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The Development of Guzheng Tuning

Xin Yue Li

THE DEVELOPMENT OF GUZHENG TUNING

A Master Thesis

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Master of Music

By

Xinyue Li

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ABSTRACT

The g*uzheng* is a musical instrument that has existed for about 2500 years, since the period between 770 and 476 BCE. The tuning of the *guzheng* is the foundation that influences how its music performed. It plays a decisive role not only in musical creation, but also in musical skills and applications. It also affects the sustainability of the g*uzheng*'s art. By analyzing the traditions and the developments of the tuning of the *guzheng*, this thesis will inform the reader about how the various tunings of the *guzheng* have influenced its development. In addition, this thesis will deeply explore the causes that made the *guzheng* develop and spread from generation to generation, and search for the reasons for its continuing influence on Chinese culture.

KEYWORDS: guzheng, tuning, China, music, instruments

This abstract is approved as to form and content

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Dr. John S. Prescott

Chairperson, Advisory Committee

Missouri State University

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INTRODUCTION

The g*uzheng,* a Chinese tradition instrument, has existed for about 2500 years, since the period between 770 and 476 BCE. The g*uzheng* gradually became popular during the *Qin, Zhao*, and *Qi* states during the Warring States Period (475-221 BCE), and among those it was most popular in the *Qin* state (Yusong, 2011). An article, *The Admonition against Ordering Guests to Leave*, which is from *Shi Ji*: *The Biography of Si Li* described the *guzheng* in the following way. "Tapping water tanks and drums, playing dominoes and the *guzheng* of the Qin, then singing and cheering, the sound as piercing as the wind blowing, making people's ears and eyes enjoy it --that's the real music of *Qin*" (Yusong, 2011). In addition, there are many references to the *guzheng* in other books. For instance, the scenes of people playing the Chinese harps and *guzheng*s are described in *Strategies of the Warring States· Qi's Strategies*. "The musical sounds that the Qin's g*uzheng* plays are like the harmonious sounds of the *Qi*'s harps." The history of the *Han* Dynasty (202-220) mentioned that traditional customs and *guzheng*s were performed at private parties. Above all, the articles illustrated that the g*uzheng* earned great favor and praised in the North of China in ancient times. It had become a very popular plucked string instrument at that time. It is not clear, however, how the *guzheng* could remain so popular for over 2000 years. There must be some profound reason behind it.

During its long history, the *guzheng* has played an accompanying role for traditional opera in civil society, but the type of performance that the *guzheng* manifested

was essentially different in various places: either it played in the traditional classical style, or it played folk tunes in the Chinese music ensemble. The social status of the *guzheng* caused the role it played in society to change from age to age (Zaisheng, 2006).

Before the establishment of New China in 1949, the *guzheng* was a folk instrument that had no unified specifications. The materials, shape, structure and the number of strings of *guzheng* were not constant, and the differences depended on different people and different places. For example, the wood used in making a *guzheng* could be candlenut and catalpa; the structure of the *guzheng* according to sizes could be classified as *Chang Li* and *Hong Zheng* (See appendix); the form of placement could be classified as *Heng Zheng, Wo Zheng* (See appendix); and the number of the *guzheng*'s strings could range from five to fifteen (Zaisheng, 2006). After the establishment of New China, Chinese traditional music underwent unparalleled prosperity and development under the support and advocacy of the Communist Party and the Chinese government. Then the *guzheng* began to get significant attention and become an independent folk instrument in professional art institutes (Zaisheng, 2006). Therefore, the social status of the artists who originally worked in traditional musical activities improved, changing their impoverished live, and they became critical pillars of the composition, performance, and teaching of *guzheng* music in this era. All of this created conditions for innovation and development of the compositions for the *guzheng*.

At present, the development of the *guzheng* is gradually moving toward a more scientific path. After a long period of innovation, the current type of *guzheng* is mainly

dominated by twenty-one strings and is tuned using the pentatonic mode. In fact, the tuning of the *guzheng* is the foundation that affects how its music perform. It plays a decisive role not only in musical creation, but also in musical skills and applications. It also affects the sustainability of the g*uzheng*'s art. This thesis designs to research the origination of the *guzheng*'s tuning and its background. First, it reviews the tuning of the *guzheng* before the 1960's, and explores the traditional tuning method of the *guzheng*. Then it explores the reform of the *guzheng*'s tuning in 1970's and 1980's, and the wide range of development and evolution of its tuning since the 1990's. Therefore, the thesis expounds on the existing merits of the tuning methods and the ideas involved with the development of the *guzheng*. In addition, by analyzing the traditions and the developments of the tuning of the *guzheng*, the thesis will inform the reader about the necessities and issues of the tuning of the *guzheng* in its developing progress. Finally, this thesis will explore the causes that made the *guzheng* develop and spread from generation to generation, and speculate about the reasons for its effect on Chinese culture.

THE TUNING OF THE GUZHENG BEFORE THE 1960'S

As the basis of the *guzheng*'s tonality, tuning plays a crucial role in its basic style, timbre, gamut, playing skills and styles of composition. In the process of long historical development, because of the effects of people's habits for music enjoyment, aesthetic ways and social environment, the *guzheng* developed different tuning methods in different historical stages.

Documentary Records of Guzheng's Tuning in Different Historical Periods

According to historical documents, there were five strings on the original structure of the *guzheng*, which was referred in *The Fengsu Tong*[1] (Yanzhou, 2004). In addition, a five-string musical instrument was unearthed at the royal tombs of the early Western *Han* dynasty (202 BCE-8) in Changsha, Hunan province, in 1993, and it has been verified to be a five-string *guzheng* by many authorities (Yibing, 1993). Therefore, this discovery reinforced the records in the historical documents that mentioned that the number of the original *guzheng*'s strings was five. The five-string *guzheng* was tuned to five pitches, which are named *Gong*, *Shang*, *Jue*, *Zhi*, *Yu*, and they correspond to dol, re, mi, sol, la in western tuning. However, the original structure was destined to change.

[1] *Fengsu Tong*, <风俗通>, an ancient Chinese book, which could literally translate to *The Custom.*

The structure of the *guzheng* changed in the *Qin* dynasty (221-207 BCE). According to S*ui Shu· Yinyue Zhi*[2]*,* the thirteen-string *guzheng* is the *Qin*'s music, which was created by Tian Meng (Yibing, 1993). There is another record from *Qing* dynasty (1616-1912) literature indicating "the *zheng* has thirteen strings, and is made of bamboo. Tian Meng changed the strings from five to twelve in the *Qin* dynasty. The structure is like the *se*[3], and the material is changed to wood. The strings were changed to thirteen after the *Tang* Dynasty (618-907) (Yibing, 1993)." This record shows that the numbers of *guzheng*'s strings were twelve and thirteen. Then as the development of the *guzhen*g continued, more people began to play it. Particularly in the Eastern Han dynasty (25-220), the innovated *guzheng* that had twelve and thirteen strings demonstrated the extraordinary advantages. Meanwhile, the *Qing Shang* music that was evolved from *Xianghe* opera made the Silk Orchestra more and more developed. Therefore, the requirements of instruments in the orchestra were more and more strict (Yusong, 2011). At this time, the Chinese flute and *guzheng* replaced the twelve-string *guzheng*, and the thirteen-string *guzheng* superseded the five-string *guzheng*, but it is important to point out that the five-string *guzheng* did not just disappear (Yusong, 2011).

The g*uzheng* entered a new era with the rising of *Xianghe* opera in the west during the *Han* period (202-220). "Six feet long, a round top and flat body with twelve strings and high bridges, generally played with bones instead of the real nails, and the music is beautiful." The *guzheng* during that period compared with the seven-string

[2] S*ui Shu· Yinyue Zhi*, <隋书, 音乐志>, The Book of Sui and its musical record. *Tang* dynasty.
[3] *Se* is an ancient plucked instrument but wider than *zheng.*

Zheng. Its sound was more vibrant, and compared with the *se*, it was more portable. Thus, the *guzheng* had become the people's favorite instrument.

THE TUNING OF THE GUZHENG FROM THE 1970'S TO THE 1980'S

After the founding of People's Republic of China in 1949, the structure of the *guzheng* underwent several changes. The number of strings increased from thirteen or sixteen to twenty-one or twenty-five, and the material used for the strings became wire twined with silk instead of just silk. These developments improved the timbre, increased the range of the *guzheng* and enriched its performance capabilities. "Chinese traditional music had a great revitalization and development with the government's strong advocacy and support (Yanzhou, 2004)." At the same time, *guzheng* music came into a new era, and the promotion of new techniques and methods of artistic expression were a big step. For example, it became possible for many folk pieces to be arranged and published, a variety of professional *guzheng* groups held shows throughout the country, and the *guzheng* became a professional music education instrument in the universities. Therefore, a large number of works were written or rearranged (Rongkun, 2008).

