

Slippage and Strata in Brian Ferneyhough's *Terrain*

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"The farther out an object goes in space, the less it represents the old rational idea of visible speed. The stream-lines of space are replaced by a crystalline structure of time."

"Words and rocks contain a language that follows a syntax of splits and ruptures. Look at any word long enough and you will see it open into a series of faults, into a terrain of particles each containing its own void."

- Robert Smithson

Like many of Brian Ferneyhough's compositions *Terrain* was inspired by extra-musical sources: the homonymously titled poem by A.R. Ammons, *The Writings of Robert Smithson*, and *Octandre* by Edgard Varèse. Ammons, Smithson, and Varèse are/were all important figures in their respective fields of poetry, art, and music. Their influence upon *Terrain* led to the creation of a piece of chamber music that is powerful, immediate, and complex. Manfredo Tafuri has said that "every analysis seeks only to measure the effects that it sets into motion in order to change itself according to the intervening transformation."^[1] Analysis can also cast shadows beyond its own borders and suggest realms beyond what meets the eye or ear. In this essay Ferneyhough's *écriture* is placed within a cross-pollinated territory containing geological, textual, and musical terminology.

Background

From the beginning of Ferneyhough's career soloists play important roles in his published output. Many of his compositions are written for soloists, groups of soloists, or soloists pitted against ensembles of various sizes. Between 1988 and the mid-1990s Ferneyhough completed three works that featured soloists set against medium-sized chamber ensembles. The first to be composed, *La Chute d'Icare* is scored for solo clarinet and a mixed septet. It was the result of Ferneyhough's reflections on the myth of Icarus as conceived in a painting by Peter Brueghel, and a poem that William Auden wrote about Brueghel's painting. *Allgebrach*, the second work, is scored for solo oboe and string ensemble. This piece is based upon the artistic and literary output of the schizophrenic Swiss artist Adolf Wölfli. The third work in this conceptual trilogy is *Terrain*, a work composed for the same ensemble as Varèse's *Octandre* (flute, clarinet, oboe, bassoon, horn, trumpet, trombone and double bass) plus a solo violin part. All three works are distinguished by numerous instrumental and structural relationships between the soloist and various ensemble combinations. Each piece also metaphorically engages a

non-musical image. The transfer from image to sound occurs on many levels. As Ferneyhough puts it, his "motivating concerns are dependent less on concrete material transference than on a 'state of mind' which is itself in a constant process of evolution and redefinition".^[2]

Completed in 1992, *Terrain* marks both old and new directions for Ferneyhough. It can be considered as part of a stylistic trend that began during the early 1980s with works such as *Lemma-Icon-Epigram* for solo piano and the *Second String Quartet*. Around this time Ferneyhough began to "look into questions of death, and what it is about a work of art that gives it a certain permanence, as against its ephemeral, immediate expressive capacity."^[3] His inquiries led him to sedimentary musical surfaces produced with multi-layered, subsurface processes (see Toop 1985, 13). *Terrain* shares other aspects with works written between the late 1980s and the middle 1990s. Many of these compositions are based upon prominent American sources including: Ezra Pound and Jackson MacLow in the *Fourth String Quartet* and Gertrude Stein in *Trittico per Gertrude Stein*. (Perhaps this was a reflection of Ferneyhough's preoccupation with his own new *Terrain*, as he had recently relocated to the United States to teach at the University of California at San Diego.) *Terrain* is a concertante piece composed especially for the British violinist Irvine Arditti for whom he also wrote the solo entitled, *Intermedio alla ciaccona*. It also employs meandering lines to mark the interrupt patterns between two or more layers of material. This is similar to what occurs in *Mnemosyne* for solo bass flute and tape, and other works.^[4] And like *Trittico per Gertrude Stein* it is aimed squarely at the highest level of virtuosic string performance.

The compositional procedures in *Terrain* reflect natural processes that are extant in each of Ferneyhough's three sources. These include: crystallization, erosion, fracturing, and sedimentation. Each relates to time or demonstrates the motion of time in a different way - as a retardation or acceleration of motion. According to Henri Bergson "time is what hinders everything from being given at once. It retards, or rather it is retardation."^[5] This potent image is relevant to the understanding of any kind of music, especially one that is process-related and requires repeated listening.

In order to illustrate the shared conceptual space between *Terrain* and the work of Ammons, Smithson, and Varèse we will now briefly examine some of the major ideas associated with each.

Robert Smithson

Robert Smithson's entire career spanned a mere decade. But during those ten years he managed to produce numerous paintings, drawings, sculptures, earthworks and essays, while becoming one of the best known artists of his time. His international reputation was largely established because of his involvement with earthworks. At the time of his death in 1972 he left behind several monumental earthworks such as the *Spiral Jetty* located in Utah's Great Salt Lake, and *Broken Circle* in the Netherlands.

According to Eugenie Tsai, Smithson's work "occupies a crucial historical and conceptual position in twentieth-century art... emphasizing the historical break with the aesthetic field of modernity." ^[6] She places his work at the epicenter of this fracture because of the way he employs language. Similarly Craig Owens has said that "the eruption of language into the aesthetic field... signaled by the writings of Smithson... is coincident with, if not the definitive index of, the emergence of postmodernism." ^[7] He goes on to compare Smithson's privileging of the act of writing to similar treatments made by Roland Barthes and Jacques Derrida. ^[8]

Like other contemporary artists and poets Smithson's texts employ a mixture of signifiers, arranged into sedimentary layers of shape and sound. The semantic value of language is often underplayed. Similarly his sculptures present objects intended to be cross-modally perceived rather than merely read as a text. In an interview with Dennis Wheeler, Smithson once said that he was "concerned with the physical properties of both language and material." ^[9] His artistic output demonstrated how they could coexist without either one dominating. For Smithson, language was "as primary as steel." ^[10]

During the early part of his career Smithson composed various poems that functioned as verbal analogues to his paintings and drawings, and made collages that exploited the visual attributes of language. He called these collages "writing paintings" and "collage writing." ^[11] Smithson's essay entitled "A Heap of Language" is an example of this. It was composed in the shape of a triangle, widest, and with the longest sentences at bottom. This piece was used as an illustration in a press release for the exhibition "Language to be Looked at and/or Things to be Read." As Craig Owens has noted, the exhibition title itself "suggests the reciprocal translatability of verbal and visual phenomena." ^[12] As in the work of Kurt Schwitters, when Smithson's "collage writing" is read aloud a "tongue-twisting cacophony of 'found' sounds" ^[13] is produced.

Several critics have compared Smithson's writings to his earthworks. For instance, according to Kate Linker the "words move across the page in a jagged or overflowing pattern. The texts halt and stammer, then flow eruptively or abruptly end. They assume, in their explosion and evanescence, many material properties of earthworks and we seem to read them as if within a sensuous field, scanning perspectives, surveying alternatives, mirroring the processes of a sensibility in action." ^[14] Her description also represents the kind of activity one experiences while attempting to perform or listen to a score by Ferneyhough.

From 1968 until his death Smithson created and constructed earthworks in various obscure sites. Because of the difficulty of locating these sites he extensively photographed and documented them, inventing the notion of the 'nonsite' ^[15] as a result. Nonsites contained the physical detritus from a given site after it had been disrupted. ^[16] The nonsite was a network of signs that both the viewer and the artist discovered as they went along. ^[17] Smithson used the term 'site' to represent the actual location of the

earthwork, and 'nonsite' to represent its dislocation or absence as a gallery piece. Each of the materials in a nonsite is a signifier for a different part of the site.

Smithson's first nonsite, *A Nonsite, Pine Barrens, New Jersey* consisted of a six-sided aerial photographic map with five quadrants per side, and thirty containers arranged to correspond with each quadrant. Each container held sand that was collected from a corresponding location on the map. Like all his nonsites Smithson put together a collection of disparate objects, all of which pointed to a specific site. Significantly the nonsites draw the viewer's attention to the process of their construction, including Smithson's excursions to gather material for them. So, paradoxically, the nonsite is also a site that redefines the original site as a nonsite.

The full earthwork, site and nonsite included, is spread across various media including: photographs, diagrams, texts, and geological remnants. By definition they never coalesce in the same physical space. The viewer is forced to acknowledge the futility of ever directly perceiving the work in its entirety. To the vast majority of viewers, earthworks, as well as most works of art, are encountered mostly through secondary sources. Recognizing this, Smithson used these sources to enhance his art, demonstrating that the conceptual 'baggage' that surrounds a work of art also shapes the viewers experience.

Smithson also used the nonsites to facilitate something he called a "surd situation,"^[18] which included drastic changes in size and scale. "A point on a map expands to the size of the land mass. A land mass contracts into a point."^[19] This telescoping of dimensions brought about through the site/nonsite dialectic resembles a kind of postmodern sublime. Jean Francois Lyotard has characterized the sublime process as one in which, although able to conceive of infinity, we are unable to represent it in objectified form. Thus, "the imagination fails to present an object which might, if only in principle, come to match a concept."^[20] Gyorgy Kepes has noted that during this century the "rapid expansion of knowledge and technical development have swept us into a world beyond our grasp."^[21] Modern machines such as the ones utilized by Smithson - bulldozer, camera, truck and plane - have significantly contributed to our ability to relocate the limits of size, scale, and distance.

Henry Sayre has suggested that, "in the feelings for the remote, the inaccessible, and the nearly invisible that (Smithson's) earthworks generate in us a sort of sublime."^[22] The physical object dissolves, throwing the mind "back on itself."^[23] But, if we take the term 'sublime' in the sense that Edmund Burke meant it, Smithson deliberately minimized the possibility for the sublime by choosing locations for his earthworks that were not considered awe-inspiring. In fact just the opposite was the case.

Smithson seems to have been preoccupied with the sublime. In his essay, "Aerial Art"^[24] he describes a sublime art that can be seen from airplanes on takeoff and landing. He was primarily fascinated with the change in scale brought about by the viewer's distance from the site. The "surd situation" concept is bound up with the notion that his earthworks can only be perceived in partial view. Even an aerial overview can be

considered only a partial view because of the work's entropic relationship to time. As Sayre has pointed out, Smithson's work harnessed two types of time: human and geological. The former is revealed at the site, the latter only from an aerial view.^[25] It should be remembered that all measurements of time involve motion, e.g. clocks, sundials, or vibrating quartz crystals. Smithson's aerial art points to the fact that time and motion are intimately bound up with scale.

Smithson's work was intentionally constructed to engage the forces of deterioration, erosion, and slippage. The concept of entropy not only carried physical but also mental connotations for him. The boundary between the physical and the mental was eradicated. Explaining how entropy operated in his earthworks Smithson said that "the information tends to obliterate itself... (it) is so overwhelming in terms of its physicality that it tends to lose itself."^[26] One distinctly hears echoes of the 'New Complexity' movement, a phenomenon usually attributed to Ferneyhough's influence.

For Ferneyhough, Smithson was "an outstanding thinker... deeply aware of how close even the most ordered fields of perception are to collapsing into chaos, and was, in consequence, concerned to *name* this propensity as a condition of its creative harnessing."^[27] Smithson is lauded for his ability to creatively harness chaos into the structure of an artwork. Ferneyhough was most attracted to Smithson's "mental slippage images (since I feel that to be the way my own mind works), and sharp, contorted phrasing."^[28] All three concepts are embedded, to various degrees, in the compositional procedures he employs in *Terrain*. *Terrain* is Ferneyhough's "distant reflection of some of Smithson's 'mental tectonics'."^[29]

We now move on to briefly consider the relevance of A. R. Ammons and Edgar Varèse to *Terrain*. Their work engages many of the same issues that have been discussed in regard to Smithson.

A. R. Ammons

In Ammons' poetry the self is often located in relation to natural surroundings and objects.^[30] His descriptions of the natural world foreground the notions of time, flow, and motion. Sometimes Ammons metaphorically elides music with motion. In a poem entitled, "Motion" he writes that the 'music' of poems is characterized "by the motion of/ its motion/ resembles/ what, moving, is - ."^[31] Ammons, like Smithson, clearly values the interruptive qualities of punctuation. In the span of just a few words he manages to create various types of rhythmically derived motion with the aid of three punctuation devices: the slash, comma, and dash. In addition to impeding the flow of the sentence they also suggest types of continuation unique to each.

Ammons also uses punctuation to link seemingly unrelated phenomena.^[32] The reader is faced with a difficult task of decoding. Hugh Luke has pointed out that Ammons' language is often highly difficult to traverse because "complex perceptions lead

on to complex metaphors and stretchings of the ordinary boundaries of vocabulary and sentence structure."^[33] He is interested in "the coincidental, peripheral event... (the) minute particular that leads to something inevitable."^[34]

His poetry is also coupled with a disposition that sees small things as actually quite large, like under a microscope. Similar to what we found in Smithson there is a telescoping of scale, a conjuring of the sublime. According to David Lehman, Ammons is fascinated with the "sublime otherness" of his poetic landscapes.^[35] In order for something to attain the status of an 'other' there must first occur a kind of distancing that displaces the poet or viewer. As our sense of scale is altered we begin to see the world in a different way. We become disoriented and perhaps, displaced from old habits.

Ammons' poem "Terrain" is essentially a text about the soul. He begins the poem by stating that "the soul is a region without definite boundaries"^[36] and goes on to describe other infinite attributes of nature. Each time Ammons cites another attribute he further extends the metaphor by negating it. This process itself is self-consciously foregrounded in the second stanza when he writes that "there are barren spots: bogs, rising by self-accretion from themselves, a growth into destruction of growth" (90). Paradoxically the growth that attempts to connect separate parts of the self results in a separation of the self.

