A COMPREHENSIVE PERFORMANCE GUIDE FOR THE USE OF ADVANCED TECHNOLOGY IN EUPHONIUM REPERTOIRE WITH ELECTRONIC MEDIA THROUGH ANALYSES OF WORKS BY D. EDWARD DAVIS, NEAL CORWELL, AND LUCY PANKHURST

Irving Paul Ray, B.M., M.M.

Dissertation Prepared for the Degree of

DOCTOR OF MUSICAL ARTS

UNIVERSITY OF NORTH TEXAS

August 2017

APPROVED:

Brian L. Bowman, Major Professor
Justin Lavacek, Committee Member
Donald C. Little, Committee Member
Benjamin Brand, Director of Graduate Studies in the College of Music
John W. Richmond, Dean of the College of Music
Victor R. Prybutok, Dean of the Toulouse Graduate School

Solos for euphonium with electronic media present the unique challenge of incorporating an active, physical involvement in the live accompaniment through sound-altering technology such as guitar pedals or digital processors. Instructions for this solo genre are often vague and demand a general knowledge of how to use non-traditional devices. Due to the lack of information available on newly-composed pieces for this medium, students and professionals easily overlook the artistic merit of electroacoustic music. This dissertation provides a comprehensive performance guide that aids in the set-up and operation of advanced technology and presents a methodical approach to performing common musical and technical challenges found in modern euphonium repertoire with electronic media. Included in this dissertation are tables of common audio vocabulary and images of connectors, safety precautions, equipment recommendations with performance settings, a list of required connectors, adapters, cables, speakers, and amplifiers, performance set up diagrams, background information, and analyses of both the technical and musical aspects of each piece. In the appendices are signal flow charts, visual illustrations of polar recording patterns, and an updated catalog of published and unpublished original, adapted, and arranged euphonium solos with live electronics and electronic media accompaniment between 1970 and 2017.
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by

Irving Paul Ray
ACKNOWLEDGMENTS

I would like to express my sincerest gratitude to Dr. Brian Bowman for his devoted effort in shaping me as a better musician, educator, and human being. Without his continuous guidance, patience, and cooperation throughout my time as a graduate student, this project would not be possible.

I am especially appreciative of the collaborative counsel from close friends and colleagues (especially Dr. Nicholas Williams, Dr. Patrick Nyren, Dr. Daniel Chapa, and Erik Lundquist) who helped meticulously edit this document. The time donated to me is highly valued and truly cherished.

Finally, I would like to thank my future wife, Annie Lehman for the moral support and encouragement she has given me during the completion of my doctorate. I am forever grateful for your patience and unconditional love. I cannot wait to spend the rest of our lives together.

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CHAPTER 1

INTRODUCTION

Significance

The first euphonium solo with an electronic accompaniment was John Boda’s *Sonatina for Euphonium and Tape* (1970).\(^1\) As innovative as Boda’s piece was, it was not until eight years later that George Heusenstamm would write *Alter Ego* (1978), just the second original euphonium solo with a form of electronic accompaniment in existence.\(^2\) This sparse amount of new compositions for euphonium and electronic media continued for nearly two decades, yielding only five works in that time. Shortly after this scarcity in compositions, the body of literature for solo euphonium and electronic accompaniment began to multiply significantly due to the works of Neal Corwell.

Corwell is considered the most prolific electronic composer for euphonium by contributing nearly one-third of the repertoire written. Corwell’s first piece was *Night Song* (1989) and in the span of only three years he doubled the amount of pieces written for euphonium and recorded accompaniment. His collective works account for twenty-two of the sixty-five solos currently available with CD accompaniment or the use of electronic media.\(^3\) In addition to his substantial contribution to the body of literature through both original works and arrangements, Corwell is responsible for writing the only comprehensive list of available music in the solo category, found in the “Euphonium with Electronic Media” chapter of the *Guide to the Euphonium Repertoire: The*

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*Euphonium Source Book*. Among the pieces including in this chapter are his own compositions, other composers’ published solos available for purchase, and unpublished music. Since the *Guide to the Euphonium Repertoire: The Euphonium Source Book* was published in 2007, the latest composition included in Corwell’s list of repertoire for euphonium and electronic media was written in 2004, leaving over ten years of new music unaccounted for since the creation of this list. This study will help encourage the performance of newer compositions in the repertory by supplying an updated catalog of euphonium solos with electronic accompaniment not previously included in Neal Corwell’s comprehensive list of available euphonium solos with the use of electronic media.

One of the most important traits a musician can develop is versatility displaying the ability to shift between differing styles of music. For a euphoniumist, this skill is essential due to the lack of original repertoire available.\(^4\) As a university student, it is common for a degree recital to showcase musical maturity in the performer by a varied selection of repertoire. Colleges and conservatories commonly adopt this requirement for senior recitals and occasionally graduate degree recitals. Public universities often provide a syllabus with a list of works of contrasting styles and periods of music for students to choose from appropriate to their individual instrument or voice\(^5\) or make a general statement of performing music from the Baroque, Classical, Romantic, and Contemporary historical periods.\(^6\) Conservatories have similar expectations of a “broad


\(^5\) Ted Soluri, “UWM Bassoon Studio” (syllabus, University of Wisconsin Milwaukee, Milwaukee, WI, 2013)

\(^6\) David McCullough, “MU 419 Senior Recital” (syllabus, University of Northern Alabama, Florence, Alabama, 2008)
spectrum of repertoire from 1700 to present” and even suggest for instruments created after this date to perform “transcriptions or arrangements in order to demonstrate a capacity to play in the styles of all periods from 1700 onward.” Programming Baroque and Romantic music on the same recital as a solo that requires electronic technology can provide a unique spectrum of musicianship through the wealth of tone colors and textures available through modern synthesizers, and the quality, clarity, and convenience offered by today’s new recording techniques….Electronic instruments are capable of creating an enormously wide variety of timbres, attacks, and effects, and when paired with modern multi-track recording and mixing techniques, the sonic possibilities are virtually endless… In a recital situation, the primary accompaniment of choice is, with good reason, the piano. It is a marvelously flexible instrument capable of creating many nuances of color and texture. It would be ludicrous to suggest the piano be completely abandoned in favor of a synthesizer and that all soloists should be accompanied only by a set of loudspeakers. However, for the student or professional solo artist, the decision to consider adding a solo with [electronic accompaniment] to one’s repertoire, would not be without some merit.8

The application of new technology to altering sound expands the capabilities and potential of electroacoustic music.9 Some of the newer techniques found in euphonium solos written in the past ten years would not be considered “new” to the current field of science and technology. Music written for this medium prior to 2004 includes a “CD accompaniment” as the only form of technology used. Neal Corwell’s Fantasy on “Night,” Opus 46 (2004) is one of the first evidences of live electronics used in a euphonium solo with electronic accompaniment.10 Juxtaposed to contemporary

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7 Shepard School of Music, “Student Resources: Recital Packet” (handbook, Rice University, Houston, TX, 2017)
euphonium literature of the past, devices such as delay pedals, ring modulators, and loop stations are just a few of the new sound modifiers found in solos for euphonium written in the last decade. The effects of each of these devices will be demonstrated and examined through technical and musical analyses of the music of D. Edward Davis, Neal Corwell, and Lucy Pankhurst.

State of Research

The first documentation of research on euphonium solos with electronic accompaniment is Neal Corwell’s dissertation, “Original Compositions for Solo Euphonium with Tape” (1996). Corwell compiled every piece available at the time and included background information, musical analyses, publication information, and specifics on the equipment used to create the accompanying tapes.11 In his dissertation, Corwell included a chapter that included common problems and solutions when performing with taped accompaniment, some of which are antiquated due to changes in technology. At the time of publication, there were only ten euphonium solos in existence that Corwell could discuss in his dissertation. To date, there are sixty-five solos written that use electronic media. Aside from the twenty-nine solo entries in the “Music for Euphonium and Electronic Media” chapter of the Guide to the Euphonium Repertoire: The Euphonium Source Book, works from D. Edward Davis, Lucy Pankhurst, Peter Meechan, Steven Bryant, Karsten Brustad, and Roderick Skipp are just a few of the undocumented composers who account for the remaining thirty-six works not included in this chapter. The technology that Corwell discusses in his dissertation merely requires the soloist to press “play” on the recording and stay with the accompaniment. With a need for

more involvement, modernized technology found in euphonium solos with electronic media requires an active role in operating devices during a performance. Some of the newer works still include a backing audio track with these advanced techniques; however, there are exceptional cases where the altering of devices acts as the accompaniment itself.

Aside from Corwell’s dissertation, the only other documented research on euphonium solo literature with the use of electronics is David Thornton’s “Performance Portfolio” (2015). Thorntons was essential in commissioning new works, adapting previous electroacoustic music for the euphonium, and experimenting with numerous sound effects through a commercial recording project. Thornton’s efforts to extend beyond the traditional expectation of euphonium solo literature with electronic music were to encourage innovative music to be written for the instrument. A portion of this portfolio discusses the processes by which he acquired each of the eight pieces on his commercial CD, brief background information, and specific equipment used for each sound effect. Although Thornton’s thesis focuses on a number of newly-adapted and composed pieces for euphonium and electronic media, only half of the pieces discussed in his portfolio are for this medium; the other pieces range from chamber music to unaccompanied solos. Thornton’s portfolio also does not discuss intricacies and nuances required to use the devices that he recommends. In an effort to elevate basic knowledge of non-traditional devices in this solo genre, this study provides analyses of the technical and musical aspects that will encourage subsequent performances of euphonium repertoire with electronic media and inspire the use of technology in future compositions.

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13 Ibid., 6.
Terminology and Identification of Audio Equipment

When working on euphonium repertoire that requires a CD or digital playback (MP3, WAV, or AIFF audio file played from a computer or audio device) accompaniment, the set-up and operation of the needed audio equipment is self-explanatory, provided the speaker system is already assembled. For both a CD and digital playback, the standard set-up by the performer is simply plugging a 3.5mm audio/headphone/phone jack into a computer, phone, or MP3 player that is already connected into a type of PA system and pressing “play” on the playback device.

