Developing a rhythmic performance practice in music for piano and tape[1]

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There are many excellent works for piano and tape; however, there have been an insufficient number of pianists widely performing these works. The purpose of this article is to critically analyse the rhythmic relationships between piano and tape, serving a pedagogical function for both composers and pianists in technical and aesthetic terms. Hopefully these techniques will encourage pianists to include music for piano and tape as part of their repertoire.

1. PREFACE

Music reflects the society and technology of its age. As a pianist of the twenty-first century, in addition to traditional solo piano and chamber repertoire, cultivating skills in performing new music and electroacoustic music contributes to expanding the horizons of the musical world. By collaborating directly with composers, pianists gain insight into the composing process and each composer's original approach to music. Through such collaborations, composers also gain better understandings of real performance considerations. There have been numerous pianists specialising in acoustic new music, including Emanuel Ax and Paul Jacobs, and pianists/composers such as Frederic Rzewski, Moritz Eggert, and Gao Ping. In the electroacoustic music world, though, there have not been equally prominent pianists/composers, and not enough pianists have specialised in electroacoustic music. The best-known pianist of electroacoustic music is Philip Mead in the United Kingdom, who has commissioned works from Katharine Norman (*Trying to Translate*),[2] Russell Pinkston (*TaleSpin*),[3] Jonathan Harvey (*Tombeau de Messiaen*),[4] and others. Additionally, there have been several famous pianists who have premiered electroacoustic pieces or for whom composers have written pieces, for example, Maurizio Pollini, for whom Luigi Nono wrote …*sofferte onde serene*…[5] However, except for Mead, their careers have not focused even partially on electroacoustic music. On the other hand, flutists Elizabeth McNutt and Margaret Lancaster, clarinetists Gerald Errante and Esther Lamneck, and the violinist Mari Kimura in the United States have focused part of their careers on electroacoustic music. Therefore, the purpose of this paper is to investigate a number of pieces for piano and tape with respect to their performance practice, to serve a pedagogical function for both pianists and composers in both technical and aesthetic terms. The research method includes interviews with pianists specialising in electroacoustic music, critical reflection on my own experience of performing, and interviews with living composers whose pieces are included in this paper, if applicable, so that performer and composer perspectives may complement each other.

2. INTRODUCTION

2.1. Defining 'tape'

Electroacoustic music is music 'in which electronic technology, now primarily computer-based, is used to access, generate, explore and configure sound material, and in which loudspeakers are the prime medium of transmission'.[6] The word 'tape' in my topic is a general term designating a fixed format, originally recorded and played back on magnetic tape, but nowadays mostly utilising CD format. The 'tape' part can be made with synthesised sound (also known as *elektronische Musik*), recorded sound (also known as *musique concrète*) with or without sound processing, or both. In contrast to real-time sound processing, the tape part is fixed.

2.2. 'Live element'

Most articles on the subject of performance combining electronics and instrument(s) focus on real-time digital

[1]For the purposes of this paper, 'tape' is used as a general term designating a fixed format. Originally recorded and played back on magnetic tape, pre-recorded media now usually refers to CD format. In contrast to real-time sound processing, the tape part is fixed.

[2]Katharine Norman, p. 5 in the liner notes for *Katharine Norman: Transparent Things*, Philip Mead, piano, Metier Sound and Vision, 2000. MSV CD92054, Compact Disc.

[3]Russell Pinkston, in the programme notes for *MidAmerican Center for Contemporary Music* concert, 2001; available from http://www.bgsu.edu/colleges/music/MACCM/events/programs/032801-electroacoustic.pdf; Internet; accessed 22 November 2005.

[4]Jonathan Harvey, in the liner notes to *Jonathan Harvey*, Philip Mead, piano, Sargasso, 1999. SCD 28029, Compact Disc.

[5]Luigi Nono, in the liner notes to *Luigi Nono*. Maurizio Pollini, piano, Deutsche Grammophon, 1979. 2531 004, LP.

[6]Emmerson, Simon and Smalley, 'Electro-acoustic music', *Grove Music Online*, ed. L. Macy (accepted 11 November 2003), http://www.grovemusic.com

Organised Sound **11**(3): 255–272 © 2006 Cambridge University Press. Printed in the United Kingdom. doi: 10.1017/S1355771806001518

https://doi.org/10.1017/S1355771806001518 Published online by Cambridge University Press

processing of music rather than works for tape and instrument(s), probably because real-time interaction is relatively new, requiring very different, non-traditional performing approaches and the courage to deal with new technologies. Music for instrument(s) and tape has been accused of being mechanical, non-spontaneous and old-fashioned.[7] Many people overlook the rich variety of musicality inherent in interactive works for live acoustic instruments and tape. With acoustic instruments as a 'live element', music for instrumental performance and tape may offer the same degree of interaction between players and audience, contributing to the excitement of its performance.[8]

3. RHYTHMIC RELATIONSHIPS BETWEEN THE PIANO AND TAPE

The system of registral designation in this paper assigns the middle C as C4, followed upwards by D4, E4, and so forth. The octave changes with each C. The higher Cs are C5, C6, and so forth. The lower Cs are C3, C2 and C1.

3.1. Choice of repertoire

The pieces chosen for analysis include Christopher Bailey's *Balladei* (2005), Luigi Nono's *…sofferte onde serene…* (1976), Mario Davidovsky's *Synchronisms No. 6* (1970), Jonathan Harvey's *Tombeau de Messiaen* (1994), James Mobberley's *Into the Maelstrom* (1992), and Katharine Norman's *Trying to Translate* (1991). This choice is based on pianism, virtuosity and the historic value of diverse styles.

3.2. Synchronisation with the tape

In music for piano and tape, the greatest difficulty that pianists encounter is the synchronisation with the tape. Pianists have the privilege of a huge volume of great solo repertoire, and we are accustomed to being deeply emotionally involved with our understanding of and feeling about the music, sometimes to the point of self-indulgence. To play with a fixed part indeed contradicts these habits.

Yet, the relationship between piano and tape is comparable to performing a concerto, in which the orchestra's tempo is steady and the solo pianist sometimes needs to tightly lock with the orchestra and sometimes is free to play tempo *rubato*.

[7]Chadabe, Joel. *Electric Sound: The Past and Promise of Electronic Music* (Upper Saddle River, NJ: Prentice-Hall, Inc., 1997), pp. 69–70. McNutt, Elizabeth, 'Performing electroacoustic music: a wider view of interactivity', *Organised Sound* **8**(3) (2003): 3; available from http://journals.cambridge.org/action/displayJournal?jid=OSO; Internet; accessed 4 September 2004.

[8]Puckette, Miller, 'Something digital', *Computer Music Journal* **15**(4) (Winter 1991): 65. 'An essential part of "real" music is the live element, the indefinable but undeniable interaction between players and audience which makes music exciting'.

In addition to the synchronisation with the tape part, the invariable tempo of this music, particularly in pieces with little synchronisation flexibility, can be very challenging and raises the level of virtuosity. On the other hand, purely acoustic music works allow the players not only more tempo *rubato*, but also to speed up or slow down the tempo throughout the entire piece according to individual traits of style, which, changing tempo freely, does not exert the same energy in the tape part.