Ferneyhough's interest in Ammons' "*Terrain*" revolves around the latter's "vision of two worlds, one fecund and living, the other rough-hewn, seemingly motionless, but subject to tremendous subterranean pressures."^[37] The friction between these two worlds is largely responsible for the charged environment of Ferneyhough's own *Terrain*.

Edgard Varèse

Edgard Varèse is certainly one of the most important composers of the twentieth-century. His compositions have profoundly influenced composers from Iannis Xenakis to Frank Zappa. Because there has been so much written about Varèse the following will be limited to those concerns that intersect with Ammons, Smithson, and/or Ferneyhough.

For Varèse "the impetus (for a composition) may come from an idea, an image, a phrase, anything that gives a shock... But this object which solicits the composer outside himself is only an ostensible motive and will disappear, finally eliminated by the work that is taking shape."^[38] His description of the impetus for a composition predominantly includes extra-musical events. The rest of his statement could serve as an explanation of the dialectical relationship between art and the sublime. His "initial shock" causes the composer to go "outside" of himself. Varèse, like Ammons, is preoccupied with a "sublime otherness." His statement could also describe entropic or palimpsest^[39] processes. Both are characterized by erosion. Erosional procedure, as we will see, plays an important role in Ferneyhough's *Terrain*.

Varèse often spoke about the spatial qualities of music and the movement of sound masses. He manipulated his materials with reference to spatial attributes such as size, shape, and direction, but also in regards to color or timbre. As Jonathan Bernard points out, Varèse was probably the first composer to treat music in a spatial manner.^[40] Like Smithson and Ammons he employed cross-modal metaphors in his work.

Varèse thought of his compositional process as analogous to crystallization. As he put it, "there is an idea, the basis of an internal structure, expanded and split into different shapes or groups of sounds constantly changing in shape, direction, and speed, attracted and repulsed by various forces. The form of the work is the consequence of this interaction. Possible musical forms are as limitless as the exterior forms of crystals."^[41] Crystallization is a process of growth involving orderly expansion. Bernard ^[42] has spoken about the processes that occur in *Octandre* as analogous to crystallization, which as we know, was also an important concept for Smithson.

As in many of his pieces, in *Octandre* Varèse's employment of timbre is attached to registral placement. He used a large palette of timbres, wide dynamic contrasts, and frequent pauses in order to aurally segment the different parts of his composition. All these devices are what Bernard calls "striking phenomena"^[43] because they physically jolt the listener.

Another element found in many of Varèse's works is a slow rate of pitch change due, in large part, to his use of repetition. For example in *Octandre*, the oboe solo at the beginning of the piece essentially consists of the same chromatic tetrachord [0, 1, 2, 3] repeated four times. The first, third, and fourth members of this tetrachord are consistently placed together in the same register, whereas the second member is placed in the register immediately below.

Octandre was an extremely important work for Ferneyhough because it was, at the age of fifteen, the very first piece of modern music he had ever heard. He recalls this moment as his earliest experience of a musical composition's actual sound. Prior to this he had only seen scores of new compositions, because performances and recordings were rare. Describing his experience of listening to *Octandre* he has said that "I remember being tremendously impressed by the uncompromising clarity and cleanness of sound, and it was at that moment that composing became my definitive goal in life."^[44] Thus, besides being the first piece of modern music he heard, it also partially determined his own compositional identity. He described his use of *Octandre* as "the payment of a long-standing debt."^[45]

The color and weight of *Octandre*'s instrumentation ignited Ferneyhough. He was interested in the generational possibilities of this octet formation because it was a largely untapped region. And because of its inherent heterogeneity it could potentially be divided into many different subgroups. Additionally, he was impressed with the ensemble's "cutting 'bite' " when employed as a single mass entity.^[46] But what proved most inviting for

Ferneyhough was the "vast palette of registrally-defined timbral nuances available, as well as the, more or less, stable chordal states defined by absolute registral distribution"^[47] - two significant procedures found in *Terrain*.

Ferneyhough's *Terrain*

W. W. Rouse Ball has said that "in order to make sure of describing a maze without knowing its plan it is necessary to have some means of marking the paths which we traverse and the direction in which we have traversed them."^[48] The analysis that follows describes some of the paths that have been traversed.

The large-scale form of *Terrain* is shown in Figure 1. There are seven sections, each defined by instrumental and/or textural shifts. They are unevenly distributed over the course of the piece into two main parts. During the first half (sections 1-3) the violinist performs unaccompanied in sections 1 and 3, and is joined by various instrumental combinations in section 2. The second half of the piece is characterized by various full ensemble and quintet combinations. The full ensemble frames the second half (in sections 4 and 7). Symmetricality is a distinguishing characteristic of the overall form as well. The first and last sections are opposites of each other (violin solo vs. entire ensemble). Sections 2 and 6 employ various degrees of instrumental subdivision. Section 2 uses many combination types whereas section 6 uses only one. Sections 3 and 5 symmetrically surround section 4, the central axis of the entire form. The violinist is not used during section 4 (the center), interesting given the fact that this is a piece for violin soloist and ensemble. The violinist's formal role has been literally de-centered, if only for six measures.

Section 1 - mm. 1-29, violin solo
 Section 2 - mm. 30-79, violin + ensemble combinations
 Section 3 - mm. 80-96, violin solo
 Section 4 - mm. 97-103, ensemble alone
 Section 5 - mm. 104-160, full ensemble
 Section 6 - mm. 161-183, quintet combinations
 Section 7 - mm. 184-213, finale

Figure 1: *Terrain* - Large-scale form

Above measure 1 are the words: "tense, electrified." These two terms could serve as directives to performers for how to perform any of Ferneyhough's works. Both point to the razor-sharp quality that he desires in all his performances. Because of the inherent difficulty involved in performing his compositions it seems tautological to indicate to the performer that a passage is "tense" or "electrified." However, some performers of Ferneyhough's music may have become so well acquainted with it that they unintentionally perform with less "electricity" than required. So, a gentle reminder to keep the sparks flying may be in order.

Terrain begins with an unambiguous presentation of the violin as soloist within a twenty-nine measure solo. The violin's role as soloist remains in place for the rest of the piece (except for the six measures of section 4). During the first thirty-seven measures the violin part is split between two staves, each presenting a different rhythmic layer. Ferneyhough uses horizontal lines extending from noteheads on either staff to indicate the polyphonic flow of events, and vertical lines between both staves to indicate the points at which the flow is interrupted. Referring to his use of what we will call "meandering guidelines" Ferneyhough has stated that "the retardational and catastrophic timeline modifiers are employed equally to focus temporal awareness through the lens of material."^[49] The first notes in patterns that contain such lines are always cut short, interrupted by succeeding notes on the opposite staff. Rather than notating the actual durations for each layer he employs this tactic for its psychological effect, reasoning that "a note begun as *if* it were going to continue for its full written length... is going to have a considerably different effect when interrupted than a note written as having an identical real duration."^[50] Ferneyhough calls this concept "interference form" or "interruptive polyphony."^[51] Like nonsites, the interruptions are devices of dislocation. Often the two staves present mutually incompatible rhythms and articulations, yet there is only a single line of material. Thus, the performer is faced with the paradox of reading two distinct layers of information while attempting to perform them as one. With this technique Ferneyhough seeks an "active projection of multiplicity (in the sense of incorporating alternative and competing trajectories as constituent contradictions making out an essential element of their expressive substance)."^[52]

During the opening violin solo another dialectic unfolds between two types of material. The first is characterized by the aforementioned interruption patterns (e.g. m. 1); the other is more linear and continuous (e.g. m. 8). Each relates to space and time differently, a reflection of Ferneyhough's reading of Smithson and Ammons. He locates two contrasting kinds of time in their work - stratified, and vertical or "slippage"^[53] time. Stratified time is characterized by multi-textural materials, whereas slippage time includes mostly single-texture (mono-texture) materials. Stratified time involves strata which continuously recombine and are subject to interruptions or slips that cut across the different layers. Conversely the strata in slippage time rarely recombine. Slippage is a process applied to the strata of time.

The interruptions in section 1 resemble slips.^[54] They dislocate the strata in the violin part. The first half of *Terrain* predominantly explores stratified time whereas the second half explores slippage time.^[55] The two senses of time also refer to the two worlds which Ferneyhough has spoken about in reference to Ammons work. Stratified time represents the "fecund and living" world of the terrain. Slippage time represents the "rough-hewn, motionless" world of the subterrain.^[56] Although distinct from one another the two types of time are not mutually exclusive. There may be slippage between them.

Hugh Kenner has said that "in a maze, time crosses and recrosses... one time lives in another."^[57] This is also true in regards to *Terrain*. Interestingly Ferneyhough

composed this piece backwards, starting with the second half first.^[58] Hence, the opening violin solo was approached from the perspective of having to begin 'again' after already composing the end.

Ferneyhough was also inspired by the different approaches to time he found in *Octandre*. For example, in the opening measures of the second movement he tells us that, "our sense of time passing skitters confusedly over the surface of a fast-but-immobile dyad" and in the opening of the third movement we encounter a "weird 'time-machine' quality."^[59] Significantly he describes both of these perceptions of time in relationship to 'Smithsonian' concepts by calling them "experiential fault lines."^[60] Likewise in an essay entitled, "The Tactility of Time," he states that, "when we listen intensively to a piece of music there are moments when our consciousness detaches itself from the immediate flow of events and comes to stand apart, measuring, scanning... we become aware of the passing of time as something closely approaching a physical, objectivized presence."^[61]

There are two additional techniques that impact the flow of events in *Terrain*. They are: "figural enhancement" and "stepwise erosion."^[62] Figural enhancement is a procedure whereby the periodicity of a figure is broken up through the use of localized changes, e.g. changes in speed such as retardation or acceleration.^[63] Stepwise erosion is a kind of decompositional meta-procedure not unlike the palimpsest. It takes generational processes and erodes them through linear deconstruction.

Measures 1-10

For the purposes of this study I will call the higher staff of the violin part layer 1 (L1) or the primary layer, and the lower staff layer 2 (L2) or the secondary layer. For the most part L1 involves more primary types of material than L2. It occupies more time, contains louder dynamics and more heavily accented attacks, and exhibits a greater degree of textural variation than L2. The first page (mm. 1-10) of the score is shown in Example 1.

Terrain begins with the pitch C accented, and played as an artificial harmonic in L1. (Actually the piece begins with a thirty-second rest.) The C is then immediately interrupted by a C-sharp in L2, effectively cutting short the duration of the C. The placement of pitches within interruptive polyphony represents attack times rather than durations. The fact that there are, on occasion, two mutually incompatible rhythmic layers (utilizing different tuplet subdivisions for example) necessitates complex calculations in order to place each layer in relationship to the other.

[Click here to view Example 1: *Terrain*, page 1](#)

The third pitch in m. 1 is another C, but in L2 and in a different octave. It is interrupted by another artificial harmonic in L1. This time however the finger extension

required is only a major third above the stopped C. Thus the pitch sounded is the fifth partial or E. This pitch is interrupted by a B in L2 - the first pitch that circuitously links both layers in that it is itself interrupted after serving as an interruption. Its placement is also significant for another reason. It is interrupted by a short flurry of four attacks played as loud as possible - a marked reference to slippage time which is characterized by more linear and continuous types of materials. This figure is abruptly cut short by the ensuing silence consisting of a dotted thirty-second rest with a pause sign above it.

The Cs in m. 1 are all more durationally significant than the other pitches in the measure which are all semitonal or microtonal inflections of C. The first four measures present two pitch-class spaces, one revolving around C (in L1), the other revolves around A (in L2). Like Varèse Ferneyhough is carving out a slow moving pitch space through repetition and the utilization of pitch materials that surround a primary pitch space.

In other parameters the two layers move in opposite directions. Over the course of m. 1 dynamics successively increase in L1 and decrease in L2. L1 has only heavily accented attacks whereas L2's are lightly accented. The first microtone (the third pitch of L2) even though at a low dynamic level, seems to destabilize the texture. It is 'answered,' or interrupted, by a small burst of activity in L1, marking a microtonal space around C, performed as loud as possible. Rhythmically L1 is characterized by compression, whereas L2 is characterized by expansion. Although the material in both layers is centered around the pitch-class C, three distinct registral areas are presented: high, middle, and low. L1's material is mapped onto an overall linear descent (high to low). L2's material stays within a narrow range in the middle register.

In measure 2 we go back to stratified time. Two new gestural types are introduced - glissandi and multiple violin stops. The four figures in this measure are divided into two per layer, arranged into two pairs of symmetrically related figures comprising an X-shaped, or crossed pattern (see Example 2). The first figure in L2 and the second figure in L1 each contains two pitches located a semitone apart. The first figure in L1 and the second figure in L2 both contain glissandi and triple-stops, [0,1,6] trichords. With one exception (the grace note at the end of the glissando) L2's notes interrupt those in L1. After the first two figures there is another pause as in m. 1, dividing the measure into one figural pair per half.



Example 2: *Terrain*, m. 2

The symmetry inherent in m. 2 is further exhibited in the fact that L1's triple-stop is performed loud (*sffz*) and is interrupted by L2, whereas L2's triple-stop is performed soft (*p*) and interrupts L1. (In the first case L1's triple-stop does interrupt the Ab in L2, but only in an absolute sense.) Further symmetrical dualities can be located in the fact that L1's glissando ascends from a microtone to a tempered tone whereas L2's descends from a tempered tone to a microtone.

