

A Derived Canvas:  
Abstracted Structuring Principles in Adrian Moore's *Study in Ink*

ABSTRACT

Adrian Moore's 1997 work *Study In Ink* is a single-source composition for fixed media, the source material being an improvised recording of the composer drawing a marker across a dry erase board in various motions. Not unlike many "tape" pieces fashioned from a limited cache of material, the work explores the intrinsic musical qualities of the sound source, exploiting its full potential. However, it is a notable feature of *Study In Ink* that these intrinsic qualities are not merely explored; rather, they additionally serve to govern the overall form and syntax of the composition. Applying Simon Emmerson's "Language Grid," developed in his seminal 1986 book *The Language of Electroacoustic Music*, my analysis focuses on the structuring principles governing the organization and behavior of large sections, examining how these principles are derived from qualities inherent in the original source material.

*Study In Ink* is cast in three main sections. Section A is expository in function, introducing the untreated sound source in various gestural guises alongside more heavily-processed layers of sound. These materials are further developed in Sections B and C, which comprise the main body of the composition. For each of these two main sections, there is an underlying principle which governs the music: Section B is driven by an ever-present fluctuation of pitch, which manifests as slow prolonged glissandi in the background and the serpentine shaping of gestures in the foreground. By contrast, Section C is characterized by stableness of pitch, underpinned by pulsating single-pitched (or nodal) textures and static buzzing drones. These two separate characteristics are derived from the piece's initial gesture, a low-pitched stammer which accelerates and crescendos into a rapid upward glissando. *Study In Ink*, as we shall see, is an archetype of Emmerson's *abstracted discourse*.

## I. Introduction

Adrian Moore's 1997 work *Study In Ink* is a single-source composition for fixed media, the source material being an improvised recording of the composer drawing a marker across a dry erase board in various motions. In his program note, Moore explains the initial inspiration behind the work:

"Whilst teaching in the classroom with a white board and marker pen, I noticed how, as the pen became dry, it began to make interesting noises. For many listeners this class of

sounds are *noises* to avoid. However, it transpired that even a marker pen could create interesting noises that could be used musically.”<sup>1</sup>

It is not surprising that in creating a single-source piece the composer would be motivated to explore the intrinsic qualities of the sound source. But it is a notable feature of *Study In Ink* that these intrinsic qualities serve to govern the overall form and syntax of the composition.

The composer makes nearly continuous use of the original unprocessed (or relatively-unprocessed) material, keeping the listener grounded in, not only the sonic nature of the source sound, but the physical act that sets the piece into motion and which maintains that energy until the very end.<sup>2</sup> The foreground teems with sounds characteristic of marker-on-whiteboard: frantic scribbling, wildly fluctuating squeals, faint airy wisps, strident friction, and Morse code-like strokes. Interspersed are gestures which are more heavily-processed yet retain salient qualities of the original source, making a morphological connection obvious to the listener. These are the sounds one tends to lend the most focus to; it’s truly arresting stuff, with long phrase arches constructed from combinations of shorter statements and shaped by expressive capabilities one does not expect from a mere writing instrument! These sounds are made even more inescapable by the fact that (as Moore points out in his program note) they primarily lie between 1,000 and 2,000 hertz, a particularly sensitive frequency region for the ear.<sup>3</sup>

I must admit that I listened to the piece dozens of times before finally achieving a more discerning mode of listening, one in which I was able to focus on the piece at a deeper level of construction. My attention has shifted from the fashioning of musical phrases in the immediate

---

<sup>1</sup> Adrian Moore, *Program Note for “Study in Ink,”* Composer’s website, <http://adrian-moore.staff.shef.ac.uk/music/studyinink.pdf> (accessed April 30, 2014).

<sup>2</sup> I use the terms “unprocessed” and “untreated” to refer to sounds which, while having possibly undergone mild pitch and time-shifting processes and equalization, nevertheless retain the salient qualities of the original marker-on-whiteboard source.

<sup>3</sup> Moore, *Program Note*.

foreground to the meticulously-woven backdrop of the piece as it unfolds over time. This analysis of *Study In Ink* will focus on the structuring principles governing the behavior of large sections, and how these principles are derived from qualities intrinsic to the original source material.

## **II. Brief Formal Overview**

*Study In Ink* is cast in three main sections. Section A (00:00-1:16) is expository in function, introducing the untreated sound source in various gestural guises alongside more heavily-processed layers of sound. These materials are further developed in Sections B (1:17-5:55) and C (5:56-10:21), which comprise the main body of the composition. For each of these two main sections, there is an underlying principle which governs the behavior and unfolding of music over time: Section B is driven by an ever-present fluctuation of pitch, which manifests as slow prolonged glissandi in the background and the serpentine shaping of gestures in the foreground. By contrast, Section C is characterized by stableness of pitch, underpinned by pulsating single-pitched (or nodal) textures and static buzzing drones. As we will see, these underlying principles are derived from morphological characteristics inherent in the original source.

