, 2008, p. 277; emphasis in original).

This idea of embodied interpretation is encapsulated by Thor Magnusson’s use of enactivism to explain how learning an acoustic instrument is “highly embodied, non-symbolic and perceptuo-motor based” (Magnusson, 2009, p. 170). Even though repeated practice with the unfamiliar mechanical/electronic devices will increase an understanding “of expressive affordances [...] incorporated into the performer’s motor memory” (Magnusson, 2009, p. 173), the lack of haptic feedback means that there will always be an expressive limitation and disconnection between the performer and his/her mechanical/electronic device.

Conclusion

Any music that embraces non-standard approaches to instruments, gestures, sound, and space demands bespoke approaches to interpretation, performance, and analysis. This study of *Fibre-Optic Flowers* has revealed that the various levels of interactivity

between composer and performers, performers themselves, performers and their acoustic instruments, and performers and mechanical instruments, are determined by a shifting compositional emphasis on integration, separation, association, and transformation. Consideration of Emerson's concepts of combination, transformation, control, integration, antithesis and co-existence has helped to develop a framework for understanding how Lizée achieves expressive connections and continuities between the historic and the new, and the mechanical and the human. A performer's phenomenological relationship with acoustic, mechanical and electronic instruments is determined by the distinct nature of their interfaces. Among all the devices used, the Simon game is the only one to demonstrate all three of Emerson's "impulses within composition": integration, antithesis, and co-existence. The level of interaction demanded from the game requires the cellist to immerse him/herself in Simon's world while simultaneously engaging with the rest of the quartet.

Despite Lizée's imaginative ways for depicting players' creative control and expressive, or deliberately inexpressive, interpretation, a tension seems to persist for the players between intimacy and technology, either manifested by out-of-body rhythms when emulating machines or by operating the devices themselves. This tension, combined with elements of nostalgia and chance, fuelled Lizée's inspiration for the piece, and is arguably more acute for the performer than for the listener. (The listener's perception of tension could depend on whether the experience is merely aural or visual as well (see Halmrast, Guettler, Bader and Godøy, 2010, p. 193).)

Points arising from the composer-performer collaboration in rehearsal can be summarized in diagrammatic form (see Figure 16). The basic elements of a rehearsal model that Amanda Bayley has developed for a different composer-performer collaboration (Michael Finnissy and the Kreutzer Quartet) hinges on a pivotal relationship between language and technique on the path from notation to performance (Bayley, 2011). From the evidence discussed, this model can be adapted to represent the main challenges to conventional approaches to composition and performance when machine-generated sounds intersect with acoustic instruments by extending the word language to encompass body language. In this "human-mechanical" interactive context, the techniques discussed by the players reveal the pivotal relationship between embodiment and instrumental (or machine) techniques that dictate the path, or multiple paths, between notation and performance. Composer-performer dialogues and rehearsal analysis contribute towards developing new compositional and interpretative strategies for understanding relationships between gesture and sound, embodiment and technique, and expressivity, for any composer who uses old, analogue techniques or mixed media. The most significant point here, however, is the fluctuation of expressivity between an interpretative and a compositional function with an emphasis on the latter.

Figure 16. Representation of *Fibre-Optic Flowers* in rehearsal with Lizée and the Kronos Quartet.

A new chamber music aesthetic is not achieved exclusively through the integration of new devices or instruments and their unorthodox sonorities. Each new "ensemble member" brings another layer to the creative and interpretative processes, influencing the way the performers interact, play and collaborate with each other. Vibrato, dynamics, touch, timbre, even bowing and fingering choices are re-thought and

modified to suit the specific context. Experimentation with the appearance of the score and how information is communicated and presented to performers is also a means to develop a new way of thinking – a new performance practice – and, ultimately, a new sound. Even during moments when machines are silent, the musicians are still attuned to their presence and influence.

Acknowledgements

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Supplemental material

Supplemental video files from the rehearsal are available from
<http://msx.sagepub.com/content/20/3/392/suppl/DC1>

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Footnotes

¹ “A *source* would be heard as producing the sound we believe is being transformed, while a *cause* might be a trigger (an event of any kind) of a new sound element that has a separate perceptible identity” (Emmerson, 2009, p. 179; emphasis in original).

² https://en.wikipedia.org/wiki/Simon_%28game%29;
<https://www.youtube.com/watch?v=4YhVyt4q5HI>

³ Prior to the rehearsal in London on July 23, 2012, the quartet began rehearsing the piece in San Francisco. The score and parts were received at the beginning of June 2012 and the devices/instruments arrived soon after. There were telephone conversations between Harrington and Lizée to discuss the piece and clarify details.

⁴ Note that bars 114 and 115 referred to on the video clip equate to 71 and 72 in the final score owing to a mis-numbering of bars on the original score.

⁵ In her first work for Kronos, *Death to Kosmische*, Lizée had indicated brush strokes, using the tenuto mark and slur combination, but John Sherba (second violinist) had asked to take it out of his part, not because the notation is not accurate (it should be left that way in the score and parts for rental) but, again, because it helps to read it quicker.