Measure 3 appears to be derived from the materials in mm. 1 and 2. The pitch contour of the legato phrase in L1 resembles the first phrase in m. 1 (comprised of the five pitches prior to the septuplet). L1's dynamic values are softer than L2's. In m.1 this relationship is reversed. The ascending glissando in L1 covers the same distance (spelled as a microtonally compressed perfect fifth) as the one that descends in the second measure in L2. The three attacks in L2 seem to be fragments of L1's final figure in m. 1.

This is the first time in the piece that heavily accented notes are used in L2. Significantly the first occurrence of the pitch-class A, as a stable, single note, coincides with L2's first accent. This is actually a double occurrence because the A is split into an unadorned A natural and an A harmonic. Also, A natural occurs twice in m. 2, but unstably as the initiation of a glissando and as part of a triple-stop. So both pitch centers are first brought into play as loud, stable, accented harmonics.

In m. 4 L1 contains glissandi that oscillate between the two pitch centers: C and A natural. L1 begins the measure in the middle register around A, continuing where L2 left off at the end of m. 3. As in m. 3, the material in L2 consists of single-note attacks that surround A natural. Unlike m. 3, however, they exist separately from L1. This is the first measure where Ferneyhough doesn't use any interruption lines. In cases like this he instructs the performer to simultaneously perform the events from both layers as conventional double-stops. Therefore the single notes in L2 will be played as stopped points on an adjacent string to the glissandi in L1. The durational values in L1 remain unaltered. Finally why did Ferneyhough spell L2's third pitch as a G sharp and not an A flat as in m. 3? According to conventional voice-leading he correctly spelled this pitch. Yet he did not do this with the C sharp in m. 1 or the A flat in m. 3. The answer to this puzzle, as will be explained later, can be found in the fourth to last measure of *Terrain*.

In m. 5 we encounter the first short-valued, continuous pattern of the piece. Slippage time has returned as a fracture that spreads throughout this measure. Although linearity is clearly established, distinct registral identities are used to retain the boundary between the two layers. (By m. 8, the next occurrence of slippage time, the separation between the layers will have been eradicated.) Another way he retains the distinction between layers is in his use of articulations. In the first pattern L1's three pitches are all accented, enabling them to stand apart from the staccato pitches in L2. This pattern consists of two eleven-note tuplet groups, one nested inside the other (L1's inside of L2).

Each tuplet group effectively compresses time (L2's more so than L1). The two layers interlock with each other in a binary manner. When L1 has a note L2 has a rest and vice versa. The actual rests have not been notated because the measure contains just one line of material. Otherwise Ferneyhough would probably not have had the two layers share the same dynamic contour or primary tuplet values. They also share the same impulse pattern: (3,1,2,1,3,1,1,1,1,3,1,2,1,3,1). This symmetrical pattern consists of two 6-impulse groups with exactly the same content (3,1,2,1,3,1) surrounding a center of three single impulses. The complete pattern is distributed so that every L1 impulse subgroup in the first 6-impulse group inversely becomes an L2 subgroup in the second 6-impulse group. (Interestingly, as the violinist performs the overall pattern he or she is occasionally required to counter-intuitively look in one direction while playing in the opposite registral direction.) The eleven-note group which begins m. 5 is initially displaced by a sixty-fourth rest. Ferneyhough employs this device every time he begins a new system on pages 1 and 3 (e.g. in mm. 1, 5, 8, 20, 23, and 26). The majority of these measures exhibit slippage time.

There is also more swapping and borrowing of material in measure 5. In the first gestural group L1 carries the single note attacks which were formerly a part of L2's *Terrain*. But instead of L2's staccato articulations its pitches are accented. There's activity around three pitch centers, which taken together spell a minor triad (A, C, E). These same three pitches are focal points at the beginning of *Octandre*. Back in m. 2 when the pitch A first appeared so did E. (Actually the first occurrence of E is found in m. 1 but as the result of an artificial harmonic.) However its presence was only obliquely established. Pitches surrounding E were brought into play first, but only within secondary structural positions such as grace notes at the ends of glissandi, or buried inside triple-stops. The first significant occurrence of E is found in L1 as a loud, accented harmonic just like the C in m. 1 and the A in m. 3. This E stands out as the high point in a very wide frequency space.

Figure 2 shows the pitch-class content for the first ten measures. Pitch stasis is achieved through the use of pitch commonalties between adjacent measures. Stepwise erosion occurs both between the two layers and between adjacent measures.

m. 1	L1 [0, 2, 4] L2 [0, 1, 2]	m. 2	L1 [0, 1, 2, 5] L2 [0, 1, 6]
m. 3	L1 [0, 1, 3] L2 [0, 1]	m. 4	L1 [0, 2, 4] L2 [0, 1]
m. 5	L1 [0, 1, 2, 3, 4, 5, 8, 9] L2 [0, 1, 2, 3, 4, 7]	m. 6	L1 [0, 1, 2, 4, 5, 6, 7] L2 [0, 1, 2, 3, 4, 5, 6, 7, 8]
m. 7	L1 [0, 1, 2, 3, 4, 5, 7, 8, 9, t] L2 [0, 1, 2, 4]	m. 8	L1 [0, 1, 2, 3, 5, 7, 9, t] [64] L2 na
m. 9	L1 [0, 1, 2, 3, 4, 6, 7] L2 [0, 1, 4, 5, 8, 9]	m. 10	L1 [0] L2 na

Figure 2: Pitch-class sets, mm. 1-10

In m. 6 we again return to stratified time, although as in m. 1 there is a flurry of slippage time at the conclusion of the measure - the loudest point (ffff) in both measures within a fluctuating dynamic framework. There are significant differences between the two "flurries." The differences are in terms of, 1) tuplet value and ratio (7:4 vs. 11:8), 2) articulation type (detached vs. slurred), 3) registral range (octave #4 vs. octave #5), 4) interruption pattern location (terminal point vs. link), 5) melodic motion (downward vs. upward), and 6) pitch-class repetition (some vs. none).

As in m. 3, L1 has an overall tuplet value that functionally compresses the sense of time. Each layer contains a maximum of three levels of nested tuplets. In order to simultaneously perform the two layers in this case, the violinist is required to juggle six (!) separate subdivisional strata. Most of the tuplet values found in the first five measures are also present in m. 6. Also, like the two 11-note groups in m. 5, L2 contains two adjacent tuplet levels (one inside the other) with the higher level displaced by a sixty-fourth rest. However, whereas the ratios were different in m. 5, in m. 6 they are the same (9:8).

Measure 7 employs the same time progression (from stratified to slippage), and in the same way (concluding the measure with a slippage time flurry) as in mm. 1 and 6. The flurry that concludes m. 7 contains a tuplet ratio of 7:5, whereas the one in m. 1 contains the ratio of 7:4. Both ratios surround the value of the new tempo in m. 8 which would correspond to $7:4\frac{1}{2}$ in the old tempo of MM 52. Measure 7 also resembles m. 4 in its dotted rhythm usage, and is similar to m. 3 in its succession of long-short emphasis patterns. The interruption patterns which are reinitiated in m. 6 (after a brief respite in m. 5), continue in full force with six in the measure - the most so far in the piece. The two layers are kept separate through dynamics (L2 is static, L1 is active) and register (L1 in octave 5, L2 in octave 4).

In m. 8 we arrive at the epicenter of an explosion caused by competing trajectories from the first seven measures. Measure 8 presents the first example of 'pure' slippage, occupying a single layer over an entire measure. In a sense the slippage fractures found in mm. 1, 5, 6, and 7 coalesce into a solid, singular line. It is singular not only in the sense that L2 has disappeared (for the first time), but also because of Ferneyhough's deployment of stepwise erosion, parametrical 'single-mindedness'. All the tuplet values and articulations are the same. The dynamic contour is palindromic, from *ffff* to *mp* and back to *ffff*. Gesturally there is one steep ascent, covering a distance of $3\frac{1}{2}$ octaves in just the first half of the measure. This ascent is gesturally attached to the singular glissando during the second half of the measure which covers about two-thirds of the pitch space in the ascent. There is one sixty-fourth rest at the beginning of the measure and another at the end which has a pause sign over it - the first since the beginning moments of the piece. The tempo change that occurs holds only for this one measure with a difference of two ones (11) from the previous tempo. It is interesting to note that the septuplet flurry at the end of m. 1 is performed at essentially the same rate of speed as the triplets in m. 8, although the tempo has in fact changed. Lastly his direction to the

performer of "restless and as savage as possible," in combination with the crescendo to - as loud as possible, underscores the extreme force required to adequately perform this explosive measure. The ascent climbs to a Bb performed at the lowest dynamic level. It is in direct proportion to the descent in dynamic values. Conversely the second half of the gesture increases in amplitude while descending in pitch.

Measure 9, the longest measure thus far in the piece, begins with an extremely low pitch from the only register not a part of m. 8. Measure 9 begins a new metrical area wherein stepwise erosion techniques are applied to meter. As Figure 3 indicates certain meters increase and decrease by the 'numerator' value of one while the others remain stationary as a kind of metrical 'ground'. The tempo change to MM 57 is a kind of off-center point between the two preceding tempi.

m. 9	5/8	10/16
m. 10	5/16	10/32
m. 11	9/16	
m. 12	5/16	10/32
m. 13	2/8	4/16
m. 14	5/16	
m. 15	7/16	
m. 16	3/8	6/16
m. 17	4/8	
m. 18	3/8	6/16
m. 19	7/16	
m. 20	5/16	
m. 21	5/16	
m. 22	9/32	4.5/16
m. 23	2/8	4/16
m. 24	3/8	6/16
m. 25	5/16	2.5/8
m. 26	3/8	6/16
m. 27	5/16	
m. 28	11/32	5.5/16
m. 29	1/8	

Figure 3: Meter map, mm. 9-28

Of the three gestures in this measure, the first two involve a resumption of the dual layers and interrupt patterns. The first gesture is characterized initially by wide leaps and sharp attacks. The second gesture is an elaborated, arpeggiated version of the one found at the beginning of m. 2. L1 has three microtonally altered octaves within the same registral space and grouped into a palindromic, stepwise erosion, impulse pattern of (3, 2, 3). This pattern is periodically interrupted by L2. L1's dynamic values fluctuate, whereas L2's are static and in the foreground. The third gesture consists of the pitches D and C articulating three double-stops (two actual, one virtual) in L1. The first is played at *sffz* and is followed by a rest. The next two are like echoes. Both are played at *pp*, but the second has a note missing - another example of stepwise erosion. The last note on the page, a single tremolo, *ponticello* harmonic on C in m. 10, is a distant echo of the one found at the

top of the page in m. 1.

Section 1, mm. 11-29

During the rest of the opening violin solo Ferneyhough re-uses material that is presented in mm. 1-10, including: single- and multiple-layered gestural strata, interruption and impulse patterns, registral invariance, harmonics, multi-stops, glissandi, tremoli, grace notes, varied articulations, trills, and mordants. Stratified time predominates, but as in the opening ten measures there are occasional forays into slippage time, e.g. mm. 16 and 20. The overall textural density begins to thin out and become more fragmented around the beginning of page seven (m. 20). Occasionally the gestural content diminishes to single figures.

The decrease in figural density on page seven is accompanied by an increase in the number of tempo changes - eleven in total. The number of interruptions reaches its height on page six with seventy-seven, trickling down to only nine on page seven. By the time the piccolo, bass clarinet, and double bass enter in m. 30, the violin material has been pared down to transitional material, preparing the way for the instrumental entrances.

M.M	measures
52	1-7
63	8
57	9
45	10
52	11-15
63	16
52	17-19
48	20
45	21
48	22
45	23
52	24-25
63	26
45	27
48	28
52	29-(37)

Figure 4: Tempo Map, mm. 1-29

MM	45	48	52	57	63
ratio	11:	12:	13:	14:	15:
remainder	1	0	0	1	3

Figure 5: Tempi, mm. 1 - 29

Section 2, mm. 30 - 79

In m. 10 the opening tempo of an eighth-note equal to 52 returns. The next tempo change occurs five measures later and corresponds in value to the tempo in m. 8 (eighth-note equal to 63). The overall tempo map (excluding *ritardandi* and *accelerandi*) for the first twenty-nine measures is shown in Figure 4. The first three tempi function as a ground for the subsequent scheme. The adjacent numerical differences (11, 6, 12, 7) through the fifth tempo demonstrate a further use of the stepwise erosional technique. The first number, increased by one becomes the third; the second number, decreased by one becomes the fourth. The tempo scheme in measures 10 through 29 is partly symmetrical and partly palindromic. The midpoint occurs in m. 22. The scheme is constructed as follows. The first three tempi (mm. 10-16) correspond with the three tempi immediately following the midpoint (mm. 23-26). The next three tempi (mm. 17- 21) are re-presented in reverse order (mm. 27-29). Thus, there are two groups of three tempi on either side of the midpoint. In addition adjacent tempi are organized according to various permutations of a Fibonacci series (3, 4, 7, 11, 18). Two of the Fibonacci numbers are also altered via stepwise erosion (the value of one is either added or subtracted). The number of measures for each tempo is related to another Fibonacci series (2, 5, 7). Excluding those that are repeated there are just five discrete tempi spread over sixteen tempo changes. The five values (see Figure 5) are related in a stepwise and linear manner, corresponding to the ratios of 11:12:13:14:15 with remainders of one for the first and fourth numbers. The last number's remainder is determined by summing the previous two remainders and adding one to it.