## **III. An Examination of the Materials**

The opening gesture of the piece – two rapid strokes of the marker – exposes sonic characteristics which have a profound influence on the syntax and structure of the work. Focusing on just the first stroke of the pair reveals two salient characteristics of the sound: a low-pitched stammer which accelerates and crescendos into a rapid upward glissando. The following

spectrogram allows one to visualize the gesture in its (very brief!) entirety and observe qualities that are missed (or misconstrued) by the ear.<sup>4</sup>

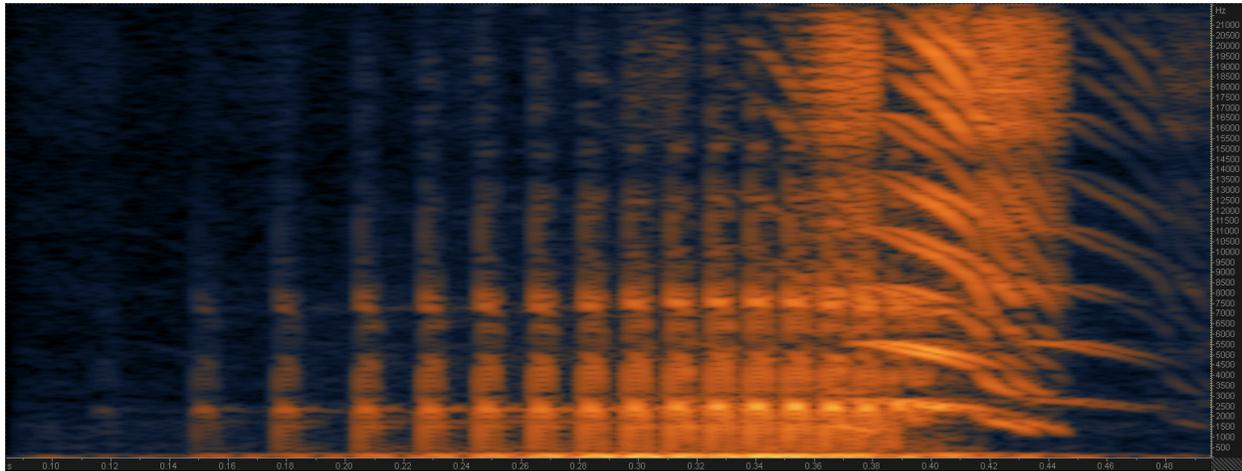


Figure 1: *Study In Ink* opening gesture. 0:00-0:00.5

The low-pitched stammer, described by the composer as a “slip-grip grating sound,” is produced by drawing a marker across the whiteboard with extreme pressure, causing the felt tip of the implement to drag rather than pass smoothly over the writing surface.<sup>5</sup> Its sonic fingerprint is clearly visible in the spectrogram: notches of low and mid-range frequencies grow dynamically over a duration of approximately 300 ms. This crescendo is matched by an increase in speed, the interval between each notch decreasing exponentially until the notches are so highly compacted as to nearly defy aural perception of separate attacks. Although the upward pitch inflection steals the ears’ attention as it emerges, the spectrogram reveals that the stammer’s presence remains constant through the glissando as does its frequency location. Furthermore, what we perceive as a glissando is the result of an exponential growth in spectral content, a phenomenon occurring so

---

<sup>4</sup> All spectrograms were made using iZotope RX Advanced v1.21.610. Since spatial aspects of the composition are not a primary focus of this analysis, spectrograms were created from a monophonic mix.

<sup>5</sup> Moore, *Program Note*. I have borrowed the composer’s name for this sound (“slip-grip grating sound”) for the remainder of this analysis.

quickly that the curvilinear ascent outlined by the expanding upper frequency limit is misconstrued as a true glissando.

In his article “Spectro-Morphology and Structuring Process,” Denis Smalley notes that, when performing a note on a traditional instrument (or, more broadly, executing a gesture on any sound-producing body) a greater input of energy results in both a louder dynamic and richer spectral profile. Smalley further proposes that this causal relationship, so ingrained in our experience of the physical environment, allows us to “deduce energetic phenomena from the changes in spectral richness.”<sup>6</sup> The slip-grip grating stammer which opens *Study In Ink*, therefore, is perceived innately as having been performed with a great amount of energy. Moore extends this correlation metaphorically, utilizing the stammer as an activator which marks the beginnings of new sections and ideas and which triggers an increase in rhythmic and spectral activity. The slip-grip sound becomes a signifier of the composer’s pen, so to speak, as he injects fresh energy into the composition and steers its course in new directions.

Another important gesture type originating in the source material is the sound of a long, fluid stroke of the marker pen, which results in an elongated and (sometimes wildly) fluctuating tone. The following gesture is taken from Section A at 00:55.

---

<sup>6</sup> Denis Smalley, “Spectro-morphology and Structuring Process,” 68.