In order to illustrate the approach of developing performance practice, I categorised the rhythmic interaction between piano and tape into four types, ranging from loose to tight: (1) independent with sectional synchronisation, e.g. *…sofferte onde serene…*; (2) free with relative synchronisation, e.g. *Tombeau de Messiaen*, *Trying to Translate*; (3) free timing within strict synchronisation, e.g. *Into the Maelstrom*; and (4) steady strict rhythm, e.g. *Tombeau de Messiaen*, *Synchronisms No. 6*, *Balladei*.

3.3. Rhythmic interaction type 1 – independent with sectional synchronisation

The type of interaction which occurs when the piano and tape part do not have close rhythmic interaction, but rather are independent from each other, can be presented with **Luigi Nono's *…sofferte onde serene…*** The rhythm in both parts is complex and the pulse is obscure, along with the repeated gesture, which make the music improvisatory. The beginning and end of each subdivision of the tape part are indicated by timings. Within each subdivision, the pianist is free to use tempo *rubato*. Among the four this type leaves the pianist the most freedom regarding the synchronisation.

…sofferte onde serene… makes the use of one continuous audio track for the entire piece, which is about 13′40″ long. Nono provided eight reference numbers for the tape part. The reference number information is written as part of the Performance Notes as well as on the piano part where the subdivisions of the tape part are located. In the Performance Notes, each number comes with a timing and a brief description of when the next section is to start, as follows:

1 = 54″ *f* – attacca dopo 3″ ca. (*f* – begin after ca. 3″)
2 = 1′56″ Attacca dopo 3″ ca. (begin after ca. 3″)
3 = 2′57″ Attacca subito (begin immediately)
4 = 5′11″ Attacca subito (begin immediately)
5 = 6′49″ Attacca subito (begin immediately)
6 = 9′16″ Attacca subito (begin immediately)
7 = 11′49″ Attacca subito (begin immediately)
8 = 13′14″ Attacca dopo 2″ ca. (begin after ca. 2″)

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There is no more written information about the tape part, neither graphic sign nor notation. In spite of that, no stopwatch is needed in the performance. The composer made very distinctive sounds at the end/beginning of each subdivision of the tape part, but the music still flows seamlessly. The depiction of the tape part's sound at and before each reference number is as follows. Bear in mind that, since the tape part is not always in the tuning system of twelve-tone equal temperament, the notes indicated in this paper are approximate pitches.

- Reference number 1, 0′54″: The timbre is muddy and materials mostly are drawn from the piano part until 0′54″,[9] where there is a *sforzando* piano cluster, comprising notes from E3 to A3, which has never occurred before either in the tape or piano part. In addition, it has a distinctively clean timbre and lasts for 3 seconds.
- Reference number 2, 1′56″: In the second subdivision, the music has a lot of echo effect until around 1′51.5″, where a silence appears and lasts for 3 seconds, followed by a wooden, close sound, and then a piano cluster at 1′56″.
- Reference number 3, 2′57″: Starting from 2′40″, the music consists of short gestures of one or two high piano sounds. The only exception is a fast gesture of three high piano sounds, B5/C6 – B6/C7 – B5/C6, which happens between 2′56″ and 2′57″ – reference number 3.
- Reference number 4, 5′11″: A very low piano A appears around 5′01.5″, repeats, and changes to a half step up, B♭, at 5′11″.
- Reference number 5, 6′49″: Starting from 6′24″, the tape consists of piano high clusters only until 6′49″, where a loud B2/C3 piano sound comes in.
- Reference number 6, 9′16″: A piano G3/A3 sound occurs at 9′08″ and G3/G♯3/A3 at 9′10.5″. The restatement from the opening sneaks in with a piano E♭1/A6.
- Reference number 7, 11′49″: The tape part is quiet from 11′42″ to 45.5″, followed by a long G♯5 on top and two shorter A3/B3s below. A soft piano cluster on very high and very low notes comes in at 11′49″.
- Reference number 8, 13′14″: A low, long piano sound comes in at 13′08″ and lasts until 13′14″, where it becomes quiet. The tape has a percussive sound at 13′15.5″, and the pianist is to come in a half second later.

Even though Nono offered eight reference numbers and timings on the score, there are two more places which may need the same degree of timing sensibility as the others between reference numbers 5 and 6. After the constant loud and aggressive section, the piano ends with a ***sfffff*** cluster, while the tape part remains loud and aggressive until after 7′38″ with the last loud piano E3/F3 gesture, followed by a quieter atmosphere. The pianist is suggested to wait to start the next phrase, which is quiet, until after the last loud piano E3/F3 gesture. In the Deutsche Grammophon recording made in 1979, Italian pianist Maurizio Pollini held the last chord for 8 seconds and waited until 7′41″ to start the next phrase. Again, eight measures later, the piano pauses the action at a fermata, while the tape grows busy until 8′27″. Pollini, this time, played the last note at 8′18″ and waited until 8′43″ to start the next phrase.

Close listening and familiarity with the tape part is needed during the rehearsals. …*sofferte onde serene*… uses many tempo changes, including ritardando and accelerando, which show the pianist the direction of the music. The tape part consists mainly of a recorded piano performance by Pollini, which gives a clear approach to the music style. The independence of timing from the tape part also encourages the pianist to interact with/imitate the piano playing in the tape part, using personal judgement and interpretation.

Even though the independence of timing from the tape part leaves the pianist much freedom of timing, it is important to be familiar with the tape and find the most musical pacing relating to the tape part so that the pianist is never waiting for the section changes or behind the tape. This way, the flow of music will not be interrupted.

Composers who would like to write such music are encouraged to provide more written information on the tape part on the score to ease the extra work that performers need to do.

3.4. Rhythmic interaction type 2 – free rhythm with relative synchronisation

Another type of rhythmic interaction where the synchronisation between the piano and tape is relative, instead of lining up, is found in most of Katharine Norman's *Trying to Translate* and a small portion of Jonathan Harvey's *Tombeau de Messiaen*. Compared to type 1, the rhythmic relationship between the piano and tape is closer, even though the timing and rhythm of each part is free, and it may be without constant pulse. It leaves the pianist much freedom of timing as well. Yet a more detailed notation of the tape part is needed. The length of each segment of synchronisation is smaller, and, as the result, the counting is easier.

Katharine Norman's *Trying to Translate*[10] (see Figure 1) is in three sections. The middle section is for

[9]The timing of each track may be slightly different. This paper uses the timing of the cue corresponding to the reference Nono provided.

[10]Originally for piano, tape and live electronics. Originally written for settings on a Yamaha SPX processing box for the live effects. The live electronics was made into the Max/MSP program by the composer for Shiau-uen Ding in 2004.