Rehearsing and practicing with this type of accompaniment has personal advantages in comparison to a pianist or any other kind of accompanist.

Some of the advantages to choosing an [electronic accompaniment piece] for performance are quite practical in nature. First of all, because one is not working with a live accompanist, there are no scheduling problems. The soloist may rehearse whenever, and wherever it is convenient. All that is needed is a tape players and a pair of speakers or headphones with which to hear the accompaniment. There is also no need to worry whether the technical demands of the piece exceed the skills of your pianist. There is a financial bonus as well, because you do not need to pay an accompanist for their time and services. For the guest artist the advantages are clear. When performing a [piece with electronic accompaniment], there is no need to send the music ahead, worry about the skills or preparedness of your accompanist, or rush through a pre-performance rehearsal.14

Euphonium repertoire that requires live altering electronics such as the three pieces in this study can be intimidating due to the lack of basic audio equipment required and terminology. As an aid to common language used in basic audio set-up, Table 1 provides a list of audio terms used in the set-up process with definitions.

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<td>Inward description of a traveling electrical signal from one source to the next</td>
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<td>Outward description of a traveling electrical signal from one source to the next</td>
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<td>Mic Level</td>
<td>A term to differentiate between input levels; mic level is too weak to be transmitted through effect pedals and sound processors; term often found on the back of amplifiers with power boost to line level for direct input through microphone without effects</td>
</tr>
<tr>
<td>Line Level</td>
<td>The strength of an audio signal transmittable to amplifiers and mixing consoles; electric instruments like guitar transmit at this level</td>
</tr>
<tr>
<td>Effects Pedal</td>
<td>A device that alters a given source sound through 1/4 inch TRS cable input/output; turned on and off by stepping on the pedal</td>
</tr>
<tr>
<td>Digital Sound Processor</td>
<td>Effects modulator with features such as ambience, tremolo, flange, pitch detune, delay, and echo</td>
</tr>
<tr>
<td>&quot;Daisy Chain&quot;</td>
<td>A wiring scheme of devices in a closed circuit</td>
</tr>
<tr>
<td>Pre-amplifier (&quot;pre-amp&quot; or &quot;mic-pre&quot;)</td>
<td>A device used to prepare an electric signal to be processed; a preamplifier increases a signal from mic level to line level</td>
</tr>
<tr>
<td>Mixer</td>
<td>An audio console used to combine, route, and change levels of timbre and/or volume levels of a given input; required for devices such as the Lexicon MPX100 or when using a combination of sound effects such as guitar effect pedals in conjunction with digital channel processors</td>
</tr>
<tr>
<td>Dynamic Mic</td>
<td>A microphone typically used for speaking or singing; can work as an instrument mic; does not require phantom power; XLR connector most common; not recommended for euphonium players because of lack of ability to move due to the mic having to be stable</td>
</tr>
</tbody>
</table>
Condenser Mic | A microphone often used for instruments; sensitivity is higher than dynamic mic; options available for clip-on, wireless capability; ideal choice for euphonium players due to freedom of motion
---|---
Cardioid | Polar pattern of a microphone; most ideal for euphonium; see Appendix E for pattern shape
Omni | Polar pattern of a microphone; not ideal for euphonium; see Appendix E for pattern shape
Figure 8 | Polar pattern of a microphone; not ideal for euphonium; most ideal for duet playing; see Appendix E for pattern shape
Phantom Power | Type of pre-amp; 48V supply; supplement to boosting mic level to line level; needed feature for a condenser mic
Feedback | A sudden loud and high sound from an amplifier; caused by a microphone picking up the sound waves of an amplifier, creating an infinite sound loop from the microphone to the amplifier; avoid the microphone from being on-axis of the amplifier
“Off/on-axis” | A term to describe the sound path alignment of a speaker and microphone, referring to feedback; on-axis produces feedback, off-axis produces no feedback
Signal Flow Chart | A simplified schematic to show the flow of input and output for set-up and proper connection of devices
Gain | An increase in a signal’s power; typically used to increase volume; most common unit of measure is decibels (dB)
Unity | A neutral sound level setting; this setting can be found by twisting a dial or raising a volume paddle shift until a notch is felt; the input and output levels are equal on this setting; most ideal setting to begin with on initial set-up

An equal challenge to preparing euphonium repertoire with electronic media is identifying the difference between gender of the required audio equipment such as cables, type of connectors, and adapters. Table 2 provides visual images of common cable connectors to aid in identification of the correct gender when setting up the cable structure for each piece.
<table>
<thead>
<tr>
<th>Cable Connectors</th>
<th>Illustrations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male - XLR(^{15})</td>
<td></td>
</tr>
<tr>
<td>Female - XLR(^{16})</td>
<td></td>
</tr>
<tr>
<td>Male - 1/4 inch TRS vs. TS(^{17})</td>
<td></td>
</tr>
</tbody>
</table>

**Male - XLR\(^{15}\)**

**Female - XLR\(^{16}\)**

**Male - 1/4 inch TRS vs. TS\(^{17}\)**

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General Safety Precautions

Audio equipment can range from basic and very affordable to professional grade and very expensive. The working elements inside cables, amplifiers, and mixers have extremely sensitive parts that are wired for proper electronic signals to pass from channel to channel. When an electronic device is wired incorrectly, even on the smallest of parts, enough damage can be done to create a power shortage and destroy equipment. The financial burden of a wiring mistake can be cumbersome but there are also irreparable health risks to hearing loss due to possibilities of loud and unexpected feedback.

A general precautionary measure when working with electronics is to keep all devices such as amplifiers, mixers, and any hardware plugged into a power source switched off or unplugged from the power source to prevent potential damage when connecting cables and adapters. Unplugging and plugging in a set of cables connected to an amplifier with live power creates a loud crack and electronic hum noise in the amplifier and can potentially lead to damaged equipment and hearing. Another general rule to operating electronics such as microphones, mixers, and amplifiers is to power them up in order of input. For example, a monitor speaker with connecting microphone would have the following powering sequence: microphone, pre-amplifier, amplifier. All three of the pieces in this study have similar power sequences that begin with a microphone and end with an amplifier. It is recommended for each of these pieces to switch on the power of the amplifier last when setting up the required equipment. When powering off the electronic set-up, the sequence will be in reverse, the first power source switched off being the amplifier.
Performance Considerations

Equipment Placement

When performing a solo with an instrument such as piano, the soloist and
accompanist have the ability to adjust the ensemble balance during a performance. There
is a reactive interaction between performers unlike when performing a solo with a CD or
digital playback. To alter balance when performing with electronic media, dials and
sliding paddle shifters adjust the accompaniment levels. Without the help of an audio
technician, making adjustments while performing is impractical and can create a
distraction away from performing the solo part.

One solution to these built-in problems of ensemble balance when performing
with amplifiers and/or CD and digital playback is placement of equipment. Placing
amplifiers behind the performer and the input source (a microphone) increase the
possibility of creating unwanted feedback; it is recommended to have the speaker(s)
placed in front of the performer. As a result of the amplifiers being placed in front of the
performer, there is an inevitable delay of sound that can effect playing in time with the
projected sound. A practical solution to this problem is placing a monitor speaker on the
floor in front, angled, and facing towards the performer. If any feedback is experienced in
this recommended set-up, it can be determined to come from the monitor and adjusted
easily. In the event that an additional monitor speaker is not available, the soloist can
connect earphones to the sound system and use either the left or right earphone while
performing. This method is not recommended due to the lower volume levels compare to
a monitor speaker and possibilities of the earpiece falling out of the ear.
With the use of pedals and digital sound processors, accessibility to the devices is a priority. *Let There Be Funk, Fantasy on “Night,” Opus 46, and Susurration* require efficient activating and deactivating of sound effects while performing, one instance only giving the performer a fraction of a second to change effects. All guitar effect pedals and digital sound processors should be in close proximity to the performer to allow for any changes of sound effect in the music. Additionally, dynamic microphones should be placed in a close location to the bell of the instrument but far enough away that it won’t be bumped into during performance; this does not apply to the recommended use of a clip-on, condenser microphone due to the freedom of motion compared to a stationary, dynamic microphone.

**Practice Set-up**

To prepare for a solo performance of an unaccompanied or a piece with piano accompanied, a rehearsal in the venue helps solidify sound balance and logistics prior to the day of a schedule performance. For a solo with live electronic media, an essential portion of the performance preparation is the electronic set-up, specifically the routing connectivity. When dealing with electronic signals, set-up can be simplified to simple inputs and outputs. Each electronic device, including pre-amps, guitar pedals, and digital sound processors have clear labels and respective designations for “INPUT” and “OUTPUT.” Provided you have the proper cables for connectivity, setting up and routing the input and outputs correctly should have the same priority of preparation as practicing the music. The advantage to practicing plugging in and setting up your electronic system is the ability to be self-sufficient in any situation and any venue while also having the
knowledge needed to troubleshoot any problems that may occur once the devices and
speakers are connected and prepared for a sound check.

Backup Equipment

Performing euphonium repertoire with electronic accompaniment includes
additional precautions in comparison to unaccompanied or traditional accompanied
literature. One of the most overlooked aspects of electronics is considering their power
source. A performing venue will presumably have a wall socket to plug in needed
speakers, AC adapters, and mixers unless you are in a remote location. If you are not
familiar with the venue in which you are performing, a very important factor to consider
is accessibility to the power source by way of extension cords. Most performing venues
will have a supply of basic extension chords however it is not always guaranteed. If you
are performing a euphonium solo that requires live stage electronics, it is highly advised
to include a backup extension chord in your required equipment to prevent any
unnecessary stress prior to a performance; a twenty-five foot extension chord is
recommended for both length and reasonable storage size for travel.

