

Arts of Guqin Making in Suzhou, China

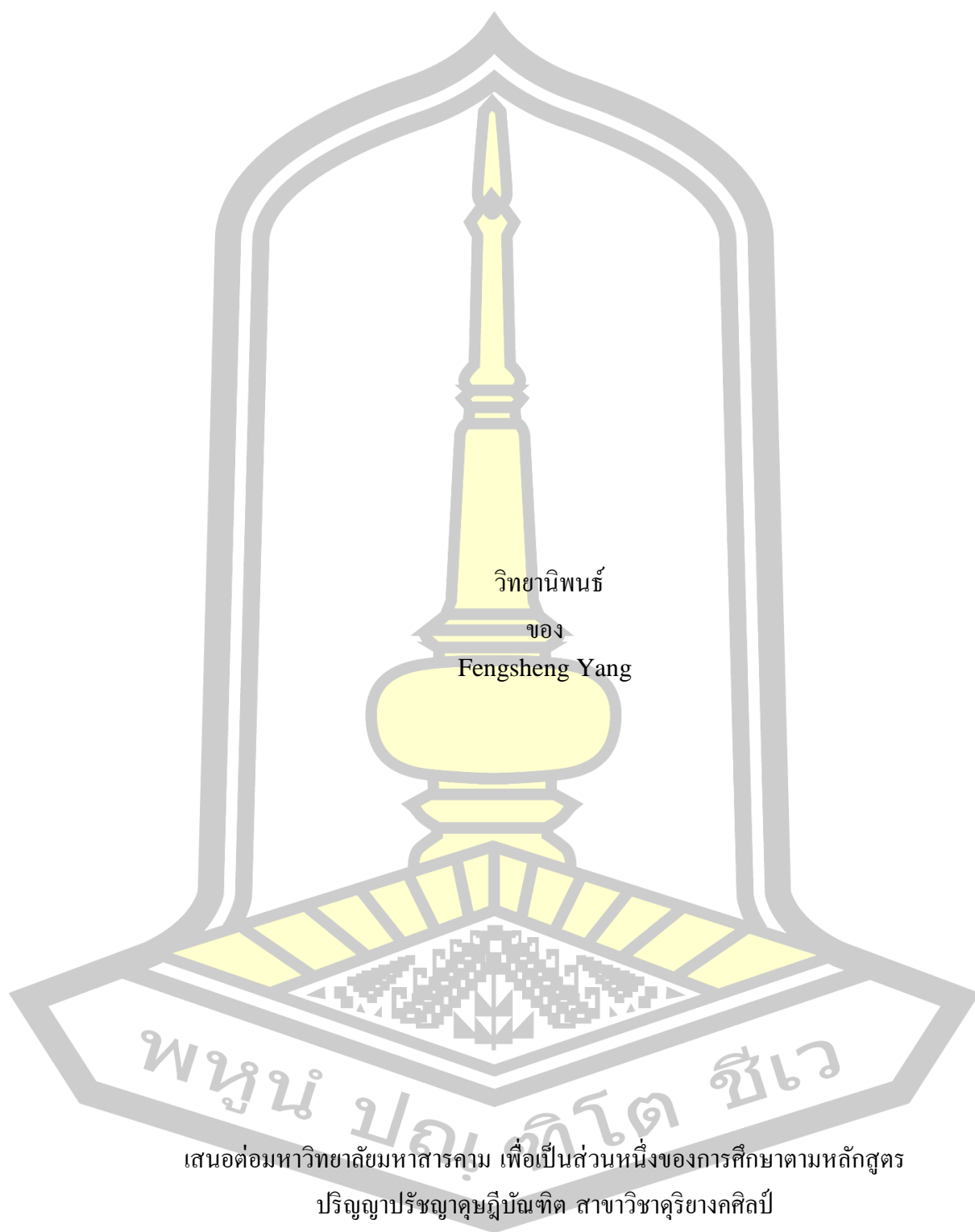
Fengsheng Yang

A Thesis Submitted in Partial Fulfillment of Requirements for
degree of Doctor of Philosophy in Music

August 2024

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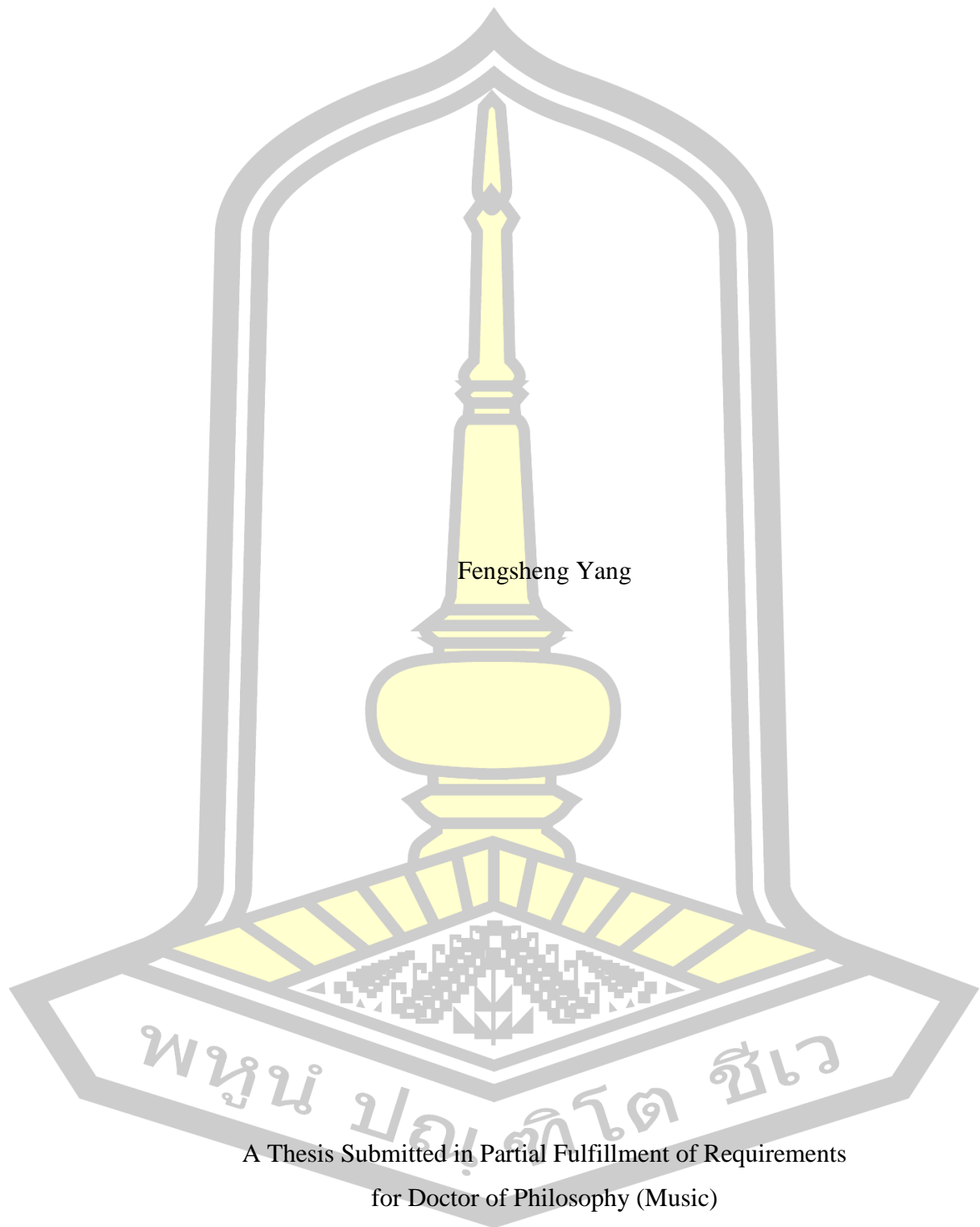
เสนอต่อมหาวิทยาลัยมหาสารคาม เพื่อเป็นส่วนหนึ่งของการศึกษาตามหลักสูตร

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ลิขสิทธิ์เป็นของมหาวิทยาลัยมหาสารคาม

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August 2024

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ABSTRACT

The title of this research is “Arts of Guqin Making in Suzhou, China”. The objectives are: 1) To Investigate the Physical Structures and Tuning System of Guqin Plucked Zither; 2) To search for the excellent characters in terms of physical structures and tone quality of guqin plucked zither to be used as the guqin model for Guqin Making; 3) To make a new guqin plucked zither that match the quality of the given model. This paper systematically collects and analyzes the written documents in the study. The data for the study were mainly derived from historical documents, field data obtained from field trips. The research methods used in the study include musicological theory, comparative study, practical performance method, qualitative and quantitative research methods to verify and analyze the data according to the set objectives. The results of the study are as follows :

1) On Physical Structures and Tuning System of Guqin Plucked Zither. The main characteristics of a good guqin are: Size, Styles, Wooden materials, Cavity belly, Sound quality, Inscription, Broken grain and Structure. (1) It also lists and analyzes how the eight tunings of the guqin operate.

2) On searching for the excellent characters in terms of physical structures and tone quality of guqin plucked zither to be used as the guqin model for Guqin Making. The researcher interviewed Suzhou guqin makers, guqin players, guqin experts, and collected research data, and finally summarized the condition factors of Guqin of Excellent Quality.

3) On making a new guqin plucked zither that match the quality of the given model. Based on the first two research objectives, Researchers have begun to produce superb guqins based on a correct and rational guqin-making process, and finally assessed the quality of the guqin by playing the guqin piece "Remembering the Old Man" (忆故人) with two guqins.

Keyword : Guqin Making, Physical structures, Tuning System, Quality of Guqin, Guqin Making experts, Guqin Players, Making a new guqin plucked zither