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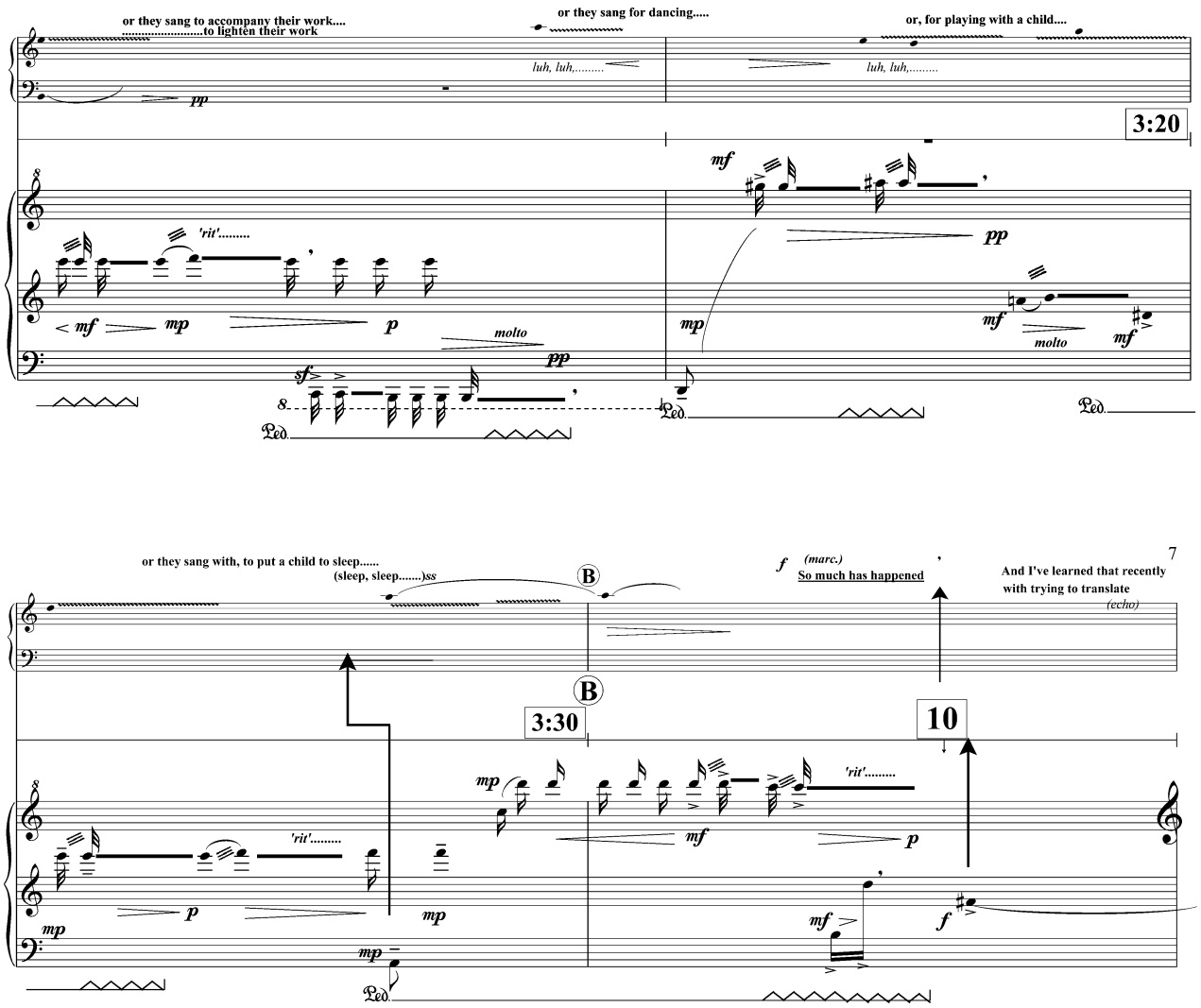


Figure 1. Detailed tape notation corresponding to the piano part.[11]

piano and live effects, without the tape. The live effects include digital delay, detuning of the live signal, which is the piano sound in this case, and reverberation. The first and last sections, which are discussed in this paper, are for piano, tape, and live effects. The first section is a little over 3 minutes and 40 seconds long, and the last section is a little over 7 minutes long. In these two sections, each measure is 10 seconds long and marked with timing. The measures are provided for the convenience of the counting and visualisation, instead of implying musical sense.

In addition to the timing by second, the tape part is well notated with pitches, dynamics, sound descriptions, and spoken texts. Thus the tape part is easy for pianists to follow. The relative length of each gesture guides the pianist with respect to aligning gestures with tape cues. It is written on the score that the 'rhythmic notation is not strict and should be interpreted freely, taking any durations given as a guide to relative length'.

Similar to Luigi Nono's *…sofferte onde serene…*, the pianist is required to be familiar with the tape and find the most musical pacing so that he/she is not waiting for or racing to catch the tape cues. The pianist is encouraged to experiment with the timing with chunks of 30 seconds of music to determine how the piano part flows.

Another use of this kind of rhythmic relationship appears after the middle point of **Jonathan Harvey's *Tombeau de Messiaen*** (see Figures 2(a)–(e)) for one and a half minutes. The entire piece is around 8 minutes and 45 seconds long. In the section in which this type of interaction is employed, the piano and the one or two voices in the tape part start upward arabesques in different timing, one following another. The distance between the entrances of the two or three voices is not all the same. When the piano comes in first and then the

[11]Reproduced by kind permission of Katharine Norman.

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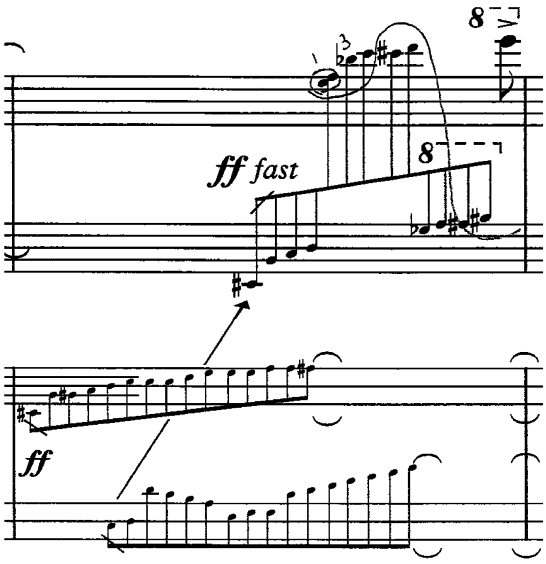


Figure 2(a). Arabesques 1: tape1 → tape2 → piano.[12]

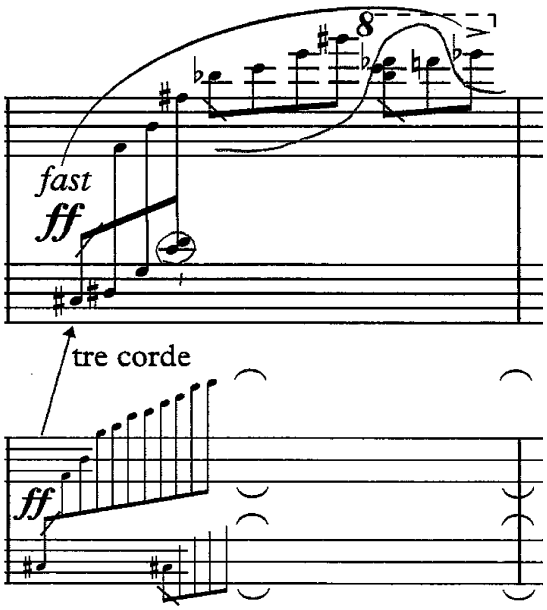


Figure 2(b). Arabesques 2: tape1 → piano → tape2.

tape follows, the music may lead the audience's ears to real-time processing music. During this section, the composer gives the pianist plenty of flexibility of timing before an arabesque starts by directing the performer to 'omit as much as necessary', 'repeat or omit as necessary', and 'continue until DAT enters then break off'.

