New Sound Realms, Techniques and Improvisational Directions for the Baroque Flute

The baroque flute is emerging as a new and remarkably flexible voice in contemporary music. This article explains new research in expanding the sonic repertoire of the baroque flute within the modern idiom through extended techniques in both sound production and articulation, as well as through recently developed directional improvisation using the improvisational practice created by Dr. Stephen Preston, called *ecosonics*. This research is given focus through the performance practices required by the piece *Less* for baroque flute and electronics (2004) by Jo Thomas.

The baroque flute has relatively recently been rediscovered as a concert instrument, and in many ways it is the embodiment of simplicity, with only the slightest hint of the mechanization that will come to dominate the modern instrument, developed in the nineteenth century by Theobald Boehm. The bore of the baroque flute is conical, and it has only six tone holes, arranged more for the comfort of the player’s fingers than for intonation, with a seventh hole covered by a simple key, which enables it to be fully chromatic. While being subject to its share of limitations, the baroque flute also enjoys many unique qualities, including a great deal of flexibility and a characteristic variety of tone colors. Quite recently, composers have begun to take notice of this versatile and adaptable new voice from the past. Contemporary works are now being composed specifically for the baroque, one-keyed flute, and a new system for improvising with the instrument has been created, called ‘ecosonic’. My own work focuses on new directions for the employment of ecosonic technique and improvisation, as well as extending the expressive vocabulary of the baroque flute, including the development of a range of articulations, and methods of sound production.

This survey, which explores the extension of ecosonic improvisation through the use of directionality and the development of new techniques, is divided into three sections. The first introduces and explains the ecosonic system, its foundation and the way in which ecosonic improvisations are created. The second section explains a key element: adapting ecosonic technique and improvisation for the directional and graphically indicated improvisational shapes used in the newly composed work, *Less – for Baroque Flute and Electronics* (2004) by the Welsh composer, Jo Thomas. The final section illustrates further research into expanding the repertoire of sound production and articulation on the baroque flute. This area has been undertaken in close collaboration with the composer, Jo Thomas, and the expressive musical integration of many of these techniques has been achieved through her piece *Less – for Baroque Flute and Electronics*.

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1 In addition to the work by Jo Thomas featured in this article, composers who have recently written works for the baroque flute include Edward Cowie, John Thow and Sergio Roberto de Oliveira. See ahead, footnote 11.
Directional improvisation using ecosonic fingering practice

The ecosonic system

Created by Dr. Stephen Preston, the ecosonic system is not based on conventional or traditional technique for playing the baroque flute. It can be described as the culmination of many ideas about music and music making, and especially about improvisation. Though its inception is a process of great interest in itself, the focus here will be the presentation of a very brief introduction to the system itself and its practical workings for improvisation.

The ecosonic system is not based on any system of tonality. Instead, the one-keyed flute is treated according to its most fundamental form, as a tube with six holes. On the baroque flute, using conventional technique results in very complex fingering when playing in keys with many flats or sharps, or when playing chromatically. In these instances, fingers must coordinate opposing motions, where some fingers are placed down whilst moving others off the finger holes. The ecosonic system was created toward forming improvisations with birdsong as their basis. Birds sing with great volubility, and for a system to begin to enter their sound world, it must also enable a great ease of the fingers and seemingly effortless skill. Ecosonic technique achieves this volubility by employing a method of fingering which is unconventional, and avoids difficult cross-fingerings and opposing motion; this is achieved by moving only a single finger at a time.

All fingerings are organized into finger-rows within a pattern based on the I Ching’s hexagrams, consisting of broken and unbroken lines. The Shao Yong arrangement of the I Ching hexagrams shown below provides the basis for the Super Row of ecosonic fingerings. In order to describe this system one uses binary arithmetic, translating the I Ching diagrams from broken and unbroken lines into open or closed finger holes, expressed as either a one or zero. As notated in binary arithmetic, an open hole is symbolized as a zero (0), a closed hole as a one (1). All fingerings are shown in the Super Row; here all finger-rows are arranged in order, following that which is provided by the I Ching hexagrams in the Shao Yong arrangement; see Figure 1. Figure 2 shows the Super Row, in Figure 3 three notations are compared.

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2 For specific description regarding the inception of ecosonic technique and improvisation, see Stephen Preston, *Birdsong as a Basis for new techniques and improvisational practice with the Baroque Flute*, PhD dissertation, University of Plymouth, 2004, Chapters 2-3.