In addition to the AC adapters, speakers, and mixers you might require, another
backup power source to consider are batteries needed for devices such as guitar pedals.
Guitar pedals include the option of power through an AC adapter. Power adapters are not
included with the purchase of a guitar pedal and are an additional cost. If you choose to
use power adapters for each device, you will need to include a power strip in your
required equipment. The default power source for a guitar pedal is a 9V battery. As a
precaution for a faulty battery or lower power from hours of use in preparation for the
performance, it is highly advised to have backup 9V batteries. Most guitar pedals include
a pilot light with the word “check” or “power” above it as a status of power source. When the light is dim, the battery has low power and is sending a low signal from the microphone, to the guitar pedal, and through the speaker. The guitar pedal will still function however the quality of the guitar pedal effect will be poor; this can be an important factor when troubleshooting a crackling or fuzzy sound from the speaker.

Commonly passed over aspects of preparing electronic equipment are backup cables. It only takes one connector or one strand of cable connection to fail for the entire electronic set-up to fail. Power cables and batteries are much more common to find in any given performance venue than specific cables such as XLR female to 1/4 inch TRS male or XLR male to 1/4 inch TRS male. It is recommended to include in your equipment one backup cable for each required cable.

Aside from the physical electronics needed to amplify an effected sound, Neal Corwell recommends to “always make a test of the equipment as far in advance of the recital as possible and be sure to make a backup copy of the accompaniment.”\(^{18}\) In addition, it is advisable to have multiple sources such as an MP3 player or a storage drive containing the digital file that can be accessed for the accompaniment aside from a CD, which that can be scratched or unrecognized in an older device.

**Method of Examination**

*Let There Be Funk* (2001), *Fantasy on “Night,” Opus 46* (2004), and *Susurration* (2014) represent a wide variety of technology found in modern euphonium repertoire with electronic media. These three pieces have similar requirements in operating devices while performing with a CD accompaniment yet each piece possesses unique technical

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\(^{18}\) Neal Corwell, “*Original Compositions for Solo Euphonium with Tape*” (DMA Diss., University of Maryland College Park, 1996), 12-13.
and musical challenges to the performer. *Let There Be Funk* and *Fantasy on “Night,”* *Opus 46* are both published works while *Susurration* is unpublished but available from the composer. The dates provided for all three of these works are the original dates of composition. With the exception of *Susurration, Let There Be Funk* and *Fantasy on “Night,” Opus 46* have publication dates much later than their original composition.

The main objective of this project is to develop a greater understanding of new technology used in modern electroacoustic euphonium repertoire while presenting methodical solutions to technical problems in performing each piece. Since each of these works are either newly discovered or recently published, there is a brief description of background information supplied by each respective composer. Following the background information are recommendations for devices required and visual diagrams of suggested placement for each device for effective operation while performing. Included beneath each diagram is a list of optimal equipment to be used such as cables, microphones, and audio speakers. In addition, there is a section on operating each guitar effect pedal and digital channel processor with specifics on dial functions and the ideal setting for each piece.
CHAPTER 2

LET THERE BE FUNK (D. EDWARD DAVIS)

Background

D. Edward Davis originally composed *Let There Be Funk* (2001) for solo tuba with a two-channel digital playback accompaniment but later created an adaptation for euphonium in 2015. This adaptation was created with collaborative help from David Thornton and includes the use of CD accompaniment and electronic media to achieve the sound of the original instrumentation. The live sound effect used to adapt this work is amplified euphonium through an octave effects guitar pedal. The program notes from the original score for tuba reads:

*Let There Be Funk* is a turn-of-the-century synthesis of American music-for-the-hips from the past 30 years, including funk, hip-hop, salsa, R&B, and soul.

Though I consider myself primarily a composer of so-called classical music or art music, I find it impossible to ignore “non-classical” developments in the music around me. Instead, my compositions are influenced by a wide variety of music, even popular genres like funk and hip-hop. In the case of *Let There Be Funk*, the resulting piece is a sometimes-fragmented (but always funk) collage of sorts; it is a full body workout for the performer, and perhaps for the audience as well.\(^\text{19}\)

*Let There Be Funk* takes its name from a song written in 1977 by singer/pianist Patrice Rushen. The background for the piece’s creation stems from a tuba-euphonium quartet piece *SCADIOT* (1999) written for a close colleague, Mark Carlson. The piece “mix[e[s] a dense chromatic polyphonic section with a funky breakdown (with pre-
This piece was written for Rex Martin, tuba professor at Northwestern University and quartet coach to Mark Carlson. The composer writes,

I was pleased with [SCADIOT] and so was Rex Martin, who was the chamber-coach of the quartet. He asked for a solo that was similar to SCADIOT and so Let There Be Funk was born. I reused some of the material from the quartet (it’s the end part of Let There Be Funk with the whispering rap and the “HO!” part), and added a number of new sections. Mark recorded the euph[onium] harmonies, Rex recorded the “pre-recorded tuba” parts, and Brian James played the drums. I put keyboards, guitar, and my voice on there. I edited them all together on a Digital Audio Workstation (this was before ProTools and Logic were widely available, so it was a little more work).

Recommended Devices

In addition to guitar effect pedals, there are many devices that offer an octave or double octave effect such as the Behringer Virtualizer 3D FX2000. Due to the very fast changes of effect in the music, a foot pedal device is recommended for the ease of coordination between the solo and accompanying effects. The recommended device to use for a performance of the euphonium adaptation of Let There Be Funk is the Boss OC-3 Super Octave guitar pedal. This device provides options for one or two octaves below the sound source and is ideal for the quick shifts between effected and unaffected sounds in Let There Be Funk. This guitar effect pedal provides a variety of lower octave options for the performer to experiment for their personal liking (See the “Device Operation” section in this chapter for description of dials and features). The cost of the Boss OC-3 Super Octave guitar pedal ranges between $50 (used) to $100 (new).
The digital playback require for this piece can be downloaded for free from the publishing company, Prima Vista Musikk’s “Downloads” page.\(^{23}\) In order to amplify the digital playback, a 3.5mm (headphone or earphone) jack input and cable or a CD player with the digital playback file copied onto a CD will be needed.

Performance Set-up

The recommended performance set-up for *Let There Be Funk* can be found in Figure 1. Included in the diagram are routing (input and output) labels to help the layout of the electronics and their connecting cables. The “Pre-amp/mixer” is label as such to give the performer the option of choosing between a dynamic microphone with a mixer or choosing a condenser microphone with phantom power (pre-amp). An AC adapter for the guitar effect pedal is not included in this diagram. The performance notes from the original, unpublished score for tuba reads:

The live tuba part is performed with the accompanying two channel digital playback (CD). The CD is to be played at a moderately loud volume (not as loud as a standard rock concert, but loud enough to suggest a similar atmosphere). If necessary, the live tuba may be miked and amplified to balance the levels between the prerecorded and live parts. Energy and rhythm are the key expressive elements of the piece and should be considered superior to concerns of intonation, pitch, dynamics, etc.\(^{24}\)

The given angle and placement of the speaker in Figure 1 will ensure a “rock concert” ensemble balance recommended from the program notes.


FIGURE 1: Recommended Performance Set-up for *Let There Be Funk*

**AUDIENCE**

**STAGE**

Recommended and required electronic equipment (excluding the Boss OC-3 Super Octave guitar effect pedal):

- **x1** Microphone: Recommendation: Shure Beta 98 H/C - $200, Other: Shure sm58 dynamic mic - $100
- **x1** Pre-amp: Shure Beta 98 H/C: Sterling Audio PHP1 Phantom Power Supply box - $50, Shure sm58 dynamic mic: Behringer Xenix 1204USB - $150
- **x2** Speakers: one monitor and one speaker for the audience (any 2-channel speaker with 300-1000W) - quality brands: JBL, FBT, QSC, Yamaha
- **x2** Cable: XLT female to XLT male - 25+ feet (microphone to pre-amp) - one connects the mic to the pre-amp, the other connects the speaker to the monitor
- **x1** Cable: XLT female to 1/4 inch TRS male - connects the pre-amp into the guitar effect pedal
- **x1** Cable: 1/4 inch TRS male to 1/4 inch TRS male (25+ feet) - connects the guitar effects pedal to the amplifier
Device Operation

The check indicator light at the top of the device will illuminate when the power is on, and will turn off when the power is off. If you use an AC adapter for the power source to this device, the pilot light will turn on immediately once plugging in the chord. If you use a 9V battery instead of the AC adapter, the check indicator light will not turn on without plugging a 1/4 inch TRS male cable into both the GUITAR IN and the OUTPUT (Mono). The 1/4 inch male inputs do not have to be from two, separate cables; the input can be from the same cable to check the power. See Figure 2 for details on the function of each dial.
The performer should make adjustments to each dial setting after trial and error. It is recommended to ask for help when checking these dial levels in a performing venue.

The Direct Level dial can be adjusted either lower or higher depending on the quality of amplifier you have. The greater the wattage of the amplifier, the closer to unity you want

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the Direct Level to be. This principle also applies for the OCT 1 level knob and the control knob. Figure 3 is a recommended setting for performing Let There Be Funk with an amplifier of approximately 1000W (recommended equipment: FBT speaker).

FIGURE 3: Recommended dial settings for Let There Be Funk - Boss OC-3 Super Octave

Performance Study

One of the most unfamiliar performance genres for a euphoniumist is jazz. For this reason, the most challenging portion of Let There Be Funk is a swung rhythm in the appropriate funk sections of the music. These passages “move between tempos in a schizophrenic way, deliberately unsettling the listener and cleverly weaving a structure that builds throughout the work.”26 Another interpretation for these quick changes in tempos is imagining the composer flipping through radio stations between funk, hip-hop, salsa, R&B, and soul. The first fifteen measures in this piece represent a reoccurring funk theme throughout the work, returning as short interjections between sections. The written part provides only a small portion of slur markings and very minimal ideas of style markings to accomplish an appropriate funk feel.

26 David Thornton, “Performance Portfolio” (DMA diss., University of Salford, 2015), 11.
Rhythm is one of the determining factors in interpreting a swing style. The funk sections are primarily written in sixteenth notes.

