

Zheng's Musical Functionalities and Techniques: Implementing the Chinese Instrument into Western Music

Michael Sidney Timpson

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ABSTRACT

The purpose of this descriptive study is to provide a creative and practical guideline for western music composers when adopting the Chinese *GuZheng* as a performing medium. Although frequently attempted by non-Sinitic composers for the adoption into western compositions, *GuZheng's* mechanic uniqueness and performance practices post contrasting challenges from the adoption of western instruments.

This study summarizes these observed issues and potential solutions for these difficulties in the order of: (1) the construction of the instrument, especially as it is related to performance practice, (2) the designated performing duties of both hands, the instrument's temperament, and the manipulation of intonation and timbre, (3) ornamental practices in both traditional and extended techniques, and (4) the viable adaptations in Zheng for performing music in polyphony, chromaticism (including scordatura) and various Western music harmonic languages are discussed through their application. A comprehensive understanding in *Zheng's* construction, tradition, and performing techniques allows the western composer to create contemporary pieces that are still idiomatic in western harmonic style and contemporary sound.

Keywords: *GuZheng*, instrumental evolutions, performing techniques, traditional instrument, contemporary music

1. Introduction

The purpose of this descriptive study is to provide a creative and practical guideline for western music composers when adopting the Chinese *GuZheng* as a performing medium. The Chinese zither, known as the *GuZheng* (古筝) or more often, *Zheng*, is one of the most popular Chinese instruments in the world¹⁾; this accessibility has resulted in frequent attempts for utilizations by non-Sino composers. However, the philosophy supporting *Zheng*'s unique physical features and indefinite tuning potentials challenge these composers both technically and conceptually. Confirmed by the field studies in Taiwan sponsored by the Fulbright Fellowship in 2009 and over 15 years of personal composition research, the author systematically concludes the potential technical hindrances and solutions as well as conceptual differences and advantages of *Zheng* for Western composers who desire to write for this Chinese traditional instrument.

2. Overview of *Zheng*

(1) Construction

The modern *Zheng* is a long zither with 21 strings (figures 1 and 2). It evolved from 5 strings at the end of the Warring Period to the Eastern Han period, 12 strings in Qin and Han Dynasties, 13 strings in Tang and

1) Shengmiao and Samuel Wong, *Qi: An Instrumental Guide to the Chinese Orchestra* (Singapore: Teng, 2005), 69.

Song Dynasties, 14-16 strings in Ming and Qin Dynasties, to the best known 21 strings in 1970s²⁾. As for the material of strings, nylon or steel strings intertwined with nylon are the most common on the 21-string *Zheng*; silk strings are still observed on the 13-string *Zheng* in the region of Henan and Zhejiang or the 16-string ones in Jiangsu and Henan, while copper or steel strings are more frequently on the 15-18-string *Zheng* in the region consisting of Henan, Shandong, Fujian, Chaozhou and Guangdong. Each string is secured on the left (non-sounding inharmonic side) via an arched nut, stretched across a sound box and over movable bridges to a straight, bridge-like nut on the right (sounding tuned side), and continues into a closed-door cabinet, where it is attached to its designated tuning peg. This design suggests potentials on how both hands may play this instrument that will be explored later in the essay.

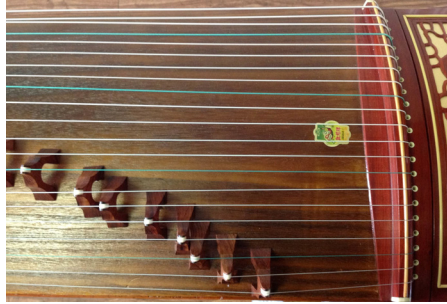
(Fig. 1)³⁾ Modern *Zheng*



2) Shengmiao and Wong, *Qi: An Instrumental Guide to the Chinese Orchestra*, 69.

3) *Collection of author* (Seoul), Personal photograph by author, April 2013.

(Fig. 2)⁴⁾ Modern *Zheng*



(2) The Primary Functions of Each Hand

In traditional *Zheng* performance, each hand has a distinctive role. The right hand has two primary roles: to activate the string to sound and determine its timbre. To initiate the sound, a performer plucks or strums the strings to the right of the bridges with the right hand (with artificial nails attached to the fingers); where each string is plucked may also determine the timbre. The primary role of the left hand is to alter intonation via pressing the portion of strings on the left side of the bridges. It may include the subtle vibratos as well as portamento, and the temporary modulation of any string from its tuned pitch.