Throughout the development of the *guzheng's* structure and the increasing of the number of strings, there were five-string *guzhengs*, nine-string *guzhengs* and thirteen-string *guzhengs*. However, it was recorded that the structure of the *guzheng* was like a

club, or the combination of the two opened halves of a piece of bamboo. Nowadays, the *guzheng* normally has twenty-one strings.

The traditional tuning method of the *guzheng* involves the pentatonic scale (see Figure 1), and uses *Gong, Shang, Jue, Zhi* and *Yu* to show the degrees in the scale (Yingshi, 2004). If the *Gong* is D, which means the D is the first scale degree, then the scale consists of the western notes D, E, F#, A and B in all octaves available to the *guzheng*.

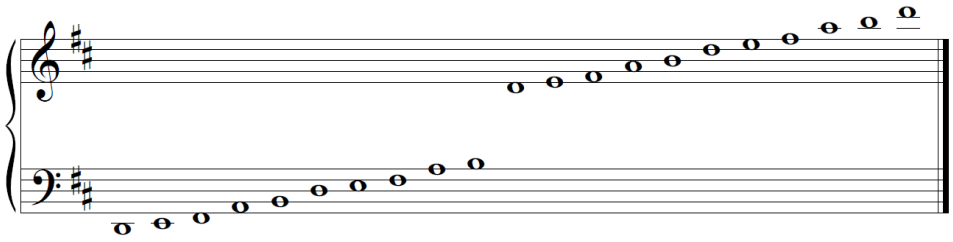

Figure 1. D pentatonic scale

As with patterns of black and white keys on the piano, the performer is assisted in navigation of the *guzheng* by one string in each octave, which is colored green or red. In the tuning shown above, all the A strings are colored differently from the rest. If the tuning is changed to the key of G pentatonic, the A string becomes *Shang* (that is 2 in the Chinese notation). The reason for this is that when performers retune to a pentatonic scale based on G, they do not raise the pitches of all strings. Instead, the fewest number of strings that must be changed to make a scale based on G are altered, which means only

the F# strings in the D pentatonic scale are tuned up a half-step to G. This is in order to minimize both stress on the *guzheng* and potential breakage of strings, as well as the avoidance of a harsh, unpleasant sound. The pitch changes are achieved by carefully shifting positions of appropriate movable bridges rather than by tightening the tuning pins. If a string's pitch is to be altered, the moveable bridges should be tipped away from the tuning box then repositioned in the same manner as if the *guzheng* were being freshly strung.

There are many *guzheng* performance techniques, which were described in the following way in a poem entitled *Qia Zheng*: "Playing *guzheng* requires the right hand to pluck the strings that are on the right side of the bridges and fix the ring finger on the inside of the front fixed bridge. The ring finger moves with the other four fingers, which are plucking the strings. There are not many techniques for left hand, but just pressing, rubbing, and pointing and feeling relaxed (Yibing, 1993)." Actually, the most important techniques of the left hand are vibrato and pitch ornamentations, which are produced by pressing the strings on the left side of the bridges. However, nowadays, a common technique of the left hand is to play with the right hand on the right side of the bridges. So the techniques of the left hand could be classified in two ways: pressing methods and plucking methods.

The major techniques of the right hand are as follows: t*uo, mo, gou, da, da cuo* and *xiao cuo*. "*Tuo*" is played by the thumb by plucking the string away from the player towards the outside of the *guzheng;* "*mo*" is performed by the index finger that plucks the

string towards the player; "*gou*" means that the middle finger plucks the string towards the player; "*da"* is played by the ring finger which is also plucked towards the player; "*da cuo"* is performed by plucking with the thumb and middle finger at the same time on different strings, almost always as an octave; and "*xiao cuo*" is plucked by the thumb and the index finger at the same time in order to perform intervals smaller than an octave.

The number of the *guzheng*'s strings has increased to eighteen, twenty-one and twenty-five since the 1970s. The materials of the *guzheng*'s strings were also transformed from traditional silk strings or steel strings to steel twined by nylon strings. The traditional pentatonic tuning method became an obstacle for the further development of the *guzheng.* Pitches other than the five, such as fourth and seventh scale degrees had to be created using the left hand by pressing down on the strings to change the pitch. Therefore, various types of alternative *guzhengs* were developed in China. Performers and composers tried to use this kind of *guzheng* to exceed and resolve some limitations of the performance capabilities of the traditional *guzheng*. Unfortunately, the modulated *guzhengs* failed to get recognition from the people, and the modulated *guzhengs* did not become popular (Yibing, 1993).

THE DEVELOPMENT SINCE THE 1980'S

Since the 1980s, China has had more and more opportunities for cultural communications with foreign countries due to the Reform and Opening policy, and the groups of people showing interest in the *guzheng* has grown at an amazingly high speed. Many composers and performers were no longer content with accepting the traditional pentatonic tuning method as the only way, and they looked for innovative paths via other means. This was done in order to eradicate the flaws and constraints that the traditional tuning method brought into the performance in terms of music qualities and performance techniques.

Meanwhile, the development of the *guzheng* continued to evolve and moved into a new period of prosperity (Rongkun, 2008). According to the musicologist Suxian Yu, since the 20th century, many performers and composers of the *guzheng* have explored a six-tone tuning method that was relatively unknown for some time, along with some folk musical tunings of different nations. Thus, they fully combined the new exploration with the historical tradition, and carried out multiple expansions and creations at higher levels. These new works not only incorporated traditional elements, but also combined new materials of tuning, new theories and new skills.

The performers and composers of the *guzheng* were no longer satisfied with the constraints of the pentatonic mode and performance techniques that the traditional tuning method brought. One of the ways to develop *guzheng* music was to reform its

tuning method, which means to arrange and design different tunings, which could help to make a breakthrough in terms of performance methods. The special sounds that came from the new tunings were no longer the simple pentatonic scales. In other words, the richness of the pitches and the diversity of the sounds had the capability of leading to different kinds of chords and melodies. Examples include the use of the parallel modes in *Huan Xiang Qu*in (*Fantasia*) (Wei, 2010). In the process of performance, even the glissando may cause the timbre to change wholly or partially. This could cause the tonality of the pentatonic scale to become unclear. Meanwhile, the new tuning method created multi-tonal recombination and alternation, and they became two of the most important techniques of *guzheng* composition.

China consists of vast territory with multiple minority groups. Traditional *guzhengs* were largely distributed in the regions of the majority *Han* people, and the subject matter about which the traditional *guzhengs* performed was mostly within the range of the *Han* people's cultural experiences. However, as the *guzheng*'s tuning methods developed, the subject matter of *guzheng* music expanded further--the themes concerning minorities and other subjects provided more opportunities for the *guzheng*s' development, and the potential of *guzheng* performance was more fully realized. Examples of the minorities' music includes *Mukamu Sanxu yu Wuqu* (Muqam's Prelude and Dance), which is full of *Xinjiang* styles, the mysterious atmosphere and the application of non-tonal techniques in *Shan Mei* (The Charm of a Mountain), and the intense dramatic effects in *Biao Qing Su Miao* (The Sketch of Emotions). Nowadays,

there are multiple compositional skills and different sorts of styles of *guzheng* works. As a plucked instrument, the *guzheng* is favored by contemporary composers, and people consider it normal that composers combine western musical styles and performance methods into *guzheng* works. Among other things, composers designed some special tunings depending on a variety of factors (Dehui, 2011).

"Innovation is the power of pushing the development of culture forward (Shanwu, 2006)." There is a direct connection between the development of the tuning methods of the *guzheng* and the evolution of new music for it. The new types of *guzheng* music come with many new arrangements instead of the pentatonic modes. The different tunings of the *guzheng* depend on the composition being played. In this context, performers and composers feel it necessary to continue to develop the tuning of the *guzheng* (Shanwu, 2006).

The Tuning Method with the Hexatone Mode

In the 1990s, Yan Gao, a *guzheng* performing artist, adapted an ensemble work, *Alamu-Gulibala,* which was originally composed by Guanren Gu. This work, based on music of the Xinjiang Uyghur region, portrays a boy's thoughts of missing a girl whom he deeply loved, and depicts the girl's beautiful dancing (Liwen, 2000). The innovation of *Alam-Gulibala* is the use of the combination of the pentatonic mode and the diatonic scale in the tuning of the instrument.

