In order and out of time

Compositions exploring

processes, polymeters and balance.

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By

Steven David Gisby

School of Arts

Brunel University

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Abstract

These compositions explore concepts based on processes and polymeter. Drawing on influences ranging from Steve Reich to Conlon Nancarrow and Nik Bärtsch they use and develop an approach to rhythmic thinking based on ostinati constructed of layers of different speeds. Through the use of click tracks, they look at how an ensemble can be enabled to perform rhythms that, without the electronic support, would be unplayable – crossing a line between the possible and the impossible.

By means of processes built on a number of different ideas, the pieces explore how these can be used to affect both the behaviour and evolution of musical material, as well as using them to create fixed structures within which I then move subjectively and more intuitively.

The question of balance, of moving between two points or approaches that are seemingly opposites, has also been examined: looking at how the journey affects the destination, where the simple becomes complex, and where personal meets impersonal.

Contents

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Introduction

Composing is, for me, about asking questions. I ask them in an effort to discover, to reveal, to better understand myself and the music that moves me. Sometimes they are questions of my own, sometimes they are the questions of others. I try to find my own answers, to trust in them and to put them at the centre of my work.

The pieces that form the basis of this submission are the result of my interests in polytempo and polymetric rhythms, musical processes and in exploring the issue of balance in a number of different contexts. As a composer, I'm fascinated by rhythm – particularly in the structure and effects of building up layers of repeated rhythms. For me, processes are a way of structuring both the means of getting from one place to another as well as determining both what and where those places are. My interest in balance comes from a desire to better understand the line between apparent opposites, and of how I can move consciously or unconsciously in either direction.

This thesis provides both a context for my work, a commentary and analysis on the compositions themselves and my concluding thoughts about the music and the ideas that tie the pieces together.

In the background section, I discuss how and why I became interested in the ideas behind my work, including the impact of the work of composers such as Steve Reich, György Ligeti and Conlon Nancarrow through to Nik Bärtsch. I examine my earlier interests in rhythm and the influence of my experiences as a bass guitarist, particularly in relation to funk. The phase pieces by Reich, from the mid to late 1960s, as well as two albums on a Norwegian record label involving the use of live sound processing, turned my thoughts towards the question of where the line between possible and impossible may be, and of how it can be crossed.

The subsequent sections of the thesis provide detailed study of each of the pieces, both in terms of my thinking behind them as well as an analysis of the pieces individually. *thaw*, for piano duet, was written in 2007 and features a tempo ratio of 13:14. Using what, in one sense, is very simple material, it

looks to create a much more intricate rhythmic texture. *when it is dark enough*, written in 2008 for percussion quartet, makes use of a pitch process based on transforming the harmonic material through a series of fixed points. Rhythmically much less demanding than *thaw*, it uses a number of different beat groupings within one polymetric structure. Composed during 2008 and 2009, the piece for chamber ensemble *different streams* has a structure built on Morse code patterns. At its core it has a process that, if completed, would have it start and end with the same harmonic material. The piece follows a number of different routes through a very rigid structure, which are then explored in a much more personal way. Finally, *11 duets for piano*, written in 2009, taking an idea from Henry Cowell in *New Musical Resources*, features a variety of tempo ratios and harmonic material based on the overtone series. They make use of rhythmic ideas first looked at in *thaw* although, harmonically, follow a process that has no sense of gradual transformation, but instead has abrupt pitch changes at fixed points.

In the final section, the conclusion, I discuss the themes and methods that underpin my work and how these ideas have made their way into the compositions. I also look at these ideas from a distance, examining why they are important to me, and how they form the basis of the questions I ask myself in my work.

Background

Rhythm has long fascinated me. As a bass guitarist, I have spent a considerable amount of time studying the idea of groove, of exactly what it is and how it's achieved. To non-musicians, its presence or absence from a performance is understood largely instinctively – either the music makes them want to move or it doesn't. From an ensemble point of view, it's about the players having a shared understanding of where the musical pulse is, of feeling both the downbeat and its subdivisions in the same place, of knowing when to play on the front, the middle or the back of the beat and of how and when to move between them.

Musically, it's all to do with how patterns fit together. On the best James Brown records, the individual instrumental parts are often not that complex or indeed particularly funky. When heard as part of the whole, however, something changes. The "funk" is in the tension and release created by the different layers. Strong, driving rhythms and their repetition have always appealed to me, from the music of James Brown, Tower of Power, and Stevie Wonder, through Gamelan and African artists like Angelique Kidjo to Steve Reich, Nik Bärtsch, and Steve Martland.

Some of the earlier works of Steve Reich have proved very important to me, in the way that a process quite simple in its concept results in very complex rhythmic effects. The clarity of reduced harmonic forms and structures and of the way this then can be used to focus on greater rhythmic intricacy has, over time, become progressively more significant in my music.

A series of coincidences in the spring of 2001 led me to discover two albums, *Birth Wish* and *Going Nine Ways From Wednesday*, both on the pan m label in Norway. Listening to them now, it'd be hard to understand their significance to the music I've written since then. What fascinated me about these two records at the time was that they used real time sound processing. *Birth Wish* has piano and trumpet as the only sound source, whilst *Going Nine Ways From Wednesday* has only voice and both albums feature live sampling and live treatments – an idea that was new to me back then and one I found very interesting.

As the sound processing happened live it meant that, in the moment of playing, the musical performances were being taken to something above anything the musicians could have achieved without the presence of the electronics. By “above” I certainly don’t mean “superior”, but rather beyond the technical and physical limitations of both instrument and performer. From a compositional point of view, this raised questions in my mind about creating music on a computer and of the limitations of both musician and instrument. Was it possible to write a technically impossible piece and then, realizing it using technology, have it sound like it’s being performed by humans?

This idea interested me for a while, but I soon felt it had limitations. Working purely electronically, creating music that would be performed just by pressing the “play” button and with no sense of ensemble interaction, held little appeal for me. As a performer myself, and someone who enjoys seeing and hearing other people play, I had no real desire to write for “virtual” musicians. There was also an issue of realism and about how much effort I was willing to go to in order to create a convincing but ultimately “fake” performance.

After further thought, a second question began to form – one concerned with the relationship between players in an ensemble, and of how it could be affected by the presence of electronics. I was interested by the idea that the “impossible” aspect of a piece could be in how the ensemble fits together, rather than with pushing at the technical and physical limits of just one instrument.

Listening to the phase pieces of Steve Reich gave me the idea of having performers playing at different speeds. His pieces that use this idea, such as *It’s Gonna Rain* (1965) and *Come Out* (1966), work by varying the speed of the tape to gradually move pre-recorded patterns out of synch with each other. In both of these pieces, Reich uses recordings of speech as his material whilst *Melodica* (1966), still a piece for tape, features patterns played on an instrument. In *Piano Phase* and *Violin Phase*, written in 1967, Reich continued to use this idea, but moved away from recorded loops and both pieces are for instrumentalists.