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Fengsheng Yang

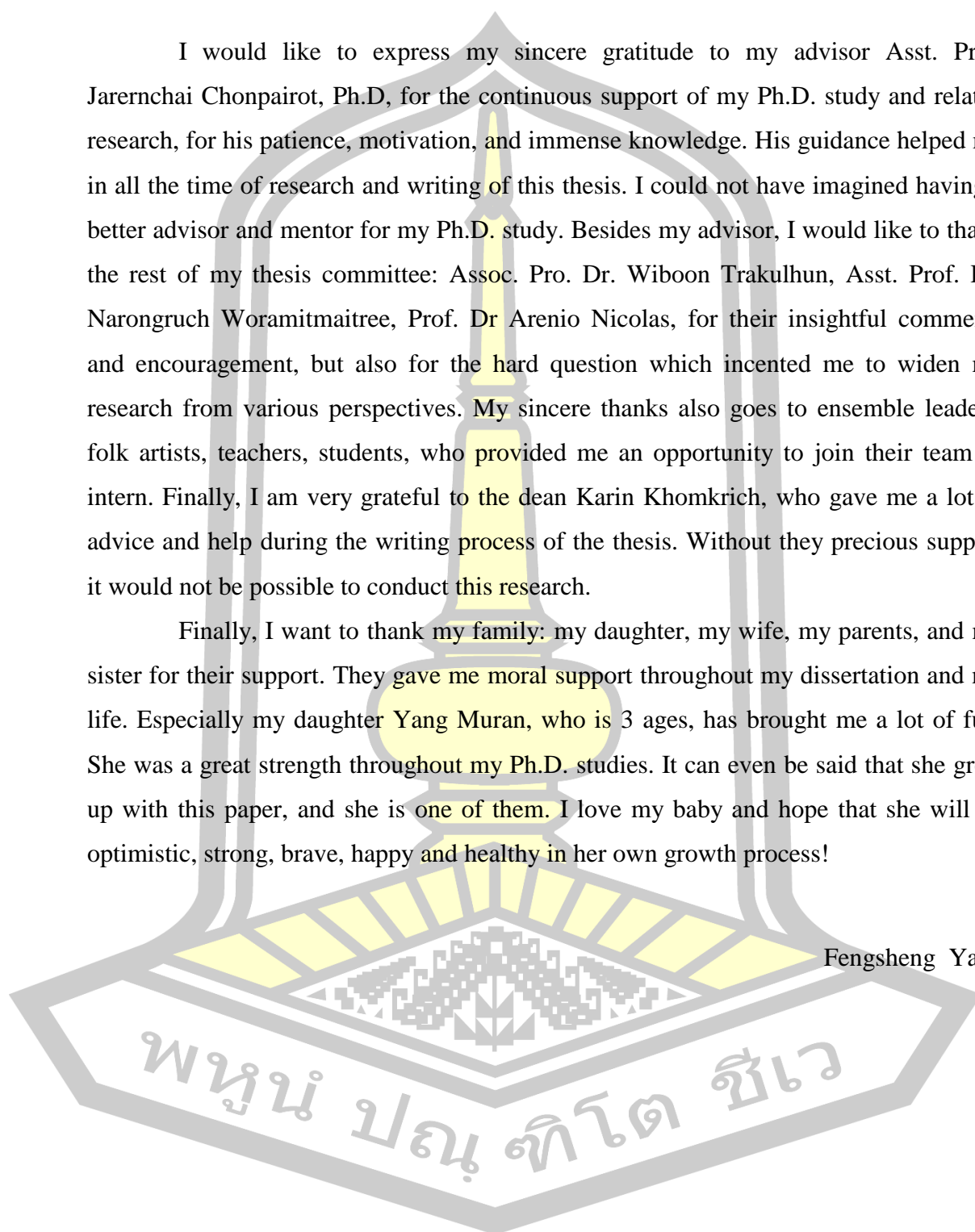


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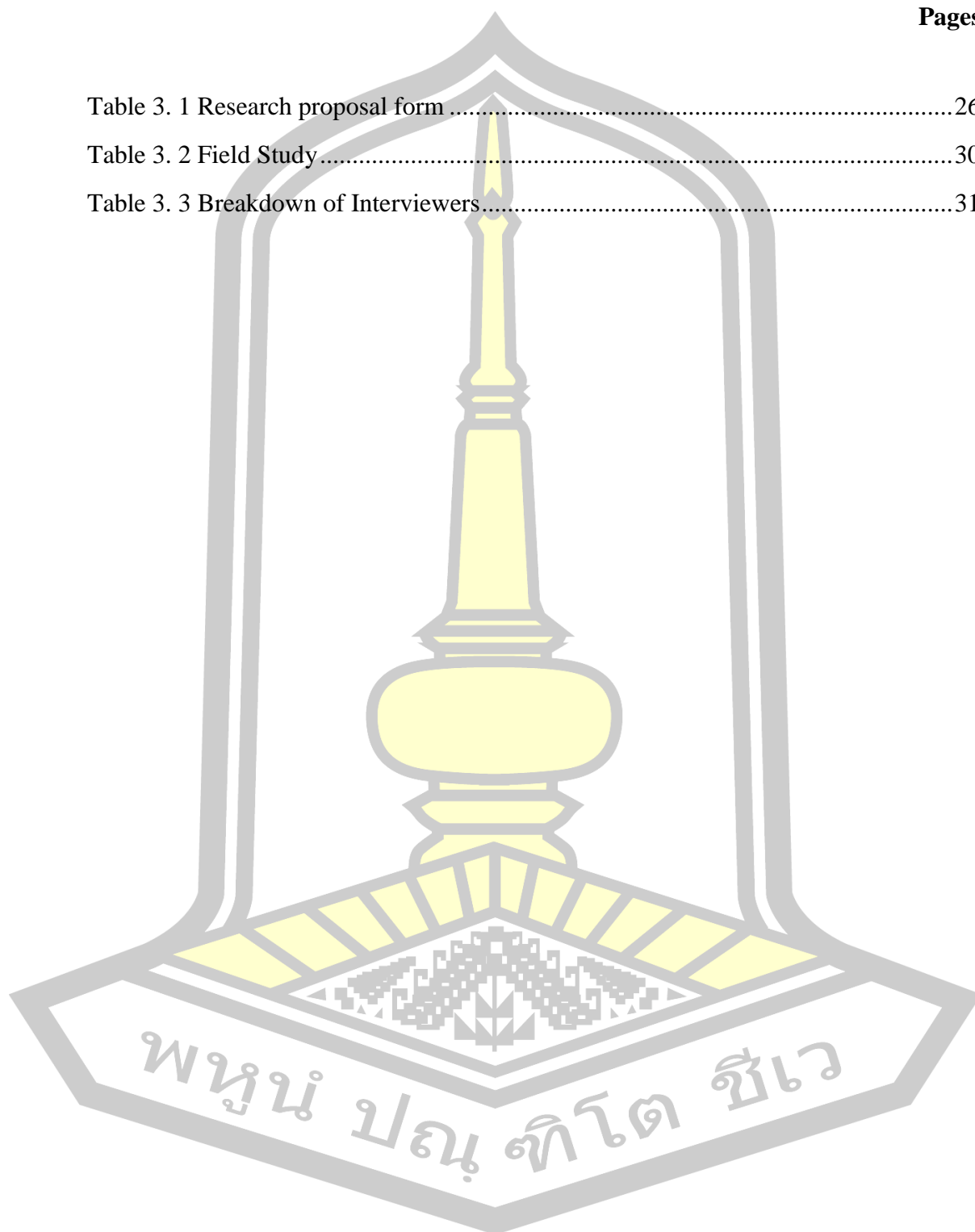
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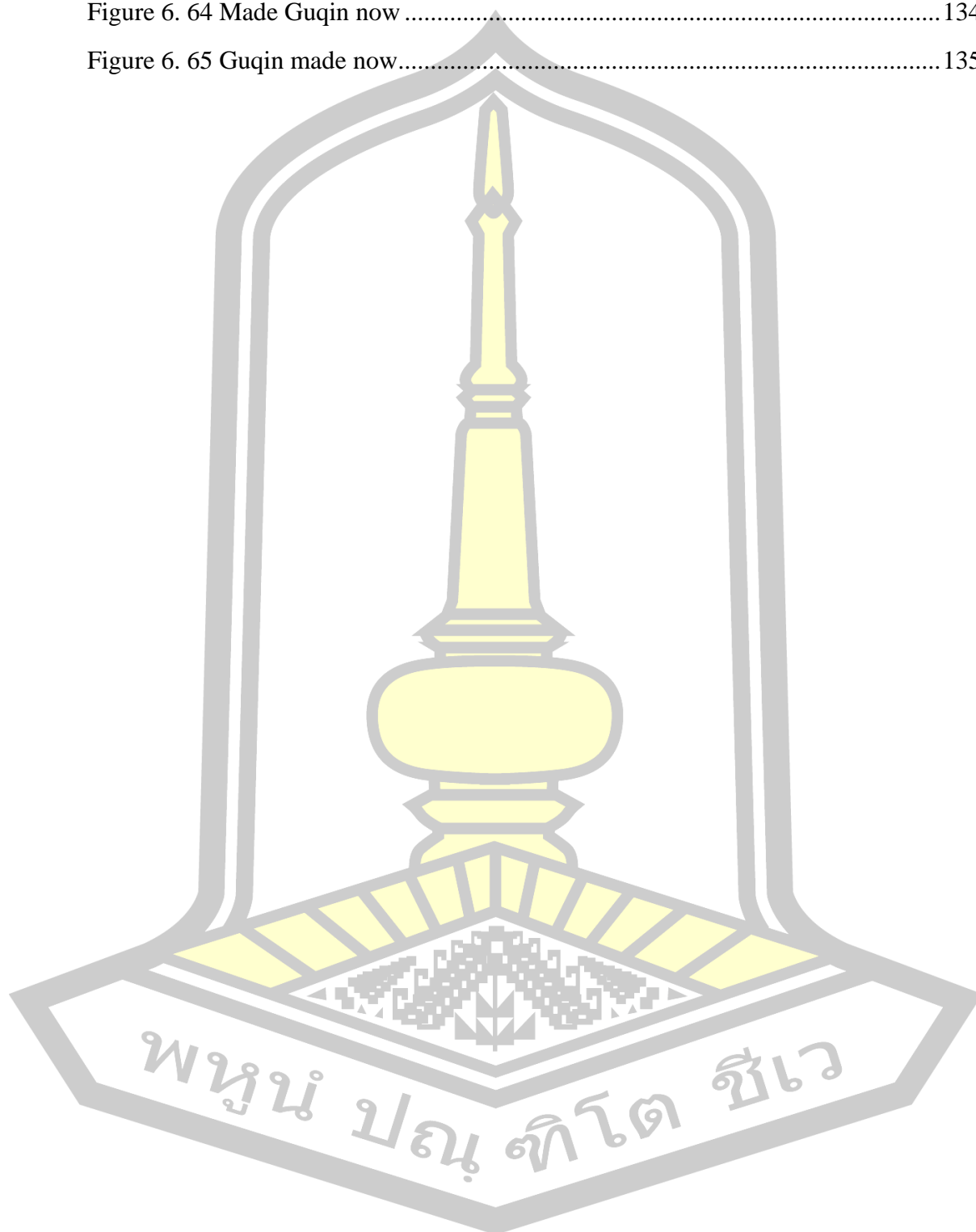
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CHAPTER I

Introduction

1.1 Statement of the Problem

The Guqin is a very representative musical instrument in China, which is also known as "qin", "seven-stringed qin", "yaoqin" and "jade qin". The Chinese Guqin has a long history of more than 3,000 years and is an important part of traditional Chinese music culture. The Guqin production technique is an important part of the Chinese Guqin art, and the Guqin production has formed a fairly mature system under the perfection of people over the generations. Guqin production is a kind of craft technology practice activity for Guqin, which means it needs people to operate it. From the historical documents, Guqin production is an extremely complex process, it is not only the appearance of the completion, but also more importantly, the grasp of the tone of the Guqin, any procedure, if the design is not reasonable, then the tone of the performance will be greatly reduced. (Liu Chenghua, 2002)

In addition, in the group of Guqin makers, there is a common phenomenon: many Guqin makers can't play Guqin music, they can't tell the good and bad of Guqin tone, they only pay attention to the beauty of Guqin appearance. Therefore, they are unable to summarize the mechanism and law of quality tone. This also prompted the researcher to study the production of Guqin. (Gu Yongjie, 2021)

The researcher began to learn to play Guqin at the age of fifteen, and began to learn Guqin making at the age of twenty-five. The researcher is very familiar with the Guqin, and she has the ability to play and make Guqin herself, and she has won some honors and awards in Guqin playing and Guqin making competitions. Therefore, the researcher has the status of an "insider" researcher, which makes it easier for me to study this topic.

In addition, my teacher Prof. Jarernchai Chonpairot often told me that Love is the most important key factor by the researcher. Love is the an important aspect in all activities; love is the most powerful drive of the researcher. Love is the most powerful drive of the people mind. Thai people believe that " soul is the boss whereas the body is the servant" Every activity will be successful through soul. Every activity will be

successful through soul. Because if we love any thing or any work, we will devote ourselves on that work with patience and full attempt. On the same token, dissertation work will not be difficult and becomes a work (Jarernchai Chonpairot, 2022) Prof. Jarernchai Chonpairot's success could not be separated from his love for his profession, for example, he often shared with the researcher some of his experiences in studying and researching Thai music. Therefore, in the researcher's opinion, besides his family, his favorite thing is music. This is also true for the researcher. Only based on the love of guzheng, the researcher will not feel difficult in the process of research and will be able to carry out in-depth research efficiently and qualitatively.

Based on the above reasons, the researcher chose Jiangsu region as the research site, wanting to summarize the suitable Guqin instruments for playing through the study of Guqin production, to promote the transmission, protection, and development of Guqin production, and also to provide a referable case study for the direction of instrumentology in ethnomusicology. Therefore, this selected topic has research value.

1.2 Research Objectives

1.2.1 To Study the Physical Structures and Tuning System of Guqin Plucked Zither;

1.2.2 To search for the excellent characters in terms of physical structures and tone quality of Guqin plucked zither to be used as the Guqin model for Guqin Making;

1.2.3 To make a new Guqin plucked zither that match the quality of the given model.

1.3 Research Questions

1.3.1 What are Physical Structures and its Tuning System of Guqin Plucked Zither?

1.3.2 What are the excellent characters in terms of physical structures and tone quality of Guqin plucked zither to be used as the Guqin model for Guqin Making?

1.3.3 What is a new Guqin plucked zither that match the quality of the given model?

1.4 Importance of Research

- 1.4.1 Understand the physical structure of the Guqin and its tuning system;
- 1.4.2 Understand physical structures and tone quality of Guqin plucked zither to be used as the Guqin model for Guqin Making;
- 1.4.3 Summarize the best quality of Guqin ;
- 1.4.4 Know how to make a good quality Guqin.

1.5 Definition of Terms

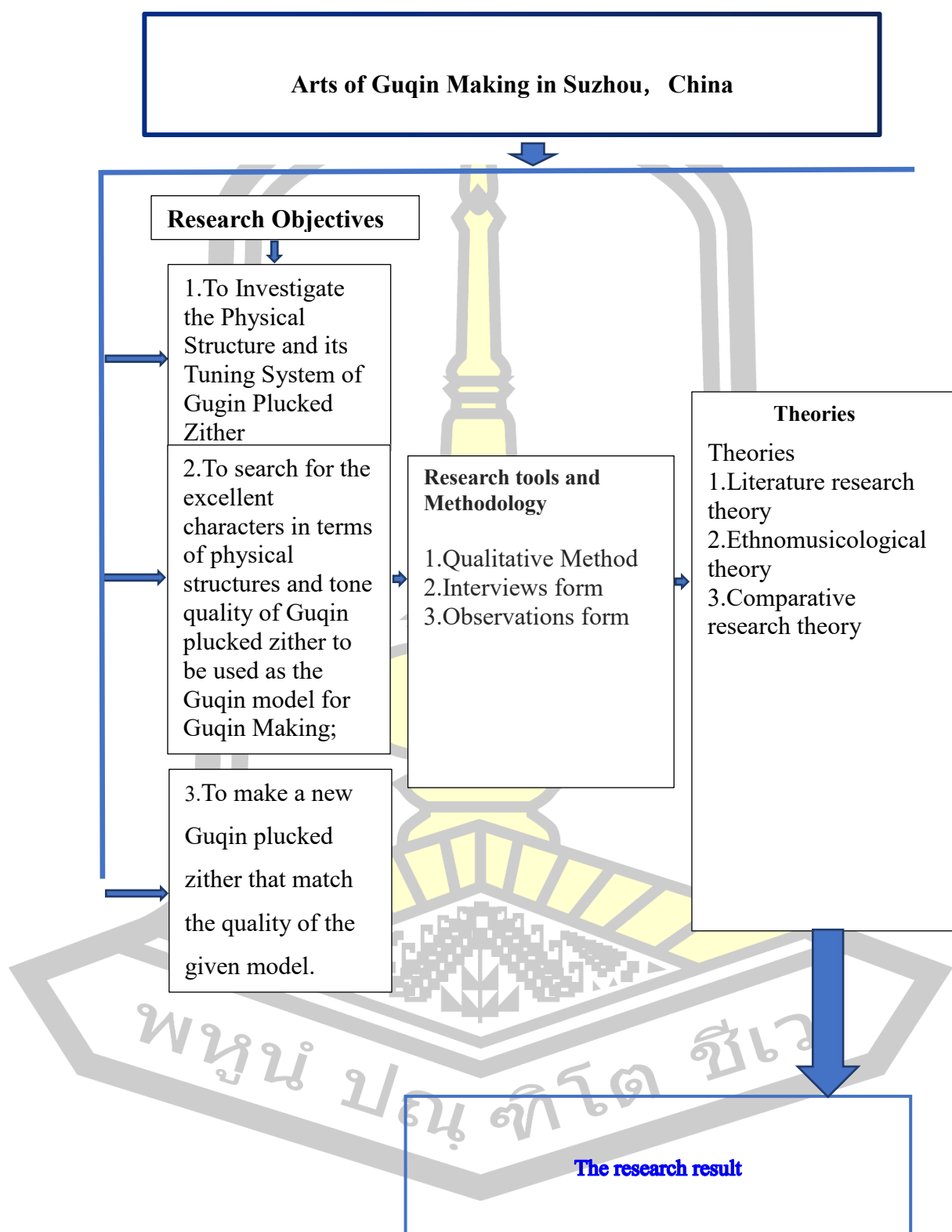
- 1.5.1 Physical structures refer to Size, Styles, Materials, Cavity belly, Sound quality, Inscriptions, Broken grain、 Structure.
- 1.5.2 Tuning system refer to the method of sound tuning for Guqin.
- 1.5.5 Arts of Guqin making refers to the process to make a new Guqin to match the quality, in terms of beauty and tone quality to match the modeled one.

1.6 Conceptual Framework

The title of the study is : Arts of Guqin Making in Suzhou, China, Research Objectives: 1) To Investigate the Physical Structure and Its Tuning System of Guqin Plucked Zither; 2) To search for the excellent characters in terms of physical structures and tone quality of Guqin plucked zither to be used as the Guqin model for Guqin Making; 3) To make a new Guqin plucked zither that match the quality of the given model; written documents and field data will be collected and field data will be obtained through observation and interviews. The theories used in this study include documentary research theory, ethnomusicology theory, and comparative research theory. The progress of the research is shown below.

พหุ ประเด็น วิจัย

1.6 Conceptual Framework



CHAPTER II

Review of Literature

In this chapter, the existing literature on the characteristics of a good Guqin, experts' identification of the quality of the Guqin, and the making of the best quality Guqin has been sorted out and very important information has been obtained, mainly according to the theme and objectives.

2.1 Suzhou City Overview

2.2 Musical Instrument Making

2.3 Physical characteristics and Tuning System of Guqin

2.4 Theories used in the study

2.5 Research and Document related

- About Excellent characteristics of Guqin
- About Experts study of Guqin Making
- About Guqin making program

2.1 Suzhou City Overview

Suzhou, abbreviated as "Su", ancient name Gusu, Pingjiang, Jiangsu Province, prefecture-level city, mega-city, is the Shanghai Metropolitan Area and the Suzhou-Wuxi Chang Metropolitan Area, the State Council approved the determination of the Yangtze River Delta as one of the important center of the city, the National High-tech Industrial Base and the scenic tourist city, located in East China, the middle of the Yangtze River Delta, It is located in East China, the central part of Yangtze River Delta and the southeastern part of Jiangsu Province, bordering Shanghai in the east, Zhejiang in the south, embracing Taihu Lake in the west and Yangtze River in the north. As of 2022, the city has five districts and four county-level cities under its jurisdiction, with a total area of 8657.32 square kilometers, a resident population of 12.911 million, and an urbanization rate of 82.12%.