F2 shows that there are six pitches per octave in this tuning. In the original G pentatonic mode, all the green strings are A, but in this work, the green strings are B3, D4, B4, and A5. Thus, the tuning design not only is more convenient for performers to play octaves and chords, but also plays a helpful role in terms of rendering the atmosphere of the music. The tonality of this work is very similar to a kind of local folk dance-– *Sainaimu* (Jiahong, 2010). The system of this work is influenced by Arabic music, the traditional Chinese music system and the European music system. Arabic music has a long history of interaction with many other regional musical styles and genres, and independent and flourishing in the 2010s. One of the most important features of Arabic music is "the quality of conditional *daiqiang"* (Yaohua, 1999). "*Daiqiang*" means that in the process of performing the note, the composer intentionally uses some special ways to present the music, such as changes of pitch, dynamic and timbre.

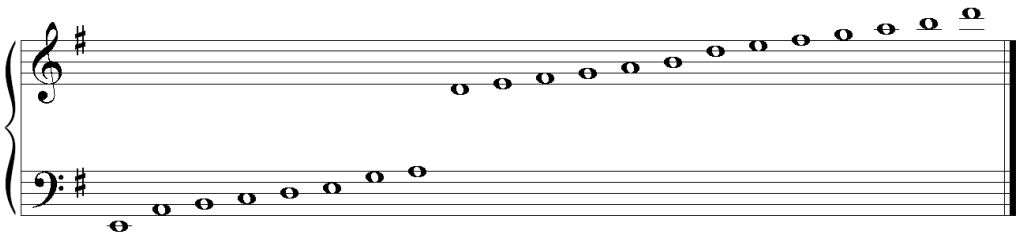

Figure 2. Tuning of *Alam-Gulibala*

The traditional pentatonic *guzheng* tuning became associated with Chinese culture in the minds of most listeners, which preserved that kind of tuning method, and a certain number of innovative aspects were also incorporated, so abundant variations in

color were formed. The composition, *Alam-Gulibala* has strong expressive force as a result of the features of the mode being used. The seventh scale degree is contained in its tuning method, and its arrangement method does not repeat octaves in the way traditional tuning does. This unconventional tuning gives the music expressive force and diverse tonal possibilities without changing the inherent national features such as change the pitches by bending the strings on the left hand.

Diatonic Tuning

At the beginning of 21st century, the well-known composer Xiaogang Ye, was invited to compose a new work, *Lin Quan* (Woods and Spring), at the Shikun Liu Piano Art Center in Hong Kong. *Lin Quan* has been performed often by many musicians. It is considered a landmark both for its composition and for the development of the *guzheng*. *Guzheng* musicologists think that it not only inherited the characteristics from Chinese traditional music, but also incorporated the pursuit of aesthetics of modern music (Wei, 2006).

Water has been a favorite theme of Chinese poets and music. It often characterizes and bestows philosophical meaning. The composer depicts the characters and transformation of water within eleven sections. Pentatonic and hexatone scales have been pre-set for the piece in varied octaves and keys. The lento section is characterized with rich color on harmony and its variations; its melody theme is developed from the repetitions of the same motives. The fourth section requires a virtuoso performance in

toccata style, until the repetitions of harmony lead to the climax in the ninth section while the melody of the first section reverberates into the final section. In this piece, the expression of dynamics includes *ff*, *fff* and *sfz*, which is quite rare in the traditional *zheng* pieces.

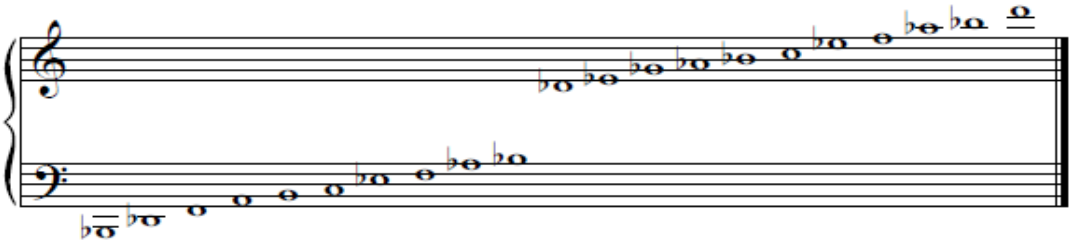

Figure 3. The tuning of *Lin Quan*

The tuning of this work has the characters of the pentatonic scale, but the tonality features the A-flat diatonic scale, and creates melody and harmony that are both traditional and also innovative. The tuning method broke with the traditional sequential tuning of the pentatonic scale, four-octave transposition of the same scale by alternating one of the patterns as shown in the F4.

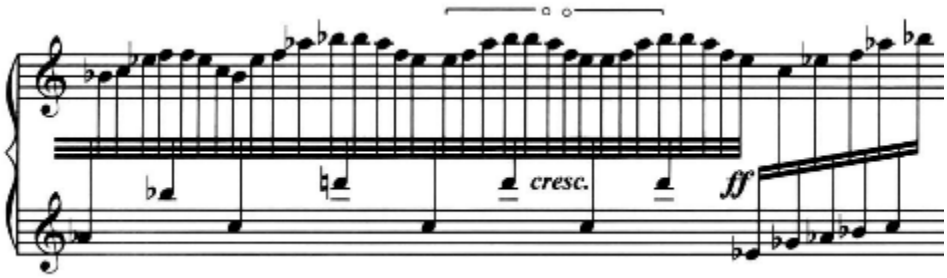

Figure 4. Xiaogang Ye — *Lin Quan*

Twelve-tone Tuning

In 1989, the composer, Long Zhou was getting his doctoral degree at Columbia University, in which he learned Twentieth Century modern composition theory and Schenkerian analysis method. During the first semester, he composed a trio, *Ding*, for the clarinet in B-flat, *guzheng* and double bass. This work was premiered at the Alternative Museum in New York City at the end of that year. *Ding* is the translation of Long Zhou's own imagination and understanding of the spirit of Buddhist concept of calm and quiet (Long, 1989). The work is a slow abstract improvisation and the basic material of the subject consist of a twelve-tone scale and a tonal melody. The combination of the clarinet, *guzheng* and double bass allow a wide range, and the clarinet and the bass imitate the Chinese traditional music instruments, such as *huayin*[4], *chanyin*[5] and other special effects. Moreover, the use of Chinese and Western instruments designed to express the integrations between Eastern and Western cultural and the ancient and modern civilizations.

The composer transforms the traditional pentatonic scale and designs a twelve-tone scale for the *guzheng*. The scale is C, C#, D, D#, E, F, F#, G, G#, A, A#, and B.

[4] *Huayin*, 滑音, pitch ornamentation, includes *shang huayin*, high pitch ornamentation, and *xia huayin*, low pitch ornamentations.
[5] *Chanyin*, 颤音, the vibratos.

I / P	3	2	11	4	10	0	1	5	8	7	9	6
3	D#	D	B	E	A#	C	C#	F	G#	G	A	F#
4	E	D#	C	F	B	C#	D	F#	A	G#	A#	G
7	G	F#	D#	G#	D	E	F	A	C	B	C#	A#
2	D	C#	A#	D#	A	B	C	E	G	F#	G#	F
8	G#	G	E	A	D#	F	F#	A#	F#	C	D	B
6	F#	F	D	G	C#	D#	E	G#	B	A#	C	A
5	F	E	C#	F#	C	D	D#	G	A#	A	B	G#
1	C#	C	A	D	G#	A#	B	D#	F#	F	G	E
10	A#	A	F#	B	F	G	G#	C	D#	D	E	C#
11	B	A#	G	C	F#	G#	A	C#	E	D#	D	E
9	A	G#	F	A#	E	F#	G	B	D	C#	D#	C
0	C	B	G#	C#	G	A	A#	D	F	E	F#	D#

Figure 5. Twelve-tone matrix for the *guzheng* part of *Ding*

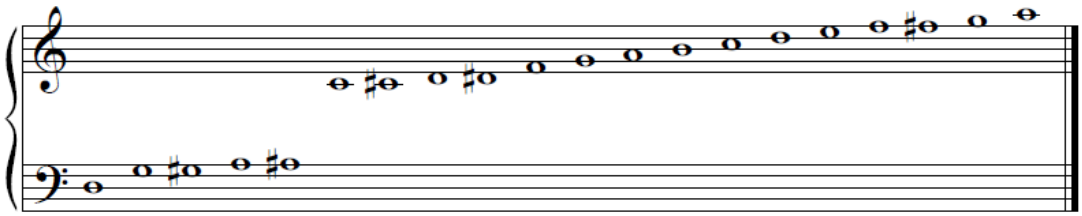

Figure 6. The tuning of the *guzheng* in *Ding*

It is very difficult to tune like this, because the strings have to be kept their tension and original timbre. However, this kind of tuning make performer play easier, because they can play the notes without bending the strings on left hand.

