

Noise and Texture, towards an Asian Influenced Composition Approach to the Concert Flute.

Dr. Garth Paine

1. Abstract

This paper discusses the composition of the electroacoustic flute work, *Fue Shō*, written especially for the 2008 Aurora Festival. The compositional brief sought a work that addressed the broader Asian and Pacific Rim context of the Australian continent. Addressing this brief, *Fue Shō* is based on the *Manzairaku*, which belongs to the Hyōjo (tonic on E) mode of the *Togaku* style, a style that heralds from China and is one of the three main influences in the development of the Gagaku music of the ancient Japanese Royal Court. *Fue Shō* requires concert flute and live electronic processing (Kyma-Capybara System).

Fue Shō seeks to weave a path between melody, pitch, noise and texture, drawing from the idiom of the western concert flute (in C) and broad, spectral sounds, similar to overblown Asian wind instruments (ie. shakuhachi) and the timbral quality of a traditional *Shō* orchestra. *Fue Shō* uses a modal harmonic framework common in the music of Asia Minor, specifically the Japanese musical tradition of Gagaku, and also utilised in some western spiritual music. Another example of such a composition would be the recent work *L'oiseau de la capitale* for Shakuhachi and electronics by Marc Battier (2008).

2. Introduction

Western art music has featured the concert flute as a solo instrument and a member of chamber and orchestral works for several centuries. The instrument has evolved from the subtle rounded tones of the end-blown flutes such as the recorder (bloch flute) through to the traverse instruments of wood and then metal, becoming the exuberant theatrical instruments of gold, performed in contemporary times by celebrities such as James Galway. The repertoire includes works of gentle, lilting beauty (Claude Debussy, *Syrinx - La Flute De Pan - Flute Solo*, Francis Poulenc *Sonata*, Gabriel Faure, *Sicilienne*, Op. 78), lyrical works of folk origin (Prokofiev, *Sonata for flute & piano in D major*, Op. 94) to extraverted competition works (Jacques-Francois Ibert *Concerto for Flute and Orchestra*, Cecile Chaminade, *Concerto*, Op. 107, etc). The oeuvre reflects idiomatic qualities of speed, lightness, brilliance and dynamism, whilst the low register can be characterized as rich and melancholic.

Asian wind instruments offer similar characteristics, but are usually more 'earthy' in nature and have a more limited pitch range than the western concert flute. Asian wind instruments are utilised in very different ways to western wind instruments, delivering melody, un-pitched timbres and plosive articulation as part of the musical work. The Shakuhachi for instance has an extraordinary dynamic range and can produce a very pure tone, but is equally well known for the noisy over blowing that provides explosive expressivity more easily related to contemporary composition where tone colour and/or noise act as predominant musical parameters (Varese, Xenakis, Boulez, Murail, Messiaen, Ligeti, Stockhausen etc) than traditional harmony and counterpoint.

Electroacoustic music is characterised by an exploration of timbre through an expansive and fluid approach to the manipulation of acoustic instrument and other sound sources (electroacoustic music) or composition utilizing location/field recordings (acousmatic music), and shares with spectralism the conceptual framework that "music is ultimately sound evolving in time" (Fineberg, 2000:2).

3. *Gagaku*

The Japanese musical tradition of *Gagaku* (literally meaning: refined, elegant music) was a music of the Japanese Royal Court. It is a rich pot-pourri of influences, including; **1)** ancient Japanese tradition, **2)** works newly composed by Japanese composers based on the ancient pieces, and **3)** influences from outside of Japan, including *Togaku* (also defined as music of the left) from China and *Komagaku* from the Korean peninsula (Ohno, 2005; Harich-Schneider, 1960; Kishibe, 1969)

According to Thompson (2006), the forms of *gagaku* included the following, not all of which survive today:

- 1) 唐樂 *Togaku*: music from the Tang
- 2) 高麗樂 *Komagaku*: music from Korea
- 3) 度羅樂 *Toragaku*: music from Thailand
- 4) 林邑樂 *Rinyugaku*: music from southeast Asia, some perhaps originating in India
- 5) 渤海樂 *Bokkaigaku*: music from Manchuria or Mongolia
- 6) 舞樂 *bugaku*: dance music; can also fall into one of the above forms
- 7) 伎樂 *gigaku* (also 吳樂 *Kuregaku*): a dance or theater form apparently originating in the 吳 *Wu* (modern Zhejiang) region of China

Of particular interest, and the inspiration for *Fue Shō*, is one of eighty remaining *Togaku* pieces (of Chinese origin), the *Manzairaku*, which belongs to the *Hyojo* (tonic on E) mode. The *Togaku* has six modes of which the *Manzairaku* represents only one.