Suzhou is one of the most economically active cities in China, and the Suzhou Industrial Park (SIP), approved by the State Council in 1994, is regarded as an important window for China's reform and opening-up. 2023, all four counties and

cities of Suzhou were among the top ten of the country's 100 strongest counties, with Kunshan taking the first place in the country for the 18th consecutive year.

Suzhou is one of the first 24 national historical and cultural cities, a famous water town in the south of the Yangtze River, known as "paradise on earth". The city of Suzhou was founded in 514 BC, with a history of more than 2,500 years. In 589 A.D., Emperor Wen of the Sui Dynasty changed the name of the city from "Wu County" to "Suzhou", taking the name of Gusu Mountain. Suzhou Gusu District is the first National Historic and Cultural City Reserve in China. From the Spring and Autumn period, when Wu Zixu built the city of Helu, Suzhou has basically maintained the double checkerboard pattern of "parallel land and water, adjacent to rivers and streets", with "small bridges and rivers, pink walls and tiles, historical sites and famous gardens" as its unique style. The classical gardens of Suzhou represented by the Humble Administrator's Garden and Shantang Street and the Suzhou section of the China Grand Canal have been listed as world cultural heritages, and the ancient town of Zhouzhuang has been included in the reserve list of China's world cultural heritages, and most of the attractions of Taihu Lake are located in the territory of Suzhou. As the core carrier of "Jiangnan culture", Suzhou has become a distinctive symbol for the world to recognize China with its Kunqu Opera, Guqin, Guomao, gardens and Suzhou embroidery. Suzhou is a famous land of fish and rice, rich in produce. Biluochun tea, oranges, loquats, plums, chestnuts, prunes, osmanthus flowers, pearls, Yangtze River swordfish, Lake Taihu silverfish, Lake Taihu white shrimp, Lake Taihu Brunswick, and hairy crabs from Yangcheng Lake are all famous.

Suzhou has a long history of Guqin culture, with a tradition of Guqin art as early as two thousand years ago. In the Ming Dynasty, the "Yushan School" of Guqin was formed in Suzhou, which had a great influence on other schools of Guqin. The Guqin is a cultural symbol of Suzhou, which is one of the reasons why researchers choose Suzhou for their studies.

2.2 Musical Instrument Making

Cheng Si-Qiong's (2020) "Study on the Improvement of the Chinese Guzheng (1949-2009)" takes the "zheng improvement" in the government-led reform of national musical instruments in the sixty years from the founding of New China in

1949 to 2009 as the research object, and analyzes the issues of instrument shape reform and the impact of instrument shape reform on playing techniques and zheng music creation. In this "improvement", the reform of the instrument form and the influence of the reform of the instrument form on the performance technique and zheng music creation are examined and analyzed. From the perspective of the beginning of the new century, we re-examine the history of the zheng improvement, analyze its advantages and disadvantages, and hope to understand the new opportunities for the development of traditional zheng music in the future.

Wang Luhua's (2013) article "Ethnic Instrument Maker Man Ruixing and His Craftsmanship" describes how Man Ruixing is a famous ethnic instrument maker in China who enjoys a high reputation in the industry. He has been learning to make musical instruments for 60 years since 1952, and has participated in the reform of musical instruments in the last century, especially in the improvement of the erhu and pipa, which are the representatives of stringed and plucked instruments among the ethnic instruments. In view of this, this article takes Man Ruixing and his "Man's Musical Instruments" as a case study to analyze the traditional production process of folk musical instruments.

Zhang Anping's (2016) article, "A Study on the Production of a New Type of Guzheng," introduces the structure and production process of the guzheng, discusses the empty-string overtones of the guzheng through spectrum analysis, compares the structural differences with modern guzhengs, and demonstrates the actual finished product of the guzheng in the field by a guzheng player, as an extension of the development of musical instrument production and academic research in the future.

Peng Yi-Qi's article "Modal Analysis of Pipa Face and Back Plate Vibration" applies modal analysis to find out the natural frequency of the pipa, and establishes the modal parameters and modal vibration patterns of the pipa, in order to analyze the so-called secret of pipa production, and to apply it to pipa production. The pipa craft is a musical instrument craft, an artistic craft, a craft with scientific attributes, and a craft that is closely related to its physical meaning. It is not the same as the general wood craft, and the considerations for its components are very different from those of the components of woodworking furniture.

Wei Zhongbin's (2007) article, "Research on the Reform of the Pipa's Sound Beam and Measurement of Vibration Modes," starts from an understanding of the pipa's historical history, and examines the origins of the pipa's various forms in history, as well as the modern pipa's forms and production methods; and then focuses on the reform of the pipa's sound beams in the hope of understanding the pipa's panel's vibration modes by means of scientific and systematic experiments and measurements, and then finally, to produce finished pipa products with different forms of sound beams glued on, to play and record their sounds in order to analyze and compare their spectra to prove the possibility of sound beam reform and explain its rationality. Finally, finished pipa products with different forms of glued-on tone beams were produced, and their sounds were played and recorded to analyze and compare their spectra, in order to prove the possibility of tone beam reform and explain its rationality.

In Lin Fuqiang's (2014) article, "The relationship between the structure of the zhongruan panel and its mode", the zhongruan strings are excited and resonate with the panel and the loudspeaker after coupling to amplify the vibration energy of the strings and transmit the sound. The modes of the panel (the vibration pattern plus its corresponding natural vibration frequency) have a certain relationship with the timbre. The researcher tries to analyze the first six modes of the panel's vibration by using the concept of the finite element method with ANSYS analysis software to simulate the first six modes of the panel's vibration, and supplemented with experiments to find out the relationship between the modes and the timbre.

In Huang Yi-chiao's (2006) "A Study on the Evolution of Erhu Forms and Materials", the study mainly focuses on the evolution of erhu forms at various times in the history of the modern erhu school established by Zhou Shao-mei and Liu Yao-hua, starting from the year 1906. In addition, the following five facts related to the erhu are used to illustrate the mutual influence of the erhu in the process of its evolution: I. Evolution of the early history of the huqin. The influence of political forces. The materials used in the production of the erhu and the different interpretations of the old mahogany are lost. The use of snakeskin, the sound-producing diaphragm material of the erhu. V. The evolution of the bow, the

pianoforte, the qianjin, the windowpane, the axle, the strings, and other forms of the erhu in various periods.

Li Qiaoyu (2021), "A Study of Erhu Production in Taiwan," focuses on the production of the erhu in Taiwan and summarizes the development of the erhu in Taiwan, as well as the ideas and characteristics of erhu makers in Taiwan in terms of instrument production, in order to understand the dilemmas and problems faced by erhu makers in Taiwan and to explore the development of erhu production in Taiwan.

Lili Tsai's (2004) article, "Transfer and Sharing of Experiential Knowledge on Violin Making Techniques," utilizes in-depth interviews and participant observation. The hermeneutic approach to the analysis is to use the rich conversation patterns of in-depth interviews and observations to help understand the respondent's violin making skills and personal history, as well as his rich experiential knowledge. With the experiential knowledge of violin making techniques, it is explored to establish the transmission and sharing of technical experience through the interaction of the master-apprentice system, whereby the master's personal intrinsic tacit knowledge is passed on to the apprentice, in the hope of gaining an in-depth understanding of the interviewees' experiential knowledge of violin making and technical knowledge of violin making.

Chen, T. C. (2015). *The Reform of the Traditional Musical Instrument Yangqin (扬琴)*, focuses on the origins of the Chinese yangqin and its reform and development after 1950. The researcher tries to find out the instrumental problems of the Chinese yangqin from a scientific point of view, and identifies the problems of the yangqin at present. The researcher discusses the problems of each part of the instrument in terms of the frame, the structure of the body, the top, the stops, and the stringing tools, and suggests the causes of these problems and the possible solutions to solve them. The researcher also draws on the structure of the yangqin in other countries, especially the mature and complete structure of the Hungarian grand yangqin, and puts forward a new proposal for the structure of the yangqin - a new type of yangqin in which the frame of the faceplate is independent of the frame of the crossbeam of the instrument body, eliminating the structure of the balls and the brass carriages, and installing the stops in the style of the Hungarian grand yangqin. The

researcher will soon file a patent application for this new type of loudspeaker. As the strumming tools of the yangqin coincide with the development of the bamboo instrument, the researcher not only analyzes and introduces the bamboo instrument at each stage, but also discusses the process and results of the researcher's research and development of the bamboo instrument.

Yan (2012), "The Heritage, Production and Performance of the Hungarian Yangqin as a National Musical Instrument," mainly focuses on the three parts of the Hungarian Yangqin, namely, the luthier, the workshop, and the performance, and analyzes the Transmission of its luthiery and industry and its development process, and records the steps of the entire production process, in an attempt to understand the structure of the instrument, the production method, the materials used, the instrument maintenance, and the sound system, among other related issues; It then analyzes the type of instrument, the choice of excitation materials, the performance method and the expression and application of techniques, in an effort to illustrate the artistic characteristics of the instrument's performance.

2.3 Physical characteristics and Tuning System of Guqin

Zhang Huaying (2005) The book "Guqin" is a study of the art of the Guqin. It covers the history and culture of Guqin music, the appreciation of heirloom Guqin masterpieces, and the genres and Transmission of Guqin music, including a brief description of the physical structure of the Guqin.

Lindsley, Sweden The Guqin (2019) is a Swedish sinologist's experience and insight into the world of the Guqin. It not only has a description of the physical structure of the Guqin, but also an interpretation of the significance of the Guqin in the lives of ancient literati, of the Guqin's destiny with human beings, its interconnection with music and poetry, and even how we should live.

Lin Chen (2009) The book "Guqin" mainly aims to let the general readers understand the art of the Guqin and guide them to appreciate the unique charm of the art of the Guqin. The researcher uses concise expressions and rich historical materials and illustrated stories as the main line, starting from the construction and style of the Guqin, and introduces in detail the development, reform, and refinement of the art of

the Guqin from the pre-Qin Dynasty to the present day. The physical structure of the Guqin is briefly described in Lao Tong's (2018) book *The Way of the Guqin*.

Chen Miao, Chen Yaoshan, Shao Long (2022) The book *The Guqin for the Masses* is a popularization book of Guqin knowledge for the grassroots and for the majority of Guqin enthusiasts, featuring some classic traditional Guqin songs, modern songs familiar to the public, as well as Guqin fingering and music theory. There is a short description of the physical characteristics of the Guqin in the first chapter.

There is a brief description of the physical characteristics of the Guqin in Zhang Min's (2022) *Appreciation of the Art of the Guqin*.

Chen Yingshi (2015) describes the physical structure of the Guqin in the first chapter of his book *Guqin Rhythmology*, mainly with pictures.

Liu Yanzhong's (2021) book *"Teaching Plan for the Analysis of Famous Guqin Music"* lists the tuning methods of Ruibin tune.

Lin Xili's (2019) *"Guqin"* lists all the modes of the Guqin, but does not describe the tuning method.

Gong Yi (2002) listed six commonly used tuning methods in his article *"Guqin Playing Methods"*.

Li Xiangting's (2004) *"Guqin Practical Tutorial"* lists the sound modes of the Guqin, but does not ignore the tuning methods.

Chen Yingshi's (2015) book *"Guqin Rhythm"* describes the tuning system of Guqin, but does not explain the method of converting Guqin's multiple modes.

2.4 Theories used in the study

2.4.1 Musicology

"Musicology" has many meanings and concepts, each with a similar viewpoint and perspective. The principles and methods of musicology have been systematized. The concept of learning is to work from research. Many scholars have elaborated their own meanings of "musicology":

Mention that musicology is the study of certain musical styles deeply, including all of the musical contents, including music performance, composition, and music resources. The contents are about the theory of music, such as music elements,

harmony, and melody. (Christine Ammer, 1987, quoted in Narongruch Woramitmaitree, 2001)

Musicology is the general term for all theoretical subjects that study music. The general task of musicology is to elucidate the nature and laws of various phenomena relating to music. For example, studying the relationship between music and ideology includes music aesthetics, music history, music ethnology, music psychology, and music pedagogy. (Yandi Yang, 1995)

Musicology is the general term for the academic study of music and related matters. Music disciplines include music performing arts, composition and composition techniques theory, and musicology. Not only that, in musicology, the subject branch should include music creation and music performing arts. (Yaohua Wang and Jianzhong Qiao, 2005)

Musicology is the study of the material properties of music, including musical acoustics, Law, musical instruments, etc. The study of musical form and its composition includes melody, harmony, acoustics, counterpoint, and compositional process. There are also performance issues to consider, such as performance theory and How to play. (Yu Renhao, 1997)

According to the above literature, musicology includes the study, music theory, music content, music history, music acoustics, and knowledge in the fields of physics, psychology, social sciences, and ethnomusicology. Knowledge in the fields of physics, psychology, social sciences and ethnomusicology. Currently, musicology also includes performance or singing techniques and composition. This paper analyzes Guqin music with a musicological approach. The sound characteristics of the Guqin are observed through the analysis of Guqin music.

2.4.2 Ethnomusicology

Ethnomusicology is: "a theoretical discipline under musicology that studies the traditional music of the peoples of the world and its types of development, with fieldwork being the basic way of obtaining sources of research material. Its main characteristic is that it regards the musical object under study as a musical phenomenon and places it into the specific natural and socio-cultural environments of the ethnic group, so as to expound the basic morphological characteristics, survival and mutation patterns of the musical genres concerned through the study of how

members of the ethnic group construct, utilize, disseminate and develop these musical genres in accordance with their own cultural traditions. By examining and studying how members of the ethnic group construct, use, disseminate and develop these musical genres in accordance with their own cultural traditions, we will expound on the basic morphological features, survival and variation patterns and national cultural characteristics of the genres concerned. (Wu Guodong, 2016)

Ethnomusicology includes investigating and studying the music characteristics of different ethnic groups, countries, and regions; exploring the relationship between these music and geography, history, and other cultures; compiling ethnomusicology or regional music, and drawing some conclusions related to music from it. It belongs to a category of musicology and is closely related to ethnology and folklore. It is a science that investigates and studies the national music of different countries and regions with different social systems and different levels of development, and finds out various laws related to music. Fieldwork is the basic way to obtain research materials. The predecessor was European Comparative Musicology. In addition, things like comparative instrumentology and comparative music history are all research topics in this discipline. (Luoqin, 2011)

Originally formed by the convergence of the disciplines of musicology and anthropology, the study of music using the theories of anthropology is a cross-disciplinary discipline that can enter more deeply into the cultural field of vision. It is a cross-disciplinary field that can enter into the cultural field of view more deeply. The study of music in the cultural field of view is defined by the American ethnomusicologist Merriam as "the study of music in culture" or "the study of music as culture". (Guan Jianhua, 2013)

Japanese musicologist Shu Yamaguchi defines the discipline of ethnomusicology in this way: The discipline of ethnomusicology deals with musical expression and even musical culture and its surrounding matters that exist at various levels of culture from individual human beings, small collectives, communities, regions, tribes, nations, countries, and races up to the whole of humanity. It seeks to elucidate not only the internal structure (Musical Structure) of its central object, but also its external structure (Chakra Structure), which is constrained by the respective society and culture, and to grasp the interrelationship between the two structures,

internal and external. In this way, it clarifies the nature of human musicality while positioning it between the poles of cultural individuality and universality.(Shan Kouxiu, 1999)

According to the above literature, musicology includes research, music theory, music content, music history, music acoustics, and knowledge in the fields of physics, psychology, social sciences, and ethnomusicology. Currently, musicology also includes performance or singing techniques and composition. This paper transcribes and analyzes the collected data through musicology and ethnomusicology methodology. In addition, the quality of the sound of the Guqin is observed by analyzing the music of the Guqin, which is the focus of this paper.