The Diversification of Guzheng's Tuning Since 1990's

Olivier Messiaen (1908-1992), a major composer of the 20th century, identified a collection of scales he called modes of limited transposition. These are "musical modes or scales that fulfill specific criteria relating to their symmetry and the repetition of their interval groups (Jeffrey, 1995)." With the increase in Eastern and Western musical exchange activities, many Chinese composers have used these modern scales in Chinese traditional musical works to innovate and develop the composition of Chinese traditional music. An example of a piece that used this kind of tuning method is *Mukamu Sanxu yu Wuqu* (*Muqam's Prelude and Dance*).

A *Muqam* is a large drum-dancing suite of the Uyghur minority people in *Xinjiang* province. *Muqam's prelude and dance* began to be played in the late 1980s. The piece combines the characteristics of the *Muqam* music materials with the g*uzheng*, and the tuning has a strong *Xinjiang* style. It breaks from the traditional pentatonic and instead employs a new tuning of the g*uzheng*. After a long exploration and many attempts, finally new g*uzheng* pieces appeared which used this alternative tuning style. Thus, the use of the new tuning promoted g*uzheng* music within a diverse developing trend.

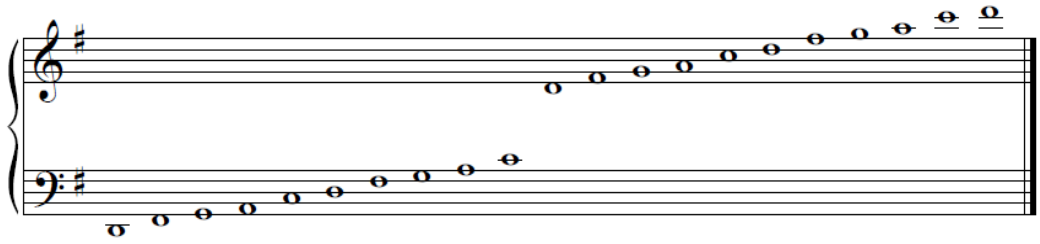

Figure 7. The tuning of *Muqam's Prelude and Dance*

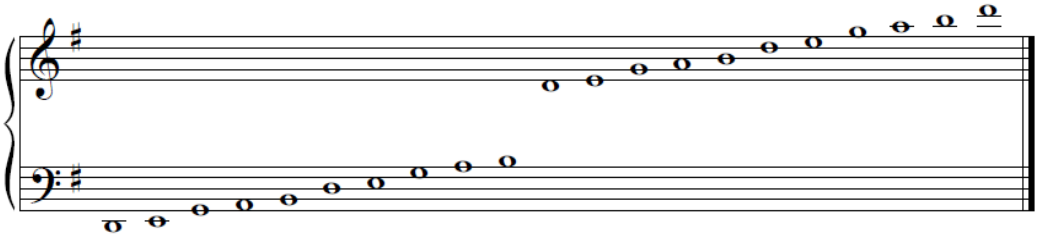

Figure 8. The original tuning of the G major pentatonic mode

Octave Periodic Tuning

Modal Mixture Tuning. Octave periodic cyclic tuning is mainly based on the four octaves of the g*uzheng*, adding the arrangement of the scale determined by the notes in the four octaves, and repeating it regularly. *Huan Xiang Qu* (*Fantasia*) (Jianmin Wang, 1991) uses this kind of tuning method.

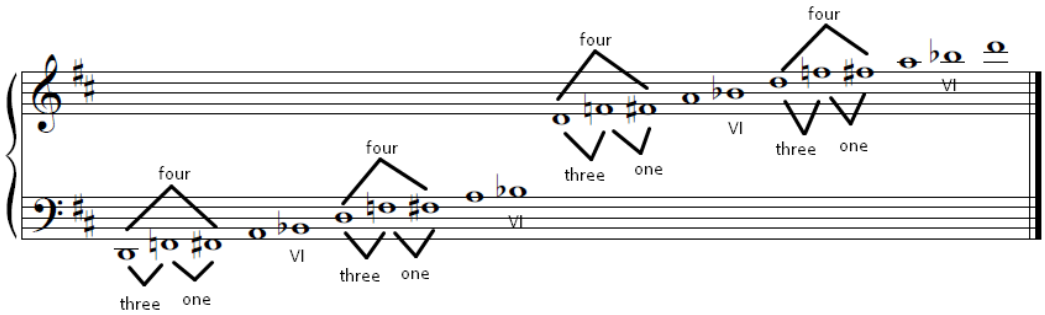

Figure 9. The tuning of *Huan Xiang Qu* with half-step patterns indicated.

This work's tuning features F#, which is the major third degree above the D; and the F, which is the minor third degree above the D. Because of the coexistence of F and F#, the tuning has the color of both major and minor scales, with the same tonic. At the same time, B flat note occurs in all four octaves and expands the diversity of tonality.

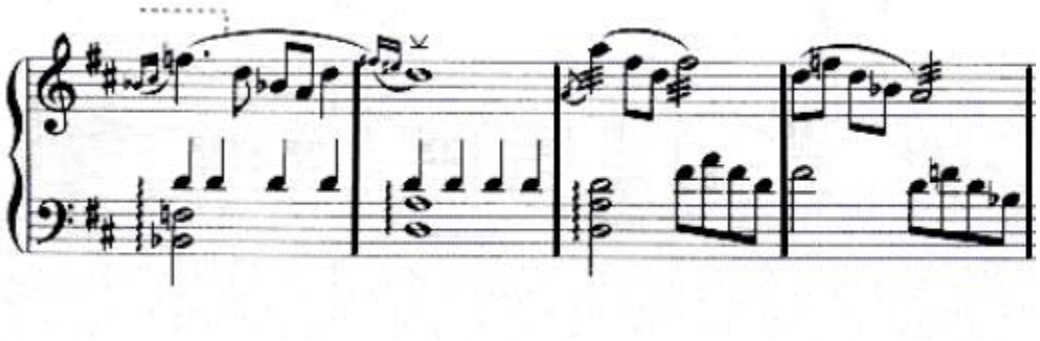

Figure 10. Wang, Jiammin— *Huan Xiang Qu,* mm.7-10

Tuning using two modes with the same tonic. This kind of tuning method is based on the range of the four octaves on the g*uzheng*, featuring two different pentatonic

modes with same tonic. An example is the tuning of *Chang Xiang Si* (the title literally means deep lovesickness).

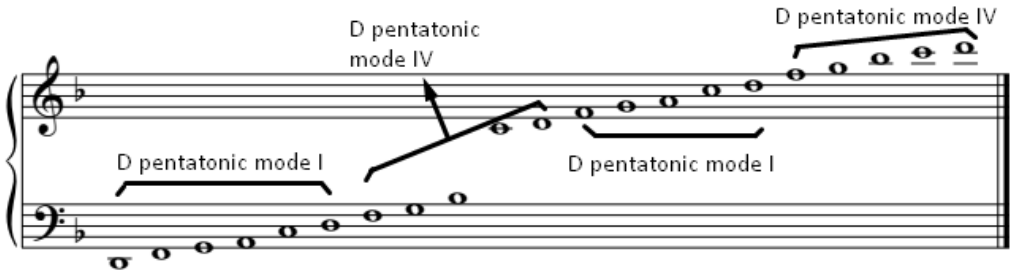

Figure 11. The tuning of *Chang Xiang Si*

The tuning of *Chang Xiang Si* uses both D pentatonic mode I (minor) and D pentatonic mode IV. There are two significant features of using this kind of tuning method: 1) There is no need to add any notes which are not in the scales and 2) The note D is the first note in the tuning, and it is repeated in every octave.

Therefore, two different modes with the same tonic used simultaneously not only enriches the tuning of music, but also makes the work melodic and chromatic without modulation.

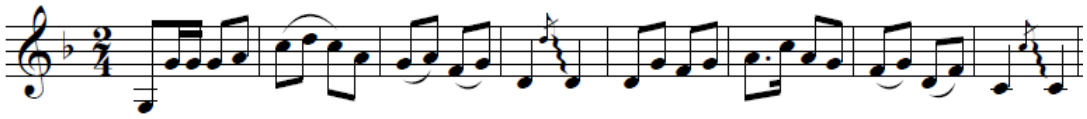

Figure 12. Wang, Jianmin-- *Chang Xiang Si,* mm.84-91

Tuning using multiple modes. This kind of tuning method also uses a single tonic with different modes in an octave. The example of this kind of tuning method is a trio piece played by Chinese traditional musical instruments, g*uzheng*, *pipa* and *xiao*, entitled *Man Ting Fang*. This is also the name of a famous collection of old poems. The work portrays the scene of spring in the court imperial garden.