I have, for several years now, been mesmerized by a recording of the *Manzairaku ~ Derute*, performed by the Tokyo Gakuso (Ohno, 2005). The music contains waves of sound that fold over and over, tumbling in a very abstract and refined manner as if representing direct experience of an ancient myth. The various instruments for the orchestra seem to operate on almost independent temporal scales; drums beating a regular, short, accelerating pattern as if the beater is just dropped on the skin like a rubber ball and allowed to bounce, whilst the other instruments exchange echo like calls, building textures in which a temporal pulse is almost indistinguishable.

The *Manzairaku* is attributed either to *Wu Hou*, the only Empress of the Tang dynasty (late 7th century), or *Yang Ti*, the second emperor of *Sui* dynasty in early 7th century China. The *Manzairaku* score describes the piece as a "Chukyoku" (medium-scale piece), "nobeyahyoshi" (a rhythmic pattern in 8/4 time in 8-bar metrical units) and "consisting of 20 metrical units". (Ohno, 2005)

As mentioned above, the *Manzairaku* forms the compositional model for *Fue Shō*. Gagaku, and especially *Manzairaku* display rich timbral qualities. Shimmering layers of simultaneously complex and yet simple tones form an ancient yet, at the same time, post-modern music. A music that seems timeless, reflecting a very pure aesthetic. Gagaku music is thought to have been heterophonic, that is, music in which each performer is playing essentially the same melody but each interprets it in his/her own way. Heterophony is one of the reasons why the *Manzairaku* ~ *Derute* has the quality of folding layers. Each of the instruments of the Gagaku ensemble introduces the melody at different times with small temporal and timbral alterations. This flexibility of temporal organization is explained by the Japanese principle of *elastic* or *breathrhythm*.

Gagaku and Buddhist chanting both make use of a common Japanese principle of *elastic* or *breathrhythm*. There are, of course, many steady, *metronomic* beats in Japanese music, but one also finds sections - like the opening of any Gagaku piece - in which the beat simply cannot be conducted. The melody moves from beat to beat in a rhythm more akin to that of a breath taken in deeply, held for an instant, and then expelled. In ensembles, such a rhythm can only be coordinated when the performers listen and feel the music together. This is the kind of attitude we associate with chamber music. Much Japanese music has this chamber music quality regardless of the size of the ensemble. (Malm, 1996)

The instruments of the Gagaku ensemble include:

- 1) 箏 *zheng* (*so*) zither or koto
- 2) 琵琶 *pipa* (*biwa*) lute
- 3) 笙 *sheng* (*sho*) mouth organ
- 4) 篳篥 *bili* (*hichiriki*) double reed aerophone
- 5) 笛 *di* (*fue* or *ryuteki*) flute

See (Thompson, 2006)



Figure 1 hichiriki¹



Figure 2 ryuteki²

According to current *gagaku* practice the *ryuteki* and *hichiriki* play the main melodies while the other instruments provide simple accompaniment. The Tang Dynasty Music Research Project has shown that these *ryuteki* and *hichiriki* melodies were added later and that in fact all instruments played the melodies. (Thompson, 2006)

The *Sho* provides the harmonic infrastructure for the *Manzairaku*, and uses a specific scale that reveals several chords (see Figure 3).

This composition is titled *Fue Shō*, as the work is written for flute (*Fue*) but with the aid of the live electronic processing which acts to expand the solo flute line in a manner reminiscent of the timbres produced by the traditional *Shō* orchestra. *Fue Shō* exhibits rich timbral fields characteristic of the traditional use of the *Shō* to produce finely nuanced multiphonic progressions (Crowe & De, 1992).