In this situation, the pianist must not only continue the gesture of the tape part, or anticipate the gesture for the music in the tape part to follow, but also be sensitive to timing, articulation and loudness to create the best

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Figure 2(c). Arabesques 3: piano → tape1 → tape2.

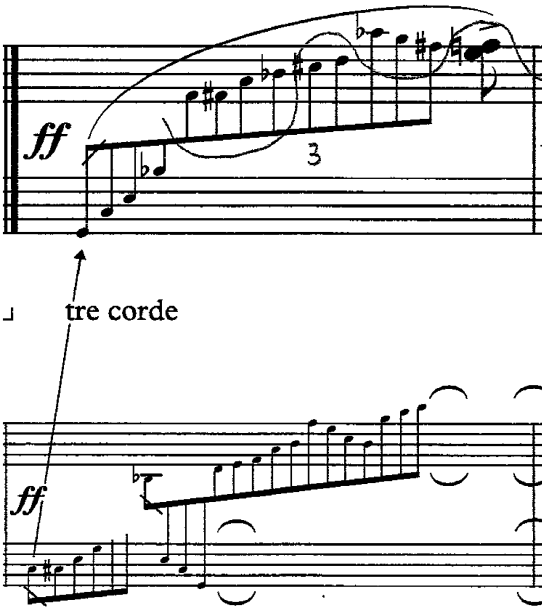


Figure 2(d). Arabesques 4: tape → piano.

response with the tape part and make the result an integrated entity.

3.5. Rhythmic interaction type 3 – free time within strict synchronisation

The third type of rhythmic interaction between the piano and tape is one in which the tape part has either a long rest, a long sustained note/chord, or an irregular pulse, and the pianist is required to synchronise with the tape part at certain points. A stopwatch or click-track through headphones may be used for this kind of music. In the former case, the precise timing is indicated in the score. This type of rhythmic interaction can be found in **James Mobberley's *Into the Maelstrom*** (see Figures 3–6).

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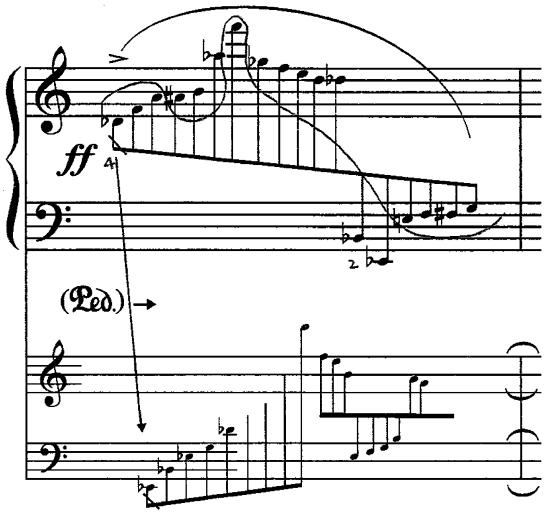


Figure 2(e). Arabesques 5: piano → tape.

Into the Maelstrom can be divided into three sections: the long, free-timed, improvisatory first section, the perpetual, sixteenth note-driven second section, and the piano solo cadenza. The first section utilises the third type of rhythmic interaction discussed in this paper, where the tape part comprises primarily long sustained notes. The rhythm of the piano part is free and measured in response to the change of notes in the tape part. The timing is precisely indicated by seconds, sometimes to the tenth of a second. This helps the pianist build a sense of pulse with the length of a second, as does the metronome number quarter note = 60 marked with parentheses on measure 4.

Although helpful, using a stopwatch or click-track through headphones strongly affects the visual dimension of the work, and is antagonistic to deep listening, feeling, and breathing with the tape part as well as openness to the environment. Strong compositional elements used in *Into the Maelstrom* allow the pianist to perform without a stopwatch or click-track. There are methods which can be utilised during practice and performances to avoid the use of equipment that detracts from performance focus.

In the first section of *Into the Maelstrom*, many of the long notes in the tape part come out from *niente*; therefore, the precise timing of the beginning of notes is hard to catch. The composer gives the pianist plenty of flexibility of timing adjustment by giving the piano long notes before the precise synchronisation with the tape is needed, and offers appropriate cues for the pianist without losing the musical flow. For example, at 0′56.1″, the piano is to synchronise with the tape, and the composer gives the rhythm to the glissando in the tape part starting one second before 0′56.1″. The pianist joins at the sixth note of that accelerando rhythmic figure, even though this figure is not notated on the score.

The most challenging part of catching the exact synchronisation is the beginning. The first sound in the tape part fades in and out and lasts 13 seconds. The piano has to be synchronised with the tape on the second note since the piano and tape parts are both clearly articulated. During concerts, I have asked the technical assistants to start the tape part using iTunes and give me the counts of seconds 10, 11 and 12 as they showed on the screen. This worked very well, timing-wise as well as stage-wise. The first four notes in the piano part are stopped with the pianist's left hand. At this moment, the pianist's body is slightly turned toward the audience. The pianist can raise his/her head slowly

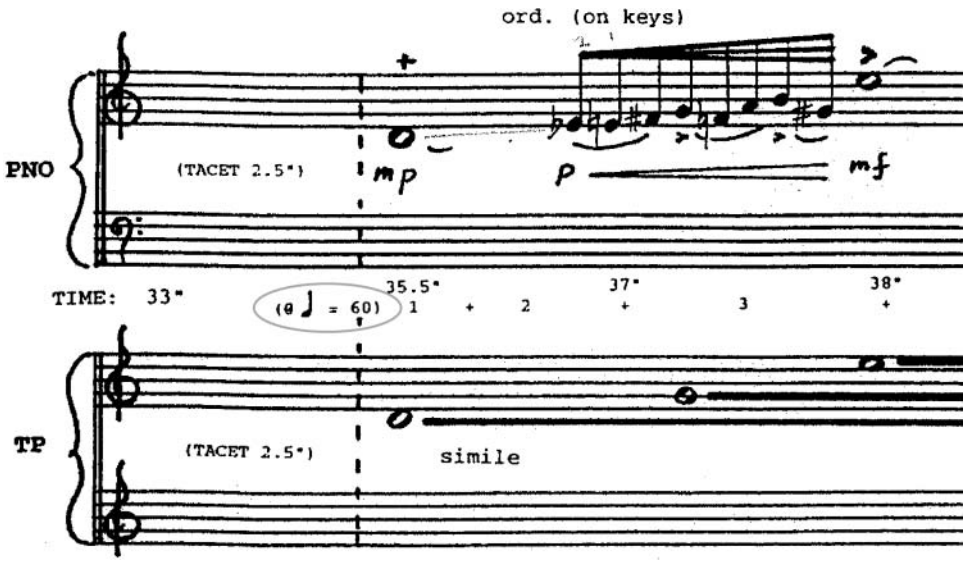


Figure 3. Quarter note = 60.[13]