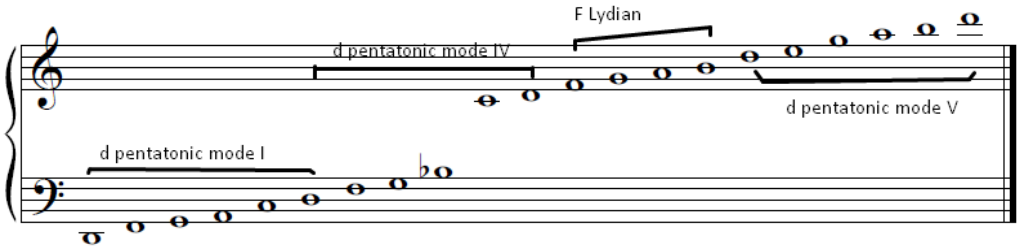

Figure 13. The tuning of *Man Ting Fang*

The composer used D as the tonic in three different modes. The sequence of the tuning from low to high is D pentatonic mode I, D pentatonic mode IV, F incomplete Lydian mode, and D pentatonic mode V. The method of periodically altering the different modes in octaves is derived from the traditional way of tuning, but it cycles around one central note in different modes in each octave. Composers can combine the rest of the notes in the mode besides the tonic, allowing for modulation without changing the tuning.

Non- Octave Periodic Tuning

Patterned tuning. This method changes the traditional way of tuning so that the notes ascend in groups regularly, based on the relationship of existing intervals. *Xi Yun* (literally meaning the rhyme of a play) is an impromptu, which uses the materials of Chinese opera combined with modern composing techniques. The style of the whole work is free, and there are many special techniques in it. It reflects the characteristics of fast, slow, and scattered in Chinese opera, and highlights the charm of singing, reading, doing, and playing of the stage art.

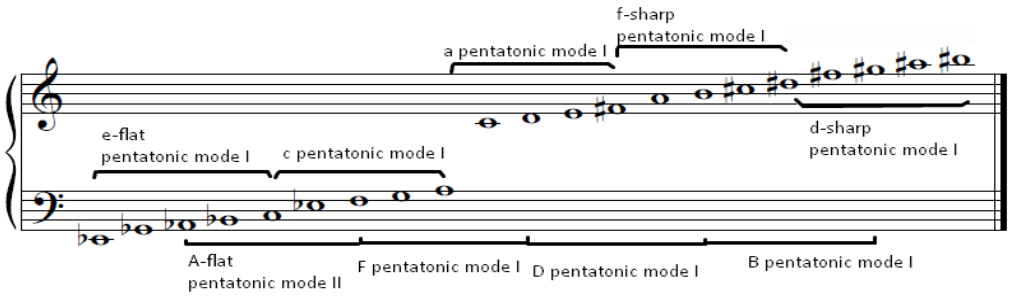

Figure 14. The tuning of *Xi Yun*

The tuning of *Xi Yun* uses chromatic scales, and can be described using numbers representing half steps. The scale of G flat, A-flat, B-flat, C and E-flat constitutes the pitch class set 5-34 (02469). The set includes one perfect fifth, one perfect fourth, two major third degrees, two minor third degrees, one tritone (G flat to C), and three major second degrees. The tuning arranges the intervals of two major seconds and monotheism a fixed order, and the whole work follows this pattern. (See Figure 15)

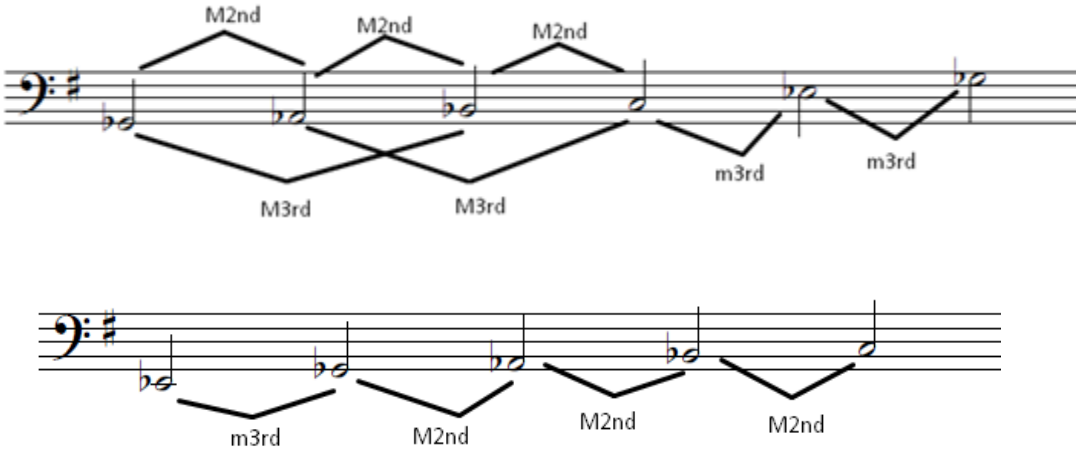

Figure 15. The illustration of *Xi Yun*, tuning pattern.

Based on the arrangement of intervals in this tuning, the pitch of the notes go higher and higher, and form the characteristics of non-octave periodic tuning. This patterned tuning, on the one hand, has the color of the Lydian mode because of the existing tritone and twelve half steps; on the other hand, it consists of groups of five notes periodically. This design allows for alternation between varieties of tunes melodically, and also opens up the possibility of harmonic multi-part combination.

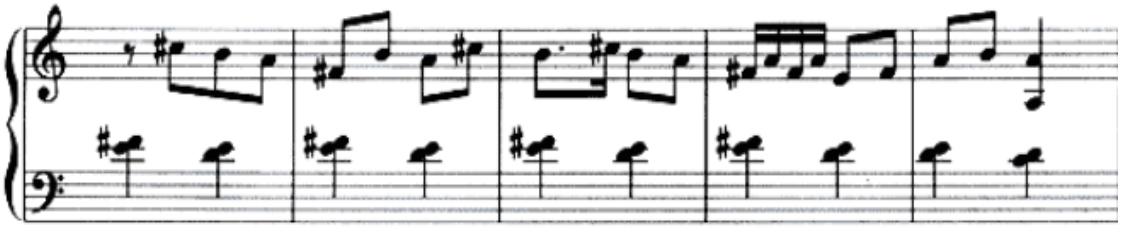

Figure 16. Wang, Jianmin--- *Xi Yun,* mm.7-11

Another example of a patterned tuning method is *Lianhua Yao* (The Rhyme of Lotus), which was completed in 1995. The composer designed the work using multiple scales instead of the original pentatonic tuning. The work is based on pitch class set 4-23 (0257), which includes two perfect fourths, one minor third, and two major seconds. The interval pattern of this tuning is major second, minor third and major second. In the tuning of this work, the composer used the pentatonic mode V as compared to the incomplete Lydian mode of *Xi Yun*.

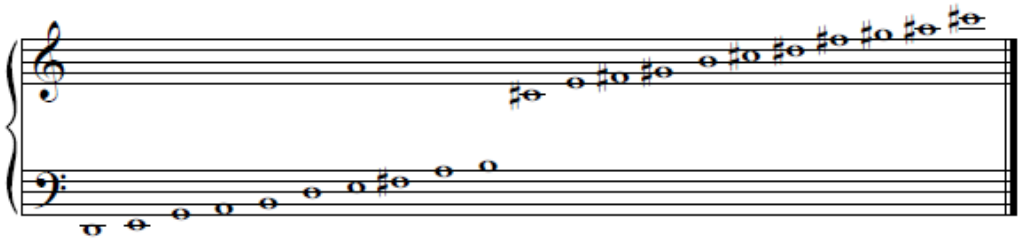

Figure 17. The tuning of *Lianhua Yao*

In China, there is an ancient poem describing the lotuses. The meaning of the poem is “even though the lotus lives in the dirt, they are still beautiful. They try to stay natural and naive without any profane things.” The composer expresses his emotion about the lotus and its noble qualities using a complicated texture as shown in F18.

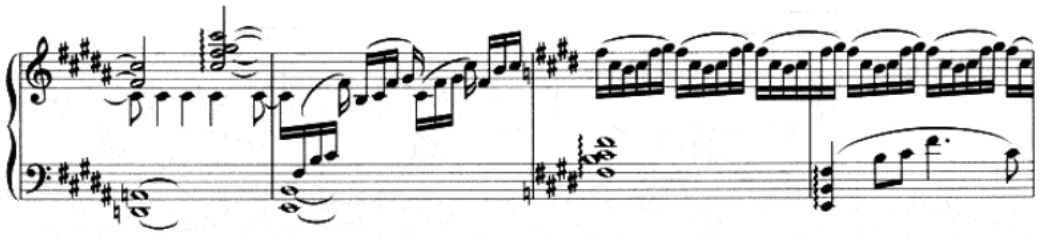

Figure 18. Wang, Jianmin--- *Lianhua Yao,* mm. 15-18

Free and mixed tuning. This method was developed by the composer Wang Jianmin and involves the use of multiple accidentals. Therefore, the analysis includes pentatonic scales and diatonic scales.