A major structural break occurs in m. 30. The violin is joined for the first time by other instruments. Measure 30 begins a forty-measure period in which the ensemble is partitioned into various combinations (mostly duets), used simultaneously and in succession. Throughout, the violin part remains consistently soloistic. Occasionally it is paired with other instruments but only for very brief moments (e.g. m. 42). Similarly there are times when the ensemble subgroups briefly coalesce before ceasing or being further partitioned. Some combinations (e.g. the piccolo/double bass duo) remain invariant for longer periods.

The instrumental pairs tend to overlap, effectively minimizing major structural breaks, which occur whenever all of the participating instruments simultaneously recombine. This produces a break in the surface similar to what happens in rocks during the fracturing process of slippage. So mm. 30-79 comprise a complete section, surrounded by major structural breaks at mm. 30 and 80 (the beginning of the second violin solo). Additionally, there are three minor structural breaks (hairline fractures) at mm. 46, 51 and 67, mostly characterized by changes in tempo, surface, and instrumental alliance.

The complete mapping of the instrumental combinations in section 2 is shown in Figure 6. It will be immediately noticed that Ferneyhough has systematically altered the conventional score order (flute, oboe, clarinet, bassoon, horn, trumpet, trombone, violin, double bass). This tactic visually foregrounds the structural pairs. Ferneyhough explains^[65] that this procedure was employed "in order to reflect the constantly changing

stratification of instrumental combinations." He also states that the score order reflects the hierarchical importance of each combination and mentions that there are three texturally distinct duets. Listed according to when they first enter they are 1) piccolo and double bass, 2) horn and trumpet, and 3) clarinet and bassoon. Ferneyhough brackets each pair whenever present. Being the most 'important' instrument the violin solo, is always placed at the top of the page. The least important instruments are variously located toward the bottom of the page. Complications arise because new instrumental combinations are rarely initiated in the first measures of pages. So there is an overlapping between score order and instrumental hierarchy.

[Click to view](#) **Figure 6:** Ensemble alliance map, mm. 30 - 79. Numbers in bold indicate brief alliances. Numbers in italics indicate alliances that begin in the preceding measure S = solo.

Figure 7 shows the score order procedure for section 2. The highest instrument on the page corresponds with the leftmost location in the diagram. Viewed in its entirety, the stratification process (one layer per page) has been arranged according to the principles of stepwise erosion. Pairs of instruments swap locations in a symmetrical manner. For example the bassoon and trombone exchange positions from page 12 to page 13. Instrumental pairs occasionally move in block formation, e.g. the move made by the clarinet and bassoon from pages 15 to 16. Further stepwise erosion occurs in regards to conventional score order. Each instrument is involved in a more or less linear development which leads back to the appearance of conventional score order in m. 97. By page 20 (the last page in this process) half the ensemble has arrived at their conventional score location. The other half is divided into two pairs of instruments. In addition to swapping locations each pair requires the addition, or subtraction, of four location 'rankings' in order to arrive at its conventional position. The two pairs are also a step away from being located equidistant from the center.

Page #s	High								Low
4	Vln	Picc	Db	Bcl					
5	Vln	Picc	Db	Eh	Bsn	Bcl	Tbn		
6	Vln	Picc	Db	Eh	Bsn	Cl	Tbn	Hn	Tpt
7	Vln	Picc	Db	Hn	Tpt	Cl	Tbn	Eh	Bsn
8	Vln	Picc	Db	Hn	Tpt	Cl	Tbn	Eh	Bsn
9	Vln	Picc	Db	Hn	Tpt	Cl	Bsn	Eh	Tbn
10	Vln	Picc	Db	Hn	Tpt	Cl	Ob	Bsn	Tbn
11	Vln	Picc	Db	Hn	Tpt	Ob	Cl	Bsn	Tbn
12	Vln	Hn	Tpt	Cl	Bsn	Fl	Ob	Tbn	Db
13 & 14	Vln	Hn	Tpt	Cl	Bsn	Ob	Tbn		
15 & 16	Vln	Hn	Tpt	Cl	Bsn	Fl	Ob	Tbn	Db
Normal	Vln	Fl	Ob	Cl	Bsn	Hn	Tpt	Tbn	Db

Figure 7: Score order, mm. 30-79

Many of the gestural materials first found in mm. 1-29 reappear in similar

forms during section 2. In measure 30 the piccolo and double bass parts contain what can be termed 'fuzzy' materials characterized by a multiplicity of techniques. Thus, the piccolo part has trills, tremoli, glissandi, and flutter tonguing. These techniques are often employed simultaneously which leads to a complex 'fuzzy' type of textural sonority. It is significant that the first ensemble instruments that enter represent the extremes of the ensemble's registral space. Thus Ferneyhough immediately presents the listener with a registral map of the pitch boundaries of the piece. However, it is more implied than actual because the piccolo mostly plays in its lowest register while the double bass is in its highest. The bass clarinet part is a kind of counter solo to the violin while simultaneously functioning as a registral 'go-between'. Its sustained, legato, quality is subjected to two types of interruption: 'color' fingerings and extremely short pick-up notes. The soloistic (or singular) nature of the bass clarinet part is further underscored in mm. 35-36 when the piccolo and double bass parts momentarily drop out - a sudden perforation in the texture that allows the bass clarinet to rise to the surface. This sort of sudden erasure is a hallmark of section 2.

Measure 37 continues the process first begun in m. 30 whereby duet combinations enter successively and overlap, culminating in m. 42's four simultaneously sounding duets. Measure 42 also marks the first time that the entire ensemble plays together at the same time. The piccolo/double bass duet continues to perform 'fuzzy' timbral materials while also interjecting quick, punctuated bursts of activity, sometimes in rhythmic simultaneity. The English horn/bassoon duet continues the kind of legato line that the bass clarinet had previously, at extremely low dynamic levels. In fact there are moments (mm. 43-45) when this duet functions as a 'felt' rather than an audible presence, being masked by the heavier guns at the top of the page. Later, beginning in m. 58 the bassoon, oboe, and clarinet perform long, sustained tones, tonally altered with the 'color' fingering technique that first appeared in the bass clarinet part in mm. 30-37. The short-lived (mm. 42-43 and 45) clarinet/trombone duet continues the bass clarinet's legato line, but after m. 42 it is continually sidetracked into different instrumental combinations. The horn/trumpet's duet is characterized by bursts of activity utilizing short punctuations and many repeated notes. For the first half (pages 11-15) of its existence, this duet is second in importance only to the piccolo/double bass duet (see Figure 7). Thereafter (pages 16-20) it becomes the most important duet.

The various alliances in Figure 6 demonstrate further stepwise erosional processes. The combinational layers are sometimes eroded to the point of disappearance, only to reappear later. The layers overlap in a compacted manner, and in many cases as a layer progresses it mutates into various instrumental combinations. For example, the layer in m. 51 that begins as a quartet (oboe, horn, trumpet, trombone) becomes a quintet in m. 52, a trio in mm. 53-54, and returns to a quartet in m. 55. The numbers used in Figure 6 indicate the succession of entries for each new instrumental/textural combination. Where two groups have identical start-times the numerical order is determined with reference to timbre, dynamics, and ensemble balance. An effort was made to determine which instruments would be heard first. Identical adjacent values indicate a continuation of that particular grouping. The three hairline fractures are shown with vertical lines. Besides

indicating the points of non-continuation they also occur where the ensemble 'thickness' is in a state of transition. Thus m. 46 begins an overall ensemble build-up after reaching maximum thickness in m. 45. Likewise m. 67 initiates a build-up that culminates in m. 76.

It is interesting to note that, 1) section 2 has the only significant instrumental pairings in the entire piece, and 2) there are no groups larger than a sextet employed. Of the thirty-two instrumental combinations: 10 are duets, 8 are trios, 5 are quartets, 4 are solos, 3 are sextets, and 2 are quintets - stepwise erosion with a few steps missing. The smaller the group the more likely it will occur. Ferneyhough uses 35% of all possible duet combinations, 15% of all trio combinations, 8% of all quartet combinations, etc. The thirty-two combinations are spread over a range of twenty-two distinct textural layers. Similarly to the slow moving pitch space in section 1, each instrumental combination is repeated at least once, producing the sensation of a slowly evolving group of alliances.

Interestingly the number of instrumental combinations left out is in inverse proportion to an instrument's usage (i.e. the higher the number of combinational omissions the more consistently deployed the instrument). For instance, just taking duet combinations into account, both the horn and trumpet parts are missing six (the highest number for any duet) possible combinational pairings. In fact the only combination that they participate in is the one that includes them both. Thus paring down the number of duet combinations to one emphasizes the consistency of their usage.

The consistent deployment of the horn/trumpet duet enables us to trace the development of a single duet line in greater detail than the other duets. Ferneyhough first brackets the horn/trumpet duet in m. 43. However, it actually begins in the last measure of the preceding page (in m. 42) (more stepwise erosion). During the course of their thirty-five measure relationship they participate in ten successive changes of instrumental combination. In exactly half of these the horn and trumpet perform as a separate duet. During the other five changes various instruments are added to make larger groups. A stable example of this occurs in mm. 47-49 where the clarinet is added to make a trio. An unstable example occurs in mm. 58-62 where, in stepwise erosional fashion, instruments are added to the duet in five separate changes, from a sextet to a trio. The overall progression in mm. 42-77 is shown in Figure 8.

measure #s	instrumental combination progression
42-44	separate duet
45	sextet
47-49	trio with clarinet
50	separate duet
51-53	quartet - quintet - trio
54-57	separate duet
58-62	sextet - quintet - trio - quartet - trio
63-65	separate duet
67-75	separate duet (longest)

76-77

sextet

Figure 8: Horn/trumpet duet, mm. 42-77

The number of horn and trumpet attacks during mm. 42-77 tends to increase and decrease in a stepwise manner. The attacks per measure generally progress from large to small sets, and then back again to large sets. Also, adjacent measures tend to contain common tones. The addition of new pitches occurs in a stepwise, linear manner. Hence the pitch movement slowly evolves as in *Octandre*.

Beginning in m. 67 the horn/trumpet duet rises to the top of the page (below the violin of course), becoming structurally most important. The dynamic progression during this period also contains stepwise development (see Figure 9). Beginning with only one dynamic indication in m. 67 it slowly builds to over six by m. 75. There is also a parallel development in terms of the overall amplitude level. Stepwise progressions even govern the number of tuplets per measure. For example in mm. 67-69 there is just one tuplet located in only one of the parts. By m. 75 there are a total of twelve tuplets in both parts.

During section 2 tempo changes are indicated eight times utilizing five different values. Six of the eight involve actual changes while two indicate a return to the previous tempo. Both the first and last tempi ritard to eighth-note equals 48 during the final measures in which the respective tempi are used (mm. 37 and 79). The overall tempo progression is characterized by a decrease in speed until the midpoint of section 2 is reached (mm. 58-66). Thereafter the speed increases. Typically there is an exception to this process. In mm. 71-72 the speed temporarily decreases only to immediately return to the previous tempo in m. 73.

m. 67 Hn: (<i>pp</i>) Tpt: (<i>pp</i>)	m. 68 Hn: (<i>ppp</i> , "f") Tpt: (<i>ppp</i> , "f")	m. 69 Hn: (<i>ppp</i> , <i>mp</i>) Tpt: (<i>ppp</i> , <i>mp</i>)
m. 70 Hn: (<i>mf</i> , <i>ppp</i>) Tpt: (<i>mf</i> , <i>ppp</i>)	m. 71 Hn: (<i>pp</i> , <i>mpz</i> , <i>pppp</i>) Tpt: (<i>pp</i> , <i>mpz</i> , <i>pp</i> , <i>p</i>)	m. 72 Hn: (<i>mpz</i> , <i>p</i> , <i>ppp</i> , <i>mf</i>) Tpt: (<i>mpz</i> , <i>pp</i> , <i>mp</i> , <i>mf</i>)
m. 73 Hn: (<i>pp</i> , <i>p</i> , <i>mp</i> , <i>p</i> , <i>mf</i> , <i>ppp</i>) Tpt: (<i>pp</i> , <i>mp</i> , <i>mf</i> , <i>ppp</i>)	m. 74 Hn: (<i>f</i> , <i>mf</i> , <i>mp</i> , <i>p</i> , <i>mf</i> , <i>ff</i>) Tpt: (<i>f</i> , <i>mf</i> , <i>mp</i> , <i>p</i> , <i>mf</i> , <i>ff</i>)	m. 75 Hn: (<i>mp</i> , <i>mf</i> , <i>sfz</i> , <i>f</i> , <i>mp</i> , <i>sff</i>) Tpt: (<i>pp</i> , <i>mf</i> , <i>pp</i> , <i>mf</i> , <i>sfz</i> , <i>f</i> , <i>mp</i> , <i>sff</i>)

Figure 9: Horn/trumpet dynamic progression mm. 67-75.

Section 2 predominantly employs stratified time with occasional forays into

slippage time. Stratified time is more conducive to the kind of complex instrumental pairings which define this section. The remaining discussion of section 2 will focus on certain measures that are of particular significance.