Another discovery that proved to be important for me was Conlon Nancarrow and his *Studies for Player Piano*. Nancarrow, according to Gann

(1995, p.1), had read *New Musical Resources* by Henry Cowell in 1939. In the book, Cowell suggests using the player-piano as a means to hear "highly engrossing rhythmical complexes'" (1996, p.65) that "could not be played by any living performer." (1996, p.65)

The earlier *Studies*, such as Nos. 2 and 9, make use of ostinati as a means of "making oddly accented rhythms clear through repetition." (Gann, 1995, p.70). The work of Nik Bärtsch and his ensemble Ronin, particularly on the ECM albums *Stoa* (2006) and *Holon* (2008) has also been quite influential on my rhythmic thinking. With most of my performing as a bass guitarist being in funk, rock and soul, I spend the vast majority of my time working with riffs and ostinati, and the idea of using them as the structural basis for composing held great appeal for me.

The idea behind pulse cycles, central to my approach to rhythm, came during the summer of 2004. Reich's phase pieces involve patterns which initially share the same tempo and, as a result, bar lines. By changing the speed of one pattern, any common unit of duration is then lost and the bar lines no longer coincide between parts. Pulse cycles are based on the idea of keeping the bar lines fixed and then varying the speed of what happens in different layers between these two points. The grouping and accenting of rhythms within the pulse cycles may vary, but the first beat of each of the layers in the loop always coincides. This creates a polymetric cell in which the downbeat may or may not be heard, depending on the structure of the rhythmic material.

A number of pieces by György Ligeti, including *Désordre*, *Fém* and *Der Zauberlehrling* from the *Études pour piano*, as well as *Continuum* (1968) and the third movement of the Chamber Concerto (1969 - 1970) have also been of considerable significance to my composing.

Form has, in my more recent works, taken on greater significance than it did in earlier pieces. I had been very influenced by Reich's essay *Music As A Gradual Process*, written in 1968, and by his thoughts that "The distinctive thing about musical processes is that they determine all the note-to-note (sound-to-sound) details and the overall form simultaneously." and "I am interested in perceptible processes. I want to be able to hear the process happening throughout the sounding music." (Reich, 2002, p.34).

The appeal of working with processes was that they could provide me with both a destination and a means of getting there without me, in advance, necessarily being able to predict the finer details of exactly how either the journey or the end point would sound.

My approach to form shifted about two years ago with the experiences of writing *thaw.* The impact of this piece on my thinking is something I'll cover in more detail in the analysis, but it made me consider the issue of pre-determined processes versus intuition and of allowing the course of a journey to impact upon the destination. Also with regard to form, my discovery of the Neo-plasticism movement, with the order and structure in the works of Mondrian, Van Doesburg and Rietveld, proved to be of great importance to me, as is the *Farben* series of colour charts by Richter. In Richter's colour charts and in Mondrian's *Tableau 2* (1922) and van Doesburg's *Counter-Composition VIII* (1925-6) I like the way that, although the form of the paintings is very strict and clearly defined, other details such as the placing of the colours, appear to be quite subjective.

Musical colour, through my choices of instrumentation, has been influenced by a desire to achieve quite a percussive sound to reflect the rhythmic nature of the music, without having yet felt an urge to write a piece purely for percussion. The harmonic transitions in my music are central to its overall form and, in *different streams*, I have used orchestration as a means of identifying the various paths through the piece's structure. The attacks of the piano and of pitched percussion feature, at different points, in all of my works here.

Commentary and analysis

thaw: for piano duo

The writing of *thaw* proved to be both very unusual and very significant. In the composing of it, it differed in two ways from anything I'd composed previously. Firstly, it was written in quite a short amount of time – probably no more than four hours. Normally my writing process is quite long and slow, as it takes me some time to settle on the ideas I want to use. Secondly, *thaw* was composed with no real plan about how it would develop. It evolved quickly and very instinctively, in quite a contrast to my usually much more protracted and deliberated way of working.

Rhythmically, the piece is both simple and intricate. The simplicity comes from both the fact that it uses only quavers and semiquavers and that the patterns don't change at all from the beginning to the end. *thaw* was written with a particular duo in mind, DuoDorT, formed by Semra Kurutaç and Kate Halsall, and the rhythms are taken from the Morse code spelling of their names. Using semiquavers for the 'dots' and quavers for the 'dashes', I discovered that one name created a pattern thirty nine semiquavers long, whist the other was forty two in length. Both numbers are divisible by three, which led me to the pulse cycle ratios in the piece: 13:14, with the combined pattern lasting for three bars. Therein lies the difficulty – playing thirteen against fourteen. In the case of both of the pianos, the rhythm of the right hand spells out one of the names, with the left hand of that piano playing the same pattern in retrograde. Combined, they create a rhythmically blurred effect.

Harmonically, *thaw* is quite minimal in its material, being built on a cluster that gradually expands from one note up to four. There is no overall process at work – it just unfolds the way it does and stops where it does.

The piece begins with all hands playing their respective rhythms on an A, each in their own octave. The purpose of separating the hands out in this way was twofold – one, to allow space on the instrument for each hand to work independently and two, to create a larger sound by using a wider range. At pattern 2 the cluster extends upwards to include B, but only in the higher

octave (the right hand of piano 1) and only with the semiquavers – the quavers remain on the A. This B is then added to all the layers, in the same way and one pattern at a time, moving downwards through the octaves. At 6, both hands of both pianos separate with their pitch material: A and B in the left hands, with B and C in the right hands – the cluster again extending upwards, but this time only by a semitone. Pattern 7 has piano 1 drop out, returning three bars later so that, at 8, the pattern is the same as it is at 1.

Between 9 and 12, the cluster extends in both directions, returning to the high C from pattern 6, but also with a low G in the left hand of piano 2. Both pianos introduce the new pitches in the same way – in the semiquavers first, then in the quavers too – so that, by 12, each hand has its own unique pitch. The second three bars of 12 build with a crescendo to a bar of silence. At 13 the cluster is transposed downwards by a tone, apart from the top line, which only moves a semitone. The result is that, in a reduced voicing, the inner structure of the cluster changes, with all lines now separated by a tone. Each hand also doubles its respective note at the octave.

For me, the greatest significance of *thaw* lies in the fact that I so consciously relied on my instinct to guide me through the writing of it, rather than it being planned in any detail. Combining this with my interest in processes became something I wanted to explore further in future pieces. The name is a reference to two things. I have always been fascinated by water and thaw, or thawing out, is the process of transformation between water and ice – not a state in its own right, but a time of transition. *th*aw represented a transition for me in my way of thinking, of my working methods and my approach to composition. Secondly, it refers to the way the harmonic material in the piece changes, gradually flowing outwards from a small starting point to a much fuller final pattern.