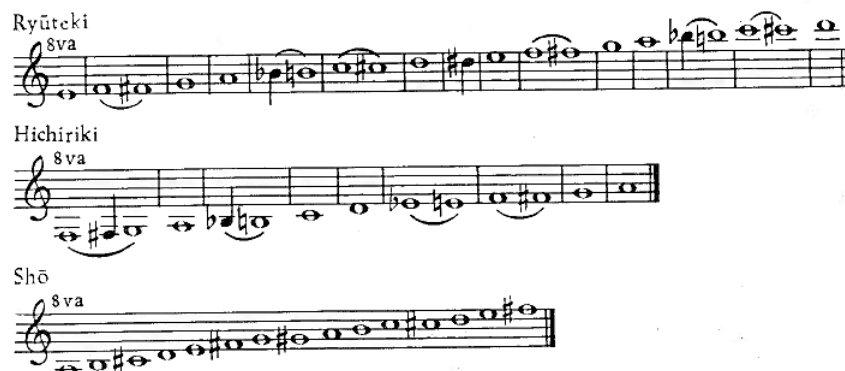
¹ Image sourced from <http://flickr.com/photos/nikkojazz/1407048183> retrieved 30/08/08

² Image sourced from <http://www.civilization.ca/tresors/immigration/im0297bf.html> retrieved 30/08/08

4. Composition

As mentioned above, the primary compositional material for *Fue Shō* is derived from the *Manzairaku ~ Derute* (Kohachiro, 1991; Ohno, 2005). The scales used in this kind of music are as follows:

The basic scales of the wind instruments are:



From this scale several chords can be derived such as:

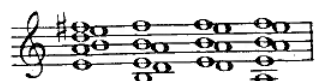


Figure 3 basic scales of wind instruments in Gagaku

The main melodic instrument in the modern version of the Music of the Left (*Togaku*) is the *Hichiriki* (see Figure 1), which produces a piercing tone. The flute (*Ryūteki* - see Figure 2) plays variations on the melody. The mouth organ, *Shō* gives to the music its harmonic support. The chords derived from the *Shō* scale are indicated in Figure 3. The root notes of these chords, E, B, D and A act as the harmonic anchors for *Fue Shō* as can be seen at section markers A, B, C and at the climax in bars 92-99, and the opening and final notes.

Ryōō Music of the Left (*Rinyugaku*) was originally written in the mode called *Sadachō* then transposed into the mode *Ichikotsuchō* during the Middle Ages. This piece is also called *Ran-Ryōō*, *Ra-Ryōō*, *Ryōō* and begins with a short musical spell, the *Koranjō*, performed on *Ryūteki*, *Shō*, and *Taiko*. The musical spell is represented in *Fue Shō* by the first 10 bars (see Figure 4), which introduces long held notes on the flute, that are gradually expanded using granular synthesis so that a rich drone grows from the introductory acoustic notes producing a rich timbral texture.



Figure 4 Introductory meditation from *Fue Shō*

In the traditional Japanese composition, the musical spell (*Koranjō*) is followed by an introduction, known as *Ranjo*. This accompanies the dancer from the music-tent, the *Gakuya* (used as a dressing room) to the dance stage. The *Ranjo* is in the form of a canon, and when performed in its entirety, develops into ever increasing contrapuntal virtuosity.

The *Ranjo* section of *Fue Shō* begins with the rhythmic figures introduced at 'A' initiating a lullaby like rocking whilst also encapsulating the Japanese principle of *elastic* or *breath*

rhythm discussed above and is the first time in the work that a more temporal structure is introduced (see Figure 4 and Figure 5).



Figure 5 Second theme in *Fue Shō*

Section 'B' of *Fue Shō* sees the introduction of the main melody which starts on a B natural (the 5th). I transcribed the melody from the *Manzairaku ~ Derute* performed by the Tokyo Gakuso (Ohno, 2005). The bending of pitches between notes is a feature of the style and is indicated in the *Fue Shō* score with the slide lines leading to the note.



Figure 6 Main melody from *Fue Shō* - transcribed from the *Manzairaku ~ Derute*(Ohno, 2005)

Bar 61, Section 'D' represents a diversion from the Japanese form as western harmonies are introduced, and the pitch material rises above the range previously used. This point is also marked by the second only use of the note middle *c*, which is absent from the *Shō* chords (see Figure 3). The Neapolitan 6th is used intentionally to produce tension between the Japanese modal qualities prevalent in the work up to this point and the cultural context of the composition (*Fue Shō*), the instruments being used (Concert Flute in C, with live electronic processing) and the composers background and training (Western art music and jazz).