A representative work, *Feng Qiao Ye Bo*. The composer based this work on a famous poem of Ji Zhang, a poet in the Tang Dynasty (618-907). The work portrays the literary spirit of Chinese people, and makes the listener feel the composer's nostalgia for the river, the maples, and the fishing boats in an antiquated setting. The work fuses the tuning characteristics of *Kunqu*, Suzhou folk songs with traditional stringed and woodwind instruments, and shows a delicate and pleasant poetic style.

The work includes the E-flat pentatonic mode V, E -flat Lydian mode, F Mixolydian mode and C pentatonic mode V (See Figure 19). The E-flat and C pentatonic mode V which are at the beginning and ending match each other artistically. In addition, there are many common notes in the A-flat Lydian, E-flat Lydian and F Mixolydian mode, but A-flat and A-natural do not occur in the same octave. This tuning method is intended to portray the melancholy and lonely emotions expressed by the poem. The music helps the listener understand the translation of the poem.

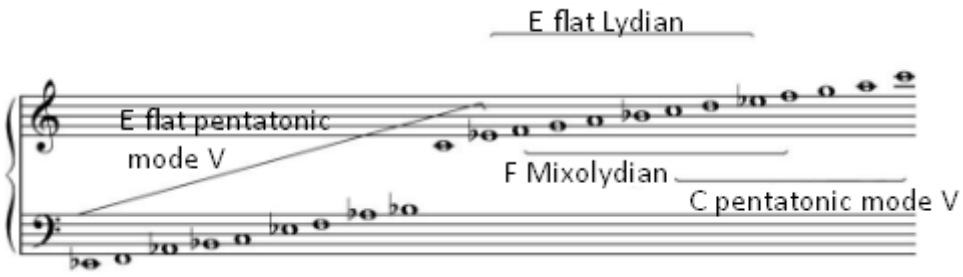

Figure 19. The tuning of *Feng Qiao Ye Bo*

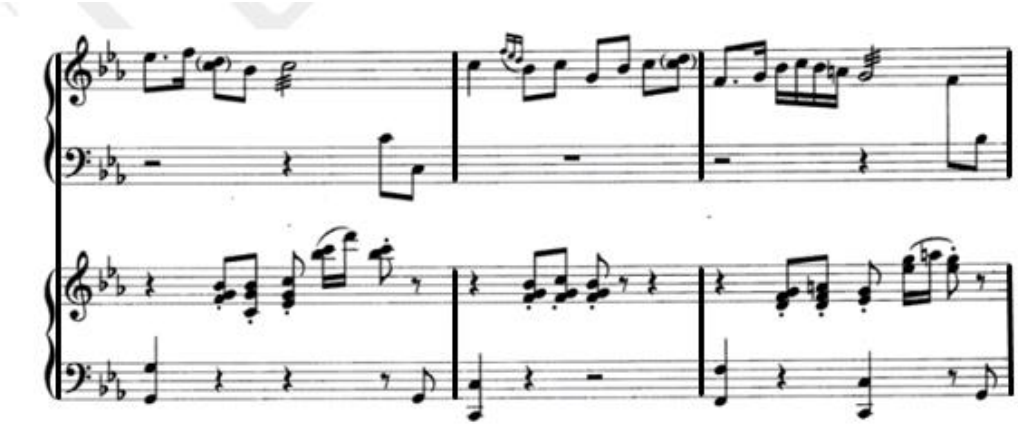

Figure 20. Wang, Jianmin---*Feng Qiao Ye Bo,* mm.42-45

Xiyu Suixiang (*Caprice of the Western Region*) was composed in 1996 using the musical material of the Uighur minority nationality and some unique and complex alternating meters such as 5/8 and 4/8. The composer also explored the combination of traditional pentatonic melody and *Xinjiang* music. Additionally, the work includes the imitation of tapping drums and other percussion of *Xinjiang* province, and depicts the local customs and culture, and the lively scenes of dancing and singing.

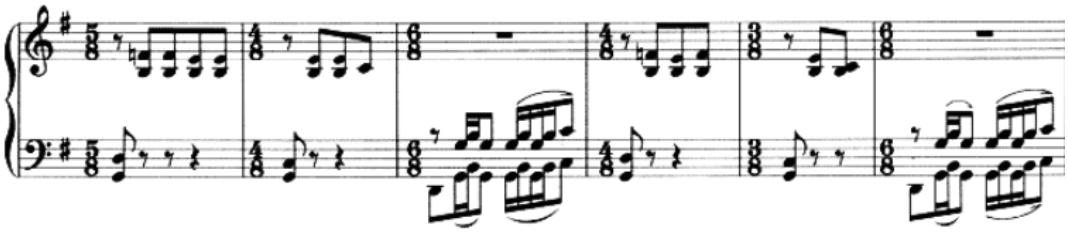

Figure 21. Wang, Jianmin--- *Xiyu Suixiang*, mm.139-144

The tuning of *Xiyu Suixiang* features incomplete Ionian and Lydian modes. The first group, from D2 to D3, features the tonality of C Ionian; the second group is from G2 to E3 which is in the G Ionian mode; the third group is from C3 to C4 which is in the C Lydian mode; the fourth group is from C4 to D5, and the tonality is still C Ionian; the fifth group, from G4 to C6, is in the G Ionian mode; and the last group, which is from C6 to C7, still in the C Lydian mode. The inflections that are produced in this kind of tuning, just match with the tone of western region. Therefore, it combines the tone of the central part of China and the western region tone powerfully.

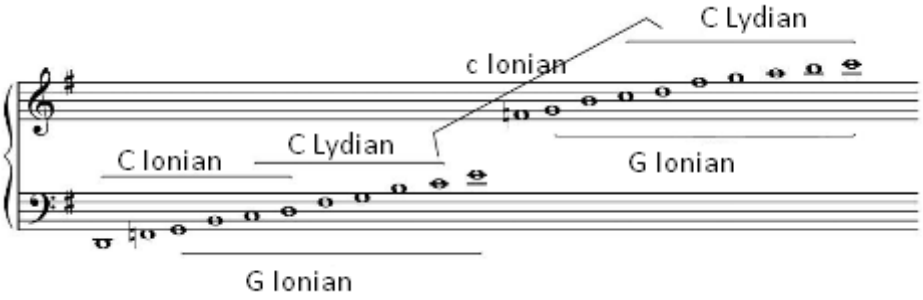

Figure 22. The tuning of *Xiyu Suixiang*

The Tuning of Major or Minor Keys

Performer-composer Wang Zhongshan currently influences *guzheng* repertoire greatly by using the fast-fingering methods [6] for which he gained a reputation in the late 1980s in China (Haiqiong, 2006). Because he was influenced by piano music, he composed for the *guzheng* using Western concepts, and he influenced more modern composers to add their new creations and ideas into the *guzheng* tradition (Haiqiong, 2006).

The work, *Ming Mountain,* uses the musical material of the Miao nationality in *Hunan* province. The work describes the changes of different seasons at a mysterious and distant mountain, which does not actually exist. Additionally, the composer, Zhongshan Wang portrays changes in the people's attitudes about life through the change of the seasons. He also uses challenging techniques to portray a variety of emotions, such as happiness, sadness, and anger.

This work alternately uses the parallel modes, B minor and B major. Most of the work uses B minor, but changes to B major in the cadenza to convey a feeling of hollowness and quiet. The usage of this tuning method not only displays the variation of tuning tonalities, but also makes a unique Chinese style by combining western modes.

[6] Use a series of fingering patterns to play highly-technical and fast musical sections

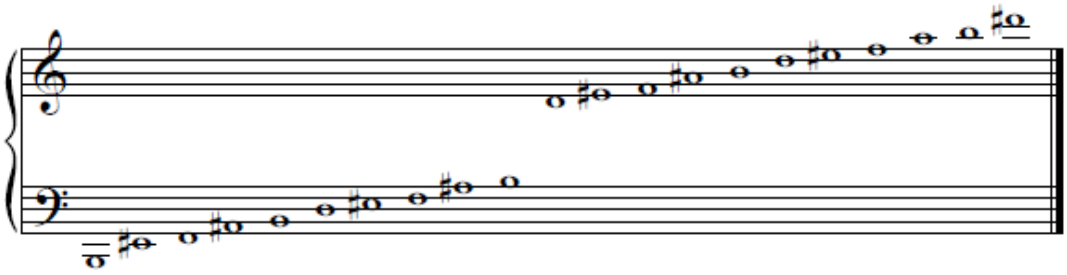

Figure 23. The tuning of *Ming Mountain*

Figure 24 shows the cadenza part that uses the mode of B major.