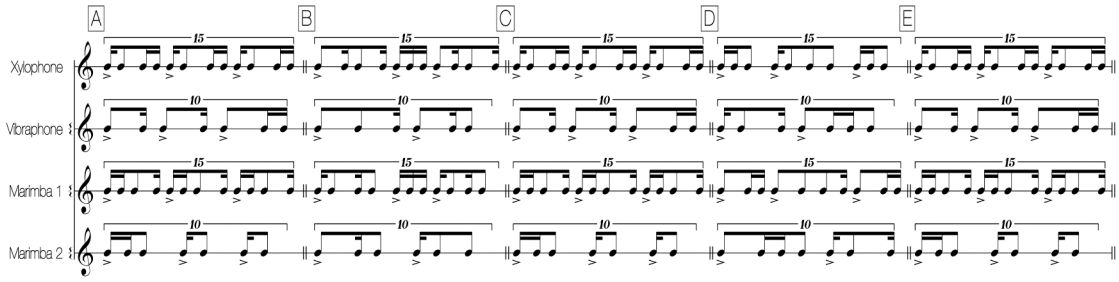
***when it is dark enough*: for percussion quartet**

When it is dark enough, you can see the stars.
- Persian proverb

The name of this piece, taken from the above proverb, has no direct connection to the music itself. It is a reference to a particular time in my life and to how it affected my composing.

when it is dark enough grew out of a desire to work with a more structured approach to harmony, as well as to explore a particular rhythmic idea. The ratio of 13:14, as used in *thaw*, isn't an easy one to perform and, as a result, I also wanted to try working with less complex rhythms. Like *thaw*, *when it is dark enough* uses four lines of rhythm but only one ratio, which remains unchanged throughout the entire piece. The ratio between them is 3:2, although the pulse cycle is 15:10. The rhythmic idea I was interested in using was to take a pulse cycle and vary the ways in which the beats were grouped within it. Having a pulse cycle longer than the basic ratio pattern of 3:2 meant a greater variety of rhythmic groupings were possible: 15:10 can be divided up into equal parts in a number of ways, as well as a whole variety of irregular divisions.

Rhythmically, *when it is dark enough* uses three different patterns. Each one bar pattern is repeated four times, at which point the harmonic material changes. The diagram below illustrates the patterns in the order in which they occur, with A, C and E being identical:



With pattern A, which is used from section 1 in the piece, the first 15 layer (xylophone) is grouped as 5 + 5 + 5. The second 15 layer (vibraphone) is the same but, with an idea taken from *thaw*, uses the rhythm

in retrograde – something that runs throughout the entire piece: instruments sharing the same pulse cycle layer playing the same rhythm, with one of them in retrograde. The upper of the 10 layers (marimba 1) is grouped as 3 + 3 + 4, with the lower 10 layer (marimba 2), being 4 + 3 + 3. The pattern at B, which enters at section 7, uses a different grouping: 6 + 3 + 6 for the xylophone, 5 + 5 for the vibraphone, 6 + 3 + 6 for marimba 1 and 5 + 5 for marimba 2. Pattern D is the only one where none of the layers are divided into equal groups. The xylophone is grouped as 4 + 6 + 4 with the vibraphone playing 4 + 6. Marimba 1 has the retrograde of the xylophone rhythm, with marimba 2 doing the same but with the vibraphone rhythm.

The various different groupings, like the ratio of 3:2, are arbitrary in that there is no rhythmic or structural process behind them. Instead they are the result of experimenting with various patterns exploring the idea of different combinations.

The harmonic structure of *when it is dark enough* is built around a series of different chords, which serve as anchor points for various processes of transformation. These points are marked by the rhythmic pattern repeating eight times, rather than the normal four. Between sections 1 and 6, the first chord builds up by gradually fanning out from the opening note of A. In its reduced voicing, as the process was conceived, the pattern builds up symmetrically, with the entry of each new pitch alternating either side of the A: first the G# below, then the B above, followed by F#, C# and finally, at section 6, the first point is reached with the entry of the E. Harmonically, the change between sections 6 and 7 is only one of revoicing.

From 8 the harmony slowly condenses, starting with the lower half of the chord. At 8, two changes take place: the C# moves to D and B moves to C#. When the A moves to B at 9, the lowest three pitches from 7 have now all moved up a tone. This process is then repeated between sections 10 and the second anchor point at 12, starting with the outer notes. However, at 10 the process isn't followed in the lower stave of marimba 2 where the G# remains, changing to E at 11.

The harmony at sections 12 and 13 changes suddenly, with no gradual shifting of notes, just the abrupt arrival, then disappearance of two pitches – A and G#. From 13, which is anchor point number three, the piece moves through a series of very small changes, gradually reducing back down to just A by 25. Sections 14 through to 20 remain harmonically almost completely static. Through a series of octave transpositions in the xylophone and vibraphone, the upper notes of the chord gradually change during this part of the piece, starting at 14 with the D above middle C, followed, at 15 by the E and then finally the F# at 16. The only change in harmony occurs at 17, when the B in marimba 1 moves down to an A. In the reduced harmonic structure, this leads to the superimposition of two triads: A major and B minor.

Between sections 20 and 25, the process of reducing the harmony involves splitting the chord in two, the upper half being from D up to F#, with the bottom half being from A to C#. The process begins by replacing the lowest pitch of the top half, the D, with an A, then working up through the E and F# in the same manner. This is then mirrored in the bottom half of the chord, starting with the C#. After the rhythmic change at 26 a transition very similar to the one starting at 1 begins, with the harmony once again fanning out centred on A. Anchor point four is reached at section 30, from where the harmonic material is slowly transposed downwards. At 32, in a reappearance by an idea from section 10, the pitch change from C# to B is not followed by the bass stave of marimba 2. The C# is the lowest pitch at 32 and changing it had more impact on the harmony than I wanted at this point. It does, however, move to the B at 35, in a step down towards the low A at 36. The fifth and final anchor point is section 36, which is a revoicing of the harmony from 30. To ensure that the process arrived at the desired point, each pitch only goes through one change. So, for example, the A that results from the change at 31 is then not affected by the change at 34. Hence at 35 the A still remains in the harmony.

From section 36, as happens between 21 and 25, the harmony gradually reduces back down to just the pitch of A. With the change in the rhythmic pattern the piece, at 40, arrives back to where it began.

Unlike *thaw*, which I always knew was going to be for piano duo, the orchestration for *when it is dark enough* wasn't initially clear. I wanted to reflect the two different layers of speed in the instrumentation, without obviously splitting the ensemble in half, but I also wanted a very homogenous sound – one where the patterns and layers would blend together. Having, at the time, recently purchased the Alarm Will Sound recording of *Reich At The Roxy*, which features *Music for Mallet Instruments, Voices & Organ* (1973), I felt that pitched percussion would be a good way to achieve my aims. The two marimbas, one on either side of the 15:10 pulse cycle, one then paired with the xylophone and the other with the vibraphone, all have the unity of attack desired.

My thinking, after finishing writing *when it is dark enough* towards the end of 2008, moved further towards processes and to form. Although *when it is dark enough* uses a much greater variety of rhythmic material than *thaw* does, neither piece has any kind of rhythmic process. For me, the fact that the form of *when it is dark enough* starts and ends at the same point proved to be quite important and it sent me in search of ways of achieving structural balance as the result of a system or process.

***different streams*: for chamber ensemble**

different streams wasn't, at first, going to be a piece for chamber orchestra. I had for some time, since composing *thaw* back in September of 2007, been thinking about the idea of expanding that piece into one of piano duets. Having listened to it myself quite a lot, as well as playing it to a number of other people and reflecting on their comments, I'd begun thinking about how I could develop a set of pieces from it. *when is it dark enough* had left me thinking about form more than I had done in *thaw* and I was interested in the idea of a process that would provide both the structure for the individual pieces as well as the series as a whole.