2.4.3 Chinese traditional music aesthetic theory

Chinese traditional music aesthetics is a theoretical discipline that takes Chinese traditional music as the research object and summarizes its laws and interprets its significance. It has no individual-to-general relationship with general music aesthetics, nor can it replace its own construction with research on ancient Chinese music aesthetics. As aesthetics, it is naturally incomplete in revealing laws, and focuses on interpretation of meaning as its academic method. It is based on the study of traditional music forms, makes full use of the theoretical resources of ancient music aesthetics, draws on the academic system of Western aesthetics, and introduces the cultural dimension for in-depth interpretation. (Liu Chenghua, 2010)

Chinese traditional music focuses on expressing the spirit of music. Guqin art is the most humanistic instrument among Chinese musical instruments. Therefore, this study will use aesthetic theory to effectively combine aesthetic theory with the sound of Guqin to explain what kind of music is High quality music.

2.5 Research and Document related

About Excellent characteristics of Guqin

Fan Yumei (2013) compiled a lot of ancient Chinese literature on Guqin making in *Selected Materials on Guqin in All Ages*. Huan Tan of the Han Dynasty mentioned the ancient tradition of making the zither out of sycamore wood in his *New Treatise on the Way of the Zither*: "In the past, Shen Nong succeeded Mi Xi and ruled the world, but he also viewed the law in the sky and took the law in the earth, taking

only the body and taking the farther from the body. The law in the sky, down to take the law on the ground, only take the body, far from all things. So he began to cut the tung for the zither, and the rope for the strings, in order to pass the way of the gods, and to harmonize with the harmony of heaven and earth." In "The Ancient Remains of the Sound - The Essay on the Material of the Qin", it is stated that the softness of tung wood and the rigidity of catalpa wood, with tung as the virtual and catalpa as the real, are the best. (The material of the world, soft and good as tung, firm and rigid as zi. The rigidity and softness of the tung is matched by the solidity of the catalpa). In "Yongle zither book integration - zither material", tung is yang, catalpa is yin, and three years of sycamore wood as the material for making the Guqin, the ancients were happy to use tung and catalpa, to achieve a combination of rigidity and flexibility, yin and yang, made of Guqin sound to achieve a sense of calm and harmony. With the ancient zither spectrum - the sky over the round into" said: "the law first to take the material length of three feet nine inches flooding more trespassing are required to have more than, no awkward and smooth. The material of the yin, yang, up and down, with the yang for the face, under the head; yin for the belly, on the tail. Its broad two sides, are refined flat "production of Guqin, you must look for the road about three feet long inches of wood, do not have scars, wood grain to be straight, can be divided into yin, yang, up and down, the sun to the wood for the yang side up, near the roots of the tree is suitable for the head of the qin, the sun can not irradiation of the The part is yin and can be used as the belly of the qin, the part near the top of the tree above is suitable for the tail of the qin, and the two sides that are more expansive need to be balanced and leveled. (Fan Yumei, 2013)

In the Northern Song Dynasty, Shi Rutong's "Bilu Zi Zin Hacking Method" said that the Guqin became a musical instrument because it could reach the virtue of the gods and the peacefulness of heaven and earth in ancient times, so it was not a musical instrument that could be made of a generalized wood, and the first choice of wood for qin-making was definitely the wutong wood that grew in the hills of Yishan, and the best wood to make a Guqin was known to Cai Yong in the Eastern Han Dynasty when he heard the sound of burning wutong wood, and it was difficult to have wood from Yishan, but there were still some people who used the wood. Although it is difficult to find wood from hills, there are still people looking for good

material for making qin. Jikang in the "qin fugue" said: "But the chair wutong of the birth of Ruoxi, to the lofty heights of Junyue. Phi heavy soil to birth loaded Ruoxi, the cinnabar pole and high. Containing heaven and earth of mellow and Ruoxi, sucking the sun and moon of the rest of the light. The only way to get the most out of your life is to have a good time. Beautiful sound will rise, solid and Chang and enough to delay carry." Its expression of the best wood for making qin is growing on top of the mountains, absorbing the essence of heaven and earth, the sun and the moon, and the sound out of the qin produced can produce resonance induction. The above documents mainly focus on the use of tung and catalpa wood to make Guqin, where yin and yang are intertwined to create a Guqin that is in tune with the sense of peace and harmony. (Fan Yumei, 2013)

Wu Zhao (2018), "Treasures of the Chinese Guqin", mainly includes 109 heirloom Guqins from the Tang Dynasty onwards, in which, in addition to the detailed end of the Guqin's age, style, gray tire, broken grain, etc., the book also introduces the materials used in the production of the Guqin. Mao Yi (2013), "The Secrets of Guqin Materials", mainly describes the types of wood used by the ancients in making Guqin, and focuses on analyzing the sound conductivity of cedar by scientific methods, in addition to describing the various ways of treating moisture in wood. He believes that fir wood is most suitable for making Guqin. Gu Yongjie (2016), "A Brief Discussion on the Material of the Guqin", provides statistics on the physical material of the ancient qin of all generations, and also analyzes the acoustic properties of the wood with acoustic theory. It argues that ancient Guqins were made of high quality mainly because of the advantages of wood. Tao Yuncheng's (2014) book "The Method of Making Guqin" not only describes the selection of wood, but also emphasizes that the drying of the wood and the storage of the wood affect the sound quality of the qin, and that the wood used to make the Guqin must pay attention to the drying of the wood as well as the environment in which it is stored, which have a very important effect on the sound quality of the Guqin. In addition, research results such as Wu Zhao's (2004) "The Ultimate Clear Sound" and Zheng Minzhong's (2010) "Li Xie Pian Lu Jie: Research on the Guqin and Beyond" all agree that the material of the Guqin plays an important role in the quality of its sound.

Regarding the style of the Guqin, the earliest record of the style of the Guqin to date is Tian Zhiweng's "Tai Gu Renunciation" of the Southern Song Dynasty. In the Ming Dynasty, Yuan Junzhe's "Taiyin Daquanji" included 38 styles of the zither through the ages. In addition, there are more than 40 kinds of styles in the works such as "Gu Yin Zheng Zong", "Wen Hui Tang Qin Records" and "Feng Xuan Xuan Pin". The Qing dynasty Zhu Harmony of Harmony (祝凤喈) "and the ancient zither spectrum" has included more than 50 kinds. In ancient times, many qin recipes include some styles of Guqin, such as "The Complete Book of the Qin", "Tai Gu Zheng Yin Qin Jing", "Wan Feng Ge Fingeringsés Notebook" and so on, which all draw styles of the Guqin and describe them briefly in these literatures. (Fan Yumei, 2013)

Jin Yu Qin Society's (2018) "Jin Yu Qin Journal," photographs of the qin collectors' collections at the time are recorded, which visually record the styles of the Republic of China's Guqin, such as "Liu Shaochun's collection of Guqins," "Shuang Lei Zhai's collection of Guqins," "Hu Zi Zhi's collection of Guqins," and so on. "" Hu Zifu Jun Tibetan qin ", etc., these qin style are then the qin people private, on the future of the research can be utilized. In addition, the "Records" section of the "Guqin Recruitment and Visitation Records" recorded a total of 167 beds of qin, including the style, name, length, curvature, breadth, fracture, lacquer color, sound, the maker of the Guqin, the repairer of the Guqin, etc. The "Guqin Recruitment and Visitation Records" also recorded the "Guqin Recruitment and Visitation Records". Then there is the "Guqin Recruitment and Visitation Record" which records 41 beds of qin, which records the year and month of the destruction of the qin, the style, the collector, the maker of the qin, the lacquer color, the length and breadth, the name of the Guqin and the sound, and so on. Then there are "miscellaneous records" in the "Xuanlou string outside the record" records "flying spring" "memory of the dead girl" "alone" "Ten Thousand Gullies Pine Wind Trekking", "Luqin", "Autumn Pond Cold Jade", is an important reference document for the study of ancient Guqin styles. In a word, the "Jin Yu qin publication" is one of the most important qin literature in modern times, with rich, detailed and heavy contents, which is the most reputable publication on the

Guqin since the Ming and Qing Dynasties, and is mostly respected by today's qin experts, scholars as well as qin people.

Wu Zhao (2018) The book Chinese Guqin Treasures is typeset and categorized in terms of zither styles, detailing the 109 beds of Guqin that have been handed down through the ages in China.

Zhu Huipeng (2011) The book Making the Guqin French Style analyzes the Guqin Zhongni style and Fuxi's hacking in a specific way, while other styles of Guqin are not analyzed.

Wang Peng (2010) The book "Jun Tian Making Guqin Record" has innovated the style of the Guqin and has given a detailed description.

Zhao Lu's (2017) master's thesis on "Modeling Research on the Style of the Guqin" summarizes the modeling laws of the style of the Guqin and forms a systematic research on the style of the Guqin by culturally analyzing, comparing, and classifying the styles of the traditional Guqin and combining them with the craft of carving the qin. The research shows that the modeling aesthetics of the qin's style has a certain relationship with people's temperament, and it also believes that the modeling of the qin's style represents the cultural demands of the qin player as well as conveys the characteristics of the era's style.

In addition, there are major museums in the collection of qin objects, such as the Palace Museum collection of qin 46 beds, the Hunan Provincial Museum collection of qin 53 beds, the Zhejiang Provincial Museum collection of qin more than 30 beds, Chongqing Three Gorges Museum collection of qin 47 beds, the Sichuan Provincial Museum collection of qin 30 beds. There are also qin collections in Nanjing Museum, Henan Museum, Shanghai Museum, Shaanxi History Museum, Liaoning Provincial Museum, China Art Research Institute and overseas museums, etc., which are the material basis for our research on the style of the Guqin.

Wu zhao (1996) "qin appreciation and collection" also talked about the ancient qin lacquer loose, even into the qin time is not too long time is also easy to start break, some qin, lacquer hard, time is not easy to start long time is not easy to break.

Ma Wei-heng (2012) "the ancient qin appreciation and collection" article that the broken line is the lacquer due to time long color cracks, the ancient qin tire bone and the lacquer layer is often constantly expanding and contracting produced.

Sun Yuhan's (2013) article "Zither Studies Series - Lacquer Broken Stripes" mainly introduces the history and properties of lacquer, and describes the eight types of lacquer ash used in the hacking of the Guqin. In addition, the article also introduces the categories of broken lines on the body of the zither, and according to her own practice, she believes that the production of broken lines is closely related to lacquer ash. Mao Yi, in his article "The Secret of Guqin Material", believes that the broken grain of the Guqin is very precious, which will give the instrument a different sense of beauty and also increase the collection value of the Guqin. He also believes that the broken grain of the body of the Guqin is not only harmless to the timbre of the instrument, but also helps the propagation of the timbre because "the reason for this is that the acoustic taste of the sound of the sound spoke quality constant, acoustic impedance, acoustic attenuation coefficient has been significantly improved, and the playing of the instrument feels the sound of the instrument fire gas is small, translucent, loose, and heavy, which is a rare enjoyment."

Guo Lei (2013), "Aesthetic Characteristics of Guqin Broken Texture Art", believes that the generation of broken texture is due to the layers of lacquer and gray tires on the surface of the qin, and the expansion coefficients of the lacquer, gray, and wood are different, and over the years, under the influence of cold and summer temperature differences in heat and cold expansion and contraction as well as acoustic vibration, the upper and lower Guqin generates broken texture of different shapes.

Yang Tianxing's (2018) article "The Guqin's fracture pattern - the thinking of mechanics and the change of ancient and modern times" mainly utilizes the theory of fracture mechanics to clearly explain the main causes of the transverse fracture on the surface of the Guqin, providing a reliable basis for judging the fracture pattern of the Guqin. This article makes up for the limitation brought by the written records, the researcher uses the mechanics and the relevant research results from abroad to dig deep into the inner law of the Guqin's fracture pattern, and this research is forward-looking.

About Experts study of Guqin Making

The paper of Guo, Rinmo (2018), "A Study of the transmission of the Guqin Making Tradition by Guqin Maker Mao Yi" focuses on the case study of Mao Yi, a

sixth-generation zither maker and Guqin maker of the Zhucheng School in Shandong Province. Zhang Zhenrui (2017), "The Body and the Qin: A Cultural Interpretation of a Guqin-Making Monk's Physical Practice," takes the practice of the Guqin-making monk as the object of investigation, and attempts to describe and elaborate the cultural space of significance that is generated by the Guqin-making monk's music-making in a holographic manner with an anthropological methodology, taking his experience and sense of body as the entry point. Xu Yuyang (2022), "Research on the transmission Activities of Chen Yimin, the Provincial Representative transmitter of Lingnan Guqin Production Technique," mainly takes Chen Yimin, a Lingnan Guqin maker, as the research object, and the paper mainly describes Chen Yimin's concept of Guqin production transmission, the dissemination and transmission activities of Guqin production as well as the effect of dissemination, and the researcher utilizes the theory of dissemination to explain the operation mechanism of the dissemination of the Guqin production in the Lingnan area, which is of some Value.

The Music Research Institute of China Academy of Art, Beijing Musical Instrument Society, edited by (2020) *Contemporary Guqin and Guqin Makers in China* records 172 representative Guqin makers in contemporary times (including Hong Kong and Taiwan), and the book provides objective, accurate, and detailed records of Guqin makers' Guqin making experience, craft transmission, research and exploration by means of illustrations and autobiographical documentary. The publication of this book is beneficial for the group of Guqin makers to get due respect and cultural recognition. At the same time, it also provides researchers with a vivid case study example, which will help them to conduct in-depth research in the future. In short, the publication of *Contemporary Chinese Guqin and Guqin Makers* is a milestone in the field.

The main research on Guqin makers include senior journalist Meng Jianjun's (2009) "Interview with famous Guqin maker Wang Peng", "Interview with contemporary Guqin maker Tian Shuangkun", "Interview with Guqin maker Zhang Yuxin", "Guqin maker in "Huanjia Mountain Room", "Ma Wendeng: carving a knife deeply into the wheel of history", etc, which mainly describe the Guqin makers and the Guqin makers. These papers mainly describe the biographical history of Guqin

makers and the life history of Guqin makers in the Guqin making community, and are indispensable references for the study of this community of Guqin makers.