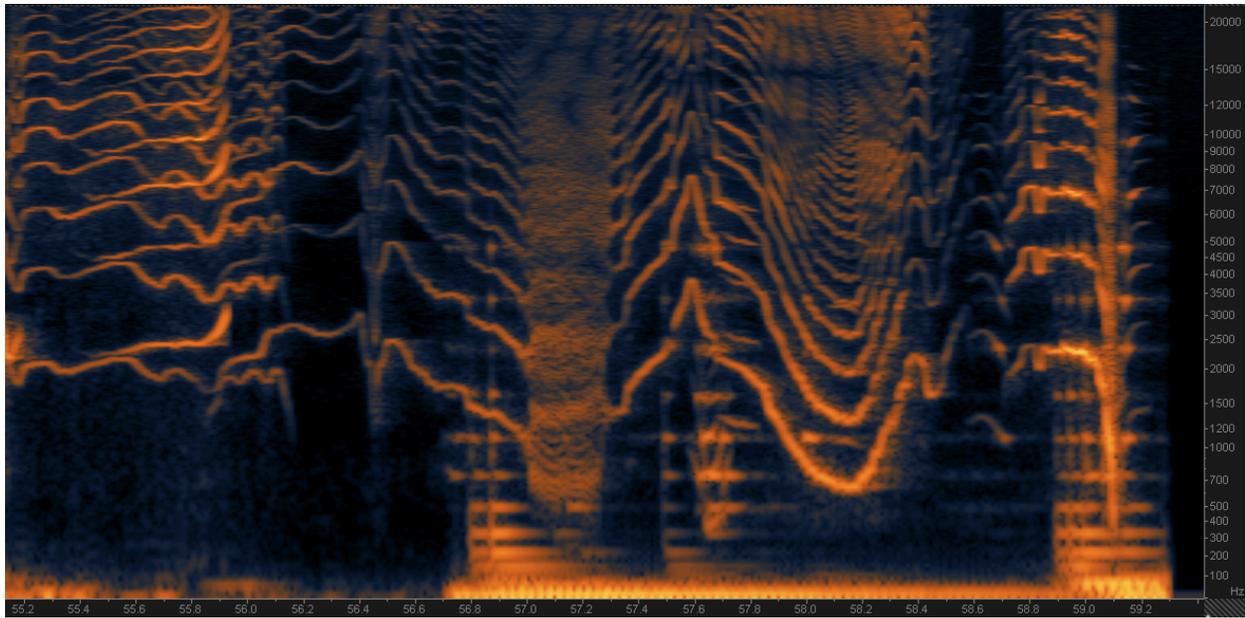


Figure 2: Long, fluid stroke of the marker from 0:55-0:59.4

This kind of continuous pitch variation makes many appearances in the piece, both overtly (in the unprocessed marker) and covertly – as a structural underpinning in Section B.

There is a third type of material exposed in Section A which becomes especially important in Section C. This material will be referred to as the “short strokes” texture – a frenetic barrage of short marker strokes (pitched B $\flat$ ).

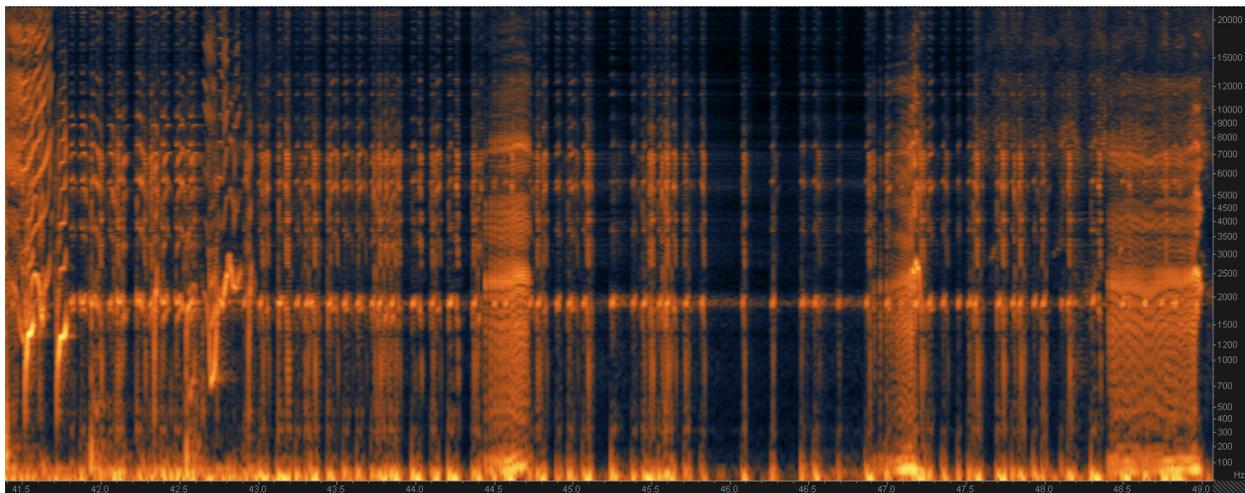


Figure 3: “Short Strokes” texture from 0:41-0:49

#### IV. Analysis

Since Section A functions primarily to expose the aforementioned musical materials most important to the composition, my analysis will focus on the two sections comprising the main body of the piece: Sections B and C.

##### Section B

Section B is governed by a near constant fluctuation in pitch by way of glissandi, a principle derived from the natural pitch contour of a long, fluid stroke of the marker pen. Following a five-second grand pause at the end of the exposition (just long enough for the resonance trailing the previous music to diminish to inaudibility), Section B opens in a frenzied state, set off by a ricocheting, somewhat industrial-sounding attack. This sound, a heavily-processed version of the slip-grip grating stammer, is sustained as a low rumble churning beneath a completely saturated harmonic spectrum. Focus shifts to marker gestures in the foreground and a prolonged ascending glissando creeping ever so slowly. The wild, frenetic strokes of the marker seem a musical reaction to the mounting sense of urgency created by the slowly rising glissando (which is not timbrally-dissimilar to a siren) and the chugging undercurrent. A sudden dynamic and spectral surge in the low stammer terminates *sforzando*, setting off panic-stricken layers of marker gestures in the foreground and a second glissando, which originates in a mid-low frequency band and is more nodal (less pitch-focused) than its higher counterpart. Between 1:40 and 2:07 the spectrum gradually dissipates until there is separation and clarity between sound layers, the lower, secondary glissando having faded into mere resonance. Only the high elongated glissando and the unprocessed marker remain. At 2:07, the glissando very suddenly rises by a whole step before beginning a gradual descent. This

descent is trailed until 2:25 by a granular texture whose internal morphology seems mimetic of trickling water.<sup>7</sup>