3 The seventh hole is not included in the system in the same way as the other six. The key covers this hole and it is treated separately, as a randomly introduced element.

4 Opposing motion is the cause of most elements of difficulty in fingering, not only with the baroque flute, but generally with all wind instruments. It was one of the driving factors in the construction of the modern flute – the desire to make it possible to play the instrument without employing cross-fingerings, and thus avoiding opposing motion.


6 Referred to as the ‘Fu Xi square’ in Stephen Preston, *Birdsong as a Basis ...*, p. 72.

7 Preston, *Birdsong as a Basis ...*, p. 72.
The pattern begins with the hole furthest from the embouchure, next to the key. With all holes open, this is zero (0). Each finger hole is referred to by its corresponding number within the Super Row. The Super Row is broken up into smaller finger-rows, each consisting of seven fingerings, much like traditional western diatonic scales.

Figure 1
The Shao Yong arrangement of the 64 I Ching hexagrams (after Huang 2000). The pattern proceeds horizontally from left to right beginning at the top left of the square.

Figure 2
The Super Row illustrating all finger-rows in an order based on the Shao Yong arrangement of the I Ching (Figure 1), beginning with 0 at top left and moving horizontally from left to right, ending with 63 at bottom right.

Figure 3
A comparison of notations. The top row is the original I Ching broken and unbroken lines, the second row translates these lines into binary notation, and the third line shows the numbers which are symbolized by the binary notation.

The pattern begins with the hole furthest from the embouchure, next to the key. With all holes open, this is zero (0). Each finger hole is referred to by its corresponding number within the Super Row. The Super Row is broken up into smaller finger-rows, each consisting of seven fingerings, much like traditional western diatonic scales.
The hole closest to the key is designated as 1, the next 2, followed by 4, 8, 16, and 32. These numbers are used to describe each fingering, therefore if one begins at 0, or with all finger holes open, the next fingering in the row will be 1, signifying that the bottom-most hole on the flute is closed; this hole is referred to as 1. The second hole from the bottom of the flute is 2. Depressing both of these fingers gives the fingering 3, designating the combination of 1 and 2 simultaneously, and not a singular finger hole.

![Figure 4](image1)

*Figure 4*
The baroque flute showing designated ecosonic numbers corresponding to finger holes.

![Figure 5](image2)

*Figure 5*
For comparison, the baroque flute showing designated conventional fingering numbers.

It is possible to describe fingerings in two ways. The first is as stated in the paragraph above, by actually naming each specific finger hole that is closed (for example: 16 and 32, Figure 6); the other is by adding these numbers together, in this case giving the number 48. This particular fingering exemplifies a fundamental aspect of the ecosonic system. Figure 6, which gives the finger combination 48 and the corresponding *I Ching* hexagram from which the ecosonic fingering has been translated, also shows that this is identical to the conventional fingering for A. All conventional fingerings appear in the ecosonic system. It is important to note however, that although all conventional fingerings on the baroque flute exist in the ecosonic system, their tonal implications do not.

![Figure 6](image3)

*Figure 6*
The conventional fingering for A is the same as the ecosonic fingering 32 and 16, or, in binary notation: 110 000.
For the performance of ecosonic improvisations, a so-called finger-row sequence is chosen. First, a fixed fingering is selected, in which three fingers are held in a static position. They may consist of any combination of open or closed holes, but once chosen, these fingers do not move during the improvisation. This fixed fingering produces pitches in up to three registers, called the key-sound; after a fixed fingering is decided, three moving fingers are then selected, producing multiple different pitches in each of the registers within the finger-row, each generating a unique set of sounds and colors, called microtonal vocabularies. The moving fingers are selected from amongst any of those that are not already engaged in the fixed fingering.

![Figure 7](image)

Finger row based on the fixed-fingering 32 and 4 (36); moving fingers are underlined: 1, 2, and 8.

It is necessary to have three fingers free to be utilized as moving fingers for it to be possible to play a complete finger-row, as an ecosonic finger-row consists of seven fingerings and is systematic in the way that a western scale contains seven notes in a specific order and arrangement of tones and semitones. Each individual finger-row yields a unique configuration of sounds.