The group of Guqin makers is mostly neglected, and they have made indelible contributions to the development of the Chinese Guqin art. At present, the academic world has not paid enough attention to this group of Guqin makers, and Mr. Meng Jianjun is the forerunner. The current results are not much to introduce the biography of the Guqin makers, not at all to the height of the academic theory, we need to pay attention to many researchers, the main body of the production of the Guqin is the "people", the people are the main mechanism for the generation of the Qin. Therefore, the researcher calls again: musicology, please focus on the "Guqin maker".

About Guqin making program

Qin Aisun (2016) The book "Guqin Making" is divided into four main chapters, which are an overview of the Guqin, the principles of Guqin acoustics, the process of Guqin making, and the tasting of ancient legacy Guqins. The Guqin making process is mainly the steps of ancient Guqin makers that are referenced.

Wang Dong (2011), "Guqin Production and Restoration", the main book introduces in detail the history of the development of the ancient Chinese musical instrument, the Guqin, and describes in detail the various types and sizes of the Guqin, as well as the production of the broken Guqin, the supporting accessories, the method of playing, and other kinds of knowledge about the Guqin. This is a worthwhile research result for those who are engaged in the production of Guqin.

Yang Zhijian (2022) The Traditional Art of Chinese Guqin Production mainly describes the traditional art of Chinese Guqin production. The heritage of the Guqin is not only embodied in the art of Guqin performance, but also in the production techniques. A qin is the result of the maker's skill, aesthetics, values and emotions. The researcher of this book, Yang Zhijian, has been devoted to the production and restoration of the Guqin for many years, and after engaging in the research and restoration of the Guqin in the Palace Museum, he has gained new insights into the art of the Guqin and the production of the Guqin. The Guqin production procedures in the text still refer to the order of ancient Guqin makers.

Wang Peng's (2017) book *Restoration and Production of Traditional Silk Strings of the Guqin* focuses on the restoration and production of traditional silk strings of the Guqin. First of all, combined with the knowledge of related disciplines, the traditional string-making technology recorded in the literature of successive generations from ancient times to the present day was combed, summarized and interpreted in a more systematic way, so that the traditional silk string production process was clearly presented. It also presents the main techniques of contemporary research and development of traditional silk strings for the Guqin, providing the necessary reference for the traditional silk string making process and its historical process.

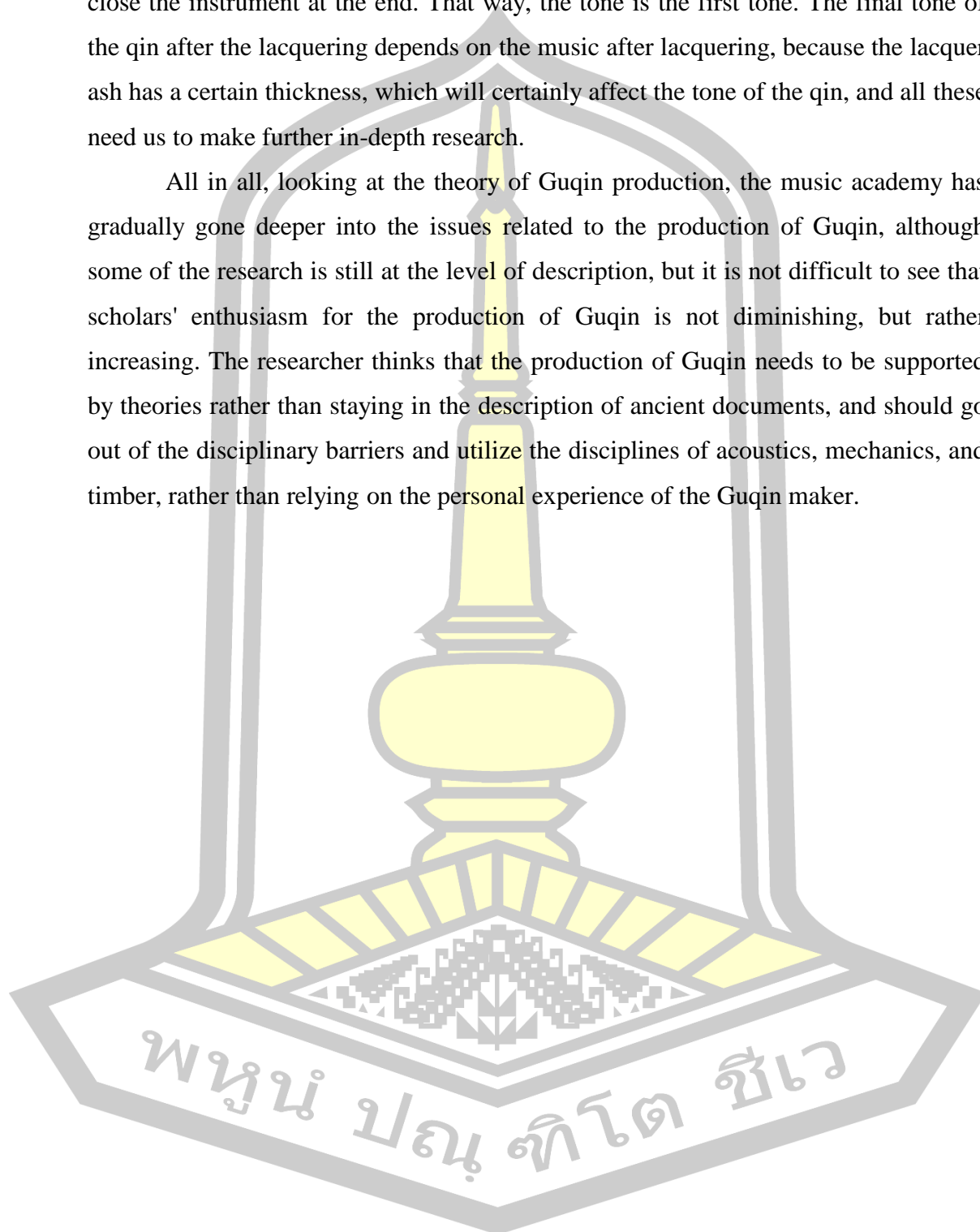
Zhu Huipeng (2011), *"Guqin production of the French style"*, a book using contemporary language expression of the Guqin production techniques in great detail, *"Guqin production of the French style"* is divided into the *"Qian set"* and *"Kun set"* of two parts of the book, the book mainly introduces the zither ministries names, styles, selection of materials, the Guqin production tools, the zither production techniques, etc.; Wang Peng (2011), *"Juntian Guqin production"*, *"Guqin is How to make"*, Qin Aixun (2016) *"Hundred Work Records - China Arts and Crafts Record Series: Guqin Production"*, Guo Ping (2006) *"Guqin Series Talk"*, Zhang Huaying (2005) *"Guqin"* and *"Heirloom Guqin Production Craft"* and other works of the Guqin production technology have a detailed introduction to the general idea and the ancients The general idea is the same as that of the ancients.

To sum up, most of the literature, whether historical or current, stays on the surface description, although some of them use acoustic theory to analyze the material of wood, but they are not in-depth and do not give the reader a clear sample parameter. Scholars should exercise acoustic theory to study the parameters of wood, so as to come up with suitable wood for production, which is a subject we need to overcome.

From the process of Guqin production, it is roughly from taking (selecting) materials, laying down materials for embryo, making face and base plate, digging groove belly, tuning, combining qin, putting on gray tire, using lacquer, pushing light, installing geese's feet, installing emblems, putting on strings, and pressing fittings. Judging from the literature, most of the instruments follow this process. The

researcher wonders whether it is possible to put the lacquer on the cloth first and then close the instrument at the end. That way, the tone is the first tone. The final tone of the qin after the lacquering depends on the music after lacquering, because the lacquer ash has a certain thickness, which will certainly affect the tone of the qin, and all these need us to make further in-depth research.

All in all, looking at the theory of Guqin production, the music academy has gradually gone deeper into the issues related to the production of Guqin, although some of the research is still at the level of description, but it is not difficult to see that scholars' enthusiasm for the production of Guqin is not diminishing, but rather increasing. The researcher thinks that the production of Guqin needs to be supported by theories rather than staying in the description of ancient documents, and should go out of the disciplinary barriers and utilize the disciplines of acoustics, mechanics, and timber, rather than relying on the personal experience of the Guqin maker.



CHAPTER III

Research Methodology

This chapter describes the research methodology used in the study, including details of the subjects, and the process of designing the questionnaires and interviews.

3.1 Research scope

3.1.1 Scope of content

3.1.2 Scope of research site

3.1.3 Scope of time

3.2 Research Process

3.2.1 Methodology

3.2.2 Information Providers

3.2.3 Research Tools

3.2.4 Data Collecting

3.2.5 Data Management

3.2.6 Data Analysis

3.2.7 Data Presentation

3.1 Research scope

This paper takes the production of Guqin in Jiangsu Province, China, as the research object, on the basis of literature research, combined with the method of field investigation, the characteristics of good Guqin instruments are studied, and the process of Guqin making and its articulation system are explained and interpreted.

3.1.1 Scope of content

The scope of the study is the foundation of the study and an important basis for determining the research plan and decision making, only by accurately grasping the scope of the study can the focus of the study and the methodology of the study be determined so as to effectively achieve the objectives of the study. Therefore, in this section, the content, location, and population of the study will be scoped.

3.1.2 Scope of research site

Since most of the Guqin makers in China are located in Jiangsu Province, the research site of this paper is Suzhou City, delineated as shown in Figure 3.1 below, which is a map of the administrative regions of the People's Republic of China, and the area delineated by the green circle in the map is Jiangsu Province, which is located in the East China region of China, as can be seen from the figure. Overall, there are more Guqin makers in Jiangsu Province than in other provinces.

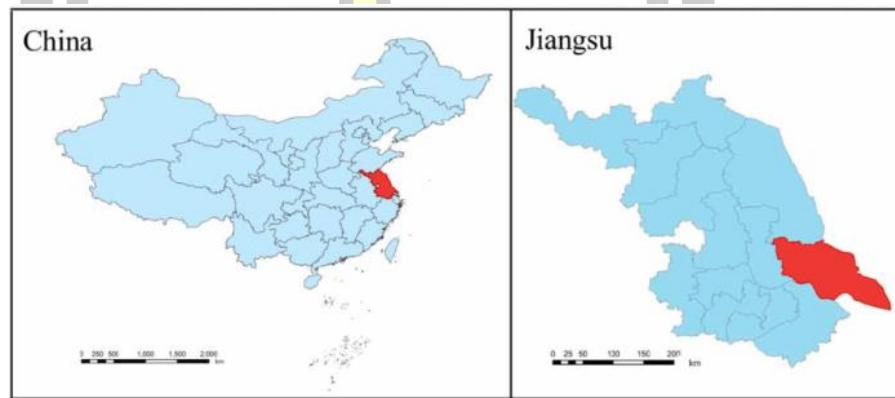


Figure 3. 1 Map of Jiangsu Province, China

Image Source : Produced by Chen Wei



Figure 3. 2 Map of Jiangsu Province, China

Image Source : Produced by Chen Wei

3.1.3 Scope of time

Table 3. 1 Research proposal form

Number	Items	Year	Month											
			1	2	3	4	5	6	7	8	9	10	11	12
1	Put forward research topic	2022												
2	Collect documents													
3	Field investigation	2023												
4	Interpret data for the practice section													
5	Practice and creation part													
6	In-depth interviewing													
7	Analyse data	2024												

3.2 Research Process

3.2.1 Methodology

3.2.1.1 Literature Analysis Method

Through literature analysis, this paper collects and summarizes the relevant characters, pictures, music scores and other information about Guqin making. Relevant characters, pictures, music scores, audio and video on the art of Chinese Guqin production. It carefully compares all kinds of information, summarizes existing data, interviews researcherities in the Guqin production industry, and then carries out the next step of the study to sort out the good characteristics of the Guqin.

3.2.1.2 Field investigation method

Adopt the method of field investigation. Go deep into Suzhou in Jiangsu Province to interview the Guqin makers. Through oral voice data, it will be organized into text and become part of the research content.

3.2.1.3 Comparative Research Method

Comparative research method is a method to study two or more things by comparing the similarities and differences between them. In this paper, the Guqin is compared with the previously made Guqin and then a conclusion is drawn.

3.2.2 Information Selected

Based on the research objectives, the researcher selected three groups of people as the interviewees in the field research. They are: key informants, casual informants and general informants. The following selected criteria and selected personnel will be presented.

3.2.2.1 Key informant

The criteria for selecting key informants are:

- (1) Artists who specialize in Guqin making.
- (2) Who Understand the history of Guqin making.
- (3) Who Good at playing Guqin.
- (4) Who the Representative transmission of intangible cultural heritage.
- (5) Who is relatively old and has been engaged in Guqin production for many years.
- (6) Although relatively young, he has already won many honors and awards.

According to the above criteria, the key information providers are Mr. Pei Jinbao, Mr. Liu Yang, Mr. Ni Shiyun, Mr. Liu Minfei, Professor Gu Yongjie, and Professor Gu Yongjie.

Therefore they will be described and elaborated in Chapter 5, so their basic information will not be listed here.

3.2.2.2 General informant

What the researcher emphasizes here is: Some artists among the general informants have made considerable achievements in the field of Guqin production. Because the number of people listed in this study is limited, they are listed here. In addition, the general informant also refers to the group of teachers. The Guqin is made

by people to play, so the evaluation of the Guqin by the group who plays the Guqin is also particularly important. They will give feedback to the Guqin maker, thereby promoting the production of the Guqin. Those who make better Guqin. The following are general informants:



Figure 3. 3 Guqin performer and professor of Nanjing University of the Arts:

Ms. Wei Wei

Soure : Wei Wei, 2023



Figure 3. 4 GGuqin maker: Mr. Cheng Huide

Soure : Huide Cheng, 2023

3.2.2.3 Casual informant

Casual informant mainly focuses on Guqin lovers in daily life, and these groups will also provide me with some reference information during the research process. These groups mainly appear in daily friendship circles, WeChat, Facebook, etc., and even some temporary informants have not yet appeared, and they will appear during the research process. Worth noting: Casual informants may also be professionals, so the information provided is also important.



Figure 3. 5 Group photo of Chinese Guqin production experts

Soure : Yongjie Gu,2022



Figure 3. 6 Audience at Guqin concert

Soure : Fengsheng Yang, 2022

3.2.3 Research tools

According to the three research objectives, the research tools used in this study are mainly interviews, participant observation, and Guqin making practice. In order to obtain research data, the researchers formulated questionnaires, interview questions and content, and interview flow charts.

- 1) The researcher make a research tools and bring it to the advisor to examine.
- 2) When the advisor makes corrections, the researcher brings them to improve according to the recommendations.
- 3) Once corrected, the researcher then imported it to collect data in the fieldwork.