We begin with an example of a technique which, though rarely used in the first half of the piece, is deployed in full force during the second half. In m. 53 the bassoon and trombone parts contain tuplet ratios of 13:9 and 11:9 respectively. Both are also temporarily part of a quartet (for this measure only) which includes the clarinet and double bass. The latter two instruments have two separate (non-nested) tuplets at different rates of speed, whereas the bassoon and trombone parts have just one ratio that applies to the entire measure. The bassoon and trombone's tuplet ratios are compressed throughout the measure, whereas the clarinet and double bass parts contain very slight ritards. Furthermore the bassoon and trombone's ratios are slightly askew (about as minuscule as the amount of retardation in the other two instruments). Therefore the incompatibility, or dissonance level, between them is extremely high, especially considering that these two instruments are seated next to each other.

In measure 33 the violin part has 'figurally enhanced' changes of speed. The first half of the measure contains three slurred groups of sixty-fourth notes divided into two groups of six and one group of nine notes. The three groups are subdivided by two tuplets which overlap the boundaries between each group. (The second one leaves out the very last note of the third group.) The tuplets have ratios which, when placed adjacently produce a slight compression. But there are also two nested tuplets that effectively create micro-shifts (a kind of 'hiccuping') in the flow of pitches. The second half of the measure has one 8-note slurred group of thirty-second notes divided by two tuplets. The tuplet ratios produce a slight decrease in speed. Thus there are four successive speed shifts in this measure. Converted into tempi they would be equivalent to an eighth note equal to: 67, 69, 62, and 60. Symmetrically, the first tuplet increases by two pulses to produce the second, whereas the third decreases by two to produce the fourth.

In m. 58 the violin begins a nine-measure subdivision process that compresses and expands time in different ways. All the tuplet values at the highest level (one per measure) utilize the number 11 as part of their ratios. However the ratios oscillate between 11:8 and 11:12 or 11:10. Each measure is either compressed or expanded but the primary value remains the same. Thus the effect is similar to a series of instantaneous changes in speed within the framework of an 11-pulse meter.

Looking at the meters employed in section 2 we find more examples of stepwise erosion. There are five complete metrical patterns in this section. In the first pattern, after doubling or halving some of the numerator values one finds a stepwise descending pattern beginning in m. 33 and continuing until m. 41 (see Figure 10). The next metrical pattern begins in m. 42 and continues until m. 57. It is characterized by two layers of metrical activity, one containing additive meters. The layer without additive meters increases stepwise to 4/8 (m. 47) and then decreases to 2/8 (m. 54). This layer also progresses stepwise in regards to repetition. The first meter after the initial 5/16 measure

isn't repeated. The second repeats once. The third repeats twice. And the fourth meter repeats three times. The additive layer employs three meters with numerator values that are one value apart (5+4, 6+5, and 7+6). The second two repeat whereas the first does not. The first meter is also exceptional because it is out of place in the overall progression (it should be located prior to the 6+5 meter). The third metrical pattern (mm. 58-66) is a stepwise erosional palindrome with 5/16 at its center (see Figure 11). The next pattern (mm. 67-72) consists of a dislocated stepwise pattern (the 4/8 and 3/8 measures swap locations). The fifth pattern utilizes just four consecutive additive measures but each one involves a three-way palindromic subdivision (e.g. 4+1+4). Eighth, sixteenth, and thirty-second values are used - another three-way division.

m. 33	m. 34	m. 35	m. 36	m. 37	m. 38	m. 39	m. 40	m. 41
4/8 8/16	7/16	3/8 6/16	11/16 5.5/8	4/8	7/16	3/9	5/16 2.5/8	2/8

Figure 10: Meters, mm. 33-41

m. 58	m. 59	m. 60	m. 61	m. 62	m. 63	m. 64	m. 65	m. 66
2/16	2/16	3/16	4/16	5/16	4/16	3/16	2/16	2/16

Figure 11: Meters, mm. 58-66

During the first half (mm. 73-74) of the last metric section the violin part contains a large number of evenly spaced notes. The twenty-six notes in m. 73 move back and forth between the two layers. The resultant layer patterns, grouped into segments of two, are shown below (the numbers correspond to their respective layers):

(1, 1) (1, 2) (1, 1) (2, 1) (1, 1) (1, 2) (1, 2) (2, 1) (2, 1) (1, 2) (1, 2) (1, 2) (2, 2)

All four dyad possibilities have been deployed (repeated in different amounts) within a stepwise erosional framework. During the first half of this progression more of the notes are located in L1. By the end of the measure more of the notes are located in L2. The same type of procedure is utilized in m. 74 in regards to the up/down direction of the melodic line in L1.

Other types of material repetition also populate section 2. The following is a sample in just mm. 39-42. The violin part in m. 40 employs a sequentially repeated pitch contour. The piccolo part in m. 42 contains a rhythmic pattern that oscillates between two pitches. The horn/trumpet duet in this section uses many successive pitch repetitions (another method for impeding the rate of pitch change). Dynamic values are repeated in instruments which are part of the same duet. Articulations are repeated in rapid succession in the piccolo/double bass duet in m. 41. Also, the horn/trumpet duet shares the same impulse pattern.

The last issue that will be discussed about section 2 is in regards to the oboe and trombone solos. Although there are four passages in which a single instrument from

the ensemble is unaccompanied, only two of them can really be considered solos (i.e. they employ solistic materials). The oboe solo begins halfway into m. 55 and continues through m. 59. The performance directions indicate that the part should stand out "in relief" while the tone of delivery is "wild and bitter." This would seem like a peculiar request until one considers that an oboe solo begins *Octandre*. The oboist plays extremely compacted and expressive phrases in the upper part of its registral range. Meanwhile by m. 58 the entire ensemble (with the exception of the clarinet) has coalesced in a quasi-tutti, articulating the same impulse pattern. The trombone solo beginning in m. 70 is also played "in relief" but in a "reckless" manner. In the immediately preceding measure the trombone is paired in a duet with the oboe (perhaps referencing the trombone entrances at the beginning of the second movement of *Octandre* where glissandi predominate). Whatever the case, the term "reckless" seems indexically related to the trombone's material - 'broken' and fragmented glissandi. This 'breaking away' from the oboe is shown in Example 3 (p. 104). In addition to the violin, three duos perform at this point in the piece: horn/trumpet, clarinet/bassoon, and oboe/trombone.

Section 3: mm. 80 - 96

By the time we approach m. 79 the ensemble has dwindled to only one duet combination. Meanwhile the violin part has become "violently frantic." The entire passage (mm. 76-79) is played at extreme dynamic levels (mostly *fffff*). The last remaining duet (flute and oboe) increases its dynamic level to *fff* in m. 79 but is abruptly cut-off, a minuscule distance away from m. 80. After the flute and oboe depart, the violin is once again left alone as in the first section.

The nature of the violin's material in section 3, in combination with the preceding, abrupt cut-off, may lead one to suspect that a violin cadenza occurs in m. 80. If so, it is premature and short-lived. Each of its twelve figures is distinguished by registral, directional, timbral, articulation, and/or dynamic profiles. With one exception (mm. 87-88) all of the gestures are clearly separated from each other either through the use of rests, or rests with pause signs (see Example 4, page 105). The first gesture (m. 80) begins in the highest register then rapidly descends exactly three octaves, arriving at A3 on the downbeat of m. 81. Thereafter it rapidly ascends the three octaves back to A6 but then slides up to the highest pitch possible. The registral movement is also mirrored by a parallel dynamic development - as the line descends there is a decrease in amplitude, etc. The second and third figures (mm. 82-83) are really single figures derived from the first. The fourth figure is a registral transposition and elaborated version of the first half of the first gesture. The fifth gesture returns to the highest octave but then meanders exactly half the distance of the first figure's descent (an octave and a half). Dynamically it travels only half the distance as well. And the sixth figure takes transpositions of figure one's first three notes and applies glissandi and tremoli, as well as a variable dynamic contour to them. Gesture six is the only gesture that is elided. Significantly the point of elision occurs as a single attack on the downbeat of m. 88 (the figural halfway point).

The musical score for Example 3, Section 2, measures 69-70, is written for a full orchestra. The score includes parts for Violin (Vln), Horn (Hn), Trumpet (Tpt), Clarinet (Cl), Bassoon (Bsn), Oboe (Ob), and Trombone (Tbn). The music is in 3/8 time and features complex rhythmic patterns, including triplets and sixteenth notes. Dynamics range from ppp to fff. Performance instructions include 'più energico', 'ancora legato', 'in rilievo', 'reckless', and 'gliss.'

Example 3: Section 2, mm. 69-70

Taking a look at the pitch content (see Figure 12) one might notice that the size of the pitch sets expand and contract according to a meandering pattern. They also expand and contract in a stepwise manner but the sense of linear development is displaced. The stepwise progression is restored if we take m. 81 with eight notes and place it after mm. 93 or 94 which have seven notes, relocate mm. 89-90 next to m. 95, m.

85 next to mm. 89-90, mm. 83 and 84 next to mm. 87 and 89 respectively, and so on. The intervallic movement in each measure is also produced with the same kind of displaced stepwise progression. Likewise the employment of microtones is systematically developed and eroded in the same manner. Beginning with quartertone inflections of G, E, F, and D in m. 80, other quartertone-inflected pitches are gradually added including F#, G#, D#, C#, Ad, and Bd. This leaves only C and A# to complete the chromatic.

<u>mm:</u>	<u>pitch-classes:</u>	<u># of notes:</u>
80	(9, 7+, 8, 7, 5, 7, 4♭, 6, 8, 7, 4♭, e, 8, 4+, 8, 5+, 2, t, 5, e, 4♭, 0)	22
81	(9, 2♭, 8, 0, 7, e, 4, 9)	8
82	(4♭, 7+, 2+, 5♯)	4
83	(5♯, 2, 7♯, 4, 7, 0, 8, 4♭, 9+, 2+, e♭)	11
84	(6, e, 5, 4+, 6, 5+, 2♯, e+, 4+, 5, 8, e, 5, 5♯)	14
85	(e, 2♭, 5, 0, 7+, 9♭, 7, 6, 9, 2, e, 6, 5, t, 3, 4, e)	17
86	(5)	1
87	(2♭, 9, 4♭, 1, 4, 9♭, 1, e+, 9, 8, 0, 5)	12
88	(8, 6, 2, 5, 3, 7, 4, 4♭, 5+, 5, 3, e, 4)	13
89	(7+, t)	2
90	(5♯, 9+, 7+, 0, 4♭, 5, e, 5, 6, 7, 9+, 4+, e♭, 2, e, 7+)	16
91	(5, 6, 9♭, 2+, 7, 3)	6
92	(6, 4)	2
93	(3, 4, 4, e, 5, 9+, 0)	7
94	(7, e♭, 2+, 9♭, 4, e, 5)	7
95	(2+, 6, 4+, 8, e, 5, 2+, 6, 2+, 6, 7, 9+, e, 7, 9+, e, 3, e, 4)	19

+ = 1/4 tone sharp
 ♭ = 1/4 tone flat
 ♯ = 3/4 tone sharp
 ("0" referring to C ♭, "1" to C ♯/D ♭ "2" to D ♭ etc and "t" and "e" referring respectively to B ♭/A ♯ and B ♭)

Figure 12: Pitch-class content, mm. 80-95

The sixteen measures of section 3 are part of two successive metrical processes. The first (mm. 77-85) contains five numerator values, comprising a stepwise progression (5, 4, 3, 2, 1) with some of the numbers repeated and/or taken out of sequence. The actual sequence (5, 3, 2, 3, 4, 2, 1, 5, 4) repeats numbers 2 through 5 twice and number 1 once. The second pattern (mm. 86-96) (after some of the values are divided in half), contains a stepwise progression which meanders between adjacent values (3.5, 3, 2.5, 3, 2). The sequence is significant in that the first four undivided numbers (7, 3, 5, 6,) are used as a basic metrical figure during the first half of section 5 (mm. 104-146). The omitted 2/8 meter is a part of the silent 'void' between mm. 95-97, which will be explained shortly.

Section 3 is the last section of the first half of the piece, which was primarily composed in stratified time. Significantly, only one violin layer is present. This, in combination with the fact that all twelve gestures are linear in nature suggests a wholly different approach to time than in the previous two sections, i. e. slippage time. On the

other hand, the fragmented and interrupted qualities of section 3 suggest that it might be the detritus or nonsite of section 1. In other words the materials in section 1 have been eroded to the fragmented state of section 3. Remember that Ferneyhough composed the second half of the piece first. So section 1 would appear to be an elaboration of tendencies found in that half. Therefore, and this is crucial for understanding the enigmatic nature of m. 96, from this perspective section 3 would actually be the end of the piece, if the sectional order corresponded to the order of composition.

Measure 96 is the structural center of a symmetrical group of tempi ($\underline{\quad} = 48, 56, 48, 36$) related to each other by the ratio of 4:5:4:3. The strange thing about m. 96 however is that it is the only measure in the entire piece that has nothing in it. Perhaps this silence represents a hypothetical ending. If so, rather than utilizing 'closing' materials it instead presents the space beyond the final measure. Thus, the (infinite) silence beyond the composition's boundary is used to signify the point immediately prior - i.e. the ending. This is the inverse of what occurs at the beginning of the piece. Curiously, the sense of time in this silent measure actually slows down due to the *rallentando*. This is an erosion of a space devoted to time itself. Time becomes a concrete presence (see Example 5).