In early February 2009, this line of thinking was reinforced whilst attending a lecture by Tom Johnson in London. His piece A*bundant Numbers* (1988) met with my own feelings about unifying form and material. My efforts to find my own way of doing this took me back to Morse code and, in particular, the patterns for numbers. They use a process that caught my attention as being ideal for building the kind of musical structure I wanted to create:

0: _ _ _ _ _	5: . . . . .
1: . _ _ _ _	6: _ . . . .
2: . . _ _ _	7: _ _ . . .
3: . . . _ _	8: _ _ _ . .
4: . . . . _	9: _ _ _ _ .

The Morse code and the numbers could, when used together, be the basis for processes of harmony, rhythm and duration. As I explored these ideas further, two thoughts began to point me away from the idea of this being a series of piano duos. Firstly, when I tried using the Morse patters as rhythms, they lacked the blurring effect that occurs in *thaw*, this being something I wanted to recreate in the series of duets. The Morse number patterns are much shorter than the rhythms used in *thaw* and, I felt, not as effective. Secondly, the patterns in *thaw* are based on two names and I could find no logical way of extending this into a series, at least not one that would have the clear start and end point that was essential to my thoughts about form.

The structure for what became *different streams* is based on a process that makes use of the fact that the numbers 0 and 5 are, when written in Morse code, the exact opposites of each other: 0 being five dashes and 5 being five dots. It occurred to me that a structure could be created where, from a central value or balance point, four “routes” extended, each “route” having two “paths”. Taking the central value as twenty, with the ratio between the ‘dots’ and ‘dashes’ being 1:2, the structure is built as follows:

Route 1:	Path 1:	Path 2:
1. Dot = 20 / dash = 40	0 (_ _ _ _ _)	5 (. . . . .)
2. Dot = 21 / dash = 42	1 (. _ _ _ _)	6 (_ . . . .)
3. Dot = 22 / dash = 44	2 (. . _ _ _)	7 (_ _ . . .)
4. Dot = 23 / dash = 46	3 (. . . _ _)	8 (_ _ _ . .)
5. Dot = 24 / dash = 48	4 (. . . . _)	9 (_ _ _ _ .)
6. Dot = 25 / dash = 50	5 (. . . . .)	0 (_ _ _ _ _)
7. Dot = 26 / dash = 52	6 (_ . . . .)	1 (. _ _ _ _)
8. Dot = 27 / dash = 54	7 (_ _ . . .)	2 (. . _ _ _)
9. Dot = 28 / dash = 56	8 (_ _ _ . .)	3 (. . . _ _)
10. Dot = 29 / dash = 58	9 (_ _ _ _ .)	4 (. . . . _)
11. Dot = 30 / dash = 60	0 (_ _ _ _ _)	5 (. . . . .)

Route 2:	Path 1:	Path 2:
1. Dot = 30 / dash = 60	0 (_ _ _ _ _)	5 (. . . . .)
2. Dot = 29 / dash = 58	9 (_ _ _ _ .)	4 (. . . . _)
3. Dot = 28 / dash = 56	8 (_ _ _ . .)	3 (. . . _ _)
4. Dot = 27 / dash = 54	7 (_ _ . . .)	2 (. . _ _ _)
5. Dot = 26 / dash = 52	6 (_ . . . .)	1 (. _ _ _ _)
6. Dot = 25 / dash = 50	5 (. . . . .)	0 (_ _ _ _ _)
7. Dot = 24 / dash = 48	4 (. . . . _)	9 (_ _ _ _ .)
8. Dot = 23 / dash = 46	3 (. . . _ _)	8 (_ _ _ . .)
9. Dot = 22 / dash = 44	2 (. . _ _ _)	7 (_ _ . . .)
10. Dot = 21 / dash = 42	1 (. _ _ _ _)	6 (_ . . . .)
11. Dot = 20 / dash = 40	0 (_ _ _ _ _)	5 (. . . . .)

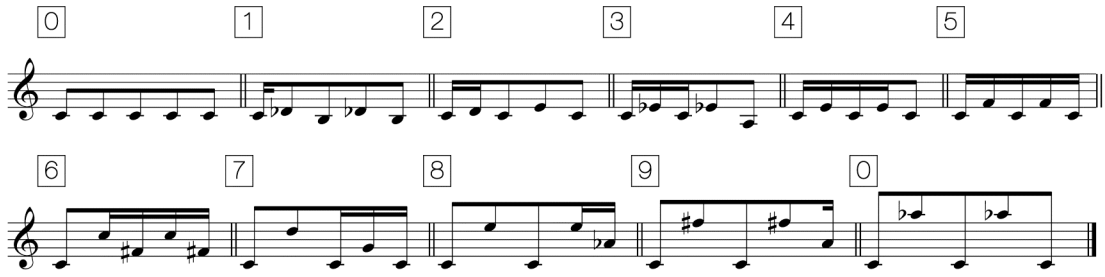
Route 3:	Path 1:	Path 2:
1. Dot = 0 / dash = 0	0 (_ _ _ _ _)	5 (. . . . .)
2. Dot = 1 / dash = 2	1 (. _ _ _ _)	6 (_ . . . .)
3. Dot = 2 / dash = 4	2 (. . _ _ _)	7 (_ _ . . .)
4. Dot = 3 / dash = 6	3 (. . . _ _)	8 (_ _ _ . .)
5. Dot = 4 / dash = 8	4 (. . . . _)	9 (_ _ _ _ .)
6. Dot = 5 / dash = 10	5 (. . . . .)	0 (_ _ _ _ _)
7. Dot = 6 / dash = 12	6 (_ . . . .)	1 (. _ _ _ _)
8. Dot = 7 / dash = 14	7 (_ _ . . .)	2 (. . _ _ _)
9. Dot = 8 / dash = 16	8 (_ _ _ . .)	3 (. . . _ _)
10. Dot = 9 / dash = 18	9 (_ _ _ _ .)	4 (. . . . _)
11. Dot = 10 / dash = 20	0 (_ _ _ _ _)	5 (. . . . .)

Route 4:	Path 1:	Path 2:
1. Dot = 10 / dash = 20	0 (_ _ _ _ _)	5 (. . . . .)
2. Dot = 9 / dash = 18	9 (_ _ _ _ .)	4 (. . . . _)
3. Dot = 8 / dash = 16	8 (_ _ _ . .)	3 (. . . _ _)
4. Dot = 7 / dash = 14	7 (_ _ . . .)	2 (. . _ _ _)
5. Dot = 6 / dash = 12	6 (_ . . . .)	1 (. _ _ _ _)
6. Dot = 5 / dash = 10	5 (. . . . .)	0 (_ _ _ _ _)
7. Dot = 4 / dash = 8	4 (. . . . _)	9 (_ _ _ _ .)
8. Dot = 3 / dash = 6	3 (. . . _ _)	8 (_ _ _ . .)
9. Dot = 2 / dash = 4	2 (. . _ _ _)	7 (_ _ . . .)
10. Dot = 1 / dash = 2	1 (. _ _ _ _)	6 (_ . . . .)
11. Dot = 0 / dash = 0	0 (_ _ _ _ _)	5 (. . . . .)