3.2.4 Data Collecting

This research adopts a combination of literature research method, field research method and musicological analysis method to collect data. In the specific literature research, the researcher will make full use of online plus offline information to collect and organize the information related to the research topic, while in the field research, the researcher mainly adopts the way of interviewing and observing the related people and things, with specific details as follows:

3.2.4.1 Document research

First of all, the researcher makes full use of the rich resources of the Internet, including China National Knowledge Infrastructure (CNKI), SCI, National Periodical Database (NSSD), Wanfang Data Digital Journal, Super Star Journal, Chinese Social Sciences Citation Index (CSSCI), Xinhua Digest, and National Newspapers Search keywords on academic platforms such as indexes and foreign academic websites to conduct a comprehensive and multi-angle retrieval of literature related to this topic.

Secondly, through the process of fieldwork, the researcher will directly and indirectly obtain some documentary materials.

3.2.4.2 Field Work

The researcher went to the residence of the famous Guqin maker for fieldwork to obtain first-hand information. Based on the relevant theoretical knowledge of music and cultural anthropology, the researcher investigates and analyzes the way of making Guqin as well as the way of transmission and the process of historical change. In the course of the study, the researcher also pays attention to matters of Chinese regional history, society, culture, and production methods. The field trip is divided into three stages, which are organized as follows: The fieldwork is divided into three stages, and the specific arrangement is as Table 3.

Table 3. 2 Field Study

Number	Stage	Specific fieldwork process
1	Preparatory stage	Selection of investigation site → familiarization with the site → outline of the investigation → familiarization with relevant theoretical knowledge

2	Initial stage	Supported by the relevant researcherities → Arrived at the location to further understand the situation
3	Investigation stage	"Participant observation" and "in-depth interview" phases

3.2.4.3 Interviewing

The researcher conducted in-depth interviews with famous Guqin makers. Before the interviews, the researcher first designed the interview outline and, after obtaining permission for the interviews, made an appointment to meet the interviewers for a formal conversation. Before the formal conversation, we first sought permission for video or audio recording, which facilitated better organization of the data. Through interviews, local people explain the current situation face-to-face, thus obtaining specific and accurate data that can fully illustrate the reliability of the information sources of this research.

Key informant

The criteria for selecting key informants are:

- (1) Artists who specialize in Guqin making.
- (2) Who Understand the history of Guqin making.
- (3) Who is a good at playing Guqin.
- (4) Who Representative transmission of intangible cultural heritage.
- (5) Who is relatively old and has been engaged in Guqin production for many years.
- (6) Although relatively young, he has already won many honors and awards.

Table 3. 3 Breakdown of Interviewers

The person's name	Age	Gender
Pei Jinbao	70	Male
Ni Shiyun	65	Male
Gu Yongjie	49	Male
Liu Minfei	42	Male
Chen Weihua	58	Female

The person's name	Age	Gender
Wangfeng	42	Female
Weiwei	43	Female
Thirty of the best Guqin makers in the country	30-45	Male or Female

3.2.4.4 Observation

In the field investigation, the researcher carries out all-round and multi-angle observation and thinking on the process of Guqin production. And make a good observation outline as well as detailed records, and finally organize, analyze and summarize the observation results and make conclusions.

Table 1. Details of Guqin Production Process Observation

Location	Suzhou	Target of an interview	Guqin makers、players
<p>Observation process: This part of the observation mainly focuses on the production process of the Guqin for about three months, the researcher will utilize tools such as video camera, cell phone, audio recorder, computer and other tools to record the whole process in detail and make a good observation log.</p>			
<p>Observation Objectives:</p> <ol style="list-style-type: none"> 1. To understand the process of making Guqin? 2. How to judge the quality of music? 3. what qualities do Guqin makers possess? 4 How to tune and test the sound? 5.What are the criteria for evaluating a good Guqin? 6.What kind of Guqin is high quality? 7.Is a good quality Guqin always perfect? <p>And so on ...</p>			

3.2.4.5 The Checking of quality and Reliable Data

The literature study, field study, and musicological analysis research methods chosen for this study all fall under the category of qualitative research, and in

order to ensure the quality and reliability of the research data, the reliability and validity of the qualitative research needs to be tested. The triangulation method (denzin & lincoln 1994) was chosen for this study to emphasize the relationship between information and interpretation. Triangulation refers to the use of multiple and different forms of methods, data, observers, and theories to check and determine the validity of sources, data collection strategies, time, and theoretical frameworks, etc. The researcher can discuss the preliminary results of the analyses or the outline of the report with other researchers in order to obtain corrections and inspirations, and can also take the information to the researched to make preliminary communications in order to correct the researcher's analyses and interpretations. It can also be used to communicate with the researched in order to correct the researcher's analysis and interpretation. Triangulation is the use of multiple research instruments to broaden the researcher's perspective and increase the breadth, depth and dimensions of the research and analysis (Jin S, 2006). According to N. Denzin and Y. Lincon (2005), triangulation involves the use of a research strategy that involves the use of different research materials, researchers, research theories, and research methodologies to analyze the same study.

Based on the needs of this study, the choice was made to use researcher's triangulation cross-correction, which is the examination of research findings from the perspective of different researchers. During the data collection process, the researcher will ask the respondents to read the researcher's interpretation of the viewpoints of the previous interviews and make suggestions and corrections to the content at the end of the interviews. In addition to the researcher, three other teachers and professors with relevant professional backgrounds were also invited to have repeated discussions to reduce misunderstanding or interpretations that appeared to be too subjective, which ultimately resulted in valid results.

3.2.5 Data Management

Data management is the process of effectively collecting, storing, processing and applying data. Its purpose is to fully and effectively play the role of data. It is the central issue of data processing. The basic purpose of data management is to extract and derive data that is 34 valuable and meaningful to certain people from a large amount of data that may be messy and difficult to understand.

From the data collected by the researcher on historical documents, raw materials obtained from fieldwork, and the quality of the music, the data were categorized according to time division, music content classification, music source channels, and relevant information of different representatives. Management to provide help for subsequent data analysis.

3.2.6 Data Analysis

In the first research objective, first of all, the researchers adopt the method of literature research to investigate the literature and obtain information, aiming at comprehensively and correctly recognizing and grasping what the physical structure of the Guqin is. And to analyze the tuning system of the Guqin.

In the second research objective, the researchers conducted face-to-face interviews with Suzhou Guqin makers, Guqin players, and Guqin experts through fieldwork in order to collect research data. And three Guqins were selected for the Guqin experts to evaluate which one was the best. And summarized the reasons or criteria why they thought the Guqin was good.

In the third research objective, it is mainly through the above two objectives, together with their own practical proofs, that the Guqin made in this way can become a fine Guqin.

3.2.7 Data Presentation

Chapter 1: Introduction

Chapter 2: Review of Literature

Chapter 3: Research Methodology

Chapter 4: The Physical Structures and Tuning System of Guqin Zither ;

Chapter 5: Searching for Guqin of Excellent Quality

Chapter 6: Guqin Zither Making Program

Chapter 7: Conclusion, Discussion and Suggestions

CHAPTER IV

The Physical Structure and Tuning System of a Guqin Zither

In this chapter, the researcher will list and summarize the good characteristics of Guqin through literature research, image analysis, fieldwork, and observation method. In addition, the tuning system of the Guqin is used to sort out how the Guqin is operated.

4.1 The Physical Structure of Guqin

4.2 Tuning System of Guqin

4.3 Summarize

4.1 The Physical Structure of Guqin

4.1.1 Size

There are strict regulations on the structural dimensions of each part of the body of the Guqin. These dimensions are not set by today's qin makers, but are passed down from generation to generation through the ancients, and today's Guqin makers are made in accordance with the dimensions stipulated by the ancients. Anciently, it was said, "言琴长三尺六寸六分，乃象征一年的三百六十六日，琴肩广六寸以象六合等等." (Fan Yumei, 2013) Zhu Fengying of the Qing Dynasty also said in his "With Ancient Qin Zhai Zither Records", "孔子之琴，为百世之法也。按此三尺六寸，乃自岳至龈之法度也，加以首额尾末，通体其长三尺九寸，此琴之体制也." (Fan Yumei, 2013) According to ancient documents, the Guqin overall measures 123cm-130cm.

Chinese	Chinese Pinyin
言琴长三尺六寸六分，乃象征一年的三百六十六日，琴肩广六寸以象六合。	yán qín zhǎng sān chǐ liù cùn liù fēn , nǎi xiàng zhēng yī nián de sān bǎi liù shí liù rì , qín jiān guǎng liù cùn yǐ xiàng liù hé .

孔子之琴，为百世之法也。按此三尺六寸，乃自岳至龈之法度也，加以首额尾末，通体其长三尺九寸，此琴之体制也。	kǒng zǐ zhī qín , wéi bǎi shì zhī fǎ yě 。 àn cǐ sān chǐ liù cùn , nǎi zì yuè zhì yín zhī fǎ dù yě , jiā yǐ shǒu é wěi mò , tōng tǐ qí zhǎng sān chǐ jiǔ cùn , cǐ qín zhī tǐ zhì yě .
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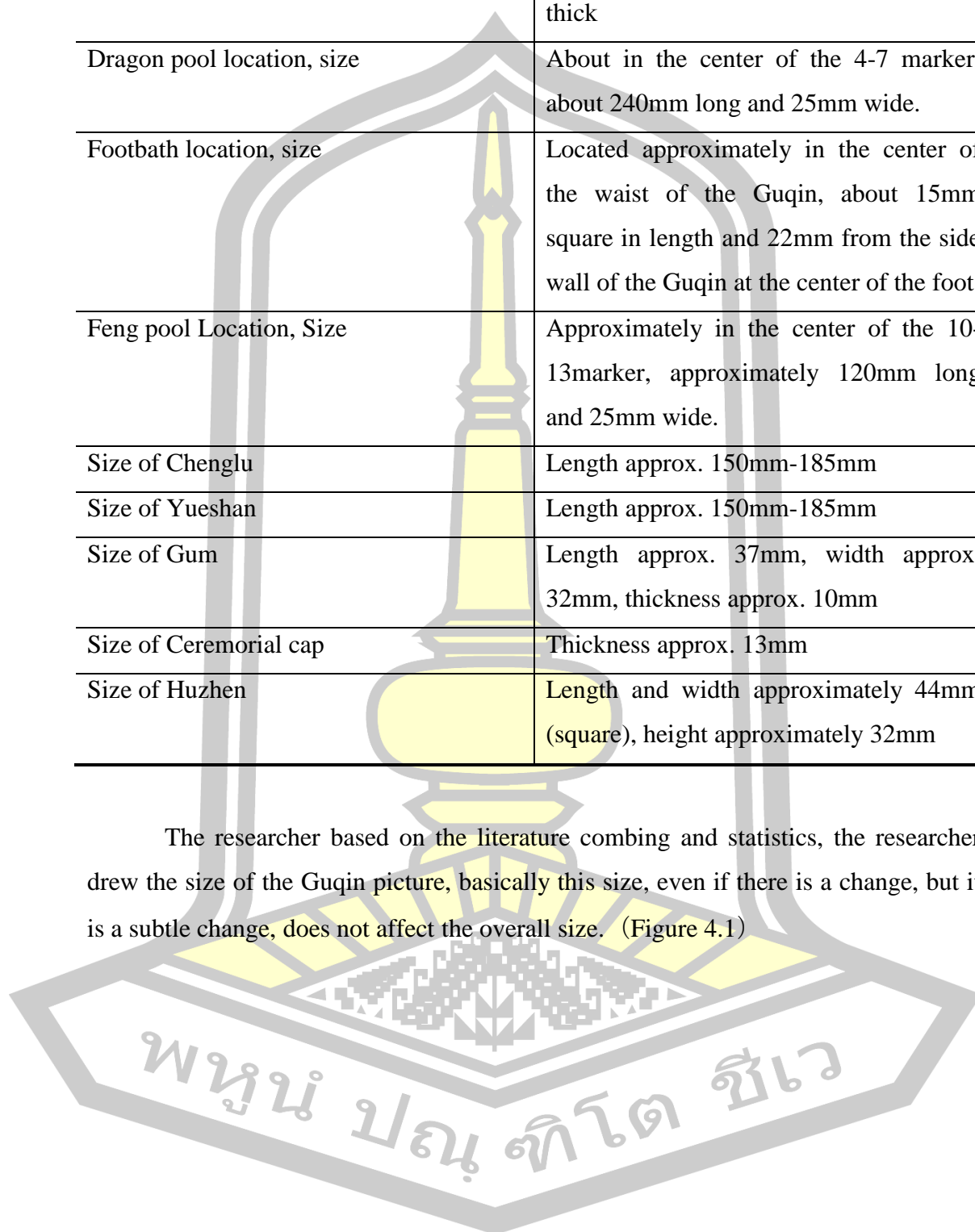
In addition, history has left a lot of ancient Guqins, through which it is basically possible to know the dimensions of the Guqin, such as Wu Zhao (2018), "Treasures of the Chinese Guqin", which contains 163 Guqins, as well as museums all over China, which also contain a lot of ancient Guqins, and the existence of these Guqins also allows today's people to know the dimensions of the Guqin in a general way.