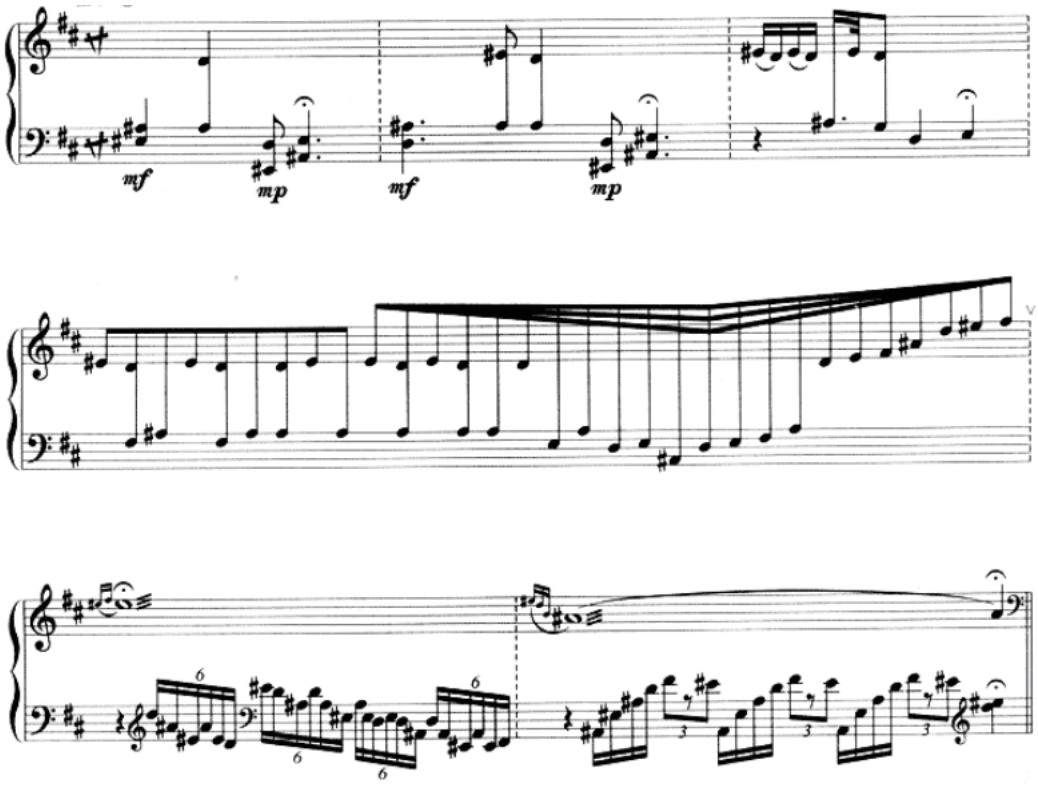

Figure 24. Wang, Zhongshan--- *Ming Mountain,* mm71-76

Many minorities such as *Miao*, *Tujia*, *Yi*, *Dai*, *Zhuang*, *and Yao* inhabit the southwest region of China, where the scenes are beautiful and the people live plainly. *Yun Ling Yin Hua (Yun Ling Musical Scenes)* draws a picture of flowing springs, the warm moonlight, and the hot dance, which lead the composer to yearn for the mountains and the nature. The work consists of four parts: dawning, celebration, loving, and night. They express Zhongshan Wang's deep feeling about the southwestern customs, and portray a colorful picture of the life of minority people (Wei, 2006).

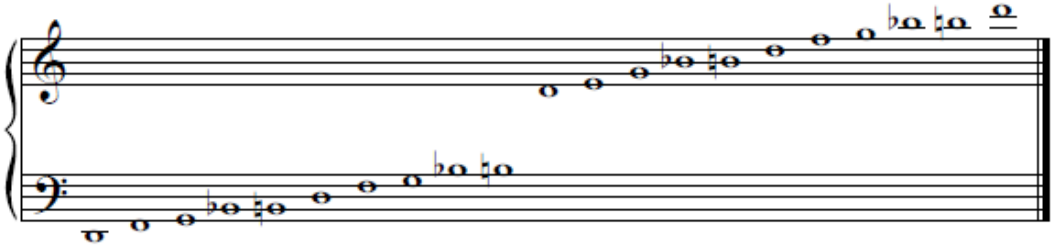

Figure 25. The tuning of *Yun Ling Yin Hua*

Yun Ling Yin Hua combines the modes of G major and G minor, and alters the mediants of the scales, which are B and B flat. The mode of G major is used in the "dawning" and "celebration" parts. The first part mostly uses arpeggio chords, and there are a few harmonic chords and many complex patterns in the second part. The mood of the third part is expressive: the mode changes to G minor, and the tempo slows down at the beginning and becomes more animated later. The mode of G major returns in the fourth part, and continues the dynamic of the third part, but with a faster rhythm.

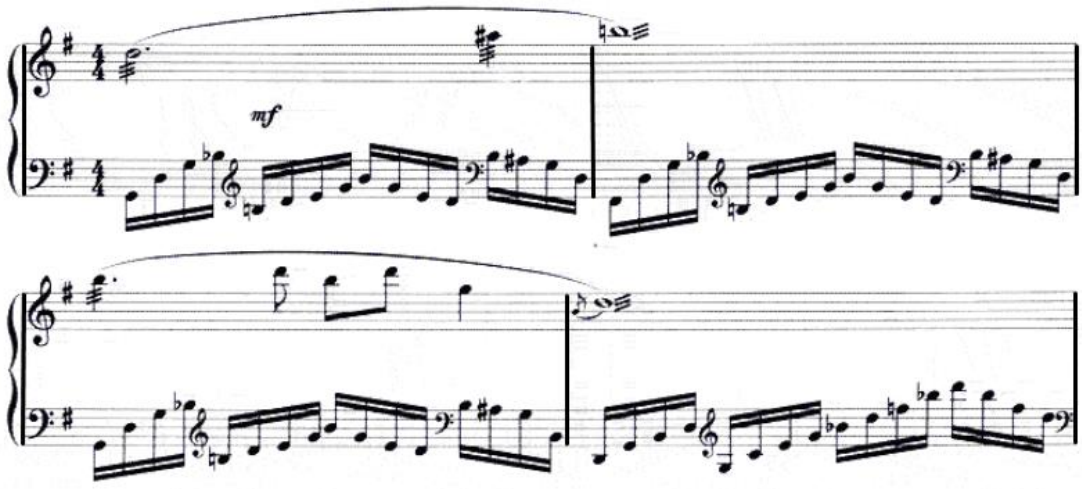

Figure 26. Wang, Zhongshan--- *Yun Ling Yin Hua,* mm. 65-68

To concluce this part, the artificial tuning method expands the traditional tuning ways on g*uzheng* and applies new musical thought that challenges the tradition of g*uzheng.* This tuning method comes from tradition, but has undergone innovative change. It opens a new field of musical language and techniques for musical creators, and strongly promotes the development of music for the g*uzheng.*

REFLECTIONS ON THE DEVELOPMENT OF GUZHENG TUNING

Currently, as an important type of performance, *guzheng* compositions have become attractive to many listeners, and the methods of performing these pieces have become more and more innovative. As the key of *guzheng* tonality, tuning has played a decisive role not only in composing, but also in the applications of techniques and creations, and has affected even the position of the art of the *guzheng* in the music world and points to its future sustainable development path.

Therefore, on the one hand, many composers and virtuosos constantly explore new tuning methods of *guzheng*, adding new vitality into new music creation; on the other hand, they are making deliberate decisions on the development of current *guzheng* tuning (Xueting, 2009). For example, in Jinhai Jiao's careful analysis of the *guzheng*'s tuning and scales, he suggests that the special tuning of *guzheng* should have the following aspects as the premise. First, combining with the characteristics of the *guzheng* performing, six notes should be included in an octave, which is convenient for playing octaves, but also conducive to increasing the thickness of the sound in order to create the necessary atmosphere. Second, it should be consistent with the traditional tuning scale like D pentatonic or G pentatonic. Third, the repetition of the different octaves should be the same as the normal tuning scale. Finally, the color of new tunings must have Chinese traditional music's style (Jinhai, 1998). Those thoughts guide the innovation and development of *guzheng*'s tuning methods.

The Necessities of The Development of Guzheng's Tuning

The development of today's tuning method shows the need of music performance techniques to change over time, and one of the important symbols of musical innovation. There are four points of its necessities.

First, it includes overcoming the limitation of the traditional tuning method when playing pentatonic scales, it only allows the right hand to play *biangong*, *qingjiao*, *run*, *bianzhi*[7] by bending the strings on left hand. However, these notes cannot be played in two-hand parts. Playing the pieces only in pentatonic scales limits their tonalities and content. In addition, the tuning of traditional *guzheng* pieces are in the order of octaves and the harmonies only could be played in the same mode, which made the sound non-harmonious. Because changes of string tuning are made by moving the bridges, if a new mode is necessary, it is difficult to modulate and play at the same time. The existence of these problems makes the changes of the *guzheng*'s tuning in the modern compositional environment very challenging.