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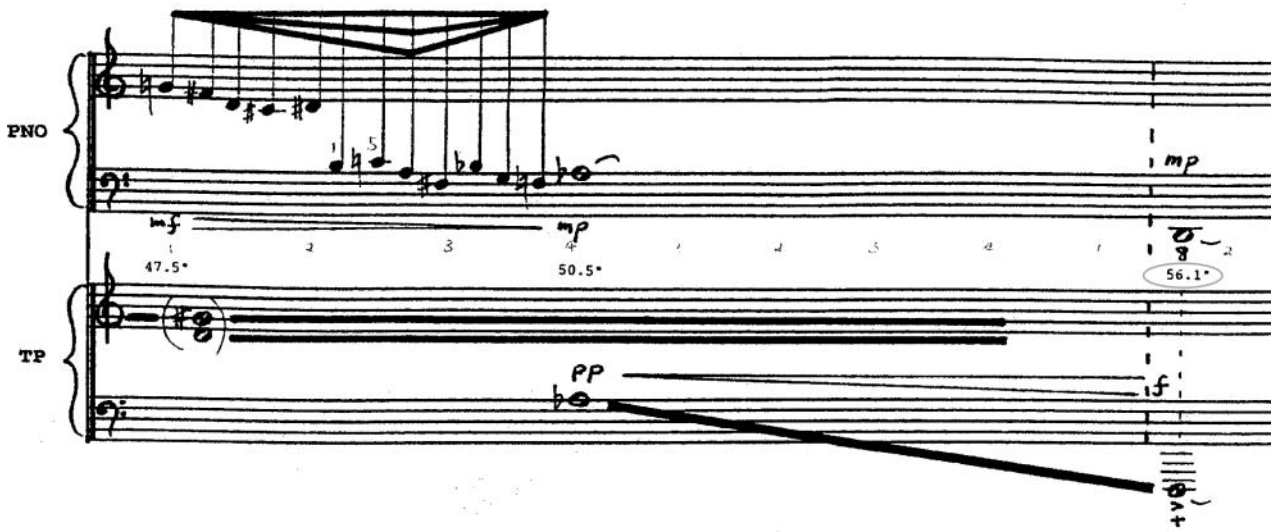


Figure 4. Glissando.

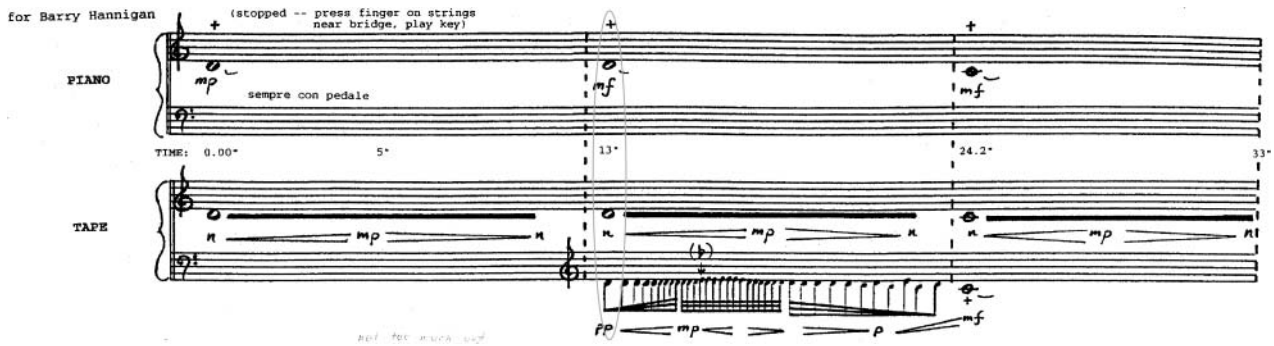


Figure 5. First sound.

around the ninth second and come back to the keys around the twelfth second. The gesture can be integrated naturally in the music.

When the tape part contains long sustained notes while the piano part is rhythmically free, especially from 1′05″ through 1′57″, it can be beneficial to practise with small chunks of music to get the best sense of timing in terms of how much it is possible to stretch each set of accelerando/ritardando figures, such as from 1′05″ to 1′09″, 1′09″ to 1′45.75″, and 1′45.75″ to 1′57″.

Soundfile editing software such as the free program 'Audacity'[14] can be utilised to help cut the tape part into smaller pieces when repetitive practising is needed. It takes only one finger to press the spacebar on the computer to restart the tape part from the cursor, and the pianist simply presses the spacebar once more to stop the tape part.

[14]http://audacity.sourceforge.net/; Internet; accessed 22 November 2005.

3.6. Rhythmic interaction type 4 – steady strict rhythmic relationship

The fourth type of rhythmic interaction between the piano and tape is where the music has a steady rhythmic drive and the tape part provides the rhythm, which can be technically used as metronome with music varieties.

Offering the pianist rhythmic cues in the tape part in a piece for piano and tape with this type of rhythmic relationship is as essential as offering pitch cues in the instrumental/orchestra part to a vocalist in a vocal piece. With appropriate cues, the pianist is constantly reminded of the exact tempo and directed to the next phrase at the right time. There are several types of such cues: tempo cues, on-beat cues, and off-beat cues.

Most of the pieces, or sections of pieces, of this type contain relatively straightforward rhythms throughout. Jonathan Harvey's *Tombeau de Messiaen* and Mario Davidovsky's *Synchronisms No. 6* are two examples