Based on the observation of these Guqins, researchers have summarized the dimensions of each part of the Guqin as follows:

Parts of the Guqin	Sizes
Length of the body of the Guqin	About 1230mm-1300mm
String length of the Guqin	Yue Shan to Gum: about 1120mm or so
Distance of the strings of the Guqin	AAbout 19mm at Yue Shan, approx. 6mm at Gum
Head width of the Guqin	About 150mm-230mm
Width of the tail of the Guqin	About 115mm-175mm
Distance from Guqin Head to Yue Shan	About 90mm-100mm
Guqin Shoulder Position	3 marker of the place
The position of the waist of the Guqin	8 between marmer-11marker
The Cavity of the Guqin	About 113m long, 36mm wide, 6mm depth on both sides, 12mm depth in center
Zhen Chi	140mm, approx. 21mm wide, approx. 11mm deep

Bottom of the Zhen Chi	Approx. 140mm long, 21mm wide, 3mm thick
Dragon pool location, size	About in the center of the 4-7 marker, about 240mm long and 25mm wide.
Footbath location, size	Located approximately in the center of the waist of the Guqin, about 15mm square in length and 22mm from the side wall of the Guqin at the center of the foot.
Feng pool Location, Size	Approximately in the center of the 10-13marker, approximately 120mm long and 25mm wide.
Size of Chenglu	Length approx. 150mm-185mm
Size of Yueshan	Length approx. 150mm-185mm
Size of Gum	Length approx. 37mm, width approx. 32mm, thickness approx. 10mm
Size of Ceremorial cap	Thickness approx. 13mm
Size of Huzhen	Length and width approximately 44mm (square), height approximately 32mm

The researcher based on the literature combing and statistics, the researcher drew the size of the Guqin picture, basically this size, even if there is a change, but it is a subtle change, does not affect the overall size. (Figure 4.1)



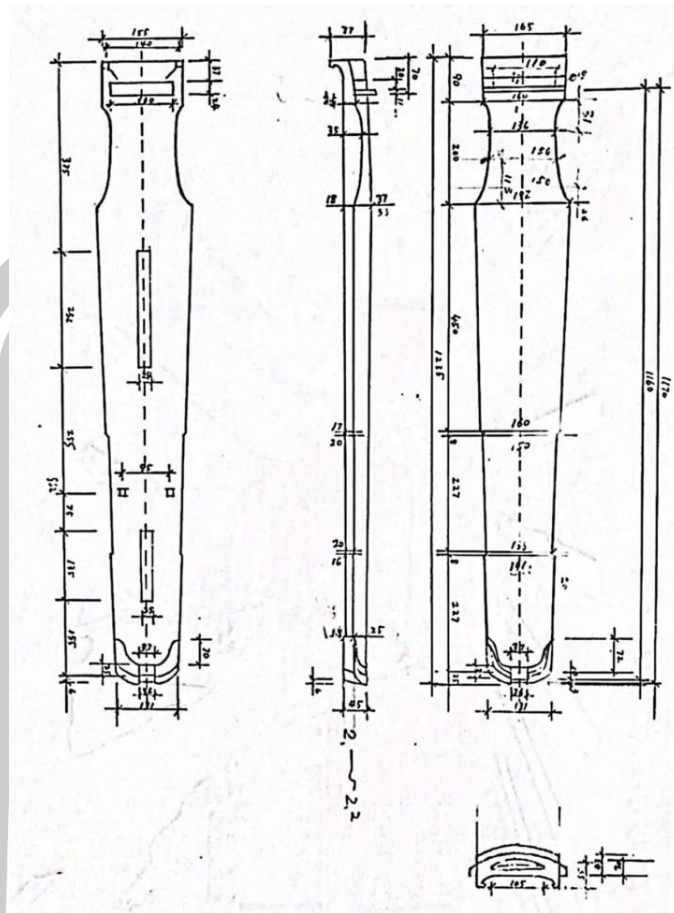


Figure 4. 1 Size of each part of the Guqin

Source: Yang Fengsheng ,2023

4.1.2 Styles

The beautiful shape of the Guqin has always been valued by Guqin makers. In the Ming Dynasty, "Taiyin Daquanji" included 38 kinds of Guqin styles, and at the end of the Ming Dynasty, "Wenhui Tang Qin Records" and "Guyin Zhengzong" had increased to 44 kinds, and in the Qing Dynasty, "Wuchi Zhai Qin Records" had reached more than 50 kinds. Of course, many of them are modeling styles that have not been included in the Guqin genealogies of the past dynasties. Wu Zhao's (2018) book, Treasures of the Chinese Guqin, includes 163 Guqins of various styles from major Chinese museums and folk collections throughout the ages, and he makes up for the deficiencies in the ancient literature with the surviving Guqin objects. Currently, the more common and aesthetically pleasing Guqin styles mainly include

Zhongni, Fuxi, Lianzhu, Banana Leaf, Fuxia, Shennong, Hundun, and so on. (Figure 4. 2-4.7)



Figure 4. 2 Zhongni style Guqin

Source:Wu Zhao, Treasures of the Chinese Guqin , 2018.



Figure 4. 3 Lianzhu style Guqin

Source:Wu Zhao, Treasures of the Chinese Guqin ,2018.



Figure 4. 4 Fuxi style Guqin

Source:Wu Zhao, Treasures of the Chinese Guqin ,2018.



Figure 4. 5 Shennong style Guqin

Source:Wu Zhao, Treasures of the Chinese Guqin , 2018.



Figure 4. 6 Luoxia style Guqin

Source:Wu Zhao, Treasures of the Chinese Guqin , 2018



Figure 4. 7 Jiaoye style Guqin

Source:Wu Zhao, Treasures of the Chinese Guqin , 2018.

Although the Guqin is a musical instrument, often its shape is just as important. Often, the first thing people look at when they come into contact with the Guqin is its appearance. The famous Guqin of the past generations not only has a very good sound, but also has a very beautiful and exquisite shape.

4.1.3 Wooden materials

The instrument, Guqin, is made of wood. The ancients believed that the most important thing to make a beautiful Guqin was to choose the wood. Lei Wei, a Tang Dynasty Guqin maker, mentioned: "A good choice of material, a deep, five hundred year old intention, and a positive sound. (选材良, 用意深, 五百年, 有正音) " (Fan Yumei, 2013) To make a Guqin, you must choose high-quality materials, and the quality of the tone of the Guqin is still very good after 500 years.

Regarding what kind of wood is used for the Guqin, the Chinese philosopher Wang Chong of the Han Dynasty mentioned in his "Lun Heng" that the Emperor Shen Nong cut the wutong for the qin, which is the earliest documented record of the use of wutong wood as a material for the Guqin. In addition, there is also the Han Dynasty Huan tan mentioned in the New Treatise: "xi shen nong shi ji mi xi er wang tian xia, yi shang guan fa yu tian, xia qu fa yu di, jin qu zhu shen, yuan qu zhu wu. yu shi shi xiao tong wei qin, sheng si wei xian, yi tong shen ming zhi dao, he tian di zhi he yan. (昔神农氏继宓戏而王天下, 亦上观法于天, 下取法于地, 近取诸身, 远取诸物。于是始削桐为琴, 绳丝为弦, 以通神明之道, 合天地之和焉)" (Fan Yumei, 2013) Meaning: the former Shennong's was able to rule the world because he was able to observe astronomy from above and know geography from below, and he made a Guqin from sycamore wood, tied a few strings on the surface of the qin and played it in the ceremonies, which in turn achieved a better access to the divine virtues and the harmony between heaven and earth, which is the origin of the tradition of ancient people's production of Guqin with sycamore wood. (Figure 4.8-4.10)



Figure 4. 8 Paulownia

Source: Yang Fengsheng, 2022



Figure 4. 9 Flowers of Paulownia

Source: Yang Fengsheng, 2022

Chinese	Chinese Pinyin
选材良，用意深、五百年，有正音。	xu ǎ n cái liáng , yòng yì shēn 、 w ū b ǎ i nián , y ǒ u zhèng yīn
昔神农氏继宓戏而王天下，亦上观法 于天，下取法于地，近取诸身，远取 诸物。于是始削桐为琴，绳丝为弦， 以通神明之道，合天地之和焉。	xī shén nóng shì jì mì xī ér wáng tiān xià , yì shàng guān f ǎ yú tiān , xià q ǔ f ǎ yú dì , jìn q ū zhū shēn , yu ǎ n q ū zhū wù 。 yú shì sh ĭ xuē tóng wé

i qín , shéng sī wéi xián , y ĭ tōng sh
én míng zhī dào , hé tiān dì zhī hé yā
n 。

"The ancient sound - Guqin material" records: "the world's material, soft and good, such as tung; firm and rigid, such as zi. Take the emptiness of tung and combine it with the reality of zi, and the rigidity and softness are matched. (天下之材，柔良莫如桐；坚刚莫如梓。以桐之虚，合梓之实，刚柔相配。)" (Fan Yumei, 2013) meaning that tung and zi are the best match. And in "Yongle qin book integration - Guqin materials", tung wood is yang, zi wood is yin, and three years of sycamore wood as the material, so it can be seen that the ancients liked to use sycamore wood and zi wood to make Guqin, to achieve the rigid and soft, yin and yang unity, which can make the quality of Guqin's sound to achieve the best state of calmness and harmony.



Figure 4. 10 Catalpa kaempferi

Source: Yang Fengsheng, 2022

Chinese	Chinese Pinyin
天下之材，柔良莫如桐；坚刚莫如梓。以桐之虚，合梓之实，刚柔相	tiān xià zhī cái , róu liáng mò rú tóng ; jiān gāng mò rú z ĭ 。 y ĭ tóng zhī

配。	xū , hé z ī zhī shí , gāng róu xiàng p èi 。
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It was recorded in the Qing Dynasty in Zhu Fengjing's "With Guzhai Zither Records":“ xi shen nong shi ji mi xi er wang tian xia,yi shang guan fa yu tian,xia qu fa yu di ,jin qu zhu shen, yuan qu zhu wu. yu shi shi xiao tong wei qin, sheng si wei xian,yi tong shen ming zhi dao, he tian di zhi he yan.(法先取材长三尺九寸，湮余擅均须有余，无拙顺。其材质之阴、阳、上、下，以阳为面，下为首；阴为腹，上为尾。其阔两面，均炼平正。)” (Fan Yumei, 2013) The meaning of the above ancient text is: if you want to make a Guqin, you should first find a wood about 3 feet 9 inches long, without scars, and the grain should be straight, divided into yin, yang, up and down, with the sun shining on the wood as the yang side facing upwards, close to the heel of the tree suitable for making the head of the Guqin, the part that doesn't shine on the sun is the “shady side”, which can be used to make the abdomen of the Guqin, and close to the top of the tree above is suitable for making the tail of the Guqin.

Chinese	Chinese Pinyin
法先取材长三尺九寸，湮余擅均须有余，无拙顺。其材质之阴、阳、上、下，以阳为面，下为首；阴为腹，上为尾。其阔两面，均炼平正。	f ā xiān q ū cái zh ā ng sān ch ĭ j i ũ c ū n ,yān yú shàn jun1 xū y ǒ u yú , wú zhu ō shùn .qí cái zhī zhī yīn 、 yáng 、 shà ng 、 xià , y ĭ yáng wéi miàn , xià wéi ī sh ǒ u ; yīn wéi fù , shàng wéi wěi ī 。 qí kuò liǎ ng miàn , jun1 liàn píng zhèng .

Biluozi Guqin Production Method:“fu qin zhi wei qi, tong shen ming zhi de , he tian di zhi he.gu fei fan mu zhi suo neng cheng ye . shi yi, bi ji ze yang zhi gu tong ,cai yong bi qu huan zhong zhi cai. you shi guan zhi, cai zhi bu ke bu ze ye ,jiu yi .qu gu ji yuan ,ze shan zhi tong ,shi ren you suo bu neng zhi gu gao ren shang shi ,chi haihuan zhong qi jue zhi cai yong zhi.(夫琴之为器，通神明之德，合天地

之和。故非凡木之所能成也。是以，必记泽阳之孤桐，蔡邕必取奂中之材。由是观之，材之不可不择也，久矣！去古既远，泽山之桐，世人有所不能致故高人上士，持还奂中奇绝之材用之。）” (Zhang Huaying, 2008) Meaning: The Guqin became a musical instrument because in ancient times it was not a simple, ordinary wood instrument because it was able to access the virtue of the gods and merge the peaceful energy between heaven and earth. Therefore, the wood used to make the Guqin must be grown in the high mountains in order to make a high-quality Guqin.

Chinese	Chinese Pinyin
夫琴之为器，通神明之德，合天地之和。故非凡木之所能成也。是以，必记泽阳之孤桐，蔡邕必取奂中之材。由是观之，材之不可不择也，久矣！去古既远，泽山之桐，世人有所不能致故高人上士，持还奂中奇绝之材用之。	fū qín zhī wéi qì , tōng shén míng zhī dé , hé tiān dì zhī hé 。 gù fēi fán mù zhī suǒ néng chéng yě 。 shì yǐ , bì jì zé yáng zhī gū tóng , cài yōng bì qǔ huàn zhōng zhī cái 。 yóu shì guān zhī , cái zhī bú kě bú zé yě , jiǔ yǐ ! qù gǔ jì yuǎn , zé shān zhī tóng , shì rén yǒu suǒ bú néng zhì gù gāo rén shàng shì , chí hái huàn zhōng qí jué zhī cái yòng zhī

According to the above historical documents, paulownia wood and catalpa wood were generally used in making Guqin in ancient times. However, it is not necessary to use paulownia wood, but also cedar wood to make Guqin. According to Zhou Mi's Yunyan Guoyan Lu of the Song Dynasty, Lei Wei, a famous Guqin maker of the Tang Dynasty, also mentioned it when he made the Guqin: “bu bi jie tong.yu da feng lei zhong,du wang e mei ,han yin zhe suo li ru shen song zhong ,ting qi sheng lian mian you yang zhe fa zhi , zhuo yi wei qin , miao guo yu tong .(不必皆桐。遇大风雷中，独往峨眉，酣饮着蓑笠入深松中，听其声连绵悠扬者伐之，斫以为琴，妙过于桐。)” (Fan Yumei, 2013) In the Tang Dynasty, Lei Wei went alone to the deep forests on Mount Emei in bad weather and heard the lilting sound of pine trees

swaying in the wind, then cut down the pine trees to make the Guqin, whose tone surpassed that of the Guqin made of tung wood.

In the Qing Dynasty, Zhu Fengjie said in his "With Guzhai Guqin Zither Recordings": "ruo you shu bai nian zhe , ji sha mu yi ke. (若有数百年者, 即杉木亦可。)". (Zhu Fengjie, 1996) The "Nine Heavenly Rings" and "Flying Spring" handed down in the Tang Dynasty were made of cedar wood. (Figure 4.11-4.12)



Figure 4. 11 Pine

Source: Yang Fengsheng, 2023



Figure 4. 12 A large Pine

Source: Yang Fengsheng, 2023

Chinese	Chinese Pinyin
不必皆桐。遇大风雷中，独往峨眉， 酣饮着蓑笠入深松中，听其声连绵悠 扬者伐之，斫以为琴，妙过于桐。	bú bì jiē tóng 。 yù dà fēng léi zhōng , dú wǎng é méi , hān yǐn zhe suǒ lì r ù shēn sōng zhōng , tīng qí shēng lián mián yōu yáng zhě fá zhī , zhuó yǐ w éi qín , miào guò yú tóng .
若有数百年者，即杉木亦可。	ruò yǒu shù bǎi nián zhě , jí shān mù yì kě .

Leng Qian of the Ming Dynasty said, "The nine virtues of the Guqin" :

yi yue " Qi " : wei Qing、Song、Cui 、 Hua zhe nai ke cheng qi . gai qing
zhe, qi cai qing ; song zhe,kou er qi sheng tou,jiu nian zhi cai ye;cui zhe,zhi jin er
mu sheng qing chang,lie wen duan duan,lao tong zhi cai ye;hua zhe,zhi ze sheng run,
jin shui zhi cai ye. er yue " gu ": wei chun dan zhong you jin shi yun,gai yuan tong zhi
suo chan de di er ran ye.you chun dan er wu jin shi yun,ze jin hu zhuo; you jin shi yun
er wu chun dan sheng,ze zhi hu qing. er zhe bei, nai wei zhi " gu ".

Among them, "Qi" (奇) and "Gu" (古) refer to the material of the zither.
Good wooden materials generally have a long history, and only ancient wood can
produce a quality tone. Because of the age of the wood, the resin and water are
dissipated, leaving the wood fiber itself and the gap between the fibers, which is more
conductive to sound resonance.