The four “routes” run, in turn, from the balance point up to the highest value (route 1), from the highest value to the balance point (route 2), from nothing up to the balance point (route 3) and, lastly, from the balance point down to nothing (route 4). Within this, the paths work through, in opposite directions, the Morse code numbers. In terms of structure, the paths within each route arrive at one of three points: one of ‘all’, one of ‘nothing’ or one of ‘balance’.

Harmonically, taking an idea from *when it is dark enough*, I then used this process to build up a series of ‘target’ patterns. These patterns took the

Morse code as their intervallic structure starting, at the smallest, with a ‘dot’ being a semitone and a ‘dash’ being a tone. These intervals are then used consecutively, alternating up and down. Pattern one has a ‘dot’ being worth one semitone and, using the 1:2 ratio, a ‘dash’ worth a tone. Pattern two uses a ‘dot’ worth two semitones, pattern three using a ‘dot’ worth three, etc. So, for example, starting at one end with zero having no interval structure and, at the other end with it built on intervals of twenty semitones, using the C as the first pitch, the patterns are as follows:



Using these as my target points, it had originally been my intention to use each one along every step of each route, meaning that each target would be built up of eight patterns - the two paths from each route. On putting all of this material into *Sibelius* and playing it back, it quickly became evident that this approach wasn’t going to work – the result of layering up so many patterns was too dense. With so much going on, each target point had no clear identity of its own, as they all started to sound the same. I experimented with combining the patterns in a more selective way. By trial and error, I created eight different target points, each using only some of the available patterns for that step. There was no process behind this working method, my only aims being that each target point should be different from all of the others and that, more subjectively, I should like them. Although this means that not all of the patterns from each step along every route and path are used, their existence is essential to, and determined by, the overall structure.

Out of the eight paths, only one doesn’t appear in *different streams* – path one of route 2. There is no reason for this other than it just didn’t feature in any of the target patterns I put together. How these target points are then connected varies from one movement to the next. In the first three

movements, the pitches of any given pattern only transform within the same path. In movement four, however, some of the pitch transformations connect to paths other than the one in which they began.

During movement one, each of these patterns transforms chromatically to its next target point. Any changes a pattern goes through are always completed by the end of the section, so all the patterns that start at letter A have arrived at their next target point, harmonically, by letter B even if the new pattern doesn't then appear until later in the piece. In the case of, for example, pattern six (21/42), its target point doesn't occur until the beginning of movement three. So, by the end of letter A, all the pitch changes have been made so that, at the start of the third movement, those same pitches return, accompanied with the change in rhythm.

Movement two has the patterns changing in a more fragmented manner – moving by larger intervals, with no process dictating how big the interval is. In movement three, the chromatic approach of movement one returns. Movement four has the pitches of certain patterns transforming into those of other patterns, again moving in bigger interval jumps. Unlike movement two, however, pitches move straight to the target point, without using any other notes in between.

Originally I had intended to use the same approach for the rhythmic durations as I had done for the harmonic material – using the process of extending the value of the 'dots' and 'dashes' for the values in the Morse code rhythms. While calculating the total durations for each of the patterns it became clear that, in the case of the longest durations, the resulting patterns were going to be very big when combined with the harmonic ideas. They would have lacked the rhythmic drive I wanted and, although some of the patterns at the shorter end of the durations process could have worked, the longer ones certainly wouldn't. As such, I chose not to use the idea at all.

The orchestration for *different streams* came from a desire to separate the various paths within the overall structure. At various points during the piece paths drop out, only to return later, and I wanted to reflect that – that each path has its own instrumental sound. Although the inner structure of the patterns is maintained I have, due to the limits of register, had to transpose some of the patterns by an octave, in some cases by two. If I had insisted on

all patterns using the same C as their starting point then, in the case of some of the larger ones, the upper or lower pitches would have been pushed out of range.

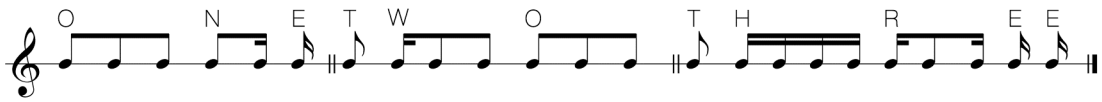
The title of *different streams* was inspired by a passage in *Siddhartha* by Hermann Hesse.

11 duets for piano

The idea to write a series of piano duets had been in my mind for some time. *thaw* had been a very significant piece for me, and I felt I wanted to further explore both the rhythmic effects and the harmonic ideas. A number of people I'd played *thaw* to had made comments that echoed my own feeling about the piece: that it could easily have been longer. The problem had always been that I'd lacked an underlying structure that would support a whole series of piano duets. As I'd done with *different streams*, I wanted to find a form that would create the rhythmic and harmonic material, as well as provide the form for both the individual pieces and the series as a whole.

Previously, when trying out ideas for this piece, I'd looked at using the Morse code numbers, as I'd done in *different streams*. When I put the rhythms into *Sibelius* and played them back, at the ratios I'd used in *thaw*, I felt they'd lacked the effect I was looking to recreate – a blurred, rhythmic texture with no sense of pulse.

I found a solution to this problem when, whilst thinking back to how I'd come up with the rhythmic patterns in *thaw*, I realised that, instead of using the Morse for 1, 2, 3 etc, I could spell the numbers: o-n-e, t-w-o, t-h-r-e-e. Thus, I ended up with the following patterns:



These patterns, without the obvious structure of the Morse code number rhythms, were much better suited to the sound I had in mind for the new piano duets.

The concept that provides the backbone for the harmonic material, the combination of rhythmic patterns, the ratios and the overall number of pieces in the series comes from Henry Cowell. In his book *New Musical Resources*, in the section "Scales of Rhythm" (1996, p.99), he proposes a scale of ratios based on the harmonic series:

C : C = 1 : 1
C : C# = 14 : 15
C : D = 8 : 9
C : E*b* = 5 : 6
C : E = 4 : 5
C : F = 3 : 4
C : G*b* = 5 : 7
C : G = 2 : 3
C : A*b* = 5 : 8
C : A = 3 : 5
C : B*b* = 4 : 7
C : B = 8 : 15
C : C = 1 : 2

I decided against using the first and last steps in the scale as, in combination with the way I intended to construct the material, they offered little of interest.