(3) The Temperament: Tuning and Pitch

The conventional tuning of the 21-string *Zheng* (figure 3) may follow the D, G, or A anhemitonic pentatonic scales⁵⁾. Depending on the length

4) *Collection of author* (Seoul), Personal photograph by author, April 2013.

5) Der-Tiau Hu, *Ming-Tzu Guan-Hsuan Yue-Fa* [The Ethno-Orchestration], (Shanghai:

of rests during the performance, a performer may move the bridges either on one string (i.e., changing an F# string to G when with only a few measures of break) or strings of all four octaves (when with the break equivalent to several music phrases) between these temperament systems for the needs of the piece. The fact that the left hand is free to modify intonations of each string through bending (figure 4) allows more pitches than ones in the aforementioned pentatonic temperaments to be generated. Strings within the higher three octaves may be raised up to a minor third. Due to the thickness the strings, pitches in the bottom octave may only be raised up to a major second. The lowest two strings are not usually altered in pitch via bending as they are too far for the performer to manipulate via the left hand while sitting down for performance.

(Figure 3) Tuning of the 21-string *Zheng*

Traditional Tuning of the 21-string *Zheng*

The image displays four systems of musical notation, each representing a different tuning of the 21-string *Zheng*. Each system consists of a treble clef staff and a bass clef staff. The notes are represented by circles with stems, indicating pitch and rhythm. Brackets and labels indicate the number of strings used for each scale.

- System 1:** Labeled "D anhemitonic pentatonic" and "13-string". The treble staff shows a scale starting on D4, and the bass staff shows a scale starting on D3. A bracket under the bass staff indicates the first 13 strings.
- System 2:** Labeled "G anhemitonic pentatonic" and "13-string". The treble staff shows a scale starting on G4, and the bass staff shows a scale starting on G3. A bracket under the bass staff indicates the first 13 strings.
- System 3:** Labeled "A anhemitonic pentatonic" and "13-string". The treble staff shows a scale starting on A4, and the bass staff shows a scale starting on A3. A bracket under the bass staff indicates the first 13 strings.
- System 4:** Labeled "26-string (D anhemitonic pentatonic)". The treble staff shows a scale starting on D4, and the bass staff shows a scale starting on D3. A bracket under the bass staff indicates all 26 strings.

Bending the strings fills in all the chromatic gaps in the tuning, thus, *Zheng* is capable of producing any of the 12 equal-tempered pitches except when the left hand has to pluck the strings to the right of the bridges instead for the sake of homophony or counterpoint. The challenge, however, is the player's ability of pinpointing the desired pitches modulated from the open tuning without compromising the

intonation, especially when playing consecutive pitches on pressed strings.

(Figure 4) Tuning of the 21-string *Zheng*

Bending Range for Traditional Tuning of the 21-string *Zheng*

The image displays two musical staves, each representing a different tuning of the 21-string *Zheng*. The top staff is labeled "D anahemitonic pentatonic" and the bottom staff is labeled "G anahemitonic pentatonic". Both staves are written in a grand staff format, with a treble clef on the upper line and a bass clef on the lower line. The notation consists of a sequence of notes, primarily half notes and quarter notes, with some notes marked with a sharp sign (#). The notes are arranged in a way that suggests a specific melodic line or scale. The D tuning starts on a higher pitch than the G tuning, reflecting the difference in their respective tonic notes.

3. Musical and Technical Characteristics of *Zheng*

(1) Manipulation of Intonation and Timbre

The manipulation of intonation and timbre (Table 1) on the *Zheng* is an essential feature of traditional performance⁶); viewing the musical instruments as an extension of human voice and expression, the variability in intonation and timbre instead of the emphasis on consistency/absoluteness of those in Western music is the normal

6) Yuan-Yuan Lee and Sin-Yan Shen, *Chinese Musical Instruments* (Chinese Music Society of North America, 1999), 122.

expectation in Chinese music. Two essential pitch altering effects by the left hand include⁷⁾: (a) various manners of vibratos to any given pitch, and (b) grace-note-like *portamenti*, which slide between two designated pitches, to the melodies. These effects may be produced on either open or pressed strings. The composer would utilize the *portamenti* and vibratos not only for the stylistic but also 'camouflage' purposes to allow performers the opportunities for finding the targeted pitch during the string bending process.