Section 4: mm. 97 - 103

Beginning in m. 97 and continuing until the end of the piece the instruments are listed in conventional score order (see Figure 7). With a few exceptions the ensemble is divided into larger groups (e.g. septets, octets, etc.) than in the first half of the piece. In section 4 the ensemble comprises an octet (the violin is absent in this section) of individual layers. The net result is a kind of static texture. The textural heterogeneity found in the first half of the piece has become homogeneous. We find a possible analog for this departure after recalling that Ferneyhough was inspired by Ammons's "rough hewn, motionless" approach to time.

Unlike in stochastic or micro-polyphonic textures, where individual lines are statistically insignificant, the individual lines in section 4 are structurally important themselves. Rather than coalescing into a mass of sound we instead have a stratification of layers that 'rub' and 'knock into' each other. Paradoxically the linearity of slippage time has 'slipped' into a configuration of strata. A geological slip can contain anywhere from one fracture to an entire fault zone. Section 4 can be characterized as a fault zone on the heels of m. 96's erosion. Although only seven measures in length, section 4 is at the center of *Terrain's* large-scale formal development.

[Click to view](#) **Example 5:** Section 3, mm. 95-98.

The closely spaced fractures that characterize a fault zone are evident in Ferneyhough's approach to rhythm (see Example 5). One significant example involves rhythmic subdivision. For the most part this section is governed by tuplet ratios that apply to the entire measure of certain instruments. In all but one measure there are also multiple tuplets used in succession that usually result in slight *ritardandi* or *accelerandi*. In order to

focus on a 'pure' example of the first tuplet type we shall examine the one measure which utilizes that approach in all of the instruments. The tuplet ratios at the highest level (one per measure) in m. 100 are shown in Figure 13. They have been converted to the same primary values (thirty-second notes) for the sake of illustration. There are five different closely related layers of speed ranging from almost twice the primary value to just a little less than it. Thus all of the layers except one compress the sense of time in four slightly different ways. After eliminating duplications and halving or doubling the first numbers of some of the ratios there emerges a stepwise progression (5, 6, 6.5, 7.5, 8). (This type of procedure was also used to organize meters in the first half of the piece.) It should also be noted that several instruments share two ratios. So the instrumental combination techniques in section 2 have been redeployed to compose metrical subdivisions.

Fl	10:7
Ob	15:14
Cl	10:7
Bsn	13:14
Hn	15:14
Tpt	12:7
Tbn	8:7
Db	10:7

Figure 13: Tuplet ratios, m. 100

Another related technique in section 4 involves pitch saturation. Figure 14 shows the pitch saturation ratios and the 'repeat factor' (RF) numbers for m. 97. The pitch saturation ratios indicate the number of attacks compared to the number of notes per measure. The RF numbers indicate the percentage of pitch repetition. Thus the more divergent the pitch saturation ratio the higher the RF number will be. The reverse is also true. The RF numbers indicate that there are eight simultaneously unfolding rates of pitch repetition.

<u>pitch-classes</u>	<u>pitch saturation ratio</u>	<u>repeat factor</u>
Fl (9, 8, 2, 3, 2, 1)	5:6	.17
Ob (2, 7+, 2d, 2+, 0, 2+, 0, 7+, 2d)	3:9	.66
Cl (6, 4d, 9+, 3, 1, 0, 3)	6:7	.15
Bsn (2d, e, 5, ed, 9d, 2d)	4:6	.33
Hn (0, 4, 5, 6, 8, t)	6:6	0
Tpt (t, 3, 4, 4, 7, 7, 3)	4:7	.43
Tbn (6, 7+, 7+, 0, 0, 0, 4d, 4d, 4d, 4d, 2d)	5:11	.45
Db (2d, 2+, 9d, 2d, 9d, 2+, 2+, 2, 9d)	2:9	.78

Figure 14: Pitch saturation, m. 97

The same type of procedure is applied to dynamic evolution. Spread over the eight instrumental layers is a total of eight different dynamic values from *pppp* to *fff*. The vast majority of dynamics employed are at the lower end of the spectrum, underscoring the textural homogeneity. Generally each part contains a different amount of dynamic indications. Often several instruments share the same basic dynamic progression, but

some of the parts are altered through stepwise erosion. This procedure is also a part of the overall dynamic progression in this section. From measure to measure the number of dynamic values per instrument gradually expands and contracts one value at a time. Some measures contain retrogrades of other measures. Hence the trumpet's dynamic set in m. 100 is the retrograde of the flute's in m. 99. One can also locate retrogrades which have one dynamic value added or subtracted from the original set. For example the bassoon's dynamic set in mm. 97-98 is a retrograde version with one value added, of the clarinet set in m. 103.

With a length of fifty-six measures section 5 is the longest section of the piece, and contains a potpourri of gestures, techniques, and instrumental combinations. In contrast it follows the shortest section which had the most stable and sustained texture. The ratio of sectional lengths between sections 5 and 4 is exactly 8:1. The numbers 8 and 1 define many minimum and maximum boundaries in *Terrain*. For instance there is 1 soloist and 8 ensemble instruments. The number 1 lies at the center of the stepwise erosional technique. The number 8 refers to *Octandre* and is often the maximum amount of structural layers and techniques employed.

The potpourri of materials that begins in m. 104 contains many familiar techniques from the previous sections. With few exceptions the violinist performs soloistic materials. So the following discussion will focus on the kaleidoscope of changes that occur in the ensemble, as well as macro-parameters which also apply to the violin part.

Measures 104-110 contain a series of five duets. The top two duets are simultaneously sounded in the woodwinds. The first duet (flute and oboe) is characterized by slow moving, detached, polyrhythmic lines that swell and subside dynamically. The second duet (clarinet and bassoon) contains small, accented groups of slurred pitches moving in rhythmic simultaneity. The other three duets overlap with the first two and are split amongst the three brass and the double bass. The third duet (trumpet and trombone, mm. 105-106) contains legato, polyrhythmic phrases at the level of inaudibility. Each phrase moves in a linear and single direction. The fourth duet contains short values which are accented and detached. The fifth duet contains three evenly spaced sustained pitches of the same duration in rhythmic simultaneity. Each note is attacked *sfpp* subito and is followed by a slight crescendo to *p*.

Beginning in m. 108 the duets begin to disappear. By m. 111 the ensemble has become texturally homogenized and contains eight separate layers of activity (this measure is marked "tumultuoso"). No sooner than this melange is brought into play the ensemble briefly coalesces in m. 112 on a sustained chord, the first of its kind in the piece. In mm. 113-118 ensemble chordal sustains occur three more times - in mm. 114, 115, and 118. The material content of this subsection is characterized by textural homogeneity with varying degrees of rhythmic activity. Figure 15 shows the primary rhythmic subdivisions per measure in each instrument for mm. 111-126. In the first two and final measures many of the parts contain several tuplets per measure. Conversely in m. 119 (the beginning of a separate process discussed shortly) the ensemble has just one tuplet 'denominator' which

would have applied to the entire measure if the melange section had not displaced it (the last note of that section is also the downbeat of m. 119). All of the tuplets in this measure relate to the same primary (i.e. hierarchically more important) number - 11. Yet they relate to it at three different speeds (i. e. 12:11, 14:11, and 20:11). Hence there are three levels of time compression. It is also a slippage time version of the violin part in mm. 58-66. This is an example of a technique that was initially applied horizontally in the violin layer becoming verticalized in the ensemble. As always the rhythmic subdivisions in mm. 111-126 are characterized by slippage time and stepwise erosion.

m.	111	112	113	114	115	116	117	118
Fl	3, 5, 3	5, 3, 7	8:5	8:5	7:6	5:3	na	6:5
Ob	5:3	3, 5, 7, 3	8:5	8:5	7	8:6	6:5	8:5
Cl	5, 12:7	15:12	11:10	11:10	17:12	15:12	13:10	8:5
Bsn	4:3	7:6	7:5	13:10	18:12	6:5	7:5	9:5
Hn	3:2	10:7, 6:5	11:10	5:3, 3:2	3:2	5:3	6:5	9:10
Tpt	na	3	9:10	7:6, 6:5	5:3	13:12	9:5	8:5
Tn	7:5, 8:7	8:6	8:5	6:5	4:3	15:12	8:5	8:5
Db	8:6	3:2, 5	9:10	7	5:3	5:3	8:5	7:5
m.	119	120	121	122	123	124	125	126
Fl	12:11	7:6, 3:2	9:10	5, 3	4	5:3	13:10	8:5, 3
Ob	12:11	5:4	7:5	13:10	6:7	8:5	6:5	5:3, 7
Cl	12:11	7:6, 7:6	5, 3	10:9	6:7	13:12	8:5	7:6
Bsn	14:11	7, 5, 3	7:5	6:5	8:7	5:3	5	7:6
Hn	20:11	9:8	6:5	6:5	9:7	na	6:5	5, 3
Tpt	20:11	7:8	13:10	7:5	9:9	5:3	7:3	11:12
Tn	14:11	3:2	6:5	4:5	9:7	4:3	7:5	15:12
Db	12:11	8:7, 11:10	8:5	4:5	10:7	7:6	15:10	15:12

Figure 15: Primary rhythmic subdivisions, mm. 111-126 Note: Commas between ratios indicate that the tuplets are horizontally adjacent.

The aforementioned chordal sustains are significant landmarks in a dense terrain. They are composed with regard to register, pitch, interval, and loudness. In combination these parameters create a kind of concrete, spectral space which remains immobile until the continuation of the more active texture. It is as if one moment in the preceding potpourri is suddenly frozen in place, put under a microscope. The violin part contains its most active materials during the four chordal sustains. Hence, in this section there are two types of textural homogeneity - active and passive. Paradoxically the passive homogeneity is more susceptible to perturbations whereas the active homogeneity (which contains only perturbations) breaks down four times, thus making it susceptible to stasis.

The four chordal sustains are found in Figure 16. Each chord member is registrally and intervallically listed from low to high. The interval content for the chords in mm. 112 and 118 is the same (m2, M2, m3, M3). This set is also used in mm. 114 and 115 but with some intervals added and others eliminated. Their interval contents overlap so that the set of four intervals which they share (M2, m3, M3, P4) is numerically displaced on both 'sides'. In m. 112 the m3 has swapped locations with the M2. The m2 is repeated three times, M2 twice, and the m and M3s are not repeated. In m. 118 the m2 and M3 is repeated. One of the M3s is inserted out-of-order between the m and M2s. In m. 114 the

M3 and the P4 have been relocated to either side of the m2. All three intervals occur only once whereas the other two (M2, m3) are repeated. In m. 115 the tritone has been rotated from the last position to the first. Also, the only interval that is repeated (M3) is inserted out-of-order between the M2 and m3.

Each chord has a different dynamic profile although the chords in the first and last measures (mm. 112 and 118) are related. All the chord tones in m. 118 are performed *pp*. Thus it is the most dynamically consistent. The same holds true for m. 112 except that the two pitches located at the center of this sonority are each one degree louder in succession (i.e. *p* and *mp*). Measures 114 and 115 contain a mixed dynamic content and are inversely related. Thus, the *mf*s in m. 114 become *mps* in m. 115; the *f*s in 114 become *ps* in 115; and the *ff*s in 114 become *pps* in 115. Repetition and positional displacements are also employed. In overview the four chords comprise a symmetrical object with a formally active center in mm. 114-115.

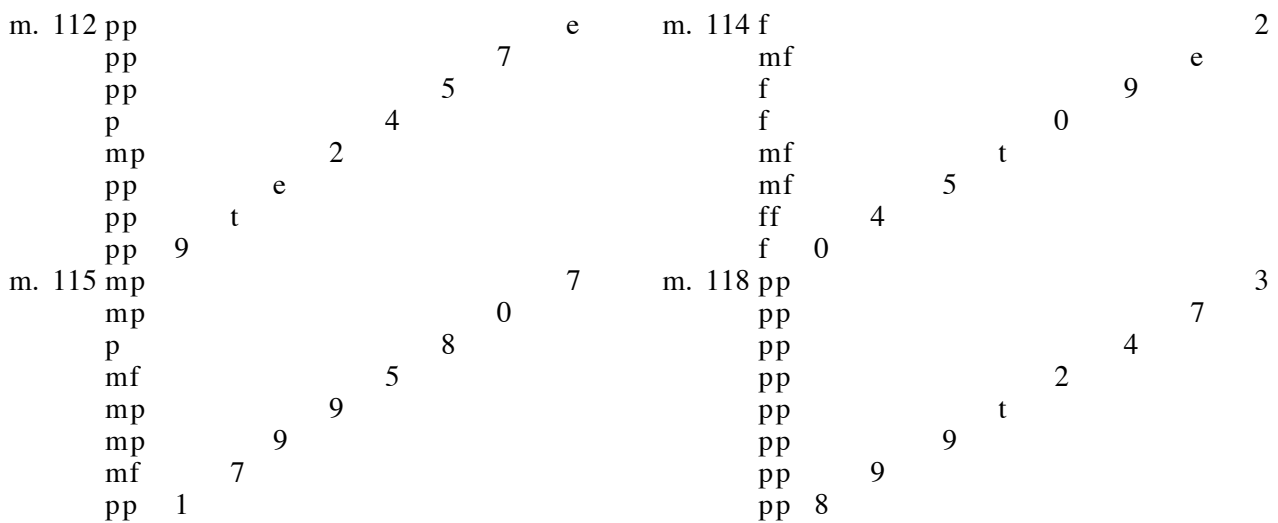


Figure 16: Chords in mm. 112, 114, 115, and 118

Between mm. 119 and 126 the tempi fluctuate within, as well as between, measures. The preceding "tumultuoso" section (mm. 111-118) prepares the ground for the succeeding eight measures. Thus it is located a temporal step below the tempo in m. 119 (M.M. 56 in mm. 111-118 and 57 in m. 119). It prepares the process that begins in m. 119 in the manner of a pick-up. The process itself can best be described as a kind of 'time-warpage', centrally located within the overall progression of tempi for the entire piece. (Recalling Ferneyhough's comments about the 'time-machine' quality in the third movement of *Octandre* we begin to sense a possible motivation behind this process.) This centrally located, temporal whirlwind is exactly eight measures in length. Dividing this section in half we find that the two types of continuous temporal change - retardation and acceleration - are symmetrically employed. Each half begins at MM 57 and then slows down to MM 51, thus a ratio of 13:14 with remainders of 1 for both. Each tempo in the next