Ex. 1: Davis: *Let There Be Funk*,\(^{27}\) mm. 2-8, opening section

The easiest approach to playing in a swing style is by changing the sixteenth notes into eighth sixteenth triplets (\(\frac{8}{16} = \frac{1}{4} \cdot \frac{3}{8}\)). This altered rhythm should have a lilting feel and the weighted emphasis should be primarily on the eighth note in each triplet grouping. Subsequently, the following sixteenth note in each group of triplets should almost be “ghosted,” or barely audible.

Another solution to playing in a swing style without sounding too “square” or academic is by adding slur and articulation markings. The euphonium has the ability to slur a passage and make it sound like a legato articulation without having to actually articulate in the mouthpiece.

Ex. 2: Davis: *Let There Be Funk*,\(^{28}\) mm. 2-8, with added slur and articulations

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\(^{28}\) Ibid.
This pattern of slur and articulation markings can be followed throughout the work, placing the slur marking from the first to second and third to fourth note in each sixteenth note grouping and placing a staccato marking over the second and fourth note. Before performing with the digital playback at a performance tempo, practice the added markings at a slow tempo with exaggerated emphasis.

In order to create a similar work to the original score, this adaptation utilizes an octave effect to mimic the lower tessitura of the tuba. During the lyrical sections where the accompaniment has more of a rock ballad feel the octave effect is turned off; there are two sections where this happens: pick up to mm. 38-51 and mm. 60-65.

Ex. 3: Davis. *Let There Be Funk*,\(^{29}\) mm. 38-51, quick effect changes

Ex. 4: Davis. *Let There Be Funk*,\(^{30}\) mm. 60-65, quick effect changes

Davis marks points in the music where the octave pedal should be activated and deactivated. In Ex. 3, the performer has an eighth rest in m. 38 to deactivate the octave effect and only a sixteenth rest to make the change in m. 60 (See Ex. 4). There is not an


\(^{30}\) Ibid.
adequate amount of time to search for the location of the pedal with your feet during the performance. Feeling around with your foot for the pedal can either delay the effect from being activated/deactivated or cause a late entrance. For performers who choose to use a stationary dynamic microphone, moving around to find the pedal can cause inconsistencies in the input levels on the microphone.

Ex. 5: Davis, *Let There Be Funk*,\(^{31}\) mm. 32-39, with added pedal markings

To alleviate this issue, personal markings should be made during slower and easier passages to locate the pedal and, if possible, have your foot placed on it in advance. Mm. 35 and 36 are ideal places in the music to locate the pedal, take a full breath, and to place your foot on the pedal due to the very repetitive line.

The next pedal change occurs between mm. 51-52 and should be approached in a unique fashion. The shortest duration between an unaffected sound and an effected sound is only 9 measures long.

Ex. 6: Davis. *Let There Be Funk*,\(^{32}\) mm. 52-61, pedal recommendation

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\(^{32}\) Ibid.
In this section, there is not an easier passage to take your eyes off the music to locate the effect pedal; m. 60 only provides a sixteenth rest to activate the effect. The soloist should leave their foot in position from m. 51 to 61 in order to have ease in performing the music without being distracted by finding the effect pedal.

The final difficult pedal change happens in m. 180, near the conclusion of the piece when the funk theme from the beginning returns.

Ex. 7: Davis. *Let There Be Funk*,\(^{33}\) mm. 172-181, pedal recommendation

This reoccurring funk theme is very repetitive and allows for flexibility in choosing where to locate the pedal and having your foot ready to make the sound effect change in m. 180. I recommend having your foot placed on the pedal by m. 178 and to have m. 179 memorized, ensuring the pedal is deactivated at the precise moment it needs to be.

With exception to only two moments of rest, this piece is an incessant test of endurance.

Ex. 8: Davis. *Let There Be Funk*,\(^{34}\) mm. 160-171, breath mark and fingering suggestions

For a majority of this piece, the role of the soloist is to represent a bass line against a funky digital playback accompaniment. In this section, the soloist represents both the bass line and, what would be in a funk song, horn interjections simultaneously. The breath marks and fingering suggestions in Ex. 8 will aid in playing through this unceasing section of notes.

While performing with the Boss OC-3 Super Octave pedal, it is easy to assume the effect pedal will correct any imperfections when performing such as duration of notes and accuracy. It should be noted to the performer that the sound you produce will be amplified through the effect pedal regardless of pitch or stability of tone. For this reason, notes immediately before the ends of phrases and moments prior to taking a breath should be given extra attention to prevent the imitated bass guitar sound from being played uncharacteristically short.

*Let There Be Funk* is recommended as an introduction to performing euphonium repertoire that uses both live electronic media and digital playback.

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Background

Fantasy on “Night,” Opus 46 was written in 2004 and is in the final publishing stages under the composer’s personal publishing label, Nicolai Music. This piece was created from thematic material taken from the final movement of Neal Corwell’s first unaccompanied euphonium solo, Four Short Narratives (1981) titled “Night”. The composer supplied the following program notes for this piece:

The Fantasy begins with a complete statement of “Night” in its original unaccompanied form. As this statement of the source material for the composition comes to a close, a pre-recorded accompaniment enters softly, and the Fantasy, a development of materials presented in “Night”, begins. From this point on, the euphonium actively develops thematic material; presenting motivic material in constantly varied landscapes and spinning out new patterns from the original source material. The primary function of the pre-recorded accompaniment is to provide rhythmic drive to push the work forward. The accompaniment falls silent during the central portion of the Fantasy, as various developmental episodes are presented, but returns for the final minutes as the work builds to a dramatic and exciting climax featuring closely juxtaposed statements of previously stated material. The fast tempo and forward motion is temporarily suspended near the end for one final statement of the five-note “Night” theme, but the rapid tempo resumes to bring the work to an exciting conclusion.  

Although the work has a completion date of 2004, Neal Corwell premiered this piece in 2003 during the Army Band Tuba Euphonium Conference at Fort Myer in Arlington, Virginia.

Fantasy on “Night,” Opus 46 uses live electronics with CD accompaniment. It should be noted that live electronics are optional and the piece can be performed as written with the CD accompaniment. The composer describes the accompaniment:

35 Neal Corwell, Email to the author, March 31, 2017.
The pre-recorded accompaniment is divided into two tracks: one for the start of the *Fantasy*, and the other for the conclusion. Both tracks begin with subtle wind-like sounds, which allow the recording to “sneak in” undetected under the cover of the solo line. With the exception of a few digitally altered snippets of euphonium, which appear in bars 36-52, the pre-recorded audio does not itself take part in the development of materials. Instead, it is used to create a distant and eerie atmosphere and supply a vigorous rhythmic underpinning for the solo euphonium. Most of the accompaniment was created by using a relatively simply and inexpensive audio effects module, manufactured in the 1980s by Roland/Boss, called the SE-70. This processor is used primarily to create arpeggiated patterns, with the composer using his voice, and tongue clicks, to trigger the module effects.\(^{36}\)

**Recommended Devices**

The sound effects used in this piece are optional and the composer allows for a freedom of choice in the type of effect to be used:

Instead of designating specific algorithmic parameters or components of audio equipment, general instructions are provided as to the types of effects preferred. Much flexibility provided in this regard. As soon as the accompaniment begins, the soloist is to add reverb to the live solo, and maintain application of that effect through the end of the composition.\(^{37}\)

In an email conversation about the type of effect required, Neal Corwell says to “add reverb/delay/echo of your choice to the solo ONLY (not the playback of CD accompaniment). Moderate to strong, very noticeable ‘reverb’ is preferable. A panned delay (one that bounces back and forth between left and right channels) is good, but anything that creates the effect of playing in a large reverberant space will be good.”\(^{38}\)

One recommended device to achieve this sound effect is the Boss DD-7 Digital Delay guitar pedal. This device offers a multitude of modes and time delays to choose from to achieve a variety of delays/echoes required in this piece. Although the Boss DD-7 Digital

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\(^{36}\) Neal Corwell, Email to author, March 10, 2017.

\(^{37}\) Ibid.

\(^{38}\) Ibid.
Delay guitar pedal is the recommended device, any guitar pedal can work. In the “initial performances, the composer used a Roland SE-70, the same [effects] module used for creation of the accompaniment, for processing the live solo. However, he now uses a guitar stomp box, specifically a Boss ME-33.”39 The Boss DD-7 Digital Delay guitar pedal costs between $75 (used) and $150 (new).

Similar to Let There Be Funk, Neal Corwell requires the use of an octave effect in this piece by suggesting that “a ‘phat’ (rich) sound is preferred.”40 The recommended device for this effect is the Boss OC-3 Super Octave guitar pedal. (See Chapter Two, Recommended Device sub-chapter for information on this device). In performing multiple electroacoustic pieces on the same program, utilizing the same equipment for similar effects can be both cost efficient and simplify the set-up process.

One of the more subtle sound effects required in Fantasy on “Night,” Opus 46 is a ring modulator effect. The composer gives alternatives to this very specific sound effect: “I use a ring modulator effect and use a foot pedal to alter the frequency response of the modulator to create strange and unexpected results. If you don’t have something that can create a ring modulator effect, or prefer a different effect, anything that sounds strange or bizarre, will suffice.”41 One recommended device to achieve a similar sound effect to a ring modulator is the Lexicon MPX100. While this device no longer manufactured, a used Lexicon MPX100 costs between $50-75. Other digital sound processors, such as any MPX model between 110-200 will also work but will cost between $100-200.