{Table 1} Summary of standard techniques on *Zheng*

	left hand	right hand
plucking	'flesh' pizzicato	nails (thumb-ring fingers) or flesh (via pinky) pizzicato pushing or pulling - location: center (standard), close to bridge, close to nut tremolo - normal (alternating push-pull) - rolled (alternating fingers) glissando
pressing/ touching	harmonics muting/damping modulating intonation - vibrato - portamento	harmonics

In terms of timbre alternations, the right hand of a *Zheng* performer does more than plucking the string with the artificial nails. Historically, the manner for how each string should be played (ex. fingerings: thumb,

7) Sin-Yan Shen, *Chinese Music and Orchestration: A Primer on Principles and Practice* (Chinese Music Society of North America, 2005), 153-154.

index, middle, or ring finger; plucking directions: pulling or pushing the string) to fulfilling the designated acoustic effects of a piece had been always indicated along with the notation⁸⁾. The modern composer, however, does not typically notate in such details, as most commissioned performers are competent in determining the most suitable technical practicality of this inherent subtlety, except for where on the string to be played for a specific timbre. For example, instead of strumming at the center of a string, plucking the string either near the bridge to emphasize the higher spectral overtones or near the nut on the right end to suppress those overtones creates similar acoustic effects like *sul ponticello* and *sul tasto*, respectively, on violins. Plucking a string from one end to the other continuously demonstrates the gradation of timbres *Zheng* is capable of producing in a temporal manner. In addition to agitating the strings with the artificial nails, the performer may also create the gentler and less bright pizzicato sound with the flesh of the pinky (the only finger without an artificial nail attached). The notation for this is a plus '+' symbol over the note, the same as that for a 'left hand pizzicato' on the violin.

Fingers of the left hand may help generate the timbre of flesh pizzicato too, especially when a passage requires a rapid succession of notes that is impossible to be accomplished by the right hand alone. As a result of bringing the left hand to the right side of the bridges, the left hand would then be unable to manipulate intonation. Two other better known timbre altering functions by the left hand are: (a) muting a string by touching the top of the bridge, and (b) dampening the strings from

8) Guan-Zhen Liang and Yuong-Wei Pan ed., *Yue-Chi Fa Shiou-Sher* [Handbook of Orchestration] (Taipei: Shih-Gieh Wen-Hua Publisher, 1994), 86-87.

ringing.

(2) Harmonics

Like most zithers, up to three octaves of harmonics is achievable for each string on the *Zheng*, although only the overtones within an octave to 12th would be utilized in most performances. These harmonics may be generated either by (a) the two-handed method: when left hand touches the appropriate node while the right hand plucks the string, or (b) the single-hand method: when the right hand alone touches the node with the side of the palm and plucks the string simultaneously. Although the two-handed method is more common and preferred due to its more effective and consistent results in generating the overtones, including the harmonic glissando, it is limited to applying only on the open strings. The single-handed method is favored primarily when the performer plays a harmonic on a pressed string or when the left hand is actively plucking the contrapuntal melodies to that of the right hand.

(3) Glissando

A distinction should be explained between two distinctive acoustic effects, portamento and glissando, on the *Zheng*. Portamento is performed by bending a string between two pitches smoothly like a pitch slide on the trombone or violin; a glissando is to rapidly draw the finger across several consecutive strings, thus resulting in glissando known on fixed-pitch instruments such as the piano, harp, or marimba. Traditionally, glissando is applied to ornamentally connect disjunctive

melodic intervals, to create grace notes, or to produce the most dramatic dynamic on the instrument when freely sliding back and forth through all strings on the instrument (like harp glissando.)

(4) Tremolo

Tremolos may be performed either by a finger or multiple fingers of the right hand on the *Zheng*. When a medium to loud dynamic is desired and it is notated as the typical western tremolo, a performer moves one finger (normally the thumb or the index finger) back and forth over the string in rapid succession. The performer may also freely manipulate the intonation and timbre of this tremolo on one or over several consecutive strings. The multi-fingered tremolo requires a player to strike a string with all digits progressively (thumb-index-middle-ring-thumb-index, etc.) in a rapid succession. This multi-fingered roll, which is frequently performed by the *pipa* (Chinese lute) player or western classical guitarist, is only capable of producing soft dynamics and on one string at a time.