The ecosonic system provides both flexibility and structure for improvisation, defining the possibilities for playing by contextualizing it within a chosen sequence, while allowing a great amount of potential flexibility with regard to both fingering and sound. Unlike any other approach to playing the baroque flute, ecosonic technique employs a unique and visceral sound quality, range, and character new to the sonic repertoire of this instrument.

Adapting the ecosonic system for performance in the work Less - for Baroque Flute and Electronics, by Jo Thomas

The electroacoustic composer Jo Thomas has specified the use of ecosonic improvisation technique in her composition Less – for Baroque Flute and Electronics. In the sections requiring ecosonics, she specifies, using conventional notation, the note on which to begin and the note on which to end at each instance. Within each indication is a graphic directional marking. First attempts at adapting the ecosonic system to these shaped indications were found to be very difficult, as all previous work toward improvising with ecosonics involved at least partially, a non-determined element that is inherent in the system. The unknown factor is that the performer cannot always know which pitch a particular fingering will produce, as the ecosonic system is based on physical fingering patterns rather than a pitch-based model. The indeterminate element desirable in improvisation modeled on birdsong was not useful in the case of Less. Indeed the challenge became one of shaping indeterminacy to the effective realization of graphically indicated directional shapes. To achieve this it was necessary to combine practical knowledge of how the flute works both conventionally and predictably with how it works ecosonically,
in order to produce the improvisational results indicated in the score.

In this case, indeterminate means that ecosonic improvisations make use of fingerings, most of which can produce two or more different and often harmonically unrelated pitches. This is different from conventional flute fingerings in most cases. The production of the correct fingering for the note 'A', for example, determines that two possibilities will be produced, either an A4 or A5. Playing in those two registers is straightforward, and a performer will know exactly which of the two notes will sound. Because the basis of the system is physical, with many ecosonic fingerings the expectation and the results are very different from a tonal system with determinate fingerings and pitches. Often fingerings will produce more than one note, especially in the third register, and it is not always possible to know which of the repertoire of sounds for a fingering will be produced. This is most true at speed.

To be able to achieve what Thomas asks in her piece, one must combine conventional, determinate technique with ecosonic technique. The following questions are most crucial:
1. What is the tonal direction indicated in the score?
2. How is it possible to produce the indicated result?
3. Is there more than one possibility for producing this result?

These are the vital questions to be addressed when utilizing the ecosonic system to produce determinate tonal directions and shapes. The problems revolve around what kinds of intervals can be produced with each combination of fixed and moving fingers, and the difficulty lies in making connections between the conventional and ecosonic systems. One must become more aware of the way a microtonal vocabulary of sounds can be made to work directionally. Previous work on improvisation based on birdsong made it clear that ecosonic microtonal vocabularies were easier to categorize by dividing them into groups of different sounds, each group lying within its own register, and differing from those in other registers. The application of a register change is still useful, but only as a rough way to begin shaping the improvisational passages indicated in Less. More detail is required to produce an accurate result designed by the directions and shapes given in the score.

Because sequences can be chosen from any combination of fixed fingers, the first challenge is, surprisingly, that the performer is left with too many choices for moving between point X and point Y. Through experimentation it was found that choosing a sequence at random which may fit the indicated shape, but has no pitch relationship to the passage, was not useful. For example, if an improvisational indication begins on A8, a sequence based on the fixed fingering on 8 will not provide a satisfactory musical result; see Figure 8.

![Diagram of flute fingerings](image)

Figure 8
Above, the conventional fingering for A8 as compared below to the physically and sonically unrelated ecosonic fingering, 8. Each number marked indicates which finger-hole is to be closed.
Such a choice, in which neither the ecosonic nor the tonal fingering has any physical relationship to the other, creates more difficulty in changing from the conventional to the ecosonic system and returning both quickly and without effort. It might be likened to speaking in one’s native language, then being required for a single phrase to change to another, completely unrelated, non-native language, and finally to immediately change back again to finish the sentence. The change becomes easier and more effective when the leap between languages is made smaller. To continue the metaphor, it is similar to using a word that shares the same meaning in both languages as a transition whenever possible. It is easier to make this leap when one creates something akin to a pivot chord – in this case a physical fingering, rather than a chord that exists in both systems. As stated above, all conventional fingerings exist in the ecosonic system, but many ecosonic fingerings do not exist in the conventional fingering system. The challenge is to find a matching fixed fingering, or one as similar as possible to the conventionally notated pitch given at the start of an improvisational passage, which therefore works as a pivot-fingering, and also has the possibility to produce the desired shape or directionality indicated in the score.