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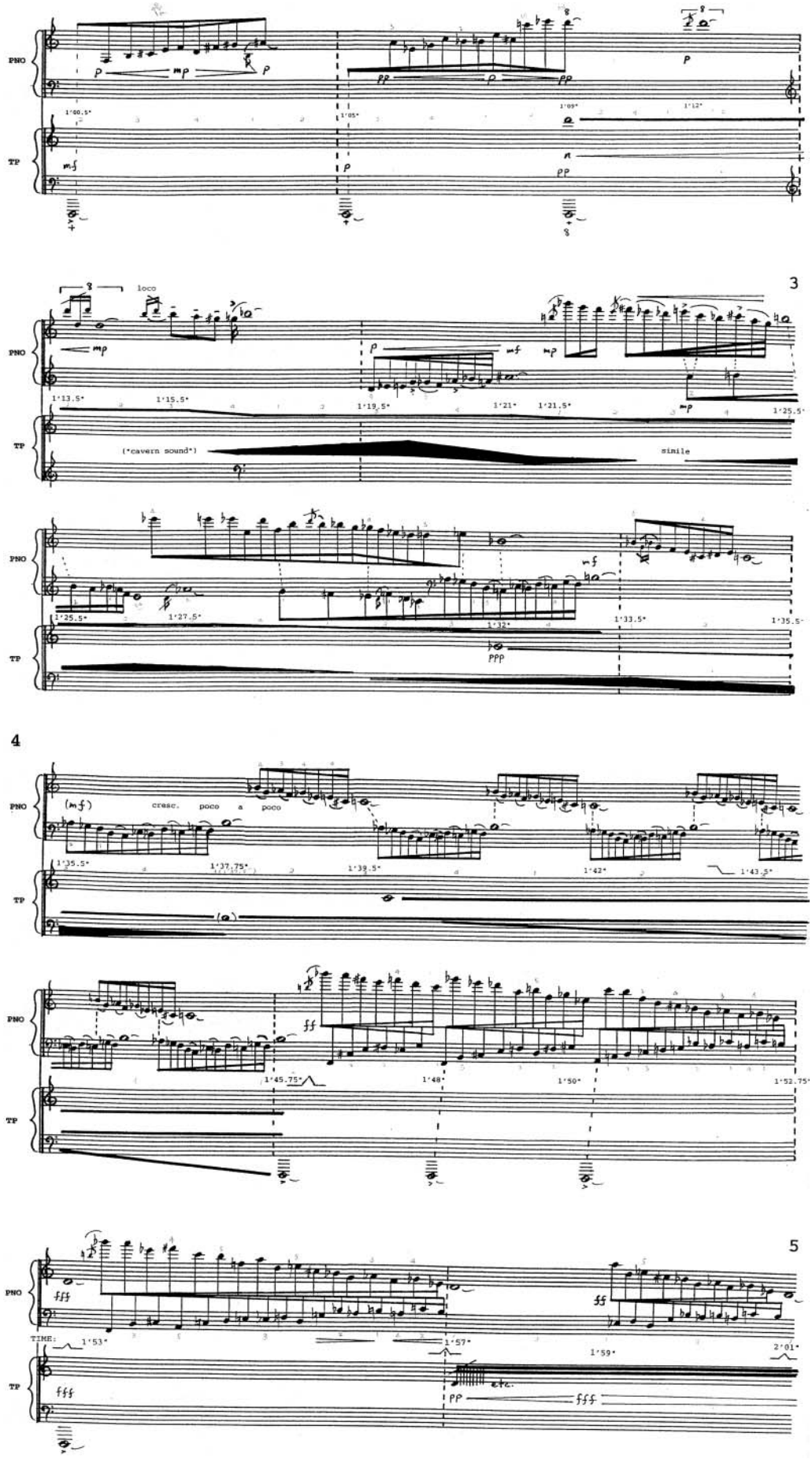


Figure 6. The semi-free rhythm between 1′05″ and 1′57″.

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whose rhythm is based on eighth notes. In such a case, the steady pulse may make the learning process of the piano part simple, with the use of a metronome to control the tempo and feel the pulse before playing with the tape.

Half of **Jonathan Harvey's *Tombeau de Messiaen*** (see Figures 7–13) makes use of this fourth type of rhythmic interaction. The basic rhythmic unit is the eighth note, and the rhythm is very steady and simple throughout this portion of the piece.

Even when the tape occasionally has a faster rhythm than the eighth note in the foreground and only the faster rhythms are rotated on the score, most of the time it includes the eighth notes in the background, which makes it unlikely for pianists to lose the pulse or their place. (There are also short triplet figures, but these are too short to confuse the pianist's sense of the rhythm.)

On top of the simple rhythm, Harvey's setting of tape cues provides the tempo and timing for the piano's next phrase. It may serve as a safety net in case the pianist's rhythm is not very steady. After all, performers are human beings and our beat is likely not as steady as a machine's, and tempo divergence may occur.

Second, since there are several long solo piano passages, occasionally with tempo changes or ritardandi, Harvey puts either a fermata or a long chord in the piano part at the end of a phrase before the tape restarts. It leaves pianists space for adequate tempo *rubato* and expression.

Third, for the sake of musical continuity, Harvey opened the opportunity for pianists to determine whether to omit a short passage or some of it on the fly, in order to catch the tape part. He also used this method later in the piece, as discussed under the second type in this paper.

As with *Tombeau de Messiaen*, the rhythm of **Mario Davidovsky's *Synchronisms No. 6*** is based on the eighth note. Comparing with *Tombeau de Messiaen*, the rhythm of *Synchronisms No. 6* is more elaborate and freer; the music has a lot of space in both parts and lots of fermatas; and there are even more piano solos.

Even though the rhythm is very much elaborated, the whole piece is based on the eighth note unit; therefore, it is useful to practise with a metronome before playing together with the tape part. And after a relatively free and complicated rhythm, the tape brings back and directs the pianist to the eighth note rhythm, by offering an eighth-note based pulse in the cues before the next piano phrase, e.g. sixteenth notes in m. 21 after a piano solo section, and the first two beats of m. 28 after the expanded quintuplets in a 4/4 measure.

There are a lot of piano solo sections, together with complex rhythms, and thus it is essential to give the pianist some time tolerance. For these sections, the tape part is silent or prolonged with a silent ending, with a fermata in both the piano and tape parts, and then the tape gives a cue before the piano joins in again, e.g. in mm. 6, 20, 47, 71, 99, 141 and 160.

Synchronisms No. 6 has a relatively sparse texture and a lot of space. A major portion of the synchronisation is