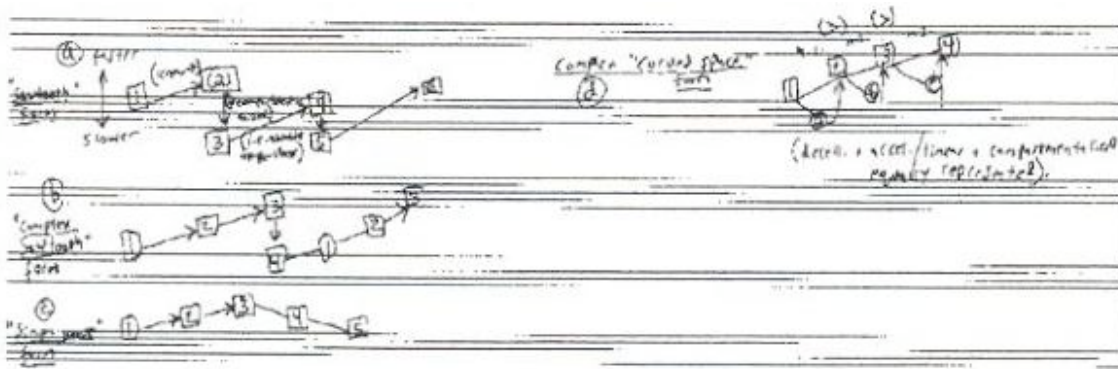
three measures of each half is related in a one-to-one fashion (see Figure 17). So the first and second tempi in mm. 120 and 124 are related to each other. The first and second tempi in mm. 121 and 125 are related, and so on. Figure 17 separates each related pair in order to show the ratios and remainders. The individual ratio numbers are located one value apart, ranging from 11 through 15. Remainders also play a role in this scheme. Of the tempi that begin each measure one from the first pair has a remainder of 1, and both from the third pair have remainders of 1. The summation of these three remainders is itself used as a remainder for the second tempo from the second pair. The concluding tempo for each measure is treated somewhat differently. The first tempo in the second pair has a remainder of one, whereas the second tempo has a remainder of two (literally duplicating their structural positions). In the first pair the same relationships occur except that the second tempo's remainder has been erased. And in the third pair the second pair's relationships are reversed.

measure #s	First half of each measure			measure #s	Second half of each measure		
	tempi	ratio	remains		tempi	ratio	remains
120 & 124	45 & 48	11:12	1 & 0	120 & 124	51 & 56	12:14	1 & 0
121 & 125	52 & 63	13:15	0 & 3	121 & 125	45 & 58	11:14	1 & 2
122 & 126	57 & 45	14:11	1 & 1	122 & 126	54 & 53	13:13	2 & 1

Figure 17: Tempo relationships between mm. 120-122, and mm. 124-126

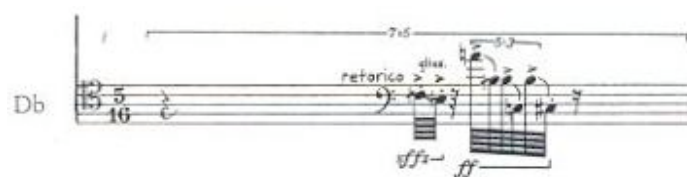
After the 'time-warp' section we arrive at a new tempo of MM 53 in m. 127. This measure also corresponds with the beginning of the second half of the overall tempo scheme (not to be confused with the second half of the piece beginning in m. 97). During the first half (mm. 1-122) the tempo that occurs most often is MM 52, in the second half (mm. 123-213) it is MM 53. Significantly there are no occurrences of MM 52 in the second half or MM 53 in the first. The percentage of occurrence for each, in regards to their respective halves, is approximately 33%. MM 52 actually occurs 32%, so there is a remainder of -1%, whereas MM 53 occurs 36% leaving a remainder of +3%. Remainders of 1 and 3 were also located in the 'time-warp' section after determining the tempo ratios, and in several other previously mentioned places.

With reference to displacement and stepwise erosion, the new 'standard' (or average) speed in the second section (MM 53) takes the old 'standard' (MM 52) and displaces it by one value. Another device Ferneyhough uses to construct tempi is what, in the sketches for *Terrain*, he calls "Tempo Gradients." These are procedures wherein he derives tempi from mapped shapes such as sine and sawtooth waves, and something he calls a "curved space" form. This latter procedure involves fixed tempi that change according to an overall linear progression. Between these fixed points are accelerandi and ritardandi (e.g. mm. 119-127). My transcription of Ferneyhough's "Tempo Gradient" sketch page is shown in Example 6.



Example 6: Tempo Gradient sketch page transcription.

Between mm. 128 and 147 we start to see the use of sustained pitches (mixed with more active materials) used in the brass and double bass, which decay in an overlapping, pyramid manner. The sustained notes themselves usually emerge from very active figures (e.g. mm. 127-127), establishing once again, the quality of immobility or stasis. During mm. 137-147 the double bass part begins to 'act' in a peculiar fashion, after having previously been paired with the brass instruments. Ferneyhough uses figures and instructions to enable the double bass part to 'break away' from its association with the brass. His indication to the bassist above the figure in m. 138 ("as if ignoring the rest of the ensemble") is telling in this respect. The first few figures are short-lived and explosive. As if to underscore this fact the 'other' string soloist in this passage performs, for the very first time in the piece, quadruple-stops which are marked "esplosivo." They remain paired in a kind of call-and-response until m. 147. For example the figure that the double bass has in m. 140 (shown in Example 7) is marked "retorico."



Example 7: Double bass, m. 140

A few measures later it is 'answered' in the violin part with a figure that is marked "analitico."



Example 8: Violin, m. 144

Have we encountered a score-bound, linguistic puzzle? Considering Ferneyhough's long-standing interest in such matters this seems likely. Using the words “rhetorical” and “analytical” in their non-pejorative senses we can, in emblematic fashion state the maxim that: 'rules' of composition are discovered (or answered) by analysis. In a Smithsonian sense they are sites and nonsites of each other.

From m. 147 until m. 160 there are more sustained chords, brief overlapping duets, staggered decays, as well as various brief alliances between certain instruments and the violinist (e.g. mm. 151-153 and m. 157). The chordal sonority formed in m. 148 is shown in Figure 18. Its symmetrical intervallic pattern revolves around a tritonal center with two 3-interval groups on either side. The second group is formed through substitution by taking the M3 and inserting a m2 in its place instead. Significantly there are no pitch repetitions so the sonority is comprised of an octachord. The Varèsian, slow-moving pitch-axis approach has progressively eroded since its appearance in m. 1.

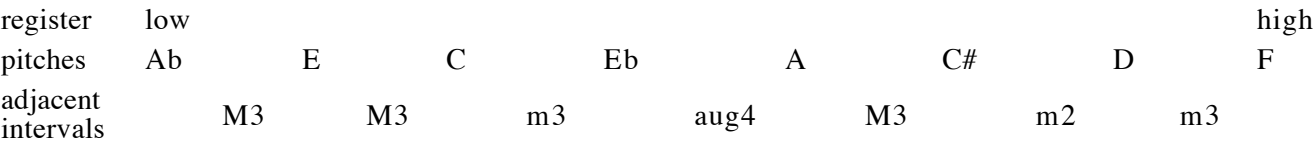


Figure 18: Chord in m. 148

The first half of section 5 (mm. 104-146) incorporates another consistently applied metric scheme. There is an oscillating pair of numerical groups that contain numerator values. The two groups (3, 4, 5) and (7, 3, 5, 6) share two values. This is an example of ordinal numbers being used to indicate their positions in respect to each other. Each group is also subject to various additions and omissions which cause it to expand and contract in size. The metrical scheme employed in the second half of section 5 (mm. 147-160) is comparable to the scheme employed in mm. 77-85 (its symmetrical double in the first half of the piece). Thus the numerator numbers 4 and 5 are used only once; 2, 6, and 8 are used twice; and 1 and 3 are used thrice.

Section 6, mm. 161-184

Because section 6 has only one tempo (MM 53), and uses metrical schemes from previous sections, and also contains familiar figural materials, the following discussion will focus on the procedure of instrumental combination - a significant aspect of

section 6's formal and symmetrical double: section 2.

Section 6 contains the only instance during the second half of *Terrain* where doubling instruments (i.e. English horn and bass clarinet) are used. The other doubling instruments that are not used during section 6 are significantly located. The piccolo is brought back a few measures prior to m. 161, departing in m. 160. The oboe re-enters immediately after m. 184. So their deployment surrounds section 6.

All of the instruments present in section 6 perform within a series of seven different quintet combinations (see Figure 19). The three measure space that would have been reserved for the eighth quintet has been eroded through the successive addition of the ensemble's other three instruments.

mm.	161-163	164-166	167-169	170-172	173-175	176-178	179-181	182-184
Vln	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	t
Fl			xxxxx	xxxxx				r
Eh					xxxxx	xxxxx		a
Cl	xxxxx	xxxxx	(Bs Cl)	xxxxx	xxxxx			n
Bsn	xxxxx						xxxxx	s
Hn		xxxxx	xxxxx					i
Tpt						xxxxx	xxxxx	t
Tbn	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	i
Db	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	xxxxx	o
								n

Figure 19: 'Quintet' combinations, mm. 161-184

All of the quintets include the violinist, accompanied by different quartet combinations. Both the violinist and the quartets employ monotextural gestures. But whereas the violin has soloistic figures, the quartets contain mostly background material. Also the monotexture utilizes half the ensemble, whereas in section 2 a full ensemble, multi-texture was used.

The ensemble instruments (excluding the trombone and double bass) participate in two quartet combinations (excluding the bassoon). Each is adjacently located. The locations of the bassoon's quartets are significant because they include the first and last locations. Its exceptional status frames the entire combinational process. The trombone and double bass parts participate in every quartet combination. Excluding the bassoon (again) these two instruments are the lowest pitched instruments. They function as a 'ground' to the violin's 'figure'. (The other instruments do so for only two quartets each.) Also they are the bottom (the ground of each score system) two instruments listed in the score (which from m. 97 on uses conventional order).

In light of this the previously mentioned, unrealized eighth quartet takes on new meaning. In a sense, the system of instrumental alliance combinations that Ferneyhough employed has reached its logical conclusion. Another quartet combination

in mm. 182-184 would create systemic instability, privileging two of the irregularly participating instruments. So the 'eighth quartet' resides in the realm of the hypothetical. However it is actualized, in part, at the beginning of section 7. The possibility of an eighth quartet is conceptually eroded by the very nature of the combinational system employed. It is materially and sonically eroded through the omission (m. 181) and addition (mm. 182-184) of instruments. There are eight quartets, but in eroded, hypothetical form only.

Section 7, mm. 185-213

Section 7 is divided into two halves each characterized by various materials.

The first half (mm. 185-192) continues the quartet pre-occupation of section 6, but in a different way. Here there is a quartet of textural layers with seven of the instruments participating (including the violin). This is shown in Example 9. It is as if the phantom eighth quartet from section 6 takes on a textural, instead of an instrumental form (it is an eroded form because the functions of 'figure' and 'ground' are absent). But recalling that sections 7 and 1 are formally related we discover another possibility. There are two layers present in the opening violin solo (section 1). There is twice that amount in section 7. The violinist's role in section 1 is as a soloist who performs two separate layers. In the first half of section 7 the violinist's role is as an ensemble member who performs only one layer. Its material status has been eroded by step. The bottom layer in section 7 consists of the brass trio. They perform short, punctuated figures in rhythmic unison. The top layer is taken by the violin which performs a large number of continuous harmonics at dynamically rigorous levels. The next layer down consists of the flute echoing the progression of harmonics in the violin. The remaining layer (above the brass) contains clarinet trills which cover the full range of the dynamic spectrum.

The score locations of the missing instruments in this 'quartet of layers' is also significant. They are invisible strata which influence the relationships and groupings found in this section. This is signified by the fact that Ferneyhough includes them in the score although they are tacet. Standard notational practice would require their exclusion. Taking a closer look at the groups formed as a consequence of their absence we discover three notationally derived instrumental groups: 1) violin and flute, 2) clarinet, and 3) horn, trumpet and trombone. Group 1 contains two instruments, group 2 contains one instrument, and group 3 contains three instruments. Stepwise erosion has been transposed to the visual realm.