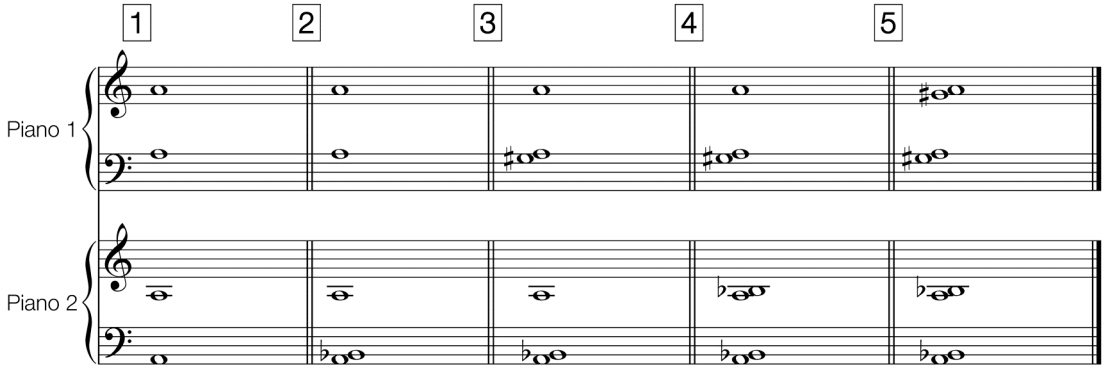
Each piece is based on one step of Cowell's scale. Rhythmically, every piece in the series has piano one using the Morse code spelling of "one", with the intention that the performers would alternate playing the roles of each piano. Piano two, starting with "one" in the first piece, uses the spellings of each step number for its rhythmic material. Duet one uses a tempo ratio of 14:15, piano one with a time signature of 14/16, piano two playing fifteen against fourteen. With an idea adapted from *thaw,* the right hand of each piano has the original rhythm, with the left hand playing not quite the strict retrograde. In a few cases, reversing the rhythms would have meant spelling out a different word: the Morse code for "N", for example, is the retrograde of the pattern for the letter "A". To get round this, the left hand instead spells the number backwards, without actually reversing the Morse code for each letter, thus "one" becomes "eno".

In one sense, all the pieces are identical in terms of form. All of the pieces have five sections, each one marked by a change in the pitch material. The length of each of these sections is dictated by the loop point in the rhythms, where the patterns in both pianos come together to share a downbeat at the beginning of a pulse cycle. In some cases, such as duet

number three, the sections are just two bars long whilst, in others, such as duet eleven, they are much longer – sixty bars, in this instance.

Harmonically, I allowed myself to be a little flexible in how I used Cowell's scale. Firstly, I used his material as the basis for intervallic ideas rather than specific pitches. In an earlier version of the series, I adhered strictly to only using two pitches in each duet – the two that Cowell has in each step. Thus, originally, duet one used just C and C#, duet two using C and D and so on. Instead, I created a process using them as intervals.

Unlike *thaw*, these duets don't have the four hands spread across three octaves, but only two. This was to allow for greater interplay between each line as the pitch material developed. The harmonic process takes the intervals from Cowell's scale and, in a strict order, has the semiquavers of each rhythm change accordingly. In piano one, across both hands, the semiquavers always rise by the interval with, in piano two, the semiquavers fall. The pianos alternate in the sequence: in duet one, the left hand of piano one moves first, flowed by the left hand of piano two, then the right hand of piano one and finally the right hand of piano two. Section by section, harmonically, duet one changes as follows:



This order is then reversed with each duet: number two has the right hand of piano one moving first, whilst duet three has the left hand of piano one making the first change, etc.

The other way in which I moulded Cowell's idea was, as is evident from musical example above, by not using the note of C as the basis for the intervals, but rather an A. Although, when sketching and trying out ideas in

Sibelius during the early stages of these pieces I did indeed use a C, I found it wasn't as effective for recreating the sound that I'd achieved in *thaw*.

Conclusion

Premeditation – instinct

In the moment of writing *thaw*, the oldest piece in this submission, I'd had no thought for how the piece might evolve, no structure or system. In previous compositions I'd worked with processes and, during a conversation with Harald Muenz in 2006 about a piece I was writing at the time, I was asked where I saw myself in the process I'd used. I was happy with the construction of the process, with the concepts behind how it worked, but the question focused my thoughts on a problem I'd been having with the piece: that, despite liking the structure, I didn't particularly care for the way the resulting music sounded. I went back to the processes, looking for a way to unpick the bits I liked from those I didn't. I found that, without dismantling everything, there was little I could do, that the processes were too strict and I'd left myself with no room to move. On reflection, I felt I'd made all of the decisions before the piece had begun.

In *Music As A Gradual Process*, Reich states "One can't improvise in a musical process – the concepts are mutually exclusive." (2002, p.36). My experiences with the composing of *thaw*, coupled with Reich's assertion, left me thinking about how I wanted to use processes, about what aspects of a piece I wanted to create using a process and about how and where I wanted to leave myself with the freedom to react to the music that resulted during a piece's composition.

when it is dark enough follows a harmonic process of transformation, but moves between chords that are not based on any system or structure. *different streams* approaches the same idea from the opposite direction: the harmonic "target points" are the result of a process that also provides the rhythmic material, with the pitches then following paths that are freer in their movement. The *11 duets for piano* use Cowell's scale of rhythm as the basis of a process, where I allowed myself some freedom in its application.

The premeditated and the instinctive are, for me, about two things: about creating a process and then following it through to see where it takes me, but

also about using a process to determine the destination without it determining how I am to get there.

Personal – impersonal:

The anonymity, the impersonality that can come from working with processes holds a great deal of interest for me. The removal of individuality in the creating of a mathematical structure, the beauty in balance, symmetry, order, in logical perfection is something that I find calming and satisfying. Drawing influence from the work of composers such as Tom Johnson and Brian Eno, I am interested in the step by step unfolding of a system based on numbers, but also in then taking a more subjective approach to how material derived from such a structure is used.

The inevitability of the structure in the phase pieces by Steve Reich, of their logical conclusion, is something I have worked towards in some my own compositions. *thaw* makes use of rhythmic patterns that never change, identical from the first repetition to the last, whilst evolving harmonically in a gradual yet unstructured way. *different streams* has, at its core, quite a simple structure built on numbers and Morse code. Within this, there are eight paths through the material - four routes, each one travelled in both directions. The piece ultimately uses only some of them and, even then, not all steps along the way.

The certainty of direction in a process need not result in music that is tedious and without identity. I am interested in trying to create processes and structures with a mathematical purity, through which I am nevertheless free to find my own route.

Possible – impossible:

Making the impossible possible, through the use of click tracks, is central to both *thaw* and *11 duets for piano*. The presence of the technology is essential to the performance of the pieces and, in that sense, the musicians are slaves to the click tracks order to achieve the level of rhythmic precision required. But, at the same time, they are enabled to create something above their abilities otherwise, the technology allowing them go further than they could without it.

With much of the work I do as a performer, I am often in the situation of having to play with little or no rehearsal and with people I hardly know. Even when playing with technically very accomplished musicians, sometimes this can be less than successful musically. My experiences of working this way led me to consider the relationships between members of an ensemble: the nature of that relationship and how it can be affected.

Altering that relationship, by introducing the electronics in a way that affects what takes place between their roles rather than within them, is about exploring our relationship to technology – that we can be bound by it in a way that removes some, indeed much of our freedom yet, in return, we can be given the means to realize a piece that, without it, we could not.

Simple – complex

The rhythmic structure and precision of my music is, for me, about intricacy of effect achieved by simple means. Layers of rhythm and the effect of their repetition, is at the core of all of my music. The work of Nik Bärtsch, particularly with his group Ronin, is very important to me. Their interlocking rhythms and shifting patterns, dependent on great precision, unity and yet also independence on the part of the players, creates a sound of tightly controlled power. It is also about creating rhythm tension, present in the music of funk bands like The Meters, Tower of Power, Parliament and James Brown. For me, the “funk” is in how the patterns combine, how the rhythms of one instrument, superimposed with those of another, create a forward motion. I am interested in rhythmic patterns in which the separate layers are lean, yet strong and potent in their combination.