In many cases, it is possible to choose a fixed fingering that is either identical to, or simple to get to from the conventionally marked starting note. Additionally, because this related fingering is either the same, or quite near to the starting note sonically, it is likely to have the possibility of creating a shape that suits what is indicated, matching the register of the note and retaining the sonic starting point. When possible it is also helpful to choose a fingering combination that will allow one to ‘land’ on the ending note without having to struggle back into the original language of conventional notation. This is most possible when the fingering for the indicated arrival occurs naturally within the selected finger-row sequence. It is this relationship that is missing when a finger-row sequence is chosen purely on the basis that it can produce the graphically notated sound shape. This latter case simply maintains the separation between the two systems and defeats the purpose of this sort of improvisation; it should feel technically fluent and effortless, both mentally and physically. If the chosen sequence is unrelated physically and thus causes difficulty in transitions, the expression of the passage is lost, and instead, the result is an audible struggle, narrowing the performer’s focus to address a technical difficulty rather than achieving a musical expression.

The above is the basis for choosing sequences that work successfully. However, it still remains necessary to learn how to find patterns of direction within a system that is meant to be indeterminate. The issue to be addressed here is: how does one improvise directionally within an unpredictable system without making that system predictable, thus destroying the improvisational quality by constraining its indeterminacy? That is: how does one avoid making the passage so predictable that it is no longer an improvisation, but a planned passage that chances to be utilizing unconventional fingerings? It is at this point that knowledge of the acoustic behavior of the flute is necessary.

The next step is the process of reviewing the most basic workings of the flute in as simple a form as possible. To begin with, it cannot automatically be assumed that the more holes one closes on the flute, the lower the pitch becomes. The flute is still merely partially predictable when a majority of holes is closed, depending on their configuration. Sounds are only completely predictable when all finger holes covered are adjacent, beginning with the hole closest to the embouchure hole. If a gap is left between closed holes, depending on how widely separated they are, the pitch changes just slightly when additional finger

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8 There is no physical relationship between these two fingerings because ecosonic fingering 8 and the conventional fingering for A have no fingers in common; every finger must move in changing from 8 to A.
holes are closed on the flute. When there is only a single hole remaining open between closed finger holes, the effect is somewhere in the middle.

Through a great deal of experimentation with the basic workings of the flute in conjunction with ecosonic explorations, which will be ongoing for as long as Less is being performed, it is possible to find sequences that effectively produce the shapes indicated in the score.

Choice versus spontaneity

An important aspect of the selection of these finger-row sequences is that to qualify as being truly improvisatory, there must be more than one combination of finger movements that will produce the desired shape. If only one pattern of finger movements is successful in producing the indicated shape, it cannot be regarded as an appropriate choice. For a valid sequence to be selected, there must be, at the very least, two different possibilities of fingering combination to create the shape indicated in the score. It is of course preferable that there be more than two possibilities. However, discovering a sequence that both matches the indication sonically and is physically compatible with the notated starting and ending notes can prove challenging.

Because of the unconventional sound of ecosonic technique, it is possible that a typical audience member would not be able to detect the difference between a planned sequence of fingerings and an improvised one. Still, the fact remains that playing a planned sequence is defeating the expression and spontaneity of an improvisatory passage, which is for the performer to produce direct musical expression at a particular moment in time in a way that cannot be duplicated. If a planned passage is what was desired, it is entirely feasible for the composer to confer with any accomplished baroque flautist and designate in the score a shaped passage employing written-out unconventional fingerings. However, in the case of Less, this has not been done: the composer continually stressed the importance of the spontaneous quality and unique sound of ecosonic improvisation.

Examples of ecosonic improvisational passages in Less

Figure 9 makes use of the possibility of choosing a fixed fingering which is exactly the same as the indicated, conventionally fingered starting note; in this case, B♭ and the ecosonic designation 32 share the same fingering. This provides both an anchor and a starting advantage for the improvisatory indication that appears in the second half of the example, written out as two slightly descending lines with dots above them. The lines indicate the directionality, and the dots indicate that the improvised notes are to be articulated with the tongue. The numbers appearing above the indications show the temporal duration in seconds. The single staff line designates the middle line of a staff in treble clef.