The glissando continues its descent as a new compositional idea takes shape, terminating at 2:42. The following spectrogram depicts its entire trajectory from beginning to end. The low churning stammer, saturated harmonic spectrum, trickle, and frantic unprocessed marker gestures are all visible in the image.

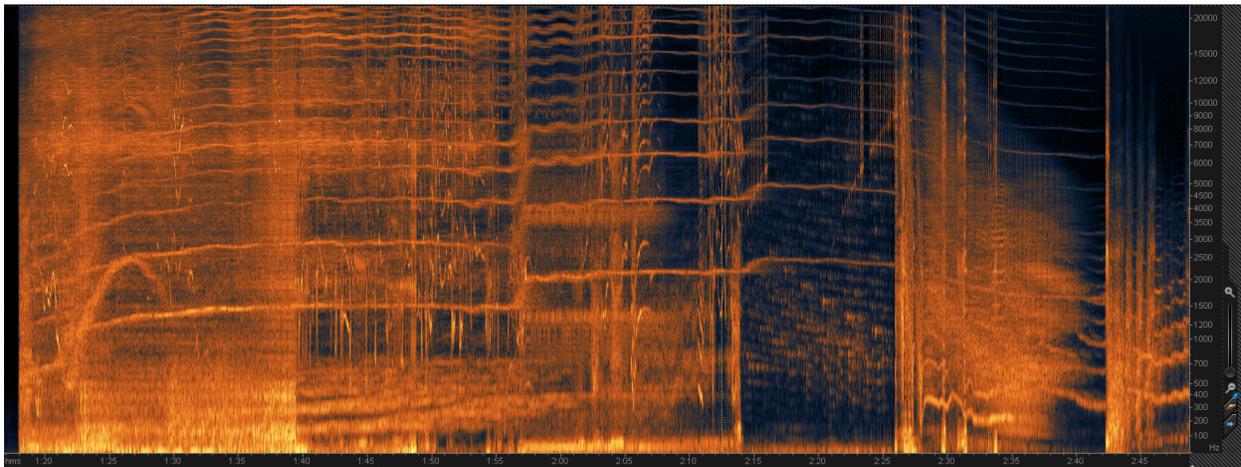


Figure 4: Glissando underpinning 1:17-2:42

The rising and falling glissando is a derivation of a long, fluid stroke of the marker presented in extreme augmentation, and is used to underpin this entire passage and engender mounting tension followed by gradual release.

Following the “water” texture and during the final stages of the glissando’s descent, the composer introduces foreground gestures which are howl-like in contour and timbre and seem to be mimetic of animal utterances.<sup>8</sup> In his treatise *On Sonic Art*, Trevor Wishart states that “aspects

---

<sup>7</sup> This “water” texture is to be further discussed during analysis of Section C.

<sup>8</sup> It cannot be assumed, of course, how every single listener will perceive a sound. This listener hears certain long, fluctuating pitch contours as intentional mimicry of utterance.

of utterance may be observed in, or structured into, the morphology of other sound-objects and events,” also adding that “in an electro-acoustic work we may play with the recognition of the sound-object as utterance by beings.”<sup>9</sup> Moore engages in this recognitory play throughout the composition and admits as much in his program note: “The natural pitch contour of the pen gives rise to some very *human* qualities such as sighing (descending gestures) and questioning (quick ascending gestures).”<sup>10</sup> I must disagree with Moore that resultant vocal sounds are humanlike; the howling gestures beginning at 2:28, for example, are more evocative of wolves or wild dogs. Regardless, the manipulation of long, fluid strokes of the marker to suggest sighs, groans, whines, howls, and further utterances remains a peripheral motivation in the composition, and one which informs the focus of music from 2:28-3:17 and 3:46-4:07. Naturally, the rising and falling nature of these utterances is in keeping with the principle of continuous pitch fluctuation guiding Section B.

There is an interesting phenomenon near the close of Section B in which clearly-pitched tones and nodes strongly suggestive of pitch form a recurring back-and-forth shift between two pitches a semitone apart (approximately D# and E): Two detached squeaks of the unprocessed marker sound out D# and E at 4:58, and a wild squiggle a few seconds later lands on E. At 5:03, the E is pulsated in a breathy haze before crossfading with a stuttering E sustain. This stuttered tone slowly dips down to D# before rocketing upward to be punctuated by two powerful reverberant sustained tones: E and D# a minor 9<sup>th</sup> lower. After a brief caesura, a series of terse gestures ensues, and a rattling reverberant D# at 5:40 resolves (ten seconds later) into a sustained E, which is fused to high-frequency granulated noise suggesting the stridulation of crickets.

---

<sup>9</sup> Trevor Wishart, *On Sonic Art*, 241, 262.