4. Historical and Theoretical Function of the *Zheng* in Western Music

The physical structures of Chinese musical instruments that reflect the Buddhist/Taoist/Confucius philosophical principles via the flexibility and variability of timbres and intonations⁹⁾ carry different capabilities in

9) Haiqiong Deng, "Musical Change and Continuity of Huayin: The Essence of Chinese

meeting the demands of consistent and precise intonation in Western music. The *Zheng's* initial use in 'Western style' music was with the establishment of the Chinese Orchestra in the 19th-Century. The Chinese Orchestra attempts to adopt not only the western orchestration, doubling the same part via multiple Chinese instruments, but also the equal temperament and harmonic structures of Western music: ex. triadic harmony, chordal progressions, and tonal modulation schemes. Unfortunately, the physical structure of *Zheng* does not easily adapt to this style of music. Musical illustrations in Figure 5 summarize its requirements in pitch alternation either by pressing strings or repositioning bridges for the modulation and secondary tonicization. As evidenced, modulating to further distant keys on *Zheng* is unpractical, if not impossible¹⁰⁾, which also limits the significance of *Zheng* in the Chinese orchestra.

Zheng Music," Master Thesis (Florida State University, 2006).

10) Shengmiao and Wong, *Qi: An Instrumental Guide to the Chinese Orchestra*, 71.

(Figure 5) Summary of required pitch alternation on *Zheng*

G anhemitonic pentatonic

Ab (6) A (3)

Bb (4) B (5)

C (3) Db (7)

D (2) Eb (5)

E (4) F (3)

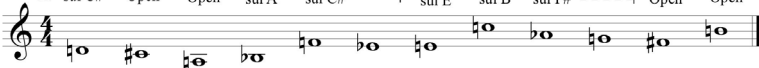
F# (5) G (2)

The early 20th century western music provided the *Zheng* another platform for demonstrating its potentials as a performing medium. The modally based music in impressionism, exoticism, and primitivism complimented the *Zheng*'s idioms. The atonal, expressionist, and serial compositions in the 20th century and beyond are easier for the *Zheng* performer to master, such as when adapting a tuning suggestion for a well-known 12-tone row (from Schoenberg's 2nd String Quartet) in figure


6. Above this figure's first staff shows how such a row could be played by the three common pentatonic tunings: D (top), G (middle) and A (bottom.) Compared with the efforts to modulate to some "distant" diatonic tonalities as aforementioned (figure 5,) music in the 12-tone system that sets every other note on an open string is much more manageable. The second staff of figure 6 demonstrates one of the known characteristics of 20th Century music, "octave-displacement;" using this method the 12-tone row is even easier to be accomplished by a *Zheng* in a *scordatura* setting shown in third staff. Late 20th century contemporary music styles, such as electronic music, sound mass, spectral music, and eclecticism, creates increasing demands on timbre that may be better fulfilled by the flexible natures of Chinese music instruments in intonations and timbres, thus, allowing the *Zheng* to be genuine to its most instinctive and idiomatic nature.

(Figure 6) 12-tone performance and tuning chart on *Zheng*

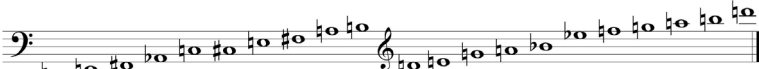
D:	Open	sul B	Open	-sul A	sul D	-----	sul E	sul B	sul F#	-----	Open	Open
G:	Open	sul B	Open	-sul A	sul D	-----	sul E	sul B	sul G	--Open	sul E	Open
A:	sul C#	Open	Open	-sul A	sul C#	-----	sul E	sul B	sul F#	-----	Open	Open



Playing the row using any of the three standard tunings (above.)



Playing the row with "octave-displacement" (above) using scordatura tuning (below.)