This point in *Fue Shō* begins a final release of this cross-cultural tension with a false climax at bar 68, which immediately repents. Bar 75 sees a reduced ghosting of harmonic material from earlier in the work, leading into a frivolous dotted quotation of material from bar 42 before an intense climax (bar 84-88) around the notes *d, e, d*, two octaves above the opening bars and final bars of the work. The note *c#* is used here for the first and only time in *Fue Shō*, leading to the climax which establishes the high *e* as the 2nd of a western Dorian mode rather than the root of the Japanese mode. The western modality quickly dissolves again to resolve onto an *e, d, e* pattern, turning the cultural mirror around before settling finally on the *E* root of the Japanese mode in the bottom octave of the western concert flute, harking back to the musical spell of the first ten bars, derived from the *Koranjō*.

As Ohno explains (2005) early *Manzairaku* scores describe "nobeyahyoshi" (a rhythmic pattern in 8/4 time in 8-bar metrical units) "consisting of 20 metrical units"(2005). In general *Fue Shō* follows the pattern or 8-bar metrical units, but uses 4/4 time, with Section A appearing at bar 10, section B at bar 26, section C begins at bar 34 and D begins at bar 61. The fact that these sections are not marked by multiples of eight is a product more of the western scoring system accommodating the qualities of *elastic* or *breath rhythm* discussed above than a lack of observation of the 8-bar metrical unit. Section E, the real climax, begins at bar 82. This also represents the tension between the Japanese and Western musical influences at play here(Battier et al., 1995).

5. General Discussion about pitch material

Fue Shō is essentially in E minor, however it derives its pitch centre from the Japanese *Hyojo* mode, (tonic on *e*), illustrated by the traditional Shō chords in Figure 3 which contain the interval relationships documented in Figure 7 and Figure 8.

Key intervals used in *Fue Shō* include

e -- *g*

a -- *b natural*

c -- *d*

c -- *f* - one octave above the root of the hichiriki scale

f -- *g*

a -- down to *e* (the root)



Figure 7 the scale used for the flute in *Fue Shō* illustrating key intervals used in the work

It should be noted that the Sho scale includes a *g#* not found in either of the melodic instrument scales. Contrary to this, the Shō chords do not include *c* or *g* in any octave.

These pitches are used sparingly in *Fue Shō*, but mark important moments. For instance bar 13 introduces the phrase from section A transposed up a minor 3rd before its appearance up an octave in bar 16. This is an early hint at the multi-cultural tension inherent in the writing of a work of this nature. The note *g#* is only used immediately before a *g* natural, creating a falling pattern before rising to the *a* above (bars 35-36 and 65). It should be noted that the lowest note on the Shō is the A above middle C. The *a* above middle *c* is a pivotal point in the traditional Shō chords which share four notes across all chords, *e a b f#* representing the tonic, the subdominant and the dominant chords. It should also be noted in Kyma timeline for the live processing in *Fue Shō* (see Figure 9), that the intervallic relationships illustrated in Figure 8, are used to structure the pitch shift intervals in the processing.

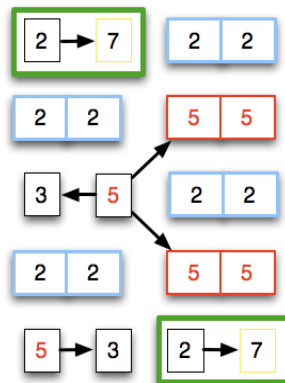


Figure 8 The intervals within the Sho chords

The range of the concert flute in *Fue Shō* begins a tone below the range of the *Hichiriki* and rises to the high *e*, half way through the range of the *Ryuteki*. The principle intervallic relationships used in the work are illustrated in Figure 7.