39 Neal Corwell, Email to author, March 10, 2017.
40 Ibid.
41 Ibid.
Performance Set-up

The recommended performance set-up for *Fantasy on “Night,” Opus 46* can be found in Figure 4. Included in the diagram are the same parameters described in Chapter Two regarding routing (input and output) labels, a pre-amp/mixer label, and recommended speaker placement. The order of devices is important to adhere to when setting up the sound effects required for this piece. The delay/reverb/echo effect is first used on page two of the solo and stays activated for the duration of the piece. The other required effects such as octave multiplier and modified ring modulator are used sparingly much later in the music. These later effects will need to be applied only to the direct input/unaffectedin signal (euphonium sound through the microphone) instead of the already processed sound/effectedin signal (the digital sound processor- MPX100). The order of devices must be Boss OC-3 pedal > Boss DD-7 pedal > Lexicon MPX100. The Lexicon MPX100 is a thin device and will need to be elevated on a small table for easy access to the control dials. Although the dials themselves will not need to be altered after a sound check in the performing venue, the “bypass” selector will need to be accessed during the live performance.
FIGURE 4: Recommended Performance Set-up for *Fantasy on “Night,” Opus 46*

Recommended and required electronic equipment (excluding the Lexicon MPX100, Boss OC-3 Super Octave pedal, and the Boss DD-7 Digital Delay pedal):

- **x1** Microphone: Recommendation: Shure Beta 98 H/C - $200, Other: Shure SM58 dynamic mic - $100
- **x1** Pre-amp: Shure Beta 98 H/C: Sterling Audio PHP1 Phantom Power Supply box - $50, Shure SM58 dynamic mic: Behringer Xenix 1204USB - $150
- **x2** Speakers: one monitor and one speaker for the audience (any 2-channel speaker with 300-1000W) - quality brands: JBL, FBT, QSC, Yamaha
- **x2** Cable: XLT female to XLT male - 25+ feet (microphone to pre-amp) - one connects the mic to the pre-amp, the other connects the speaker to the monitor
- **x1** Cable: XLT female to 1/4 inch TRS male - connects the pre-amp into the Boss OC-3 Super Octave pedal
- **x3** Cable: 1/4 inch TRS male to 1/4 inch TRS male (25+ feet) - one connects the Boss OC-3 Super Octave pedal to the Boss DD-7 Digital Delay pedal, the next connects the Boss DD-7 Digital Delay pedal to the Lexicon MPX100, and the last one connects the Lexicon MPX100 to the amplifier
Device Operation

Two of the three required sound effects in this piece can be accomplished with guitar effect pedals: the octave effect and the delay/reverb/echo effect. As mentioned in Chapter Two, the guitar pedals are powered either by an AC adapter or a 9V battery. To test the 9V battery on the Boss DD-7 Digital Delay guitar effect pedal, follow the same procedure as the Boss OC-3 Super Octave guitar effect pedal. Additionally, the recommended settings for the Boss OC-3 Super Octave pedal will be the same (See Figure 3). Unlike guitar effect pedals, digital sound processors can only be powered by an AC adapter. Once the power source is plugged into the MPX100, a series of check indicator lights on the device will flash a number of times to indicate that it is powered on. To check whether the device is ready to be used, press the “bypass” button. If the indicator light stays on, it is ready; if a light does not come on, the device needs to be repaired or replaced.

Similar to Let There Be Funk, this piece is accompanied by a CD track. The two options for operating the electronic accompaniment is using a CD player for the provided CD or uploading the CD tracks to a computer and plugging in an MP3 player or similar device to a 3.5mm (headphone or earphone) jack input. Regardless of which option you choose, you should have a backup copy of the electronic accompaniment (see Chapter One, Backup equipment).
FIGURE 5: Dial function and description of modes of Boss DD-7 Digital Delay

FIGURE 6: Recommended dial settings for *Fantasy on “Night,” Opus 46* - Boss DD-7 Digital Delay

![Recommended Dial Settings](image)

FIGURE 7: Dial function and description of the front and back panel of the Lexicon MPX10043

![Dial Function](image)

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FIGURE 8: Recommended dial settings for Fantasy on “Night,” Opus 46 - Lexicon MPX100

Performance Study

*Fantasy on “Night,” Ops 46* can be interpreted as the combination of an unaccompanied and accompanied solo. Figure 14 outlines the alternation of accompaniment and effects used throughout the piece.

FIGURE 9: *Fantasy on “Night,” Opus 46*, outline of accompaniment and effects

This piece contains a mixture of technical challenges and added coordination with being in control of a two-track electronic accompaniment. Neal Corwell gives the performer the option of using live electronics however the electronic accompaniment is not optional and requires careful preparation while performing. The extended techniques utilized in this piece are half-valve glissandi, flutter tonguing, and valved tremolos.
Ex. 9: *Fantasy on “Night,” Opus 46,* m. 18, descending half-valve glissando

![Descending half-valve glissando](image)

In a set of performance instructions at the bottom of page one of the solo, the composer writes for *3: “Use half-valves to slide down to the pedal A-flat.”*\(^4\) When compressing the valves down halfway, the air is restricted and creates backpressure in the mouthpiece. The challenge with Ex. 9 is that this particular descending half-valve glissando is written at a mezzo piano dynamic. When performing this glissando, the temptation will be to back off the amount of air needed to play in the pedal register when met with resistance, resulting in either a thin tone quality or an unresponsive note as you descend to the lower Ab. Practice finding a balance between a column of air that will both match the restricted airflow from the half-valve compression and support the pedal tone; slightly compressing the fourth valve will help control this descending glissando. This extended technique is also found in mm. 87-90, mm. 97-100, mm. 202-207, and mm. 271-272.

Ex. 10: *Fantasy on “Night,” Opus 46,* mm. 87-88, descending half-valve glissandi

![Descending half-valve glissandi](image)

\(^4\) Ibid., 1.
\(^4\) Ibid., 3.
Unlike the one octave glissando in Ex. 9, this reoccurring example of glissandi extends the interval to three octaves and is played twice as fast. One method to accomplishing a glissando on the euphonium is to play a lip slur with valves halfway down, playing as many notes in the harmonic series as possible. The embouchure must be able to easily shift from firm to relaxed and the space between the top and bottom note needs to be connected. These descending glissandi can be difficult to perfect. Ascending glissandi provide a different set of challenges to the performer.

Ex. 11: *Fantasy on “Night,” Opus 46*, m. 266, ascending half-valve glissando

![Ascending glissando example](image)

In Ex. 11, the difficulty in performing this ascending glissando is shifting from the lower register to the upper register in a controlled fashion while attempting to properly crescendo out of a fortепiano dynamic. One suggestive approach to performing this glissando is to create octave checkpoints within the sustained note, glissing at a piano to mezzo piano dynamic from E2 to E3 for the first two beats of m. 266 and continuing from E3 to E4 at a mezzo forte to forte dynamic for the last two beats of the measure.

Earlier examples of ascending glissandi happen in mm. 224-226.

Ex. 12: *Fantasy on “Night,” Opus 46*, mm. 224-226, ascending half-valve glissandi

![Ascending glissando example](image)

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48 Ibid., 6.
Although similar in direction to Ex. 11, these ascending glissandi should be played similar to an approximated rip of sound upwards. Instead of slowly compressing the valves down and controlling the airstream like in earlier examples, these fast glissandi can be played by quickly pressing the valves halfway down from ring finger to index finger, creating a visual wave of fingers.

The flutter tongued sections in mm. 15-16, mm. 231-236, and m. 255 are unaffected and the flutter tonguing in mm. 175-176 is effected by either a flange or ring modulator effect.

Ex. 13: *Fantasy on “Night,” Opus 46,* mm. 231-236, flutter tonguing

There are two methods to achieving flutter tonguing: “The first method entails using the back of the tongue, similar to gargling water or rolling the letter “r” in speech patters. The second method involves sticking the tongue forward and toward the roof of the mouth and using a very focused and fast air stream to rapidly blow through the tongue position.”

The valved tremolo is another extended technique utilized in *Fantasy on “Night,” Opus 46.* Examples of this extended technique are found in m. 10, m. 48, mm. 50-51, and m. 220.

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Ex. 14: *Fantasy on “Night,” Opus 46,*\(^5\) m. 10, valved tremolo

The composer’s note for *1 are: “Create a tremolo effect by alternating between 0 & 2/3 fingering. Start slowly, and then accelerate with crescendo.”\(^5\) Another type of valved tremolo is found in m. 48.

Ex. 15: *Fantasy on “Night,” Opus 46,*\(^5\) m. 48, valved tremolo

Instead of articulating each note, alternating between (2) and (2,4) will help create a more controlled and dramatic accelerando in this feathered beaming example.

Although the extended techniques are limited to half-valve glissandi, fluttered tonguing, and valve-tremolos, the technical challenges and musical demands make this piece amongst the most difficult in the repertoire.

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\(^5\) Ibid., 1.
\(^5\) Ibid., 2.
Ex. 16: *Fantasy on “Night,” Opus 46*,\(^{54}\) mm. 62-63, two octave leaps

Similar to the previous wide-leaping glissandi later in the piece, this passage requires a more precise execution without a glissando between the octaves. The embouchure has to be just as flexible as before, yet much more exact than in the glissandi. Other passages that require tremendous flexibility are m. 55 and mm. 134-138.

Ex. 17: *Fantasy on “Night,” Opus 46*,\(^{55}\) m. 55, flexibility (slurred)

Ex. 18: *Fantasy on “Night,” Opus 46*,\(^{56}\) mm. 131-138, flexibility (articulated)

\(^{55}\) Ibid., 2.
\(^{56}\) Ibid., 4.
The added challenge with Ex. 18 is the duration of the phrase. These seven measures are written with continuous eighth notes with no space between notes to take a breath. The composer intentionally writes this section at a mezzo forte dynamic to provide the opportunity of making the long phrase without having to skip a note for a breath. It is essential to abide by this dynamic marking despite the quick shifts between the low and upper register.

The most challenging musical demand of this piece is range. The lowest note written is an optional 8vb Eb₁ with multiple E₁s written throughout and the highest note written is an E₅ with multiple occurrences of Eb₅ and C#/Db₅.

Ex. 19: *Fantasy on “Night,” Opus 46*, 57 mm. 125-128, extreme upper register

Ex. 20: *Fantasy on “Night,” Opus 46*, 58 mm. 38-40, extended pedal register

An additional challenge to playing in this extended pedal register in Ex. 20 is accounting for the resistance caused by the mute. Practice until you find a balance between an instant response of the note and a mezzo piano dynamic.

58 Ibid., 2.
Another set of challenges to performing this piece is logistical aspects to operating the required equipment.