The *Studies for Player Piano* by Conlon Nancarrow have been very important for me, but perhaps mostly as pieces I needed to keep my distance from, at least conceptually. His extensive use of canons left me feeling that I needed to explore other means of rhythmically structuring my music – a search that ultimately lead to the idea of pulse cycles.

The textural rhythmic effects of some of the music of Ligeti, particularly *Continuum* (1970) and the opening of the third movement of the *Chamber Concerto* (1969-1970), has also influenced my thinking. The creating of blurred, quite ambiguous sounding patterns, with no sense of pulse appears

in both *thaw* and *11 duets for piano*. For me, there is an analogy with the *Farben* paintings of Gerhard Richter in the lack of a central focal point in the texture.

The effects created in *thaw* and *11 duets for piano duo*, the most rhythmically demanding of all my pieces here, are built up using notes of only a quaver or a semiquaver in duration which, in themselves, are anything but challenging to play. The difficulty lies in the way they fit together, and, with the support of the click tracks, in the creating of something beyond the sum of the individual parts.

Form

In my most recent music, I have been interested in the balance of the harmonic and rhythmic material and both *different streams* and *11 duets for piano* feature, although different for each piece, processes from which all this is built.

The four movements of *different streams* are framed by the idea of theoretically, two additional ones, which could perhaps be called Movement 0 and Movement 5. These two sections, if the inner process is followed one step further both forwards and backwards, would be based on exactly the same material – the piece emerges from and returns to the same place, although neither are heard.

when it is dark enough, without following a process that makes this a necessity, harmonically and rhythmically ends where it began. Unlike *different streams*, the same pattern here is heard both at the beginning of the piece, in the middle and at the end. In one sense we return to the same place yet, each time, we do so by different means.

Like *different streams, 11 duets for piano* also stops short of fully completing the process on which it's based, using neither the first or last step of the scale of rhythm proposed by Cowell. In response to hearing *thaw*, Tom Johnson offered the opinion that for him the piece lacked necessity of form. *different streams* and *11 duets for piano* both explore the idea of a form that works towards a logical conclusion even though neither piece reaches it.

Journey – destination:

The question of not only where one is headed, but also the means by which one travels comes, for me, as a result of my interest in processes. The structure of *when it is dark enough* is concerned with the journey, the transition from one chord to another, with pitches working through a gradual process to arrive at a predetermined harmonic point. In contrast, both *different streams* and *11 duets for piano* are built around destination points dictated by their respective structures. *different streams,* in certain places, shares with *when it is dark enough* the idea of incremental harmonic change although later in the piece, it moves away from this. *11 duets for piano*, using an idea that is also found in later stages of *different streams*, features no transitions at all: pitches simply change without any sense of preparation or intermediate steps.

This question also connects to the issue of the premeditated and the instinctive: of having a direction and destination from the outset but in allowing for detours and diversions along the way should something unexpected occur and seem worthy of the attention. This is something that has become increasingly important to me not just within pieces themselves, but also in my wider approach to composition. As I have previously mentioned, *different streams* came out of ideas that I had been working on as the possible basis for what became *11 duets for piano*. Sometimes the most interesting things happen when you put down the map and look at what's around you.

For me, these pieces represent a search for balance: of the premeditated and the instinctive, the personal and the impersonal, the possible and the impossible, the intricate and the simple, of form and of the journey and the destination.

Bibliography

Books

Boulez, P., 1990. *Orientations*
London: Faber and Faber Ltd.

Carter, E. (Ed. Bernard, J. W.), 1998. *Elliott Carter: Collected Essays and Lectures, 1937-1995* New York: University of Rochester Press.

Cooper, G. and Meyer, L, B., 1960. *The Rhythmic Structure of Music*
Chicago: University of Chicago Press.

Cowell, H., 1996. *New Musical Resources*
Cambridge: Cambridge University Press.

Feldman, M., 2000*. Give My Regards to Eighth Street*
Cambridge, Mass: Exact Change.

Gann, K., 1995. *The Music of Conlon Nancarrow*
Cambridge: Cambridge University Press.

Griffiths, P., 1985. *Modern Music: A Concise History from Debussy to Boulez* New York: Thames and Hudson Inc.

Hesse, H., 1998. *Siddhartha*
London: Picador.

Johnson, T., 1996. *Self-Similar Melodies*
Paris: Editions 75.

Kandinsky, W., 1977. *Concerning The Spiritual In Art*
New York: Dover Publications, Inc.

Mertens, W., 1994. *American Minimal Music*
London: Kahn & Averil.

Nyman, M., 1999. *Experimental Music: Cage and Beyond*
Cambridge: Cambridge University Press.

Rae, C. B., 1999. *The Music of Lutoslawski*
London: Faber and Faber Ltd.

Read, G., 1978. *Modern Rhythmic Notation*
Bloomington: Indiana University Press.

Reich, S. (Ed. Hillier, P.), 2002. *Writings on Music 1965 – 2000*
New York: Oxford University Press.

Schiff, D., 1998. *The Music of Elliott Carter*
London: Faber and Faber Ltd.
Steinitz, R., 2003. *György Ligeti: Music of the Imagination*
London: Faber and Faber Ltd.
Stockhausen, K., 1991. *Stockhausen on Music*
London: Marion Boyars Publishers Ltd.
Stone, K., 1980. *Music Notation in the Twentieth Century*
New York: W. W. Norton & Company.
Whitall, A., 1999. *Musical Composition in the Twentieth Century*
New York: Oxford University Press.

Articles

Bernard, J. W., 1988. *The Evolution of Elliott Carter's Rhythmic Practice*
Perspectives of New Music: Vol. 26, No. 2.
Bruce, D., 1997. *The Manic Mechanic*
The Musical Times: April, 1997.
Clendinning, J. P., 1993. *The Pattern-Meccanico Compositions of György Ligeti*
Perspectives of New Music: Vol. 31, No. 1.
Ghent, E., 1967. *Programmed Signals To Performers A New Compositional Resource*
Perspectives of New Music: Fall-Winter, 1967.
Hicks, M., 1993. *Interval and Form in Liget's Continuum and Coulée*
Perspectives of New Music: Vol. 31, No. 1.
Jarvlepp, J., 1984. *Conlon Nancarrow's Study #27 for Player Piano viewed analytically*
Perspectives of New Music: Vol. 22, Fall-Winter 1983 / Spring-Summer 1984
Johnson, T., *I Want To Find The Music, Not To Compose It*
www.editions75.com: Updated October, 2009.
-, *On Form*
www.editions75.com: Updated October, 2009.
Lansky, P., 1990. *A View From The Bus: When Machines Make Music*
Perspectives of New Music: Vol. 28, No. 2.

Ligeti, G., 1993. *States, Events, Transformations*
Perspectives of New Music: Vol. 31, No. 1
Stockhausen, K., 1959. *…..How Time Passes…..*
Die Reihe: 3.
Thomas, M. E., 2000. *Nancarrow's Canons: Projections of Temporal and Formal Structures*
Perspectives of New Music: Vol. 38, No. 2.