6. *Specific Electroacoustic Techniques used in Fue Shō*

Compositional considerations:

1. **Heterophony** - The melodic instruments in Gagaku generally play in a heterophony manner. However the elastic, breath rhythm technique produce small variations in the melodic line, generating a chorus like effect. This effect is applied in *Fue Shō* through the use of varying delays, repeating parts of phrases. The delays draw on separate four or eight second buffer recordings of the live flute (four buffers regularly refreshed at random intervals). Additionally the delay time is constantly varied, generating small variations in pitch. These variations are subtle, but are also randomised, again to introduce a sense of 'liveness' in the computer response to the incoming live flute part and engender the computer part with the quality of ensemble member. The overall effect is to produce a chorused effect
2. A **repeated accelerando phrase** is associated with the taiko drum part of the *Manzairaku*. This repeated pattern accelerates in the manner of a bouncing ball, seemingly freed from the temporal pulse. This characteristic is applied in *Fue Shō* through the repeated live recording of the flute into a four or eight second buffer. The playback of this buffer is then randomly altered so that the length of the replayed segment shortens, causing the loop time to shorten, creating a sense of accelerando. This technique results in a sound that also becomes more percussive as the loop time shortens and ends with a rapid acceleration towards a loop time of zero seconds, causing an effect that might be equated to the sound being sucked into a black hole, or simply imploding. The recording is triggered at semi-random times so that a sense of surprise and natural chaos is represented in the work. These subtle variations also generate a more active relationship between the performer and the electronic part, characterising the computer as an ensemble member.
3. **Pitch shifting** of the live flute notes occurs throughout the work. The pitch shifting generates a multipoint effect, illustrative of the Sho orchestra. The harmonic relationship is always within the chordal structure of the traditional Shō chords (see Figure 3) with the exception of the use of the Neapolitan 6th in section D, and the live transposition of the flute down two and three octaves in the first half of the work, generating a low frequency pedal point for the melodic and short staccato patterns occurring above.
4. **Fast Fourier Transform (FFT) manipulation** of the frequency content of the flute together with **granular synthesis** based reverb causing a smearing of the spectral content of the flute sound to broaden individual notes into spectral clouds, thickening the harmonic content of the largely monophonic flute. The FFT technique allows the flute sound to be divided into a number of frequency bands (bins in FFT parlance) – these bins essentially contain a measurement of the energy (the amplitude) of all the frequencies it

contains. An inverse FFT can then be done to re-synthesise the FFT bin as a sound. The beauty of this analysis and re-synthesis technique is that the temporal and pitch structures are un-coupled, allowing a pitch transposition without changing the temporal structure or a stretching or accelerating of the temporal structure of the recorded sample without changing the pitch. This technique is also used for the pitch shifting discussed above. An additional procedure applied in *Fue Shō* is to re-synthesise the analysis bins through a process where by their range is changed from that established for the analysis. This causes a smearing of the spectral information, altering the timbral quality of the recorded sound, and when then also processed through granular synthesis (a technique that smashes the sound into minute particles and then re-assembles those particles into a variation of the source – quite a fluid sculptural technique), the live flute sound produces a rich, evolving texture as accompaniment. This technique is used throughout the work to greater or lesser degrees and results in the sparkling, continuously changing textures that support the melodic line. These FFT, granulated lines also have longer temporal structures (they are stretched) and are fed into some of the pitch shifting and delay algorithms generating a variety of rhythmic and temporal structures rather than simple, immediate responses by the computer system to the live instrument sound. Once again this generates a more active relationship between the performer and the electronic part, characterising the computer as an ensemble member.

5. **Spatialisation** of the various layers of electronic processing over six or eight channels of loudspeakers within the performance space is done in order to envelop the audience within a reflective space, and ensure a lively and ever changing texture. The spatialisation surrounds the audience and so they become part of the work, part of the performance and actively engaged in experiencing the piece in a manner only possible in acoustic performance with antiphonal singing.