<sup>10</sup> Moore, *Program Note*.

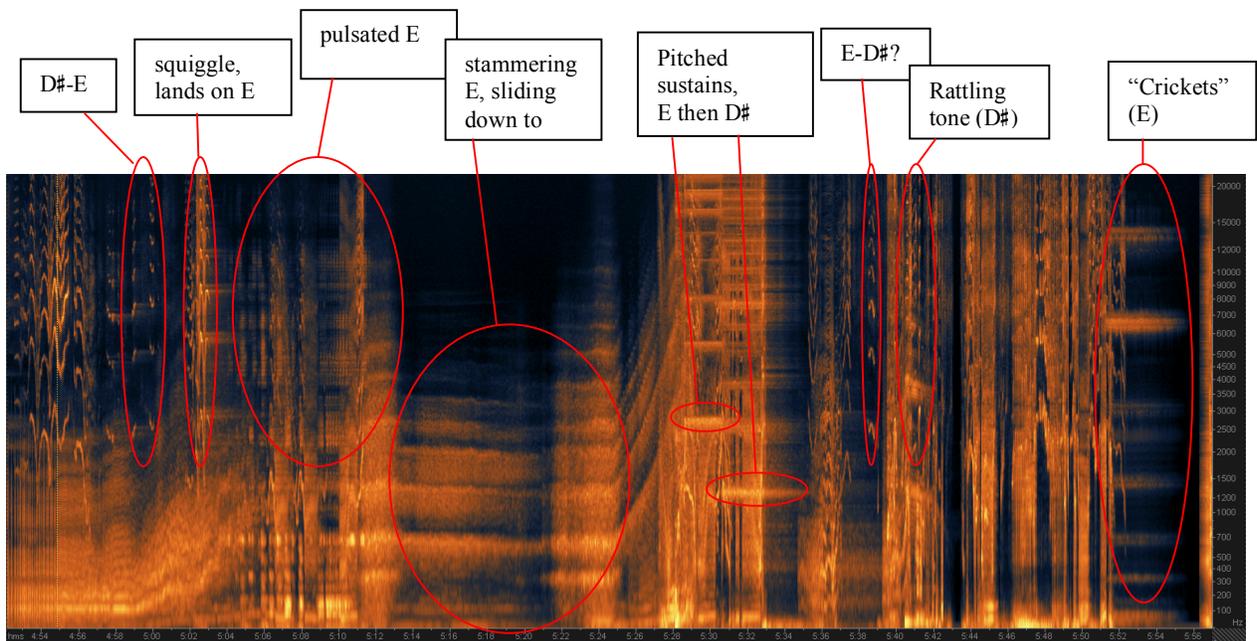


Figure 5: Semitone vacillation from 4:58-5:55

The vacillation between these two pitches is in keeping with the underlying structuring principle of Section B. It also parallels the sort of persistent leading-tone-to-tonic motion found at important cadence points in tonal, common practice works – a fitting analogy since this passage brings Section B to a decisive close.

### Section C

Whereas the overall trajectory of Section B is shaped by a continuously undulating pitch focus, Section C is characterized by a rigid focus on elongated, fixed-frequency textures and their internal morphologies – an abstraction of both the slip-grip grating stammer.

Section C opens with a pointillistic presentation of materials. From 5:56-6:50, short segments of unprocessed marker sounds appear amid interjections of more heavily-processed

notches of sound at a lower pitch level. This erratic foreground activity is superimposed onto a backdrop of sporadic staccati impulses.

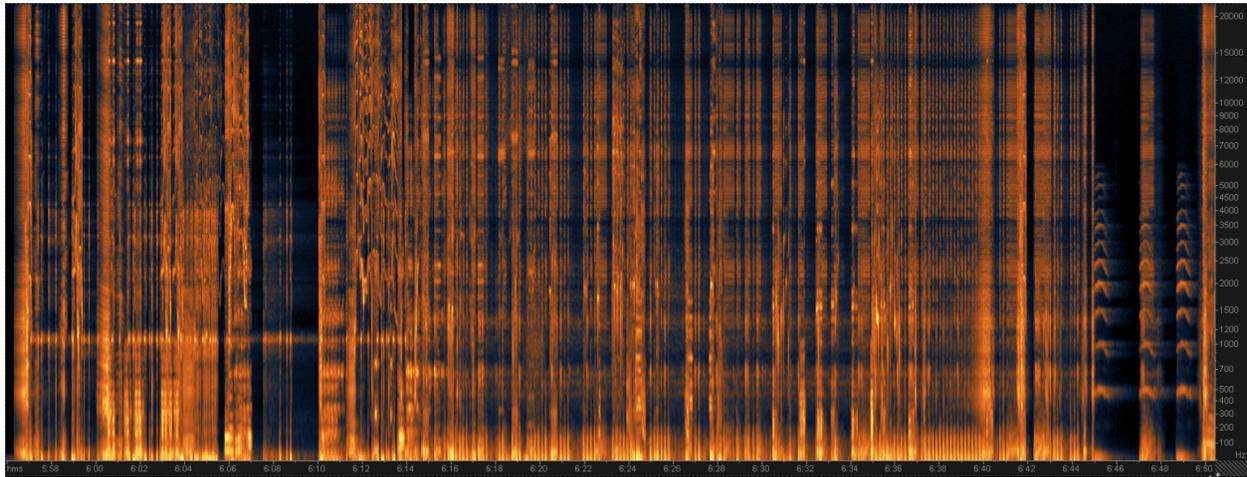


Figure 6: Staccati impulses at Section C opening (5:56-6:50). Pitched impulses are clearly visible through 6:14.