Ex. 21: *Fantasy on “Night,” Opus 46*,\(^{59}\) mm. 34-35, logistics

Whenever possible, an audio technician should be used when performing this piece. In Ex. 21, the soloist is required to start Part 1 of the CD accompaniment by pressing “Play,” create a live sound effect by blowing air through the instrument, and inserting a mute for the following section within a timeframe of only three measures. It should be noted that if a clip-on condenser microphone is being used, take caution when inserting the mute to avoid bumping the mic and creating unwanted noise. Another section where an audio technician would help with the logistics is in m. 142. Without assistance, the four counts of rest between mm. 142-143 is an option to reach over to your playback device and press “Pause” so the CD accompaniment does not continue on to Track 2.

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Background

Susurration was written for and premiered at the University of Salford in 2014 by David Thornton, Senior Tutor of Brass Band at the Royal Northern College of Music. In a Facebook message, Lucy Pankhurst provided her creative inspiration to write this piece:

We live not far from the river Mersey, so there are lots of birds that tend to congregate nearby, such as starlings, gulls, geese, ducks and moorhens etc. One of my earliest memories is seeing a susurration of starlings swirling through the sky near the cooling towers of Fiddler’s Ferry Power Station (that we affectionately referred to as the ‘Pepper Pots’ due to their shape!) I remember being mesmerised by them, thinking it was actually pepper from these ‘pepper pots’ magically flying through the air. The starlings also like to roost on the Widnes-Runcorn Bridge, so it is a common occurrence to see them dare-devil flying en-masse around the bridge, down to the river and back again. The sight of them is really quite beautiful - similar to a shoal of fish darting about like one entity. Seeing this in more recent years gave me ideas of sounds and structure, watching the birds move, tracing the same shapes in the sky.

I wanted to use these ideas within a piece of music to create different textures and harmonies, so began by writing melodic lines to illustrate the birds flying, chattering and swooping etc. The piece grew organically from there, with several extended performance techniques adding to the sound world.\(^{60}\)

The composer provides a definition to the title of the work in the beginning pages to the solo part: “A ‘susurration’ is the collective noun for starlings, but also means a ‘whispering or rustling’.”\(^{61}\) The live sound effects chosen by Pankhurst are digital delay and recorded loop through amplified euphonium. In a traditional sense, Susurration would be considered an unaccompanied piece without either a physical accompanist of CD/digital playback track. Recorded loops and digital delays provide unique performance effects that give the illusion of an accompaniment: “the digital aspect of the performance

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\(^{60}\) Lucy Pankhurst, Facebook message to author, March 31, 2017.

\(^{61}\) Ibid.
creates the ‘susurration,’ with the digital delay allowing the melodic/rapid lines to repeat and follow each other and the recorded loops giving the idea of more players, like reflections in the water as the birds fly by.”62

**Recommended Devices**

Due to the wide variety of options of delayed sound effects, the Boss DD-7 Digital Delay is the recommended device to perform this piece. The recorded loop effect can be achieved by any RC loop station models. The number of digits in each model determines the number of pedals included on each device. The two and three-digit models have additional features such as greater memory bank and phantom power capabilities however cost much more than the single-digit models. The recommended device for this piece is the Boss RC-3 Loop Station pedal. The cost of this pedal ranges between $100 (used) and $180 (new). Another suitable device with similar features is the Boss RC-2 Loop Station pedal. The Boss RC-2 Loop Station pedal is no longer made and is only available used.

**Performance Set-up**

The recommended performance set-up for *Susurration* can be found in Figure 9. See Chapter Two for the description of labels in Figure 9. Similar to *Fantasy on “Night,” Opus 46* the order of devices used in *Susurration* is determined by the function of each guitar effect pedal used. The order of required effects is loop pedal only (accompaniment) → delay pedal only (solo) → loop pedal (accompaniment) + delay pedal (solo only, not accompaniment) → delay pedal only (solo). In order to keep the recorded loop tracks

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unaffected by the delay pedal, the Boss RC-3 Loop Station pedal needs to be set as the last effect in the daisy chain (or the closest effect pedal to the amplifier).

FIGURE 10: Recommended Performance Set-up for *Susurration*

**AUDIENCE**

![Diagram of the recommended performance set-up]

**STAGE**

Recommended and required electronic equipment (excluding the Boss DD-7 Digital Delay pedal and the Boss RC-3 Loop Station pedal):

- **x1** Microphone: Recommendation: Shure Beta 98 H/C - $200, Other: Shure sm58 dynamic mic - $100
- **x1** Pre-amp: Shure Beta 98 H/C: Sterling Audio PHP1 Phantom Power Supply box - $50, Shure sm58 dynamic mic: Behringer Xenix 1204USB - $150
- **x2** Speakers: one monitor and one speaker for the audience (any 2-channel speaker with 300-1000W) - quality brands: JBL, FBT, QSC, Yamaha
- **x2** Cable: XLT female to XLT male - 25+ feet (microphone to pre-amp) - one connects the mic to the pre-amp, the other connects the speaker to the monitor
- **x1** Cable: XLT female to 1/4 inch TRS male- connects the pre-amp into the Boss DD-7 Digital Delay pedal
- **x2** Cable: 1/4 inch TRS male to 1/4 inch TRS male (25+ feet) - one connects the Boss DD-7 Digital Delay pedal to the Boss RC-3 Loop Station pedal and the other connects the Boss RC-3 Loop Station pedal to the amplifier
Device Operation

The operation details for the Boss DD-7 Digital Delay pedal can be found in Chapter Three. The Boss RC-3 Loop Station pedal has only one dial to be adjusted once in the sound check: the output knob. The inner knob controls a playback rhythm track that is not needed for Susurration. It is recommended that this knob be turned all the way to the left prior to connecting the Boss RC-3 Loop Station to avoid sudden, unwanted sounds when operating the guitar effect pedal.

The Boss RC-3 Loop Station is powered on by inserting a 1/4 inch TRS male connector into the OUTPUT A (Mono) slot. Test lights will illuminate and the digital display will turn on, displaying the most recent track used. The memory selectors shift between available tracks. In order to delete a recorded track, press and hold the write selector for up to two seconds. Once the track number flashes, press the write selector once more to delete the recorded track.

In order to begin recording, stomp on the pedal once and a red recording light will turn on. Once you finish recording, there are two options when stopping the first recorded track: 1) Overdub - record another track while the first track is played back by stomping on the pedal once or 2) Stop the recording - stomp the pedal twice (this includes stopping the overdub track option as well).
FIGURE 11: Dial function and description of selectors - Boss RC-3 Loop Station

OUTPUT KNOB
- Inner knob adjusts rhythm track (Not needed, turn to MIN)
- Outer knob adjusts the recorded track

WRITE SELECTOR
- Push (x1) to save a recorded track
- Push and hold to delete a recorded track

MEMORY SELECTORS
- Shifts between 16 empty recordable tracks

STOMP BOX
- Stomp (x1) to record a red light will be shown under REC
- OVER DUB: Stomp (x1) to record track over first recorded track
- TO STOP (without overdub): Stomp (x2) to end first recording

OUTPUT JACKS
- Connects device to amplifier
- Use OUTPUT A for amplifier
- Use OUTPUT B for optional monitor
- Plugging in OUTPUT A will power the device

INPUT JACKS
- Connects devices or mics to loop station device
- Recommendation: use INPUT A (Mono)

FIGURE 12: Recommended dial settings for *Susurration* - Boss RC-3 Loop Station

FIGURE 13: Recommended dial settings for *Susurration* - Boss DD-7 Digital Delay

Performance Study

In comparison to *Let There Be Funk* and *Fantasy on “Night,” Opus 46*, Lucy Pankhurst’s *Susurration* contains a wide variety of extended techniques and electronic effects that allows the performer a greater capacity for artistic interpretation. The entirety of this piece is both unmetered and unmeasured and has only four suggestive tempi:
Senza misura e sempre legato (lines 1-5), Allegro agitato e appassionato (lines 6-17), Con anima (lines 18-27), and Affettuoso (lines 27-end).

The interpretive freedom of this unmeasured work can make determining the form very difficult.

FIGURE 14: Susurration, Form outline

The form of Susurration is through-composed with clear sections being marked in the music by either fermata rests or the addition and subtraction of sound effects. One approach to shaping the work in its entirety is by placing a short pause between the sections shown in Figure 14.

The composer provides a series of performance notes prior to the solo score on the abstract and extended techniques. The first illustration of extended technique is the distinction between a flutter-tongued note and a flutter of air.

Ex. 22a: Pankhurst. Susurration,\textsuperscript{64} performance notes, flutter-tongued note

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{susurration_form.png}
\caption{Susurration, Form outline}
\end{figure}

\textsuperscript{64} Lucy Pankhurst, Susurration (Unpublished score, 2014), ii.
The flutter-tongued notes are marked by a ‘Z’ across the stem and have ‘flz’ written above the note. The air flutter is noted in the same way, but also has a crossed notehead (see “Performance Study” in Chapter Two for methods of flutter tonguing).

Not to be confused with a sounding fluttered note, the air flutter effect should be performed by making a “purring” sound with the tongue, ensuring the lips are far enough apart so they do not vibrate in the mouthpiece.

Ex. 23a: Pankhurst. *Susurration*, line 27, air flutter (forte)

Ex. 23b: Pankhurst. *Susurration*, line 29, air flutter (piano)

Each air flutter is written with a decrescendo and small circle at the end of it to notate a niente dynamic. The performer should continue to blow air through the instrument following the initial air flutter sound and allow the delay pedal to create the echoing effect. Regardless of dynamic level, each of the air flutters in Ex. 23 a and b

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66 Ibid., 6.
67 Ibid.
should have a large front of air at the start of each respective note. This effect is meant to represent an echoing whisper and serves as a sudden shock to the surrounding material. In Ex. 23a the melody decrescendos to complete silence before each air flutter, preparing the surprising change in dynamic of this effect. The exception to this extended technique being used as a startling effect is the final air flutter in Ex. 23b. This note serves as a final susurration, or whisper that echoes through the delay effect pedal as a conclusion to the piece.

The next distinction the composer makes is between “quaver” (eighth note) and “semiquaver” (sixteenth note) grace notes.