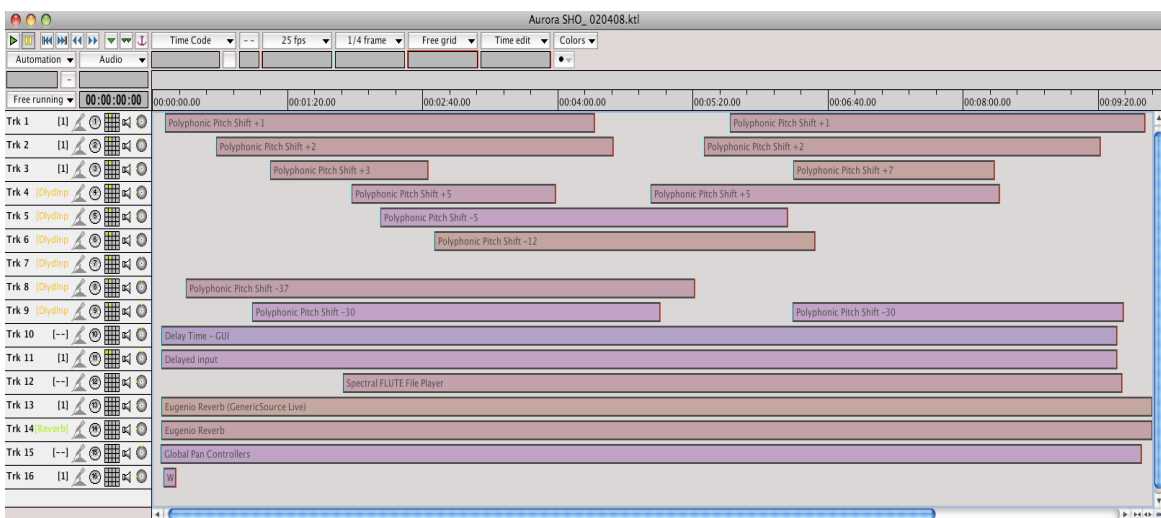


Figure 9 Kyma timeline for *Fue Shō*, showing encapsulated algorithms set for dynamic instantiation as the piece proceeds

7. Conclusion

Fue Shō represents a thorough re-interpretation of the *Manzairaku* within a western musical context and on a western concert flute. The work embodies both structural and aesthetic elements of the Gagaku tradition. As outlined above, the framework provided

by the *Manzairaku* had a profound impact of the development of both the structure of the work and the manner in which the flute material tends towards noise in overblown, spectrally rich moments. These moments represent both transitional inflections and moments of release and are always counterpoised against a thick harmonic texture derived from the traditional voicing of the Shō orchestra chords .

In general, I have found this to be a rewarding way to work, bringing together my interest in ancient Japanese music with my proficiency on the concert flute in C in a way that presents a composition rich in interest, reflecting the ancient whilst finding a fresh voice for the western concert flute.

8. Bibliography

- Battier, M., Nodaïra, I., Miwa, M., Fujieda, M., Takahashi, Y., Matsumoto, H. et al. (1995). *Innovation in contemporary Japanese composition* (Leonardo music journal CD series ; v. 5). Cambridge, MA: Leonardo.
- Battier, M., (2008) *L'oiseau de la capitale for Shakuhachi et électronique - Jean-François Lagrost, shakuhachi* (création mondiale, commande du GRM), Dimanche 8 juin 2008 Maison de Radio France , Salle Olivier Messiaen, Radio France, Paris
- Crowe, V. & De, F., Hugh. (1992). *Traditional music of Japan* (Australia's multicultural music ; 6). Pymble, NSW: Australia's Multicultural Music Series.
- Fineberg, J. (2000). *Spectral music : history and techniques*. Overseas Publishers Association, published by license under the Harwood Academic Publishers imprint.
- Harich-Schneider, E. (1960). *Shintō music* (A Musical anthology of the Orient ; 16 Music of Japan ; record 5 Unesco collection). Kassel: Musicaphon.
- Kishibe, S. (1969). *The traditional music of Japan* ([Rev. ed.] ed.). Tokyo: Kokusai Bunka Shinkokai.
- Kohachiro, M. (1991). *Shakuhachi - The Japanese Flute* : Nonesuch.
- Malm, W. P. (1996). *Music cultures of the Pacific, the Near East, and Asia* (3rd ed ed. Vol. Prentice-Hall history of music series). Upper Saddle River, N.J: Prentice Hall.
- Ohno (2005). *The Ongaku Masters, An Anthology of Japanese Classical Music: Celestial Harmonies*.
- Thompson, J. (2006). *Gagaku. On the Guqin Silk String Zither* Retrieved August 23, 2008, from <http://www.silkqin.com/11misc/gagaku.htm>