At first these impulses are unmistakably pitched, reiterating ‘C’ in an irregular, Morse-code like fashion. This string of impulses is connected to the “short strokes” texture occurring 41 seconds into the piece, albeit a more deliberately pulsed presentation of the material. A transition from note to node around 6:14 transpires nearly unnoticed, facilitated by two techniques: 1) a gradual reduction in reverberation trailing the ‘C’ impulses, which nudges their identification closer to “node” on the note-to-noise continuum, and 2) a masking of the meeting point between pitches and nodes by gestures in the foreground. The subsequent stream of nodes from 6:14-6:50 is rhythmically less erratic than the previous series of pitches, with impulses more evenly spaced. Occasionally, these nodal streams are punctuated by short bursts of nodes which are even more closely condensed. The rhythm and timbre of this material creates an overall effect reminiscent of the sound of a person plunking away diligently at a typewriter and replacing the writing head upon reaching the page margin.

Abrupt, pointillistic interjections of the marker continue atop this nodal backdrop. From 6:23-6:27, a fully-diminished seventh chord asserts itself four times and is the first instance of an overtly-triadic simultaneity. This unique occurrence is perhaps an oblique reinforcement of the vertical nature of Section C, in which focus is placed on prolonged textures with fixed frequency content.

The passage arriving at 6:50 is underpinned by a background tapestry woven from stuttering long tones whose collective morphology is undeniably reminiscent of the slip-grip grating stammer. In this abstracted variation, however, the stammering rhythm both accelerates and slows, its duration extended artificially. Furthermore, any semblance of human agency has been removed, since the grating quality of the original (a byproduct of immense friction) is no longer present. At first, mid-low groans and higher curvilinear gestures (with an almost slide-whistle quality) emerge out of the stuttering muck, with swiping reversed envelopes slowly fading into prominence through 7:24. Strands of stammering long tones and resonances begin to diverge and multiply at 7:11, with low-frequency strands emerging at 7:17 which are closer in frequency to the slip-grip stammer.

From 7:28-7:44, all foreground activity is cleared away except for short bursts of trill-like scribbling. The listener is invited to focus intensely on the sound as a vertical phenomenon, as stuttering strands across the frequency spectrum ebb and flow and wispy background resonances fill the empty spaces. The unprocessed marker sound enjoys a brief solo over this tapestry at 7:45, singing out in long expressive phrases which have thus far been avoided in Section C. The wild fluctuating contour of the marker very noticeably plunges three times to linger on the slip-grip grating sound, connecting with and acknowledging the abstracted version of this sound in the accompanying texture.

A prominent minor third harmony sounding at 7:57 is significant on a few levels. Firstly, it is a singular instance of a traditional, triadic sonority lasting longer than a mere instance. The sonority brings to fruition prior appearances of stable triadic harmony, including the aforementioned fleeting interjections of a fully-diminished seventh chord and a previously unmentioned minor third touched on at 5:59 amid a string of pitched impulses. Secondly, the sonority is timbrally and morphologically connected to the water-like texture in Section B.

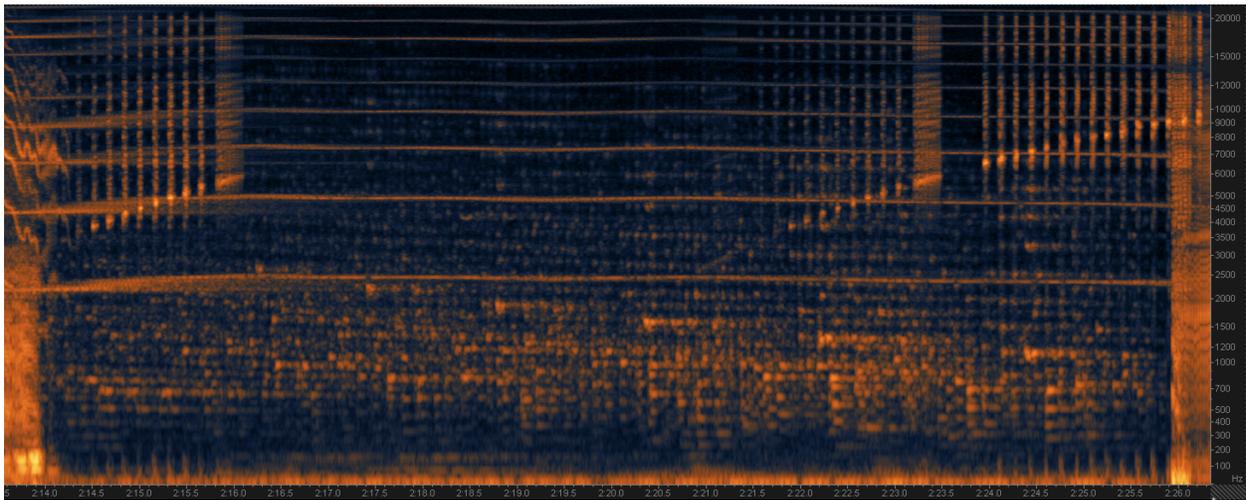


Figure 7: “Water” texture from 2:13-2:26.5

In comparing the “water” texture at 2:13 to the sonority at 7:57, one notices that the trickling behavior of the former is shared by the latter as an internal aspect of the sound: the chord itself is subtly pulsed in a manner suggestive of delay effects and is canopied by an inharmonic spectrum which trickles back and forth across high and mid-range frequencies in a granular fashion. By 8:03 the chord has fully faded, the “trickle” re-emerging on its own. Owing to a more sparse texture, the stammering tones having receded into the distance, one is able to clearly identify this “trickle” in a spectrogram.