Scores

Carter, E., 1951. *String Quartet No. 1*
New York, 1994: Associated Music Publishers, Inc.
Feldman, M., 1986. *Palais de Mari*
London, 1986: Universal Edition.
Ives, C., 1906. *The Unanswered Question*
New York, 1984: Peer International Corporation.
Ligeti, G., 1969-1970. *Chamber Concerto*
Mainz, 1974: Schott.
-, 1983. *Hungarian Studies*
Mainz, 1983: Schott.
-, 1985. *Études pour piano* premier livre
Mainz, 1986: Schott.
-, 1988 - 94. *Études pour piano* deuxième livre
Mainz, 1998: Schott.
-, 1990 - 92. *Concerto for Violin and Orchestra*
Mainz, 2002: Schott.
-, *Hamburg Concerto*
Mainz, 2004: Schott.
Lutoslawski, W., 1986. *Chain 3*
London, 1988: Chester Music.
Nancarrow, C., *Study No. 3 for Player Piano*
Mainz, 1983: Schott.
-, *Studies for Player Piano Volume 5*
Mainz, 1984: Schott.
-, *Studies for Player Piano Volume 6*

Mainz, 1985: Schott.

Reich, S., 1976. *Music for 18 Musicians*

New York, 1976: Boosey & Hawkes.

-, 1970. *Four Organs*

London, 1980: Universal Edition.

Discography

Aimard, P.L., 2003. *African Rhythms* Teldec Classics 8573 86584 2

Andriessen, L., 1993. *De Tijd* Elektra Nonesuch 7559 79291 2

-, 1994. *De Stijl* Elektra Nonesuch 9 79342 2

Bang, J. & Honoré, E., 2000. *Birth Wish* Panavision 74321 768 832

-, 2001. *Going Nine Ways From Wednesday* Panavision PNM2

Bärtsch, N., 2006. *Hishiryo* Ronin Rhythm Records Ron 003

-, 2006. *Ronin Live* Ron 004

-, 2006. *Stoa* ECM Records 1939

-, 2008. *Holon* ECM Records 2049

Boulez, P., 2005. *Le Marteau sans maître* Deutsche Grammophon 00289 477 5327

Cage, J., 2002. *Sonatas and Interludes for prepared piano* Ogam 488004 2

Carter, E., 1998. *Chamber Music* Auvdis MO 782091

-, 2001. *Oboe Concerto* Apex 8573 89227 2

-, 2005. *String Quartets 1-4* Et'cetera KTC 2507

Cowell, H., 2001. *The Louis Orchestra* First Edition FECD 0003

Diga Rhythm Band, 1988. *Diga* Rykodisc RCD 10101

Eno, B., 1978. *Ambient 1 / Music For Airports* Virgin EEGCD 17

-, 1978. *Music for Films* Virgin EEGCD5

-, and Budd, H., 1980. *The Plateaux of Mirror* Virgin EEGCD18

-, 1983. *Apollo* Virgin EEGCD53

-, 1985. *Thursday Afternoon* EG Records EGCD64

-, 2004. *Neroli* All Saints Records HNCD1480

Feldman, M., 1991. *Rothko Chapel* New Albion Records NA039CD

-, 1993. *Piano and String Quartet* Elektra Nonesuch 9 79320 2

-, 2001. *Palais de Mari* L'empreinte digitale ED13137

Fitkin, G., 1992. *Slow* Argo 433 690 2

-, 1994. *Hard Fairy* Argo 444 112 2

Gordon, M., 1996. *Trance* Argo 452 418 2

Henck, H., 2001. *Piano Music* ECM New Series 1726

Icebreaker, 1997. *Rogue's Gallery* Felmay 21750 7002 2

-, 2001. *Extraction* Between The Lines BTL 018

Ives, C., 1992. *Holidays Symphony* Sony SK 42 381

-, 1994. *Three Places in New England* Deutsche Grammophon 457 911 2

-, 1995. *Works for Piano* Vox Box CD3X 3034

-, 2000. *The Symphonies* Decca 466 745 2

Johnson, T., 1992. *Music for 88* Experimental Music Foundation XI 106

-, 1999. *The Chord Catalogue* XI Records XI 123

Ligeti, G., 1996. *A cappella* Sony Classical SK 62305

- 1996. *Works for Piano* Sony Classical SK 62308

-, 1997. *Mechanical Music* Sony Classical SK 62310

-, 2001. *The Ligeti Project I* Teldec New Line 8573 83953 2

-, 2002. *The Ligeti Project II* Teldec Classics 8573 88261 2

-, 2002. *The Ligeti Project III* Teldec Classics 8573 87631 2

-, 2003. *The Ligeti Project IV* Teldec Classics 8573 88263 2

Lutoslawski, W., 1991. *String Quartet* Elektra Nonesuch 979255 2

-, 1999. *The Essential Lutoslawski* Phillips 464 043 2

MacGregor, J., 2003. *Play* SoundCircus SC007

Martland, S., 1994. *Patrol* Catalyst 09026 62670 2

-, 2001. *Horses of Instruction* Black Box BBM1033

Nancarrow, C., 1993. *Studies* BMG Music 09026 61180 2

- 1999. *Studies for Player Piano* Wergo 6907 2

Quartet Romantic, 1984. *Quartet Romantic* New World Records 80285 2

Reich, S., 1978. *Music for 18 Musicians* ECM New Series 1129

-, 1980. *Octet* ECM New Series 1168

-, 1984. *Six Pianos* Deutsche Grammophon 439 431 2

-, 1985. *The Desert Music* Elektra Nonesuch 7559 79101 2

-, 1987. *Early Works* Elektra Nonesuch 9 79169 2

-, 1994. *Tehillim* Elektra Nonesuch 7559 79295 2

-, 1999. *Phase Patterns* Wergo WER6630 2

-, 1999. *Variations for Winds, Strings & Keyboards* Phillips 412 214 2

-, 2001. *Triplet Quartet* Nonesuch 7559 79546 2

-, 2006. *Different Trains* Sanctuary Records BBM1097

-, 2006. *Reich At The Roxy* Sweetspot Music SSSRCD001

Riley, T., 1969. *A Rainbow In Curved Air* CBS Records MK 7315

-, 2002. *Keyboard Studies* Scene MDG 613 1135 2

Tonus-Music Labor Research Result, 2002. *Live Vol. 2* Tonus-Music 008

Tower Of Power, 1970. *East Bay Grease* Atlantic 8122 71145 4

-, 1973. *Tower Of Power* Warner Brothers 972 267 2

-, 1974. *Back To Oakland* Warner Brothers 7599 27279 2

-, 1974. *Urban Renewal* Warner Brothers 7599 26349 2

-, 1993. *T.O.P.* Epic EK52805

-, 1995. *Souled Out* Epic 480942 2

Vienna Art Orchestra, 2000. *Artistry In Rhythm* Montreux Jazz Label TCB01102

Wonder, S., 1973. *Innervisions* Motown WD72606

-, 2000. *Songs In The Key Of Life* Motown 157 357 2

Zappa, F., 1995. *The Yellow Shark* Rykodisc RCD40560