In Figure 10 it is impossible to use the exact fixed fingering of the starting note, because A♭ is fingered with all holes closed excepting only one: 110 111. Of course, this does not provide for the three moving fingers necessary for an ecosonic sequence. Instead, as much of the starting fingering as possible is preserved in selecting the fixed fingering: 010 011 (see Figure 10.1); three of the five finger holes in common with the A♭ fingering, 16, 2, and 1, remain closed. The moving fingers also make it possible to return easily to the original A♭ at the end of the indication.

Examples appearing in this article have been transcribed for the sake of clarity, the graphic indications have been extracted and inputted exactly as they appear in the published manuscript score; however, conventional text has been translated from its original hand written version into typeface.
Figure 9
From Less.
The beginning note is B₄, the ending note is a C₄ harmonic. The selected sequence for this example uses fixed-fingering 32, and moving fingers 16, 4, and 2.

![Figure 9](image)

Figure 10
From Less. Here the improvisation both begins and ends on A♭.

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010 011 (A♭)
010 111
011 011
011 111
110 011
110 111 (original A♭ fingering)
111 011
111 111
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Figure 10.1
The chosen sequence for the improvisation of Figure 10. Finger row with fixed fingering 16, 2, and 1, and moving fingers 32, 8, and 4 (underlined). Only two fingers must move to change to the ecosonic fixed-fingering.

![Figure 10.1](image)

Figure 11
From Less. The beginning note is C₄, ending note is D♭. Fixed fingerings 16 and 8, moving-fingers 32, 2 and 1, or 32, 4 and 1.
In Figure 11 it is helpful to use a ‘bridge-fingering’. Here the improvisation is very short, and must take place within approximately 1.5 seconds. The chosen sequence uses fixed fingerings 16 and 8, with moving-fingers 32, 2 and 1, or 32, 4 and 1, the fingering shown in Figure 11.1. Because the duration is very short, and the directional indication shows a decidedly marked change of direction, it becomes necessary to plan the first change of fingering at the beginning of the passage. The bridge fingering works well when the finger hole closest to the embouchure (32) is moved first (in Figure 11.1 it is marked in bold). This hole works much like an octave key, and the change of pitch is marked easily with the register change caused by moving the first finger. The fixed fingering selected for this improvisation causes this bridge fingering to occur naturally, and there is no sense of having exacted a fingering order; the improvisational quality is not tampered with by the necessity of using a bridge fingering, only one finger must move from the starting note to the fixed-fingering (in binary notation: 111 000 to 011 000).

Changing registers within a sequence is especially effective when there is a very short allotment of time for an improvisational passage. Varying the register can make changes in direction more obvious in a shorter amount of time and with fewer finger movements, as in Figure 12.

**Figure 11.1**
From *Less*. Fixed-fingering on 16 and 8, with moving fingers 32, 4, and 1 (underlined). The bridge fingering appears first naturally in finger row.

**Figure 12**
From *Less*. The starting note is B♭, the ending note G♭. The chosen sequence uses fixed fingering 32, with moving-fingers 8, 4, and 2.

In Figure 12, the conventional starting fingering is again identical to the chosen fixed fingering for the improvisational passage. Because there is a brief time allowed for silence before the next conventionally notated pitch, it is somewhat less important for
the sequence to allow one to land on the G♭. Instead, a change of register provides well for the quick, drastic changes of direction in this example. Without the change of register, the moving fingers in the chosen sequence make a rather small range of pitch change. This is helpful for the last part of the improvisation, where the graphic markings show only small directional changes. The use of register change in conjunction with a sequence that also produces small pitch changes within the finger-row allows for ease of production of the several qualities of motion and direction present in this example.

Integration of new ‘extended techniques’

New Sounds: Articulation

As part of the process of creating new improvisational directions, this research also examines new possibilities for expanding the repertoire of sound production and articulation on the baroque flute. Many of these ideas have been integrated into Less after many hours of collaboration and exploration with the composer.