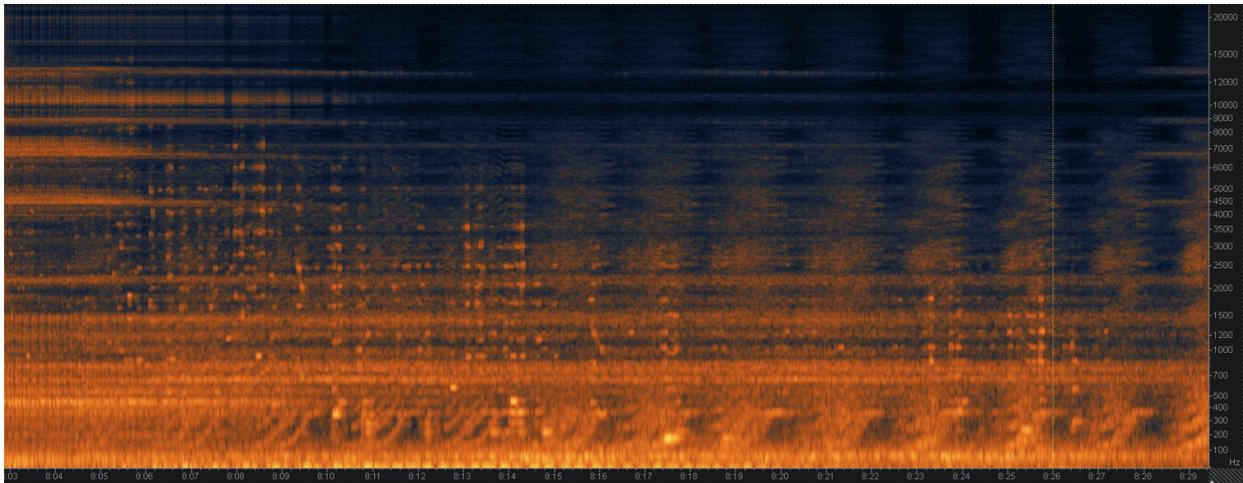


Figure 8: “Trickle” from 8:03-8:29

The “trickle” is nearly identical to the “water” texture of Section B in rhythm, but diverges from its predecessor in presentation: whereas the “water” texture descended in pitch as a unit, gliding along a contour mirroring that of the downward glissando sounding simultaneously, the “trickle” descends stepwise, gradually focusing on lower frequency bands and arriving there through movement that is discrete rather than continuous. This is all in keeping with the separate principles governing Sections B and C, with a serpentine fluctuation of pitch driving Section B and a rigid focus on static harmonic spectra prevailing in C.

As the “trickle” makes its descent, a sequence of ascending glissandi begins to fade in. While this glissando morphology seems at first contradictory within Section C, it is the presentation of the sound which connects it obliquely to surrounding material: the upward glissando is reiterated many times at a regular pace, retracing the same pitch contour with each repetition. In this way, this series of upward gestures is not defined by its sliding trajectory but rather its static-ness and obsessive, repetitive behavior.

At 8:42, a mid-low pitched drone fades in amidst the series of ascending glissandi, now regulated to the background, and wild squealing unprocessed marker and pointillistic punctuations in the foreground. The drone is doubled an octave lower at 8:59, and at 9:05 a disjunct melody of these pitched drones is presented over a backdrop of pulsing nodes. One notices that the drones are not silky smooth but coarse and buzzy. The following spectrogram of the low drone at 8:59 has been magnified to display a mere 200 ms of time.