Example 9: Section 7, mm. 185-186

The ensemble in C1 forms an active mono-texture, wherein for the first and only time there are no rests in any of the parts. The violin part contains continually active figures that proliferate to the point of having 97 (!) notes in the first four measures alone

(see Example 10). Clearly the violin's role as soloist has been restored after participating in the preceding quartet of layers, where the violin was primary only in the sense of being located at the 'top' of the score.

C1's density level is eroded gradually over the course of its duration. Figure 20 shows the number of impulses in each instrument of the ensemble, the total number of impulses per measure, and the average density of each sixteenth-note pulse. The number of impulses per measure decreases linearly with the exception of two displaced measures. To restore the linear progression, m. 198's impulses would be relocated to m. 194, and m. 196's impulses would be relocated to m. 198.

Fl	4-3-4-2-1-2	2-2	4-4-1-3	3-2	1-2	2-1	1
Ob	2-5-2-2-3	4-3	3-2-3	3-2	1-2	3-1	2
Cl	3-3-4-6	3-4	5-1-3	3-1	1-2	2-1	1
Bsn	5-2-2-1	2-3	2-4	1-2	1-2-2-2	3-1	1
Hr	2-2-3-2-3-3-1	3-1-2	3-3-4-1	1-2-3	3	1-2-1	2
Tpt	2-4-2-2	3-3-6	3	2-4	4	3	2
Tbn	5	1-3	1-2-6-3	1-2-1-2	3	1-3-1	2
Db	4-2	1-4-3	4-3-2	1-2-2	1-4	2	1
impulses per meas.	102	52	70	40	31	28	12
measures	7/16	5/16	7/16	3/8	3/16	3/32	4/8
average density per sixteenth	14.5	10.4	10	6.66	10	11.2	1.5
measure #s	<u>193</u>	<u>194</u>	<u>195</u>	<u>196</u>	<u>197</u>	<u>198</u>	<u>199</u>

Figure 20: Impulse Patterns, mm. 193-199

The ensemble mono-texture in C2 (mm. 199-213) is characterized by sustained, chordal sonorities. Occasionally this static surface undergoes perturbations that take the form of short, loudly accented pitches. The 'spaced-out' and staggered quality of the sustained tones suggests that the entire ensemble is articulating different parts of one impulse pattern, spread across multiple measures - another instance of time-warpage. The intervals and pitches for the chordal sonorities found at the start and finish of m. 200 are shown in Figure 21. The first chord contains the same interval sequence (m2, P4, m3) on either side of a centrally located P4. Hence it is a double center. The second chord is essentially constructed using the same intervals but with two types of erosion. First, the center has been eroded by the value of one semitone to become a M3. Second, a semitone is added to the m2 in the bottom group to produce a M2. Then the three intervals are rotated so that the first interval becomes the third. In the higher group two semitones have been added to the m3, producing a P4. As is also the case with the bottom group, the intervals have been rotated. However, the bottom two intervals merely swap locations. The same process (using different stepwise values) is also utilized in constructing the other chordal sonorities in this section, including the very last chord of the piece which dynamically erodes to silence.

[Click to view](#) **Example 10:** mm. 193 - 196

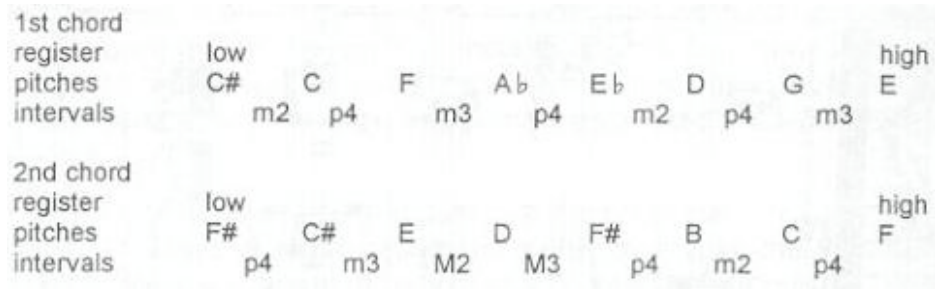


Figure 21: Chords in m. 200

The violin part in C2 continues in its capacity as soloist, employing a proliferation of fragmented figures similar in scope to those found in section 1. Section 7 is, of course, the formal double of section 1. In C2 there are six instances where Ferneyhough has drawn dashed guidelines between violin pitches and their vertical duplications in other instruments. The guidelines in C2 are eroded inversions of those found in section 1, where they indicated interruptions. Section 1 employed horizontal pitch duplication to produce a slow-moving pitch space. In section 7 the guidelines indicate the points of vertical pitch duplication. Section 1 employed the pitch centers of C, A, and E within a static pitch space. In C2 the six duplications revolve around the pitch centers of D, A flat, and F. Comparing these two trichords ([0, 3, 7] and [0, 3, 6] respectively) one notices that the value of 1 has been eroded from the first to obtain the second. Although not used as such, both are standard components of functional tonal harmony.

In m. 210 the bassoon part has a G sharp, yet a guideline is drawn from an A flat in the violin part. Has it been intentionally misspelled to draw one's attention back to the G sharp in m. 4 (whose double significance is only now uncovered)? Considering that m. 210 is the fourth measure from the end of the piece, the symmetrical relationship becomes clear. What had been a singular misspelling in m. 4 is now a double occurrence. For is it the G sharp that is misspelled, or the A flat?

During the last three measures there is a retardation (signified with a descending arrow) that slows the passage of time down to the slowest tempo used in the piece (MM 34). It is the bottom boundary (the ground) of the tempo scale used in *Terrain*.

In the measure located one before the end, the first figure in the violin part has the word "*morbido*" written above it. Significantly there are two polyrhythmic layers present. This motif's figural death is followed by a very rapid twenty-note plunge, which is a step short of four-and-a-half octaves (fifty-three semitones). Perhaps this miss(ing) step resides in the subsequent rest, or to paraphrase Smithson - in a *Terrain* of labyrinthine boundaries each containing its own double (give or take one).

Bibliography

Ammons, A. R. "*Terrain*" in *Collected Poems, 1951-1971*. Toronto: George J. McLeod Ltd., 1972: 89-90.

Ball, W. W. Rouse. *Mathematical Recreations and Essays*. London: Macmillan and Co., 1931.

Bergson, Henri. *The Creative Mind*. Translated by Mabelle Andison New York: Greenwood Press, 1968.

Bernard, Jonathan W. *The Music of Edgard Varèse*. New Haven and London: Yale University Press, 1987.

Bloom, Harold. "The Breaking of the Vessels" in *A. R. Ammons*. Edited by Harold Bloom. New York: Chelsea House Publishers, 1986: 151-168.

Bons, Joel, ed. *Complexity?* Rotterdam: Job Press, 1990.

Boros, James. "Interview with James Boros" in *Brian Ferneyhough: Collected Writings*. James Boros and Richard Toop, editors. Amsterdam: Harwood Academic Publishers, 1995: 431-446.

Childs, Barney and Elliott Schwartz, eds. *Contemporary Composers on Contemporary Music*. New York: W. W. Norton & Company, Inc., 1967.

Derrida, Jaques. *Writing and Difference*. Chicago and London: University of Chicago Press, 1978.

Feller, Ross. "Resistant Strains of Postmodernism: The Music of Helmut Lachenmann and Brian Ferneyhough" in *Postmodern Music/Postmodern Thought*. Judy Lochhead and Joe Auner, editors. New York City: Garland Publishing, 2001.

_____. "Difficulty in Brian Ferneyhough's Music." *The Open Space*, Vol. 2, Spring 2000, Red Hook, New York.

_____. "A Verbal Crane Dance: Brian Ferneyhough Interviewed by Ross Feller" in *Brian Ferneyhough: Collected Writings*. James Boros and Richard Toop, editors. Amsterdam: Harwood Academic Publishers, 1995: 447-463.

Ferneyhough, Brian. *Brian Ferneyhough: Collected Writings*. James Boros and Richard Toop, editors. Amsterdam: Harwood Academic Publishers, 1995.

Griffiths, Paul. "Interview with Brian Ferneyhough" in *New Sounds, New Personalities: British Composers of the 1980's*. London: Faber and Faber, 1985.

Hobbs, Robert. *Robert Smithson: Sculpture*. Ithaca and London: Cornell University Press, 1981.

Holder, Alan. *A. R. Ammons*. Boston: Twayne Publishers, 1978.

Holt, Nancy, ed. *The Writings of Robert Smithson*. New York: New York University Press, 1979.

Kenner, Hugh. *Mazes*. San Francisco: North Point Press, 1989.

Kepes, Gyorgy. *The New Landscape in Art and Science*. Chicago: PaulTheobald and Co., 1956.

Lyotard, Jean-Francois. *The Postmodern Condition*. Translated by Geoff Bennington and Brian Massumi. Minneapolis: University of Minnesota Press, 1984.

Linker, Kate. A Review of "The Writings of Robert Smithson." *ArtForum*, Vol. XVIII, No. 2, October 1979.

Owens, Craig. "Earthwords." *October* 10, Fall 1979.

Sayre, Henry M. *The Object of Performance: The American Avant-Garde Since 1970*. Chicago and London: University of Chicago Press, 1989.

Tafuri, Manfredo. *The Sphere and the Labyrinth: Avant-Gardes and Architecture from Piranesi to the 1970's*. Cambridge: The MIT Press, 1987.

Toop, Richard. "Brian Ferneyhough's Lemma-Icon-Epigram." *Perspectives of New Music*, Vol. 28, No. 2 (Summer 1990): 52-100.

_____. "Brian Ferneyhough in Conversation with Richard Toop." In *Ferneyhough - Carceri D'Invenzione*. London: Hinrichsen Edition, Peters Edition Ltd., 1987: 6-11.

_____. "Brian Ferneyhough in Interview." *Contact*, No.29 (Spring 1985): 4-19.
Tsai, Eugenie.

_____. Robert Smithson *Unearthed* : Drawings, Collages, Writings. New York: Columbia University Press, 1991. 39

Notes:

^[1] Tafuri, Manfredo. *The Sphere and the Labyrinth: Avant-Gardes and Architecture*

from Piranesi to the 1970's. Cambridge: The MIT Press, 1987, p. 12.

[2] quoted in Feller (1995), 459.

[3] quoted in Toop (1987), 8.

[4] see Feller (2000).

[5] see Bergson (1968), 110.

[6] see Tsai (1991), xiii.

[7] see Owens (1979), 126.

[8] Interestingly Derrida (1978) p.127, in describing a phenomenon which he called the "writing by furrows" mentions two kinds of cultivation: text and terrain.

[9] cited in Tsai (1991), 103.

[10] see Tai, *op. cit.* p.109.

[11] see Tsai *op. cit.* p 9.

[12] see Owens (1979), 123.

[13] Tsai *op. cit.* p. 22.

[14] Linker (1979), p. 62.

[15] It has been claimed that Smithson fully intended the pun on nonvision (see Hobbs, 14).

[16] see Holt (1979), 90.

[17] see Holt *op. cit.* p.115.

[18] see Holt *op. cit.* p.100.

[19] *op. cit.* p.115.

[20] see Lyotard (1984), 78.

[21] see Kepes (1956), 18.

[22] see Sayre (1989), 216.

[23] *op. cit.* p.219.

[24] see Holt *op cit.* p. 92.

[25] see Sayre *op. cit.* p.237.

[26] quoted in Tsai *op. cit.* p. 113.

[27] quoted in Boros (1995), 436.

[28] Letter to the author, 12 April 1993.

[29] *ibid.*

[30] see Holder (1978),15.

[31] quoted in Holder *op. cit* p.105.

[32] see Bloom (1986), 249.

[33] *op. cit* p.225.

[34] quoted in Bloom *op. cit.* p.214.

[35] see Bloom *op. cit.* p.253.

[36] see Ammons (1972), 89.

[37] Letter to the author, 12 April 1993.

[38] quoted in Bernard (1987), 20.

[39] Palimpsest, derived from a German word meaning "to rub" or "rubbed again," generally signifies a kind of writing whereby an 'original' text has been partially erased or written over by another text. The first text usually leaves only a faint trace. Ferneyhough seems to have used this process in *Lemma-Icon-Epigram* and in various unpublished poems, one of which is book-length in size and entitled, "Palimpsests."

[40] *op. cit.* p. 34.

[41] Childs and Schwartz (1967), 203.

[42] *op. cit.* p. 42.

[43] *op. cit* p. 110.

[44] see Griffiths (1985), 66.

[45] quoted in Boros (1995), 436.

[46] see Boros *op. cit.* p. 438.

[47] *ibid.*

[48] see W.W. Rouse Ball (1931), 183.

[49] see Ferneyhough (1995), p.45.

[50] *ibid.*

[51] *ibid.*

[52] quoted in Bons (1990) p.18.

[53] Telephone conversation with the author, 13 June, 1994.

[54] In geology a slip refers to the distance moved by rocks which reside on the opposite sides of a fault. When rocks are stressed they may fracture. The rocks on the other side of this fracture will then move past them, thus creating a fault.

[55] Letter to the author, 12 April 1993.

[56] Letter to the author, 12 April, 1993.

[57] see Kenner (1989), 250.

[58] see Boros (1995), 441.

[59] see Boros (1995), 438.

[60] *ibid.*

[61] see Ferneyhough *op. cit.* p. 43.

[62] See Feller (1996), 451.

[63] see Toop (1990), 59.

[64] “t” and “e” referring to pitches which are respectively at distances of ten and eleven semitones from the 0 pitch class.

[65] On page 4 of the 1993 edition of the score.