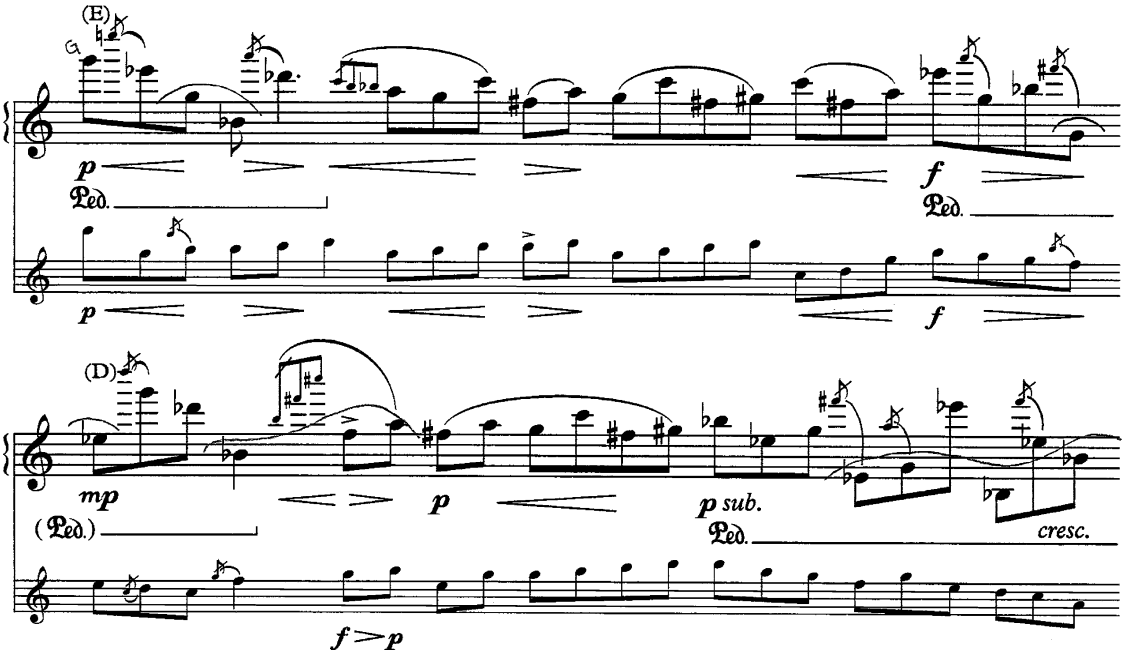


Figure 7. Basic eighth note rhythm.

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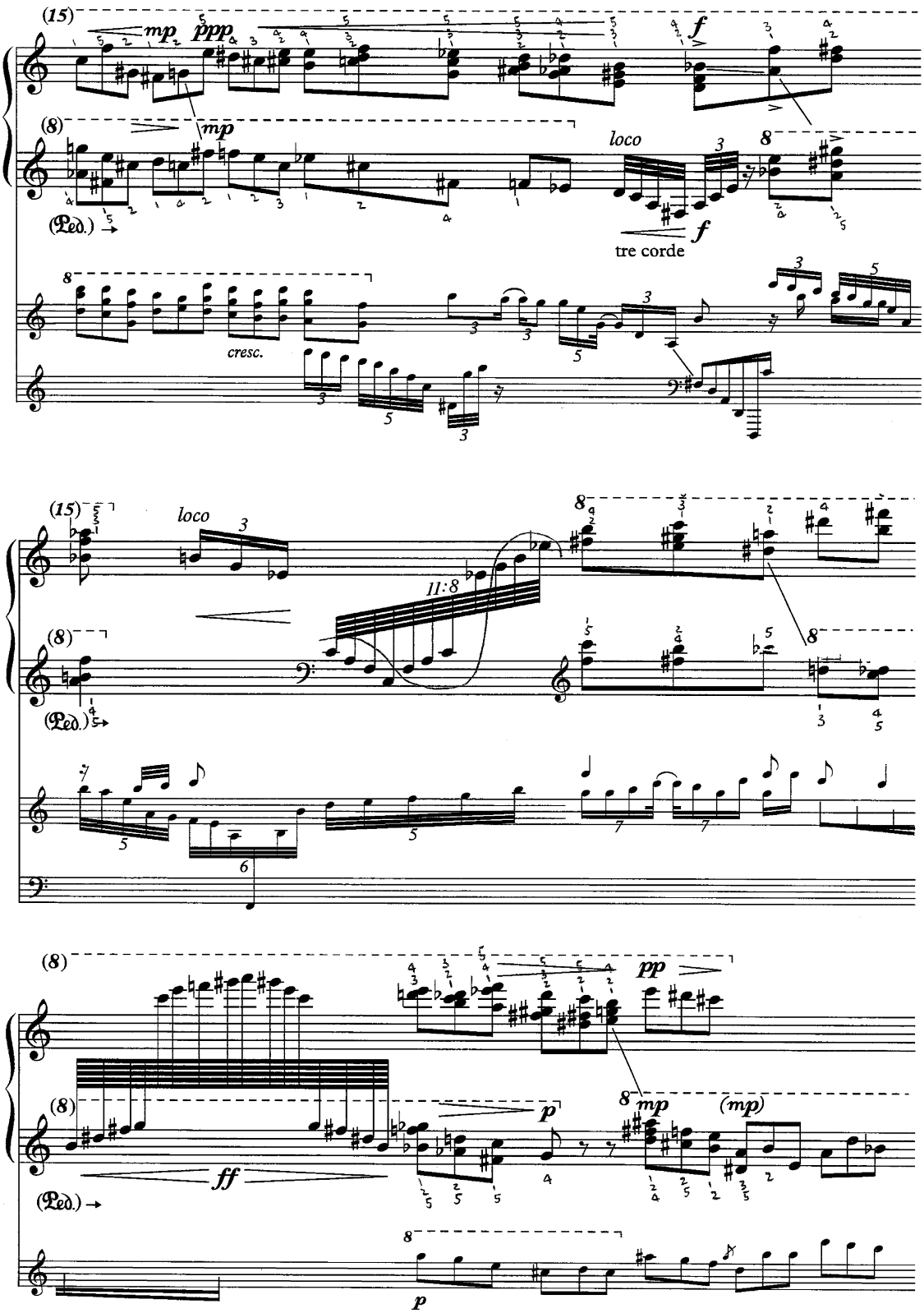


Figure 8. Faster rhythms.

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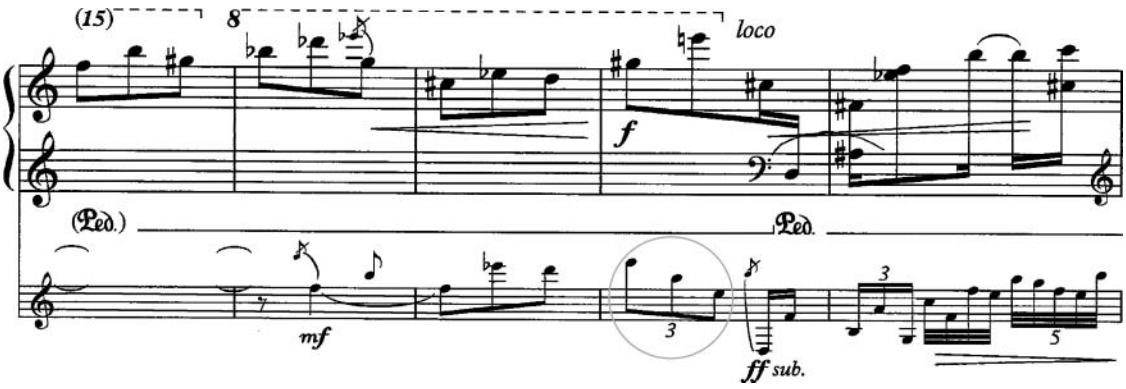


Figure 9. Occasional triplets.



Figure 10. Beginning.



Figure 11. Cue.

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Figure 12. Fermata for timing freedom.