Second, the innovation and development of the *guzheng*'s composition and performance propose higher requirements for the tuning of the *guzheng*. From 1970s to 1980s, a large number of professional composers began to pay attention to the creation of the *guzheng*'s works. They have new tonal style, and focus on creative techniques of the works. Moreover, they contribute to the development of the *guzheng*'s tuning, the

[7] In the octatonic scale, *biangong* is seventh degree, *qingjiao* is fourth degree, *bianzhi* is one half-step higher than fourth degree, and *run* is one help-step lower than seventh degree.

abundance of the techniques, and the divarication of the timbre, which led to the development and innovation of the *guzheng*'s tuning method directly.

Third, as cultural exchanges between China and Western societies constantly growing, people's living standards are rising and their mental states are changing. People's scopes of music are expanding as well. Accordingly, ideologies toward music have experienced much change. Composers and listeners are not willing to be confined to conventional styles anymore, and the contents of traditional music are no longer sufficient. Instead, from the perspective of musical meanings, more contemporary music works are needed to fit into modern society. Thus, how to innovate and develop *guzheng* music is a core question that deserves to be considered, and the variety of its tuning methods is one of the most important elements.

Fourth, in the continuing development of traditional music, instrumental ensemble has become a new trend. As an important traditional plucked instrument, the *guzheng* plays an indispensable role in the instrumental ensemble of any Chinese orchestra. However, the *guzheng*'s shortcomings mark it hard to match harmonically with other instruments. So the *guzheng* id often left out of the ensemble of traditional instruments. For example, the limitations of pentatonic scale make it difficult to modulate to a key that is not closely related. Other traditional instruments used in an ensemble have an easier time modulating, and it does not take them as long to do so. As a result, the *guzheng*'s presence in the ensemble of traditional instruments has been decreased along with its expansion and development.

Finally, according to the current tuning method, it is clear that *guzheng* music has successfully experienced innovation. Jianmin Wang's concepts of tuning innovation seek to break the limitations of the traditional tuning by reforming tuning designs and elaborately rearranging them. Examples include the creation of more varieties of chords, recombination and alternation of polyphonic modes, diversification of themes, and more abundance of functions (Jianmin, 1999).

Existing Problems for The Contemporary Guzheng's Tuning

At present, the *guzheng*'s tuning methods are becoming more and more diverse, but many problems have occurred as innovations are used in new compositions for the *guzheng*. Paying close attention to these problems and taking efficient action to resolve them are essential for studying the *guzheng*'s tuning.

First, new types of *guzheng*s have brought new challenges to the current tuning methods. Every new type of *guzheng* is improved by either innovative artisanship or changing its shapes and structures. These practices are designed to make it easier for performers to play. However, it is not always beneficial from the perspective of tuning. In the 1970s, in order to seek the change of the *guzheng*'s performance, there is a twelve-tone scaled *guzheng* with modulation characteristics was developed in the cities of Shenyang, Shanghai, Suzhou and Guangzhou. It not only maintains the traditional *guzheng*'s shapes and basic techniques, but also is designed in a way that divides the

instrument into three parts with two sets of bridges so that the left and right hands remain separate when they play.

This so-called modulated *zheng* allows performance of both pentatonic and octatonic scales, which improves the performance techniques enormously, and forms a new functional *guzheng*. However, in terms of tuning, performers are held to higher standards, because they have to tune with the help of pianos or tuners.

The modulated *zheng* was designed because of the limitations of the traditional *guzheng*. While it is more comprehensive than the traditional *guzheng*, the sacrifices made by the modulated *zheng* are the traditional *guzheng*'s timbre, techniques and performance methods. This is the contradiction between the improvement of artisanship of instruments and performers' practical skills. Therefore, the modulated *zheng* in some ways is a new type of *zheng* in which the limitations have been resolved differently. However, this type of *zheng* has not been widely accepted. As a result, the tuning of the *guzheng* still focuses on the pentatonic scale and twenty-one strings.

The Development Direction of Pentatonic Scales

First, from the point of view of cultural inheritance, tuning with the pentatonic scale plays a very important role of the development of Chinese instruments. It not only conforms to the musical expectations of Chinese people, but also represents the traditional culture of China. Currently, an international trend that has become

increasingly important is how to retain the features of the *guzheng*'s compositions. This has also become a core issue for musicologists.

Second, from the point of view of musical constructions. Jinhai Jiao insists that the development of tuning requires pentatonic scales or similar scales, because they have the flavor and connotation of Chinese traditional music. To him, this represents the wisdom of Chinese people.

During its long history, the tuning of the *guzheng* has maintained the pentatonic tuning method. Although other tuning methods are used with the *guzheng*, they are all based on the pentatonic scales. As the *guzheng* develops, some may wonder that since there are so many strings on the *guzheng*, it be tuned in any order. This is not possible, though, because every string has to maintain its tension in order to get its perfect timbre. It cannot be too loose or too tight. The pitch level must be kept within the interval of a minor third. In other words, the tuning cannot be completed with octatonic scales or chromatic scales.

Tuning with the pentatonic scale parallels the traditional appreciation of music in China. The inter-connections of the notes of pentatonic scales are the choice of the Chinese ancestors. This is the reason the *guzheng* still uses pentatonic tuning after such a long evolution. This kind of tuning results in the *guzheng*'s characteristic sounds and acoustics. Because of the developments and changes in society, the *guzheng*'s tuning has experienced a variety of non-traditional innovations. These tuning methods have not only changed the *guzheng*'s timbre, texture and harmony, but also have expanded the scope of

composition much broader and more creative. It is clear that the potential of the *guzheng* is very high, and that due to the efforts of composers and virtuosos, new works for the *guzheng*'s will make greater progress. As a result, it is necessary for innovations of the *guzheng*'s tuning to reflect its relationship with the pentatonic scale, and for Western compositional principles to incorporate Chinese characteristics.

SUMMARY

Tuning is the basis of the *guzheng*'s tonality. It plays a decisive role whether for the composition of the music or for the application of techniques, and it affects the position of the *guzheng*'s art within the world of music in both the present and future.

Contrary to this situation, it would be beneficial for future scholarship to focus on the traditions of the *guzheng*'s tuning and to recognize three important periods, which are the *guzheng* before 1960s, the evolution of 1970s to 1980s, and the diverse development from the 1990s forward. It is also important to know the composers' reasons for using non-pentatonic scales. Examples of this include *Yun Ling Yin Hua, Xi Yun,* and *Xi Yu Sui Xiang.* In addition, concerning the innovation and development of the current *guzheng*, it is a necessity to be aware of the development of the *guzheng*'s tuning and the issues regarding westernization and transplantation of the compositions.

Throughout the development of human culture, innovation has been the life-blood of any cultural style. To determine the innovation and developmental direction based on the pentatonic scale, it is important not to use the pentatonic scale rigidly, but to combine it with new developments and new techniques. In this way, the *guzheng* will maintain its profound cultural heritage and meet people's musical expectations while also continuing to experience revitalization.

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APPENDIX: TRANSLATION OF CHINESE TERMS

Chan Yin 颤音 – vibrato.

Da 打— the plucking technique performed by the ring figure.

Da Cuo 大撮-- play octaves notes with the middle figure and the thumb at the same time.

Feng Su Tong 风俗通 – the Second century work mentioning the *guzheng*.

Han 汉— dynasty of Chian, 202-220 B.C.

Gong, Shang, Jue, Zhi, Yu 宫, 商, 角, 徵, 羽— the first, second, third, fifth and sixth scale degree.

Gou 勾— the technique of the middle figure.

Hua Yin 滑音— bending the strings by the left hand.

Kun Qu 昆曲— Kun Opera, is one of the oldest extant forms of Chinese opera.

Mo 抹— the technique of the index finger.

Pipa 琵琶 -- a four-stringed Chinese traditional musical instrument.

Qi 齐— State of China, 550-577 B.C.

Qin 秦— dynasty of China, 221-206 B.C.

Shiji 史记—the Third century B.C. work that contains the first known reference of the *guzheng*.

Tuo 托— the technique of thumb.

Xiao 箫-- a Chinese vertical end-blown flute.

Xiao Cuo 小撮— the technique of playing small chord on the *guzheng* by using the index finger and the thumb.

Xianghe Opera 相和歌-- a folk song and dance that first seen in the *Han* dynasty. It is based on the inheritance of music in *Qin* and *Chu* dynasty.

Zhao 赵— a country in 403-222 B.C.

Zheng 筝— a plucked-stringed instrument of ancient China. *Compare to the guzheng,* it also means all that kind of instrument in this thesis.