⁶ Most video clips involve the players discussing ideas in relation to the sounds they produce on their instruments. Transcriptions of discussions are included in this article only where reference to a video extract is not required to make sense of them.

Figure 1. Preface to Nicole Lizée's *The Golden Age of the Radiophonic Workshop (Fibre-Optic Flowers)*. Copyright © 2012 Nicole Lizée, used by permission.

**The Golden Age of the Radiophonic Workshop
(Fibre-Optic Flowers)**

Instrumentation

Violin 1 (amplified, with reverb)
+Korg Kaossilator pocket synth

Violin 2 (amplified, with reverb)
+Manual typewriter (amplified, with reverb, phaser)
+4-Track tape machine (Tascam Portastudio 424)
2 prepared tapes (available from the composer)

Viola (amplified, with reverb)
+Miniature turntable
1 record prepared with masking tape to create locked groove (available from the composer)

Violoncello (amplified, with reverb)
+Milton Bradley Simon™ handheld game (amplified)

Stereo audio track (with click)
2 Reel-to-Reel Machines

Duration: ca. 10'

This work was commissioned for the Kronos Quartet by BBC Radio 3.

Figure 2a. *Fibre-Optic Flowers*, bars 86–91. Copyright © 2012 Nicole Lizée, used by permission.

Figure 2a shows the musical score for bars 86–91 of *Fibre-Optic Flowers*. The score is written for four staves: Violin 1, Violin 2, Viola, and Violoncello. The music is characterized by complex rhythmic patterns and dynamic markings. Key performance instructions include "Hover overtop of ensemble, grad. overtaking re-to-reel (Molto reverb, touch of phaser)" and "Stomp". Dynamic markings include *ppp*, *mf*, and *pp*. The score also includes markings for "Gl. (or port.)" and "Non gl.".

Figure 2b. *Fibre-Optic Flowers*, bars 95–98. Copyright © 2012 Nicole Lizée, used by permission.

Figure 2b shows the musical score for bars 95–98 of *Fibre-Optic Flowers*. The score is written for four staves: Violin 1, Violin 2, Viola, and Violoncello. The music is characterized by complex rhythmic patterns and dynamic markings. Key performance instructions include "Grad.", "More vib. (fast/narrow)", "Stomp", "Portamento", "Ord.", and "Sub mp". Dynamic markings include *f*, *mf*, and *mp*. The score also includes markings for "Gl. (port.)", "Stomp", and "Non gl.".

Figure 3. *Fibre-Optic Flowers*, bars 121–133. Copyright © 2012 Nicole Lizée, used by permission.

Figure 3 shows the musical score for bars 121–133 of *Fibre-Optic Flowers*. The score is written for four staves: Violin 1, Violin 2, Viola, and Violoncello. The music is characterized by complex rhythmic patterns and dynamic markings. Key performance instructions include "Corrupted Dr. Who Theme" and "Sul Tasto Long bows". Dynamic markings include *mp*.

125

Kaoss: Kaossilator: Patch L18 (fornim scale) High screen L *mf*

Type: *mf*

Vla:

Vc:

130 Lift finger (Overtones continue)

Kaoss: L-----R

Type:

Vla:

Vc:

Figure 4. *Fibre-Optic Flowers*, bars 1–5. Copyright © 2012 Nicole Lizée, used by permission.

$\text{♩} = 120$

Violin 1: Reel-to-reel ca. 23" Click *f* Emulate reel-to-reel Relentless/machine-esque

Violin 2: *f* Emulate reel-to-reel Relentless/machine-esque

Viola: *f* Emulate reel-to-reel Relentless/machine-esque

Violoncello:

N. Lizée

Figure 5. Structure of *Fibre-Optic Flowers* defined by instrument and texture (drawn to scale).