5. Technical and Tuning Adaptations for the 20th and 21th Century Music

(1) Polyphonic Techniques

During the Twentieth-Century, the modern *Zheng* began to adapt some Western musical elements, such as playing chords or counterpoint. Although the right hand can alone approximately arpeggiate over two octaves, many western musical textures will require the use of the left hand due to their technical demands. This creates challenges to both the composers and performers. In addition to the loss of manipulating the intonation on strings, that is, the performer could only play pitches produced by open strings, there is an inconsistency in timbres between the fresh pizzicatos by the left hand due to the fact that the fingers do not normally wear nails, and those by the fingers of in the right hand with the artificial nails. Many advanced performers would thus weigh the pros and cons of wearing nails on the left hand fingers in polyphonic music. To achieve the evenness of timbres between both hands by wearing nails on the left hand, the performer would now have more difficulties in accurately modulating pitches of open strings with the flesh on the left fingertips without the artificial nails being in the way; it would also become increasingly challenging especially in depressing consecutive open strings. For more accessible chromatic counterpoints, many modern *Zheng* compositions may require *scordatura* tunings.

(2) *Scordatura*

The *scordatura*, or the alternative tuning from the traditional anhemitonic pentatonic temperament, is permissible although not idiomatic. The decision for *scordatura* should be carefully considered for its level of difference in pitch alternation, purpose, and other pros and cons. For instance, retuning one to three strings is a reasonable compromise for a performer to facilitate as a good remedy for chromaticism in a limited range. Tuning it to another parallel anhemitonic pentatonic temperament (such as E^b or C) is also very reasonable to the performer. However, it is a drastic change in tuning, from the conventional pentatonic to an entirely chromatic tuning, that may be the most appealing as well as practical to many contemporary composers.

When adapting the chromatic *scordatura*, there are three variables a composer should accommodate. First, one should allow the performer additional practice time prior to the performance. Playing outside the traditional tuning is very awkward to any *Zheng* performers (especially those with perfect pitch.) While a professional may virtually sight-read a work in traditional tuning, a drastically altered tuning (especially in a virtuoso context) will take many weeks learn. Pieces in extreme *scordatura* would be more accomplishable by the advanced, experienced player.

Second, the altered acoustic effects of the *scordatura* on a *Zheng* should be carefully assessed and incorporated into the composition. The strings in traditional tuning create the resonance consisting of the already familiar harmonic series to the audience. The alternative tuning, as resulted, produces another acoustical hierarchy different from what is expected.

Scordatura would also increase the demands in concert setup and programming. It may take more than 15 minutes to retune a *Zheng* to *scordatura* and allow the bridges to set. To program two consecutive pieces requiring different tunings, one should prepare for another *Zheng* tuned in *scordatura* or program one piece before the intermission then another piece after the intermission.

Figure 7 samples various *scordatura* tunings in selected compositions by the author. These show some various, from slight to great, possibilities that may be adopted by the contemporary western composers. Each tuning is compared to the G pentatonic temperament for showing how each string should be either raised or lowered in number of semitones.

The first example, *Sizhu-ations*, requires only minor adjustment to only two strings. This type of tunings is very easy for nearly any level of player to accommodate. The second example, *Quintet for Zheng and Strings*, retunes several strings by no more than a whole-step, with most of the alterations being just a half step. Since most of the notes are tuned very closely to their original position, it is considerably easy to learn. Within this tuning is an embedded 'cycle of fifths' meant to create sympathetic harmonic overtones in the tuning. The third example, *CRUSH*, is more drastic, with nearly every string retuned, many by a minor or major third. This is a representation of typical chromatic *scordatura*, where the tuning itself provides for the harmonic flavor, in this case a 'blues' type of sonority, of the composition. The fourth and final example, *Chasin' Bill*, is an extreme version of *scordatura*; some of the tones have been altered as much by a perfect fourth or fifth. This very unusual example is never less possible and allow playing close chromatic notes in chordal movement with ease.

(Figure 7)

1. Michael Sidney Timpson, *Sizhu-ations, mvt. II* (2012)

Musical notation for 'Sizhu-ations, mvt. II' (2012). The score is in G major and 4/4 time. The right hand (treble clef) plays a sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5, with fret numbers -2, -2, and 0 above the notes. The left hand (bass clef) plays a sequence of notes: G2, A2, B2, C3, D3, E3, F3, G3.

2. Michael Sidney Timpson, *Quintet for Zheng and Strings* (2012)

Musical notation for 'Quintet for Zheng and Strings' (2012). The score is in G major and 4/4 time. The right hand (treble clef) plays a sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5, with fret numbers +2, +1, +1, +1, +1, +1, -1, -1, +2 above the notes. The left hand (bass clef) plays a sequence of notes: G2, A2, B2, C3, D3, E3, F3, G3, with fret numbers -2, -1, -1, +1 above the notes.