Ex. 24a: Pankhurst. Susurration,\(^{68}\) performance notes, eighth grace notes

Ex. 24b: Pankhurst. Susurration,\(^{69}\) performance notes, sixteenth grace notes

The composer notes: “‘Quaver’ grace notes should be played with control and definite pitch, whereas ‘semiquavers’ indicate where the notes should sound like an ascending flurry of sound.”\(^{70}\) Each eighth note grace note figure consists of a series of repeating finger patterns.

\(^{68}\) Lucy Pankhurst, Susurration (Unpublished score, 2014), iii.
\(^{69}\) Ibid., iii.
\(^{70}\) Ibid.
Ex. 25a: Pankhurst. *Susurration*,\(^{71}\) line 1 (opening), fingering

![Ex. 25a: Pankhurst. *Susurration*, line 1, fingering](image1)

Ex. 25b: Pankhurst. *Susurration*,\(^{72}\) line 2, fingering

![Ex. 25b: Pankhurst. *Susurration*, line 2, fingering](image2)

These figures primarily occur in the legato and lyrical sections and are mostly repetitions from the opening four notes. Although there are no written articulation markings or slur indications, these figures should be played slurred and as connected as possible. The speed of each eighth note grace note grouping is to be decided by the performer so long as they are played with “control and definite pitch.”\(^{73}\) Example 26 represents an exception to the speed of the eighth note grace note figures that are found in lines 14-17.

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\(^{72}\) Ibid.

\(^{73}\) Ibid., iii.
Ex. 26: Pankhurst. *Susurration*,\textsuperscript{74} line 15, fingering

Due to the initial speed of the feathered beaming, these eighth note grace note figures should be played more quickly than the earlier lyrical sections.

The ascending and descending sixteenth note grace note figures are strictly notes ranging from the second to the eighth note in the harmonic series.

Ex. 27a: Pankhurst. *Susurration*,\textsuperscript{75} line 4, harmonic series, fingering

Ex. 27b: Pankhurst. *Susurration*,\textsuperscript{76} line 5, harmonic series

Ex. 27c: Pankhurst. *Susurration*,\textsuperscript{77} line 18, harmonic series

\textsuperscript{74} Lucy Pankhurst, *Susurration* (Unpublished score, 2014), 4.
\textsuperscript{75} Ibid., 1.
\textsuperscript{76} Ibid., 2.
\textsuperscript{77} Ibid., 4.
In a similar fashion, these sixteenth note grace note figures should be slurred and played much faster than the eighth note grace note figures. Precise accuracy on each note in the sixteenth note grace note figures is not necessary so long as the effect of a “flurry of notes” is present.

Between the feathered beaming, quintuplets, sextuplets, and septuplets, it is difficult to play the correct number of notes or repetitions of each group. One method to facilitating ease in reading these odd collections of notes is by creating a visual grouping.

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79 Ibid., 1.
Ex. 28b: Pankhurst. *Susurration*, line 12, feathered beaming, grouping and fingering

Ex. 28c: Pankhurst. *Susurration*, line 19, feathered beaming, grouping

Ex. 28 a and b are similar in both structure and finger combinations. As a supplemental aid to playing the accelerated lip slurs from F3 up to D4 (Ex. B), the finger combination (1,3) should be used.

Ex. 28d: Pankhurst. *Susurration*, line 14, feathered beaming, grouping

For the feathered beaming with repeated notes found in lines 14-17, one separating line every four notes will aid in playing the correct number of repetitions. The same grouping approach should be taken when reading combined groups of quintuplets, sextuplets, and septuplets.

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81 Ibid., 4.
82 Ibid., 3.
Ex. 29a: Pankhurst. *Susurratio*, line 3, quintuplets, sextuplets, and septuplets

Ex. 29b: Pankhurst. *Susurratio*, line 9, quintuplets, sextuplets, and septuplets

Ex. 29c: Pankhurst. *Susurratio*, line 19, quintuplets, sextuplets, and septuplets

Reading groups of $3 + 4$ and $2 + 3$ can aid in tracking the music correctly but also solidify playing each tuplet perfectly in time.

Another set of challenges to reading the feathered beaming notation happens in lines 10, 11, and 20.

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84 Ibid., 2.
85 Ibid., 4.
Ex. 30a: Pankhurst. *Susurration*,\(^{86}\) line 10, feathered beaming, scalular

Ex. 30b: Pankhurst. *Susurration*,\(^{87}\) line 11, feathered beaming, scalular with fingerings

Ex. 30c: Pankhurst. *Susurration*,\(^{88}\) line 20, feathered beaming, scalular with fingerings

Ex. 30a consists of a concert D major scale that descends from an F\#4 to a D3, a concert Db major scale that ascends from Db3 to a Bb4, and a short lip trill from Bb4 to C5. Line 11 in Ex. 30b follows a similar structure consisting of a descending chromatic scale from E4 to G3, an ascending concert Db major scale from Gb3 to Db5, and a lip trill from D5 to E5. A suggested fingering for the D5 to E5 lip trill is playing the D (1,2) and the E (1,2,3), trilling only the third valve with (1,2) compressed. Ex. 30c consists of a descending concert Bb major scale from C5 to C3 followed by a concert D harmonic minor scale starting on D3 and ascending to E5, with exception to the last three notes. Another scale commonly used in this piece is the whole tone scale.

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\(^{87}\) Ibid.

\(^{88}\) Ibid., 5.
Ex. 31a: Pankhurst. *Susurration*,\(^{89}\) line 3, whole tone scale

Ex. 31b: Pankhurst. *Susurration*,\(^{90}\) line 8, whole tone scale and fingerings

Ex. 31c: Pankhurst. *Susurration*,\(^{91}\) line 9, whole tone scale and fingerings

Ex. 31d: Pankhurst. *Susurration*,\(^{92}\) line 9, whole tone scale and fingering

\(^{90}\) Ibid., 2.
\(^{91}\) Ibid.
\(^{92}\) Ibid.
Susurratin is an unmetered and unmeasured piece in a neutral key with added sharps and flats to delineate a specific tonal center. By knowing that Ex. 31a-d are whole tone scales, it aids in the difficulty of having to read an accidental written before each note.

The final variation of feathered beaming found in Susurratin is arguably the most difficult section to perfect. The composer writes a series of arpeggios in each set of 64th notes.

Ex. 32a: Pankhurst. Susurratin,93 line 23, arpeggios, fingerings

Ex. 32b: Pankhurst. Susurratin,94 line 25, arpeggios, fingerings

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93 Lucy Pankhurst, Susurratin (Unpublished score, 2014), 5.
94 Ibid., 6.
Every arpeggio in this section can be played alternating between varieties of (0,1,3,13) finger combinations. The intervals span no wider than a perfect fifth for each group of arpeggios, with exception to Ex. 32b with two slurs of a major ninth to reset each repeating arpeggio.

Ex. 33: Pankhurst. *Susurration*,\(^95\) line 24, arpeggios, grouping

![Musical staff image]

Similar to the feather beaming sections, the ambiguous grouping of the arpeggios can be difficult to differentiate between finger combinations. By adding a line between each finger combination, the eye can read the pattern of intervals instead of each individual note.

These arpeggios should be given priority in performance preparation to exercise the ring finger and facilitate the required strength and dexterity needed to effectively play this section. It should be noted to the performer that the delay effect will amplify the given input from the euphonium. If each note is not played at the same volume, the arpeggio will not have a resulting chordal effect. It is recommended that you slow the figure down when the arpeggiated pattern changes to highlight the change of harmonies and speed it back up for any repeated notes thereafter. The written piano and pianissimo dynamics will be tempting to play without enough air and can cause a separation of notes.

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in each arpeggio. The performer should play these arpeggios at a soloistic dynamic level of approximately mezzo piano and mezzo forte.

Lucy Pankhurst provides clarification on half-valve glissandi and lip bends written in *Susurration* in the performance notes prior to the solo score.

Ex. 34: Pankhurst. *Susurration*, performance notes, half-valve glissandi

![Glissandi Example](image1)

The larger intervals of an octave or more should be treated as a fast rip of notes without focusing on a distinction of pitches. The smaller interval glissandi should be played in a controlled manner with close attention to making each chromatic pitch between the starting and ending notes audible.

Although the vast majority of loop station pedals and devices have the capability of pre-recording source material from the solo part, the sound effect should be recorded during the live performance.\(^97\)

Ex. 35: Pankhurst. *Susurration*, line 5, recorded loop and fingerings

![Loop Station Example](image2)

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To facilitate ease in playing this trill at a soft dynamic, use the recommended fingering found in Ex. 35. The difficulty in playing this specific fingering is the unfamiliar backpressure in this tessitura resulting from the added tubing. Loop 1 should be practiced with 100% accuracy since the loop will be recorded during the live performance and will not be able to be redone if a mistake is made. Another difficult challenge to recording the looped track during the live performance is the composer’s choice of multiphonics.

Ex. 36: Pankhurst. *Susurration*, line 13, recorded loop, contrapuntal multiphonics

The performer vocalizes a melody while sustaining notes played on the euphonium. This passage should be practiced first by playing the top line on the euphonium and then singing the same line through the instrument without playing. One method to getting used to the close intervals is by playing and singing a major scale starting with a unison pitch and ending with an octave. The most difficult intervals to sing and play in this example are the unison C’s and the second, fourth, fifth, and sixth fermata. The next challenging interval to sing and play is a major second found in line 15.

---

Depending on your vocal range, one method to successfully playing and singing this interval is by getting used to the fast waves/air vibrations caused by the close interval is to play a lower note such as Bb3 and singing an Ab below (or major second down).

The Boss RC-3 Loop Station pedal will loop a recorded track until the user stomps on the pedal twice. In the music, there are specific points where the recorded loop is indicated to be stopped.

In this example, the delay effect will continue past the recorded loop track. Due to the interpretive nature of this piece’s tempos, there can be a long, awkward pause between the end of the written part and the recorded track without premeditated planning.