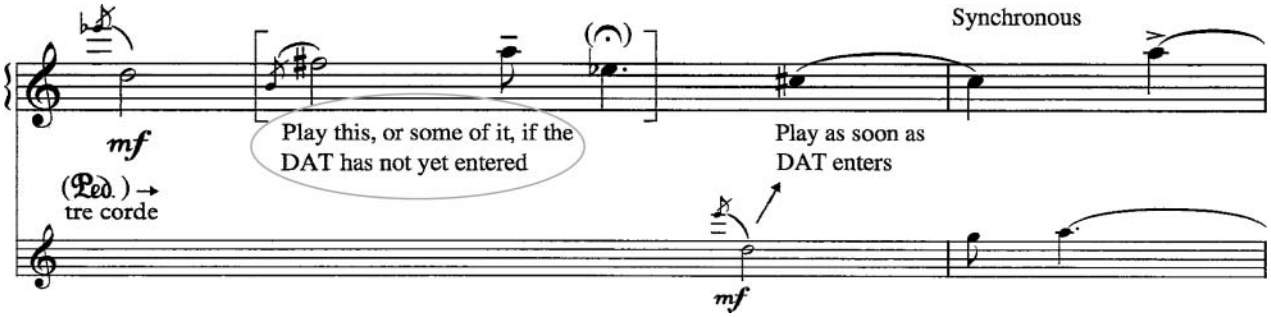


Figure 13. Omitting possible.

not in one place, but interwoven between the two parts. This may ease the synchronisation for the pianist, while at the same time providing cues.

Christopher Bailey's *Balladei* (see Table and Figures 14–18) uses an uncommon practice of this type of music. Most of the piece is free of steady pulse. In

Table. Structure of Christopher Bailey's *Balladei*.

Instrumentation/pitch-structure: 15 sections														
(1) 17tet: recorder, bells, viols; 29tet: crumhorn, lute, xylorimba														
(2) Percussion is omitted only in the beginning and end during piano solo sections														
M. 1	37	73	143	170	228	264	297	326	329	453	742	798	815	897
	17tet		17tet	17tet	17tet	17tet	17tet	17tet				17tet	17tet	
		29tet			29tet	29tet		29tet	29tet	29tet	29tet	29tet	29tet	
	piano piano	piano		piano		piano	piano	piano	piano		piano		piano	piano
Metre/tempo: 15 sections														
M. 1	37	75	152	179	244	264	277	311	362	453	733	791	812	897
	10/8	2/8	7/8	3/8	8/8		12/8	5/8	3/16		6/8	9/8	4/8	
	♪=115.5	♪=82.5		♪=74.25	♪=57.75	♪.=52.8		♪=82.5	♪.=148.5	♪.=165	♪=66	♪=52.8	♪=66	

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Figure 14. New tempo cue in m. 169.[15]

[15]Reproduced by kind permission of Christopher Bailey.

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Figure 15. Changing tempo cue.

addition, it is rhythmically complicated by constantly subdividing measures differently, except when the music is frantically fast in 3/8 metre. I will discuss how Bailey provided tape cues to make synchronisation possible and how pianists can prepare for this piece.

The form of *Balladei* is sectional. There are two ways of dividing sections, according to the instrumentation/pitch-structure and the metre/tempo, respectively,[16] both resulting in fifteen sections. The pitch-structure of each of the two ensembles is 17- and 29-tone equal temperament, respectively, with recorder, bells and viols in the 17tet ensemble, and crumhorn, lute and xylorimba in the 29tet ensemble. Overall, when there are changes only between the 17tet and 29tet ensembles, without changing the status of the piano, the music does not affect the rhythmic reorientation for the pianist.

Before the piano comes in to join the tape part, in mm. 170, 264, 742 and 815, the tape part provides the tempo cues, with clear beats for at least a full measure before the piano comes in.

When the time signature changes while the piano continues playing, the tempo cues are given in another way. The piano and tape come in together on the downbeat, and the tape gives the tempo while the piano has a rest. Then the piano joins in, in mm. 75, 179 and 277.

In contrast to other pieces of this type of music, the most unusual aspect of *Balladei* is the constant change of subdivision of measures. For example, in mm. 37–45, the time signature is 10/8 with quarter note = 115.5, but the sub-division of a measure changes as m. 37 – 5, m. 38 – 6, m. 39 – 6, m. 40 – 7, m. 41 – 6, m. 42 – 5, m. 43 – 4, m. 44 – 12, with quarter-note triplets in it.

Since the subdivision of the measure keeps changing throughout most of the piece, the composer uses the tape part to give the clear rhythm of the new subdivision. In addition, on-beat and off-beat cues are helpful for giving the pianist warning after a long rest in the tape part or in both parts. An on-beat cue gives the pianist the beat, and the pianist starts with an off beat, feeling the bounce back. An off-beat cue alerts the pianist to play the next note.

In addition to these three types of cues, detailed writing in the tape part including the tuning system (17- and 29-tone equal temperament), instrumentation ((i) Percussion; (ii) 17tet ensemble, including recorder, bells and viols; (iii) 29tet ensemble, including crumhorn, lute and xylorimba), dynamics, and stereo position of pitch, has been enormously helpful for the pianist's close understanding of the tape part in *Balladei*.

[16]E-mail correspondence with the composer, 5 May 2006.

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Figure 16. Changing subdivision of measure and cues.

Since the unusual subdivision makes the piece very difficult to count, the composer's mock-up is very helpful in the learning process. The pianist can get familiar with the constantly changing rhythm by repeated listening to both the mock-up and the tape part alone, in order to reproduce the rhythm as correctly as possible. Eventually, the pianist feels at home with the changing pulse speed on stage.

For the pianist's rehearsal situation with the tape, for this type of synchronisation, the software Audacity can be utilised to slow down the tempo by a certain percentage without changing the pitch. Creating

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Figure 17. On-beat cue.



Figure 18(a). Up-beat cue.

practice versions of the tape part at multiple tempi enables the pianist to slowly work up to the performance tempo. Listening to the tape part at a slower tempo is also helpful for the pianist to capture the nuance of the music, the detail of the compositon, including intricate rhythms, layers of instrumentation (counterpoint), and tangled timbre (from conflicts between the different tuning systems). As helpful as in the rhythmic interaction type 3, using Audacity, the pianist can also easily make sub-sections of the tape part for practising purposes.

4. CONCLUSION

Music for piano and tape is challenging for the pianist to synchronise with the tape part. Technically, appropriate rhythmic cues are essential for the players to follow the tape part, including relative adjacencies and pulsed signals for relative and strict rhythmic relationships, respectively, between the piano and tape. In addition, composers are encouraged to provide relevant information on the score to players, including a written-out tape part in traditional notation or pictorial symbols, and the relationship between the piano and tape in terms of dynamics and mixing level, which ranges the spectrum from two independent voices to one combined sound. Musically, the tape part provides a lot of information on style, which helps the player to interpret the work, which is very different from learning a brand-new work of purely acoustic music. In the end, even though the tape part is fixed in time, the pianist can be free with his/her own interpretation while still synchronising with the tape. The techniques discussed in this article regarding developing performing practice for players and providing tape cues for composers can be easily extended to works for any solo instrument and tape.

I believe that music for instrument(s) and tape will remain a viable means of musical expression well into the future. With its easy set-up for rehearsals/performances and large control/stability over the electronic sound, it provides performance mobility and unlimited imagination to the musical world.

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Figure 18(b). Up-beat cue.

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