3. Michael Sidney Timpson, *CRUSH* (2003)

Musical notation for 'CRUSH' (2003). The score is in G major and 4/4 time. The right hand (treble clef) plays a sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5, with fret numbers -2, -2, -3, -2, -1, +1, +2, +1, +1 above the notes. The left hand (bass clef) plays a sequence of notes: G2, A2, B2, C3, D3, E3, F3, G3, with fret numbers -2, -1, -2, -2, -1, -3, -3, -3, -4 above the notes.

4. Michael Sidney Timpson, *Chasin' Bill* (2000)

Musical notation for 'Chasin' Bill' (2000). The score is in G major and 4/4 time. The right hand (treble clef) plays a sequence of notes: G4, A4, B4, C5, D5, E5, F5, G5, with fret numbers +7, +6, +5, +3, +2, -1, -2, -3, -4, -3, -3, +2 above the notes. The left hand (bass clef) plays a sequence of notes: G2, A2, B2, C3, D3, E3, F3, G3, with fret numbers -3, +1, +1, +1, +1, +4, +7 above the notes.

(3) Playing on the Left Side of the Bridges

In contrary to the normal sounds that playing on the right side of bridge may produce, a performer can play on the left side for several special effects. The inharmonic tones to the open strings produced on the left side of bridge are a close series of microtonal frequencies in the

same range. When playing the glissando on the left side, it effectively produces a distinctive otherworldly ‘moan’ unheard of on any other musical instrument.

(4) Extended Techniques

Additional extended techniques, such as using a bow, a wood dowel, or playing the instrument percussively, may be applied to the *Zheng* (Table 2). Playing with a cello or bass bow is the most effective approach for producing *arco*. Notice that individual pitches can only be achieved on the outer strings when bowed; the inner strings are so close in distance that the glissando is what they are more capable of producing. *Zheng* strings may be also struck with a wooden dowel (such as a chopstick) for a unique timbre as well as simultaneous overtones—a method which produces a ‘flanging’ effect while repeatedly striking the string from side to side.

(Table 2) Summary of extended techniques on *Zheng*

TECHNIQUE	QUALITY	LIMITATIONS	NOTES
Playing with large bow	Arco	Only outer strings can play single note; full range can only perform glissando (as strings are too close together)	With extra pressure, brings out harmonics.
Hitting or dragging wood stick across string sideways	Flanging effect	Must grab stick; possible damage to strings	May be done as tremolo between two strings

TECHNIQUE	QUALITY	LIMITATIONS	NOTES
Pressing on same side of string with Tuning Wrench while playing	Large-range and strange sounding portamenti	Must grab wrench: possible damage to strings. Easy to rub neighboring strings accidentally.	Works best while playing on left side of strings (indefinite pitch.)
Hitting body of instrument with palm or nails	percussive	Must move hands out of playing position.	Several sounds are possible by hitting different locations (under body, on side, on peg cabinet)
Pinching and Pulling a string between the fingers	Scraping	Must move hand into position: slightly painful	Slightly soft: best if done with two hands (different strings) simultaneously
Dragging nails across strings to right of nut	Scratching: guiro-like	Relatively soft	Easy to access, since it is close to playing position
Dragging nails across tuning pegs	Scratching: with harmonic resonance of strings	Need to open peg cabinet	Opening and closing peg cabinet can be noisy (see next)
Opening and shutting tuning peg cabinet	Causes sympathetic vibrations of strings	Takes time to do	Similar to shutting the keyboard cover on a piano with the pedal down.

A *Zheng* is also capable of producing several ‘percussive’ sounds. A performer may strike various places on the body either by the palms or the nails. Pinching any string between two fingers and dragging down its length produces a ‘scraping’ quality. Dragging the nails against the strings along the other side of the nut produces a ‘scratching’ guiro-like quality. Another louder, ‘scratching’ sound can be produced using nails on the tuning pegs, which requires opening the tuning peg cabinet to

perform the effect. Finally, the action of opening and closing the tuning peg cabinet door causes the strings to resonate, which sounds similar to the acoustic effect as results of stepping down the damper pedal while closing the lid over the keyboard on a piano.