Historical articulations have formed a foundation for the new shapes and ideas for extending articulation techniques on the baroque flute. The first technique to be developed was taken from a well known ‘extended technique’ for the modern flute, and is often used in contemporary composition, Latin music and jazz. In the technique called spit tongue, the tongue holds back an amount of air, and is then suddenly released to produce an explosive effect. This technique is essentially the same as for the modern flute, excepting that the amount of air required to produce the explosive effect is much less, due to the comparative smallness of the baroque flute and its embouchure hole. Another version of this articulation is to use the lips as the plosive rather than the tongue, producing a rougher sound. Thomas uses spit tonguing in several instances in Less, including a passage of repeated attacks, as well as pitchless spit tonguing with the lips as plosive. Rapid spit tonguing, such as that in Figure 3, is also well suited to the baroque flute’s relatively diminutive nature, owing to the fact that only a small amount of air needs be released for a spit tongue articulation to speak, allowing the player to produce several attacks in succession with less effort.

Stop tonguing is an exaggeration of an articulation proposed by the late-18th-century German flute player J.G. Tromlitz in his book The Virtuoso Flute-Player. Tromlitz uses this articulation to clarify staccato notes, distinguish their sound and express their difference from other articulation markings.

For contemporary stop tonguing, the aim is for a much more pronounced effect than the examples illustrated by Tromlitz. In Less, the flute often uses stop tonguing to relate the sound worlds of the flute to that of the electronics, as in Figure 15. Indeed, the effect produced is markedly similar to that produced by the electronic sounds.

New Sounds: Tonal Alteration

In the context of this research, the variations of tonal content were developed in ratios of noise to pure tone. As opinions on tone production can be subjective and because there are many ideas of what constitutes a ‘good sound’, for present purposes the noise content of a tone will be described in relation to alterations to the traditional tone of the baroque flute, i.e. a colorful, yet soft-edged tone. It is from this traditional notion of desired clarity and quality of sound that this research seeks to depart.

It is possible to increase the amount of noise within one's tone while using a conventional embouchure; the tongue can be moved forward and/or upward within the mouth, changing the quality of tone. The tip of the tongue can be moved by any degree, from just below the stream of air as it travels forward and exits the lips, to all the way forward into the embouchure itself, between the lips to the point where the sound stops because the tongue completely blocks the air flow. In Less it is used to relate the sound worlds of electronics and the live flute by increasing the noise within the tone, making the flute's tone become a noise shaft rather than a conventional, baroque flute tone.

This introduction of noise into the tonal dimensions of the flute greatly increases the scope of the instrument's sound world, especially within a contemporary setting.

One can also make use of the possibility of playing the flute without employing a conventional embouchure. To do this the upper lip is left relaxed and the mouth more open. Although this technique is not specifically indicated in Less, it is effective both in producing a 'roar' effect for high noise to sound ratio (see Figure 17) as well as in using this relaxed non-embouchure technique to produce whistle tones. Figure 18 is an example. Even a dynamic marking of pianissimo is actually quite loud for whistle tones on the baroque flute, and the dynamic is well served by using a non-embouchure technique to produce a greater volume of sound.
These changes to the shape of the mouth and position of the tongue are often imperceptible, even to the player; but as slight as they are, they can mean the difference between producing a whistle tone, nothing, or a true tone. The use of this non-embouchure technique makes it possible to play lower pitched, louder whistle tones while maintaining a greater degree of stability. Given that whistle tones on the baroque flute are naturally extremely soft in volume, this is especially useful and effective, providing both greater volume of sound and the stability required to sustain the whistle tones called for in the score for several seconds.

Summary
The baroque flute might be seen as an instrument providing a limited expressive medium because of its relatively small tessitura and difficult cross-fingerings. Ecosonic technique removes many technical boundaries for this instrument, resulting in a sense of fluency and direct expression from the player. It is this direct flow that is an integral part of the work Less and is a major part of this research. The music of Less does not limit itself to conventional baroque flute playing, but goes far beyond this, integrating the performer, the notated score, electronics and the instrument itself into a single expressive force. Ecosonic improvisation proves its capacity for adaptation and scope for new applications in contemporary music. Both the research necessary to perform Less and the work itself extend the boundaries of baroque flute playing and ecosonic improvisation, redefining the baroque flute as a fresh contemporary voice ideally suited to the idioms of 21st century composition.11 This research seeks to fully integrate the techniques developed through exploration and experimentation into personal musical work, to have them available for their fullest musical potential. In the future, it is hoped that these techniques may continue to be employed to their fullest capacity within new compositions and improvisations, as they have been during their inception and growth within Jo Thomas’s new work, Less – for Baroque Flute and Electronics.

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