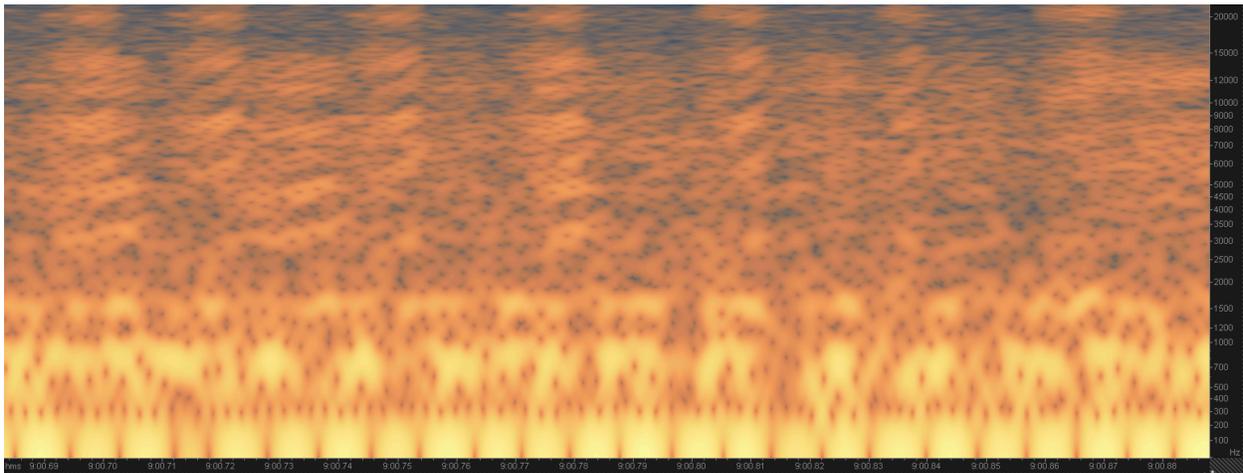


Figure 9: Low drone from 9:00.68-9:00.89

The image confirms what the ear has already sensed: that this low tone is constructed of many infinitesimal segments of sound, suggesting the morphology is derived from the slip-grip grating stammer. However, in this instance the segments are so closely compacted that one perceives not a stutter comprised of individual attacks but an elongated tone with a rough, jagged surface.

Considering Section C up to this point, it is clear that the elongated static textures and tones which permeate the music undergo a morphological progression: a sporadic stream of staccati pitches crossfades with a stream of more regularly-spaced nodal impulses; this is followed by a complex web of long stuttering nodal strands and resonances and, lastly, pitched buzzy drones. On one end of the progression, morphological typologies are abstracted from the

“short strokes” texture at 00:41; on the other, they are abstracted from the slip-grip stammer. Derivational overlap occurs at the second waypoint along the progression with the sound previously likened to that of a typist plunking away at a regular pace and replacing the writing head; the first constituent of this soundstream (evenly-spaced impulses) is more aurally connected to the “short strokes,” while the second is more closely identified with the slip-grip stammer. The last two waypoints along the progression are unambiguously derived from the stammer.

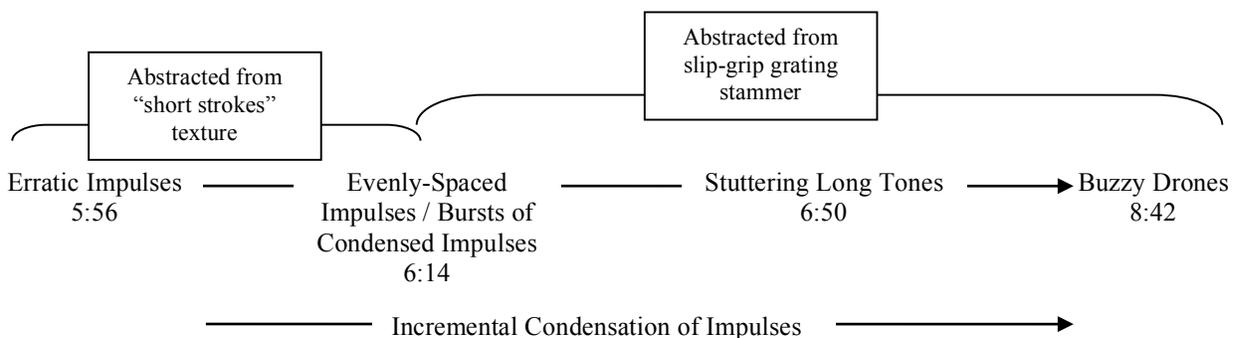


Figure 10: Morphological Progression in Section 20

One notices that there is an incremental condensation of impulses with each step forward in the progression, with movement from moderately-spaced impulses to impulses which are so closely compacted that they are perceptually synthesized into a long, coarse drone. This progression is itself abstracted from the slip-grip stammer, mirroring its acceleration and compression of impulses over time.

The introduction of the buzzy drones at 8:42 marks the beginning of what can be considered the coda. During this concluding passage, musical elements previously appearing in Section C are restated, summarizing the morphological typologies occurring at various waypoints along the progression and ushering the work to a close.

## V. Conclusion

Adrian Moore's *Study in Ink* is a shining example of single-source tape composition, the composer spinning out a diverse array of gestures and textures from a presumably limited sound source. However, the true brilliance of the piece lies in the very direct connection between the source material and the form and syntax of the work, with the structuring principles used to shape large sections having been derived from qualities intrinsic to the original source. I like to think of *Study in Ink* as a work of sonic calligraphy, inscribed onto a canvas which is woven from the same kinetic energy as the writing itself – and which is equally pertinent to the artwork overall.

## Bibliography

- Emmerson, Simon. "The Relation of Language to Materials." In *The Language of Electroacoustic Music*, edited by Simon Emmerson, 17-39. New York: Harwood, 1986.
- Moore, Adrian. *Program Note for "Study in Ink."* Composer's website. <http://adrian-moore.staff.shef.ac.uk/music/studyinink.pdf> (accessed April 30, 2014).
- Moore, Adrian. *Traces*. Montreal: IMED 0053. CD. 2000.
- Smalley, Denis. "Spectro-morphology and Structuring Process." In *The Language of Electroacoustic Music*, edited by Simon Emmerson, 61-93. New York: Harwood, 1986.
- Wishart, Trevor. *On Sonic Art*. York: Imagineering Press, 1985.