(5) *Zheng* Variants

While the 21-string *Zheng* is the standard nowadays, there are several other existing variants as aforementioned (Figure 5). Earlier versions of the instrument had fewer strings, most commonly 16 (reducing the range to three octaves.) A modern 26-string instrument is also available. This version extends the range another octave and has a warmer sound due to its expanded body and sympathetic resonance. Composers may find the additional strings on the larger instrument useful for *scordatura*, but should be aware of its limited availability to most performers and its impact to future performances (a *scordatura* tuning on a 26-string *Zheng* is difficult or impossible to be adapted onto a 21-string one). In addition to that of 16, 21, and 26 strings, *Zheng* have also been made in 12, 13, 17, 18, 23, 25 and 28 string combinations.¹¹⁾ Some *Zheng* use silk or purely steel strings instead of nylon-woven. Silk strings were the original (12 and 13-string) design and are much softer and have shorter resonance duration. The steel string variety has a timbre closer to that of the Chinese *yangqin* (hammered dulcimer) and much longer resonant duration.

11) Duong-Sheng Liu ed., *Zhong-Guo Yue-Chi Tu-Chan* [The Pictorial Guide of Chinese Instruments] (Shang-Dong Giao-Yu Publisher, 1995), 201-205.

(Figure 5)¹²⁾ 18-string (steel), 21-string and 26-string



6. Conclusion

When composing for the *Zheng*, it is important to musically reflect the essential differences between Western and Chinese music. The precision in pitch is prioritized above any other musical essences in the Western music. In fact, the design of Western instruments intends to guarantee accurate intonations in the equal temperament with a consistent timbre across all registers. For the *Zheng*, both the design and performance techniques encourage flexibilities in intonations and the variability in timbres. *Zheng* was originally intended to perform monophonic music with an emphasis on the sound variability; playing chords, counterpoint in a polyphonic composition, and/or ones tuned in

12) *Collection of Haiqiong Deng* (Tallahassee, FL), Personal photograph by author, September 2009.

chromatic-based *scordatura* require additional adaptations and exceptional techniques beyond its original design and performing concept. Playing pitches excluded from the standard anhemitonic pentatonic scales is not natural to a traditionally trained *Zheng* performer in contrary to ones accustomed to the common chromatic equality of western instruments' mechanisms. To achieve any western musical effects on *Zheng*, it would be more effective to focus on highlighting the instrument's intrinsic nuanced possibilities in intonation and timbre s¹³⁾ and require the least amount of modification in tuning or fingering.

13) Information for this article was partly derived from interviews with *Zheng* players Juan-Reng Yeh, Ya-Hsiu Lin and I-Hsien Lin (Chai Found Music Workshop, Taiwan), Chihchun Chi-sun Lee (Composer-in-residence of Chai Found Music Workshop) and Haiqiong Deng (Chinese Ensemble director/visiting professor at Florida State University).

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개요

쟁(箏)의 음악적 기능과 연주법 서양음악을 위한 중국 악기의 활용

마이클 시드니 톰슨

본 논문은 중국 악기 ‘고쟁’을 위한 곡을 쓰는 작곡가들에게 창의적이고도 실용적인 가이드라인을 제공하는 것을 목적으로 한다. 중국인이 아닌 작곡가들이 고쟁을 작품에 도입하는 경우가 빈번한데, 고쟁의 기술적 특성으로 인해 다른 서양악기들과의 합주에서 튀어나거나 대조되는 것을 듣게 된다. 본 연구는 이러한 문제들에 대해 관찰한 내용들과 이에 대한 잠정적 해결책을 정리하였으며, 특히 1)고쟁의 구조, 특히 연주 실제와 관련이 있는 구조, 2)두 손으로 연주하기, 악기의 성질, 조율 및 음색, 3)전통음악과 확대된 장식음을 넣는 테크닉, 4)다성음악, 반음계주의(스코르다투라 포함), 또는 다양한 화성 어법을 연주하기 위해 효과적으로 쟁을 사용하는 방법 등을 논하였다.

쟁의 구조, 전통, 그리고 연주기법에 대한 전반적인 이해가 수반될 경우, 서양의 작곡가들이 현대 음악 안에서 화성양식과 현대적 음향 안에서도 자연스럽게 쟁을 사용할 수 있게 될 것이다.

주제어: 고쟁(古箏), 악기개량, 연주기술, 전통악기, 현대음악

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