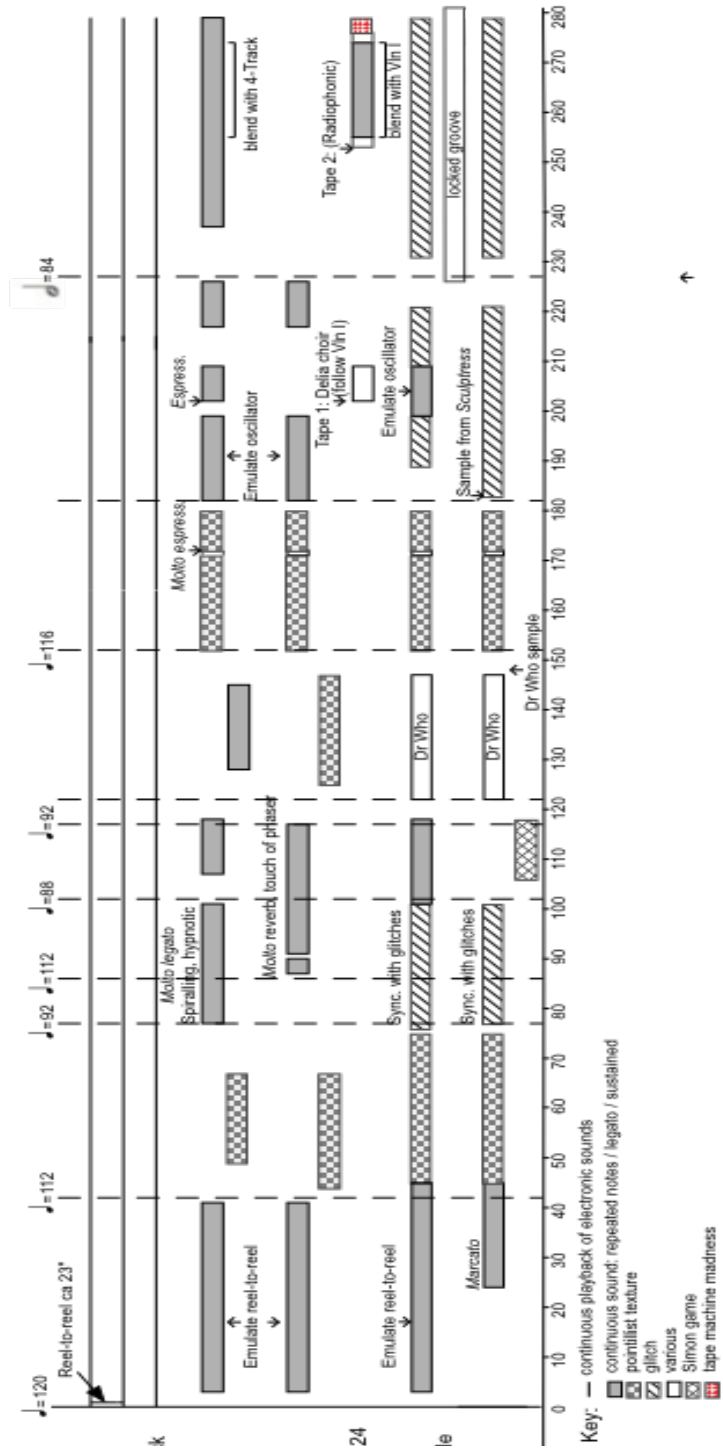


Figure 6. *Fibre-Optic Flowers*, bars 150–153. Copyright © 2012 Nicole Lizée, used by permission.

Figure 7. *Fibre-Optic Flowers*, bars 38–47. Copyright © 2012 Nicole Lizée, used by permission.

Figure 8. *Fibre-Optic Flowers*, bars 48–51. Copyright © 2012 Nicole Lizée, used by permission.

*Touch screen locations: high, mid, low represented by register of pitches on staff
 **Don't take finger off screen - rearticulate only if tip sign ^ is indicated

Figure 9. *Fibre-Optic Flowers*, bars 237–241. Copyright © 2012 Nicole Lizée, used by permission.

Figure 10. *Fibre-Optic Flowers*, bars 158–161. Copyright © 2012 Nicole Lizée, used by permission.

Figure 11. *Fibre-Optic Flowers*, bars 135–140. Copyright © 2012 Nicole Lizée, used by permission.

Musical score for Figure 11, bars 135–140. The score is for a string quartet (Kaoss, Type, Vla, Vc) and includes dynamic markings such as *f*, *mf*, and *mp*. It features complex rhythmic patterns and articulation marks.

Figure 12. *Fibre-Optic Flowers*, bars 182–185. Copyright © 2012 Nicole Lizée, used by permission.

Musical score for Figure 12, bars 182–185. The score is for Violin 1 and 2, Viola, and Violoncello. It includes performance instructions like "Con sord. Emulate oscillator Brush strokes (Louré) Molto legato" and dynamic markings like *p* and *mp*.

Figure 13. *Fibre-Optic Flowers*, bars 121–124. Copyright © 2012 Nicole Lizée, used by permission.

Handwritten musical score for Figure 13, bars 121–124. The score is for Violoncello and includes performance instructions like "Sul Tasto Long bows" and dynamic markings like *mf* and *large*.

Figure 14a. *Fibre-Optic Flowers*, violin 1, bars 221–222. Copyright © 2012 Nicole Lizée, used by permission



Figure 14b. *Fibre-Optic Flowers*, violin 1, bars 221–222, with Harrington's recommendations regarding the relocation of glissandi. Copyright © 2012 Nicole Lizée, used by permission.

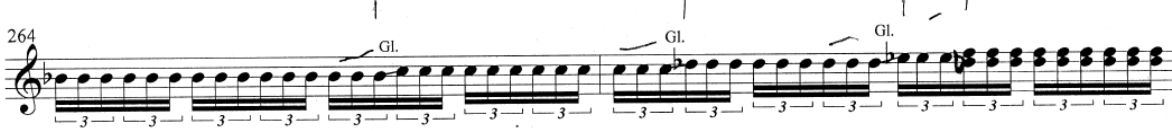


Figure 15. *Fibre-Optic Flowers*, bars 114–117. Copyright © 2012 Nicole Lizée, used by permission.



Figure 16. Representation of *Fibre-Optic Flowers* in rehearsal with Lizée and the Kronos Quartet.