101 Ibid.
CHAPTER 5

CONCLUSION

*Let There Be Funk, Fantasy on “Night,” Opus 46, and Susurration* represent a wide variety of applications of advance technology to the euphonium repertory: an octave guitar effect pedal to adapt a tuba solo for euphonium, a solo with CD accompaniment and optional live electronics, and a self-accompanied solo through live delay and recorded loop effects. This dissertation supplies students and professionals with a complete instructional framework to perform euphonium solos that utilize guitar effect pedals, digital sound processors, or devices with similar connectivity. It is my intent that this dissertation will advance the euphonium literature forward by inspiring future compositions to be written and expose the advantages to performing solo literature that utilizes electronic media.
APPENDIX A

CATALOG OF EUPHONIUM SOLOS WITH ELECTRONIC MEDIA ACCOMPANIMENT

<table>
<thead>
<tr>
<th>Title</th>
<th>Composer</th>
<th>Year written</th>
<th>Type of accompaniment</th>
<th>Published</th>
<th>Available by Composer</th>
<th>In Print</th>
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<tbody>
<tr>
<td>Sonatina</td>
<td>Boda, John</td>
<td>1970</td>
<td>Tape (synthesizer)</td>
<td>Yes</td>
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<tr>
<td>Echanges *</td>
<td>Globokar, Vinko</td>
<td>1975</td>
<td>Any brass- live electronics</td>
<td>Yes</td>
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<tr>
<td>Alter Ego</td>
<td>Heussentamm, George</td>
<td>1978</td>
<td>Pre recorded track of performer</td>
<td>Yes</td>
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<tr>
<td>Dream Sequence (or “Landscapes”)</td>
<td>Patterson, Merlin</td>
<td>1981</td>
<td>CD</td>
<td>Yes</td>
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<tr>
<td>Ricercare Una Melodia (2015)*</td>
<td>Jonathan Harvey</td>
<td>1985</td>
<td>Tape delay system</td>
<td>Yes</td>
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<td>Differentia</td>
<td>Carastathis, Aris</td>
<td>1987</td>
<td>Tape</td>
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<td>Matrix</td>
<td>Nagano, Mitsuhito</td>
<td>1989</td>
<td>CD</td>
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<td>Night Song</td>
<td>Corwell, Neal</td>
<td>1989</td>
<td>CD</td>
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<td>Odyssey, op. 9</td>
<td>Corwell, Neal</td>
<td>1990</td>
<td>CD</td>
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<td>New England Reveries</td>
<td>Corwell, Neal</td>
<td>1990</td>
<td>CD</td>
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<td>Distant Images</td>
<td>Corwell, Neal</td>
<td>1992</td>
<td>CD</td>
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<td>Psalm for Euphonium and Synth</td>
<td>Suzuki, Ryati</td>
<td>1992</td>
<td>CD (opt. synthesizer instead of piano)</td>
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<td>Meditation</td>
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<td>Simyeh</td>
<td>Corwell, Neal</td>
<td>1994</td>
<td>CD</td>
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<td>Venetian Carnival Animals</td>
<td>Corwell, Neal</td>
<td>1994</td>
<td>CD</td>
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<td>Aboriginal Voices</td>
<td>Corwell, Neal</td>
<td>1994</td>
<td>CD</td>
<td>Yes</td>
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<td>Flight of the Bumble Bee^</td>
<td>Rimsy-Korskov (arr. Corwell)</td>
<td>1994</td>
<td>CD</td>
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<td>Aboriginal Voices, op. 21</td>
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<td>Solveig’s Song Fantasy</td>
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<td>1995</td>
<td>CD</td>
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<td>Wet Metal Music</td>
<td>Schulz, Patrick</td>
<td>1996</td>
<td>Computer Generated Tape Environment</td>
<td>No</td>
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<td>Black Moon Rising</td>
<td>Corwell, Neal</td>
<td>1997</td>
<td>CD</td>
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<td>Points to Line</td>
<td>Brustad, Karsten</td>
<td>1997</td>
<td>Tape</td>
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<td>Initiation</td>
<td>Brustad, Karsten</td>
<td>1998</td>
<td>Tape</td>
<td>Yes</td>
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<td>2 AM</td>
<td>Corwell, Neal</td>
<td>1998</td>
<td>CD</td>
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<td>Heart of a Wolf</td>
<td>Corwell, Neal</td>
<td>1998</td>
<td>CD</td>
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<td>My Mountain Top (2006) †</td>
<td>Scott, Andy</td>
<td>1998</td>
<td>CD</td>
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<td>Pears I</td>
<td>Szentpali, Roland</td>
<td>1999</td>
<td>CD</td>
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<td>Hungarian Hallucinations</td>
<td>Corwell, Neal</td>
<td>2000</td>
<td>CD</td>
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<td>Relentless Grooves I - Cuba</td>
<td>Pilafian, Sam</td>
<td>2000</td>
<td>CD</td>
<td>Yes</td>
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<td>Relentless Grooves II - Armenia</td>
<td>Pilafian, Sam</td>
<td>2001</td>
<td>CD</td>
<td>Yes</td>
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<td>Largo and Allegro^</td>
<td>Bach, J.S. (arr. Corwell)</td>
<td>2001</td>
<td>CD</td>
<td>Yes</td>
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<td>House of the Rising Sun^</td>
<td>Traditional (arr. Corwell)</td>
<td>2001</td>
<td>CD</td>
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<td>Dandy Noodles</td>
<td>Corwell, Neal</td>
<td>2001</td>
<td>CD</td>
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† - Adapted for euphonium  ^ - Arranged w/CD accompaniment  * - Uses live electronics
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<th>Title</th>
<th>Artist</th>
<th>Year</th>
<th>Medium</th>
<th>Liveorchestra?</th>
<th>CDorchestra?</th>
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<td>Let There Be Funk (2015) **</td>
<td>Davis, D. Edward</td>
<td>2001</td>
<td>CD- Digital Playback</td>
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<td>Breathing Room: Radiators</td>
<td>Davis, D. Edward</td>
<td>2001</td>
<td>CD- Digital Playback</td>
<td>No</td>
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<td>Spooky Kids*</td>
<td>Foster, Ruben</td>
<td>2002</td>
<td>CD</td>
<td>No</td>
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<td>Improvisations on a Bach Sarabande</td>
<td>Corwell, Neal</td>
<td>2002</td>
<td>CD</td>
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<td>Nightwalker (2012)*</td>
<td>Turnbull, Kit</td>
<td>2002</td>
<td>CD- Digital Playback</td>
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<td>A Century of Aeroplanes</td>
<td>D. Edward Davis</td>
<td>2002</td>
<td>Electronic Playback</td>
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<td>Giving/Taking</td>
<td>D. Edward Davis</td>
<td>2003</td>
<td>Two Channel Digital Playback</td>
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<td>The Clock Tower</td>
<td>Magnuson, Roy</td>
<td>2003</td>
<td>CD</td>
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<td>Funk Theory</td>
<td>Meechan, Peter</td>
<td>2003</td>
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<td>Fantasy on “Night,” Opus 46*</td>
<td>Corwell, Neal</td>
<td>2004</td>
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<td>Kuklos</td>
<td>Roberts, Deri</td>
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<td>Floating Dreams</td>
<td>Meechan, Peter</td>
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<td>In Memoriam E.S.</td>
<td>Dobson, Simon</td>
<td>2009</td>
<td>Dance Track and Brass Quintet</td>
<td>No</td>
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<td>Calling</td>
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<td>iPhonium for Euphonium</td>
<td>Skipp, Roderick</td>
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<td>2010</td>
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<td>Exit the foundry</td>
<td>Hase, Ben</td>
<td>2011</td>
<td>CD</td>
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<td>Game</td>
<td>Akahoshi (Mead), Misa</td>
<td>2011</td>
<td>CD</td>
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<td>Hummingbrd</td>
<td>Bryant, Steve</td>
<td>2012</td>
<td>CD</td>
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<td>The Hang is On…</td>
<td>Oxford, Josh</td>
<td>2012</td>
<td>CD</td>
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<td>Passing Lands (In progress)*</td>
<td>Davis, D. Edward</td>
<td>2013</td>
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<td>Awwwww…</td>
<td>Oxford, Josh</td>
<td>2013</td>
<td>CD</td>
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<td>Les Oies Sauvages en Vol Groupe*</td>
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<td>Electronics (in real time)</td>
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<td>Sound Barrel</td>
<td>Brown, Christopher Cree</td>
<td>2013</td>
<td>Fixed media electronics</td>
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<td>Susurration*</td>
<td>Pankhurst, Lucy</td>
<td>2014</td>
<td>Self accompaniment through FX</td>
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<td>Yatsar*</td>
<td>Post, Jason</td>
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<td>Live electronics</td>
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<td>Set Adrift</td>
<td>Kelly, Thomas</td>
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<td>Alien Loop de Loops</td>
<td>Buss, Howard</td>
<td>2015</td>
<td>CD</td>
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<td>Disquiet</td>
<td>Murchison, Matthew</td>
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<td>Fixed media</td>
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<td>Terminal Intelligence</td>
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† - Adapted for euphonium    ^ - Arranged w/CD accompaniment    * - Uses live electronics
APPENDIX B

SIGNAL FLOW CHART FOR *LET THERE BE FUNK*
APPENDIX C

SIGNAL FLOW CHART FOR *FANTASY ON “NIGHT,”* OPUS 46
SIGNAL FLOW CHART
FANTASY ON "NIGHT" (NEAL CORWELL)

MIC ➔ PRE-AMP ➔ Boss OC-3 Octave Pedal ➔ Boss DD-7 Delay Pedal

Monitor ➔ SPEAKER ➔ Lexicon MPX100
APPENDIX D

SIGNAL FLOW CHART FOR *SUSURATION*
SIGNAL FLOW CHART
SUSURRATION (LUCY PANKHURST)

MIC → PRE-AMP → Boss DD-7 Delay Pedal → Boss RC-3 Loop Pedal

MONITOR → SPEAKER
APPENDIX E

OMNI, CARDIOID, AND FIGURE 8 PATTERN
BIBLIOGRAPHY