4.1.4 Cavity belly

Cavity belly is the core process of making Guqin, which largely determines
the quality of the sound of a bed of qin, and this is also the most test of the experience
and technology of the Guqin maker. There is no absolute standard for Cavity belly, and
it needs to be designed according to the different materials of the panels, the
corresponding structure, and then matched with the appropriate backing boards, which
ensures that the sound of the Guqin is pure. In ancient times, Li Mian's "Guqin
Records" of the Tang Dynasty, and "The Ancient Remains of the Sound" of the Song
Dynasty, "Guqin Garden Records", and "Biluozi's Method of Hacking the Qin"

recorded the excavation of "Cavity belly" in the Guqin production process. Cavity belly has a vital influence on the quality of the sound of the Guqin. Recorded in the Secret of Guqin Production : "shui shi yi shan lu ,jiang shen hai yi shen,dong zhong duo qu an ,ci chu zhi qian jin . shan gen shen chu tai wu duan, na geng xian gao xia zhi nan,hui wai xiang ying wu bie yun,heng wen long pa yue chi bian (谁是倚山路,江深海亦深,洞中多曲岸,此处值千金.山根深处太无端,那更弦高下指难,徽外相应无别韵,横纹龙怕岳池边。)" (Li Mingzhong, 1997) It probably means that the importance of the inner chamber of the Cavity belly to the sound, and the unevenness and ruggedness of the internal excavation of the Cavity belly, which is generally regarded as unattractive or rough, but the vibration of these unevennesses to the sound is the mystery that makes the sound appear distinctive, though.

Chinese	Chinese Pinyin
谁是倚山路，江深海亦深，洞中多曲岸，此处值千金……山根深处太无端，那更弦高下指难，徽外相应无别韵，横纹龙怕岳池边。	shuí shì yǐ shān lù , jiāng shēn hǎi yì shēn , dòng zhōng duō qǔ àn , cǐ chù zhí qiān jīn .shān gēn shēn chù tài wú duān , nà gèng xián gāo xià zhǐ nán , huī wài xiāng yīng wú bié yùn , héng wén lóng pà yuè chí biān 。

It was recorded in the Song Dynasty in Shi Ruli's "Bilu Zi Guqin Making Method":

Fan di hou mian bao ,mu zhuo fan qing,da xian wan dun,xiao xian jiao yan.mian di ju hou, mu fan ju shi,yun duan sheng jiao.mian bao di hou , mu xu fan qing,li yu xiao xian, bu li da xian. mian di jie bao,mu fan ju xu,qi sheng ji chu,sheng yun piao dang.mian di xiang dang , xu shi xiang chen ,xian mu sheng he(凡底厚面薄，木浊泛清，大弦顽钝，小弦蕉咽。面底俱厚，木泛俱实，韵短声蕉。面薄底厚，木虚泛青，利于小弦，不利大弦。面底皆薄，木泛俱虚，其声疾出，声韵飘荡。面底相当，虚实相称，弦木声和。)。 (Fan Yumei, 2013)

Chinese	Chinese Pinyin
凡底厚面薄，木浊泛清，大弦顽钝，小弦蕉咽。面底俱厚，木泛俱实，韵短声蕉。面薄底厚，木虚泛青，利于小弦，不利大弦。面底皆薄，木泛俱虚，其声疾出，声韵飘荡。面底相当，虚实相称，弦木声和。	fán dǐ hòu miàn báo , mù zhuó fàn qīng , dà xián wán dùn , xiǎo xián jiāo yān 。 miàn dǐ jù hòu , mù fàn jù shí , yùn duǎn shēng jiāo 。 miàn báo dǐ hòu , mù xū fàn qīng , lì yú xiǎo xián , bú lì dà xián 。 miàn dǐ jiē báo , mù fàn jù xū , qí shēng jí chū , shēng yùn piāo dàng 。 miàn dǐ xiāng dāng , xū shí xiāng chēng , xián mù shēng hé .

He believes that the thickness of the Guqin's top and bottom plates affects the sound transmission of the Guqin.

The Qing dynasty Zhu Fengjie "with Guzhai Guqin zither spectrum" records:

Qin mian wei biao, nei li wei fu, han xu fei kong, qu sai ruo gu. xian yin sui fa yu wai, yin yun shi ying hu zhong. Fu 、 Shi 、 Qing 、 Zhuo zhi sheng, mo fei suo zhi .yi wei cai zhi zhi you yong, yi yin ti fu zhi hou bao ye. guo hou ze yin yi yang bu yang , er shi qi qing liang; tai bao ze yin fu bu shi, yi zhi yu kong san. shi ze you pian yu hou bao er ran, kao qi de dang, wei you yi ding. gai cai zhi you qing 、 song 、 zhong 、 jie zhi yi, qi xin jiu you you ye 、 zhi 、 qi 、 hua zhi shu, gu bi yin cai shi er du zhi. wei ke ju ding qi hou bao ,wei yu zhi shi, sui shi er zhuo zhun zhi ke ye.

He believes that different wood materials, when digging and chiseling the inner chamber, especially thick wielded especially thin will have a certain impact on the quality of the sound of the Guqin. (Figure4.13)

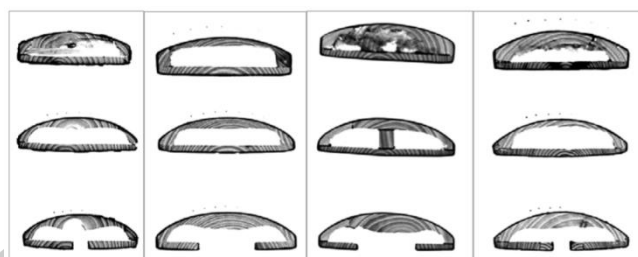


Figure 4.13 Various types of Cavity belly

Source: Yang Fengsheng, 2023

4.1.5 Sound quality

A quality Guqin, in addition to the beautiful shape, the most important thing is the sound, that is, acoustics, that is, (the quality of tone).

Leng Qian of the Ming Dynasty said, “The nine virtues of the Guqin” : “san yue “ tou ”:wei sui yue mian yuan,jiao qi gan kui ,fa yin xiang liang er bu yan sai . si yue “ Jing ”:wei zhi wu sha sa yi luan zheng sheng. wu yue “ Run ”:wei fa sheng bu zao, yun chang bu jue , qing yuan ke ai. liu yue “Yuan”:wei sheng yun hun ran er bu po san.qi yue “ Qing ”:wei fa sheng ru feng zhong zhi duo .ba yue “ Yun ”:wei qi xian ju qing yuan ,er wu san shi si xu zhi bing . jiu yue “ Fang ” : wei yu dan er sheng yu chu,er wu dan jiu sheng fa zhi bing.(三曰“透”：谓岁月绵远，胶漆干匱，发音响亮而不咽塞。四曰“静”：谓之无杀飒以乱正声。五曰“润”：谓发声不燥，韵长不绝，清远可爱。六曰“圆”：谓声韵浑然而不破散。七曰“清”：谓发声如风中之铎。八曰“匀”：谓七弦俱清圆，而无三实四虚之病。九曰“芳”：谓愈弹而声愈出，而无弹久声乏之病)” (Fan Yumei, 2013)

Chinese	Chinese Pinyin
三曰“透”：谓岁月绵远，胶漆干匱，发音响亮而不咽塞。四曰“静”：谓之无杀飒以乱正声。五曰“润”：谓发声不燥，韵长不绝，清远可爱。六曰“圆”：谓声韵浑然而不破散。七曰“清”：谓发声如风中之铎。八曰“匀”：谓七弦俱清圆，而无三实	sān yuē “tòu ” : wèi suì yuè mián yuǎn , jiāo qī gān kuì , fā yīn xiǎng liàng ér bú yān sāi 。 sì yuē “jìng ” : wèi zhī wú shā sà yǐ luàn zhèng shēng 。 wǔ yuē “rùn ” : wèi fā shēng bú zào , yùn zhǎng bú jué , qīng yuǎn kě ài 。 liù yuē “yuán ” : wèi shēng yùn hún rán ér bú pò

四虚之病。九曰“芳”：谓愈弹而声愈出，而无弹久声乏之病。	sàn 。 qī yuē “qīng ” : wèi fā shēng rú fēng zhōng zhī duó 。 bā yuē “yún ” : wèi qī xián jù qīng yuán , ér wú sān shí sì xū zhī bìng 。 jiǔ yuē “fāng ” : wèi yù dàn ér shēng yù chū , ér wú dàn jiǔ shēng fá zhī bìng .
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“Tou” “Jing” “Run” “Yuan” “Qing” “Jun” and “Fang” are all embodiments of the Guqin's timbre.

Zhu Fengjie (祝凤喈) in the Qing Dynasty, “and the ancient zither music” has mentioned the tone of the Guqin: “qin mian wei biao,nei li wei fu,han xu fei kong,qu sai ruo gu.xian yin sui fa yu wai,yin yun shi ying hu zhong. Fu 、 Shi 、 Qing 、 Zhuo zhi sheng , mo fei suo zhi 。” “Fu” “Shi” “Qing” “Zhuo” are the character and performance of the sound quality of the Guqin.

Swedish Sinologist Lindsley argues: “The Guqin is a sound that is “Jian” (坚)、 “Shi” (实)、 “Qing” (清)、 “Liang” (亮) without being empty, floating and stagnant, and it is pertinent.”

4.1.6 Inscriptions

Most of the Guqins have their own names, and many of them are engraved with various inscriptions. In this naming and inscriptions, the cultural flavor of the Guqin can be best reflected. And these inscriptions have a certain culture and aesthetics. When we mention the name of a certain Guqin, we will naturally enter an atmosphere of culture or artistic beauty.

For example, inscriptions that express the sound of the Guqin. The “Jiu Xiao Huanpe” (九霄环佩, Figure 4.8-4.14) of the Forbidden City Museum in Beijing has a soft and pleasing tone, with a sense of heavenly music. The sound of the “Dasheng Yiyin” (大圣遗音) is crisp and loose; Mr. Cheng Gongliang's "Autumn Melody" has an elegant and quiet tone, gentle and mellow. The “Feiquan” (飞泉

) of the National Palace Museum and the "Deadwood Longyin" and "Mingfengqin" of the China Academy of Art are all named after their timbre.

The "Jiu Xiao Huanpei" (Nine Heavenly Rings) is favored by many Guqin players. The text on the back of the Guqin is very soft.



Figure 4. 14 Jiuxiao Huanpei, Inscription: Jiuxiao Huanpei

Source: Wu Zhao, Treasures of the Chinese Guqin, 2018

The "Spring Thunder" Guqin was made by Lei Wei, a famous Guqin maker in the Tang Dynasty, and is a fine example of a Guqin with a transparent sound. In addition to the beautiful sound, the inscription on the back is also very beautiful and is an important symbol of this Guqin. (Figure 4.15-4.17)

พหุณ ปณ จิต ชเว



Figure 4. 15 Tang dynasty Guqin, Inscription: Chunlei
 Source: Wu Zhao, Treasures of the Chinese Guqin, 2018

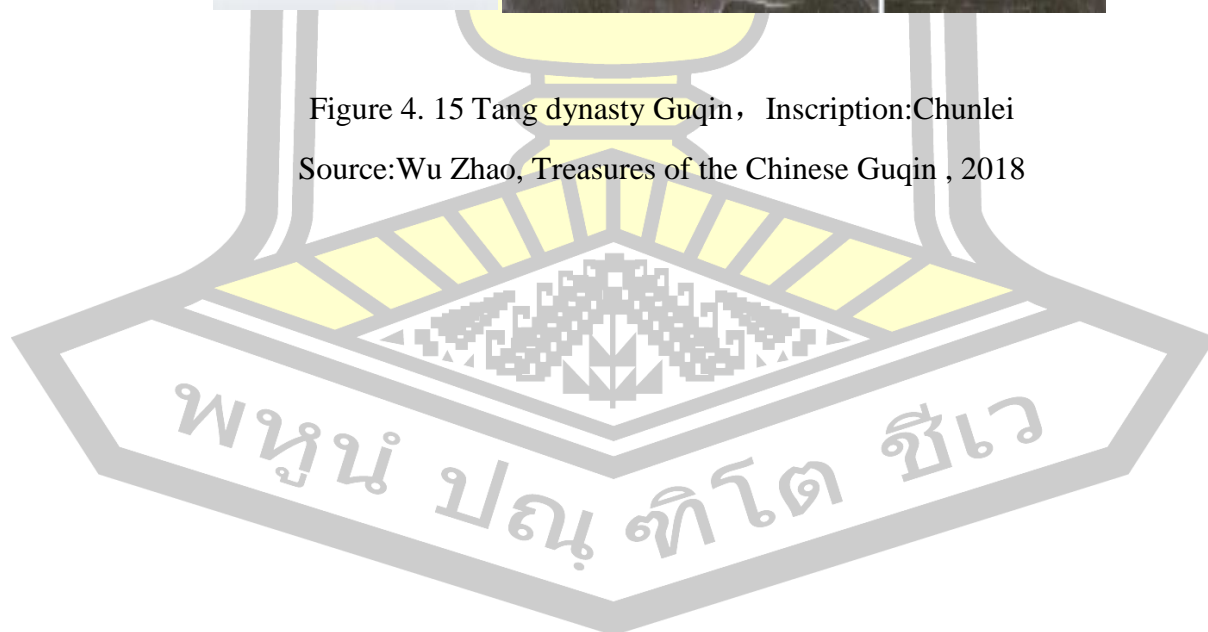




Figure 4. 16 Ming dynasty Guqin, Inscription:Yueming Canghai

Source:Wu Zhao, Treasures of the Chinese Guqin , 2018



Figure 4. 17 Song dynasty Guqin, Inscription:Songshi Jianyi

Source:Wu Zhao, Treasures of the Chinese Guqin , 2018

This is a Zhongni-style Guqin, which was successfully made by the researcher in the winter of 2020, and has the inscription "Linglong" on the back, which represents the symbolism of being small, slim, and soft. (Figure4.18)



Figure 4. 18 Researcher made a Guqin named "Linglong".

Source: Yang Fengsheng , 2022

The owner of the Guqin would also usually inscribe an inscription on the Guqin. For example, on the right side of the Dragon Pond, there is an inscription by the owner of the Guqin: "Ling ran xi tai gu .shi meng zhai zhen cang.(冷然希太古, 诗梦斋珍藏.)"Underneath the dragon pool, there is a vermilion seal engraved. (Figure 4.19)



Figure 4. 19 Inscription

Source: Wu Zhao, Treasures of the Chinese Guqin , 2018

There are also some inscriptions that tend to express a mood. For example, Professor Liu Chenghua's "Changtian Qiushui" (长天秋水) from the famous Tang Dynasty poet Wang Bo's "Preface to the Tengwang Pavilion" reads, "luo xia yu gu wu qi fei, qiu shui gong chang tian yi se. (落霞与孤鹜齐飞，秋水共长天一色)". The inscription on Su Shi's "Jiuxiao Huanpei" (九霄环佩), an ancient zither left over from the Tang Dynasty, reads: "ai ai chun feng xi, lang lang huan pei yin . chui lian xin yan yu, cang hai lao long yin (蔼蔼春风细，琅琅环佩音。垂帘新燕语，沧海老龙吟)". People can't help but think of a pair of spring breeze, the cabinet fairies in long skirts fluttering posture, not only as the "Jiuxiao Huanpei" (九霄环佩) as a concrete picture, plus the "cang hai lao long yin" rich fantasy imagery, adding to the romanticism of the inscription color. (Figure 4.20)



Figure 4. 20 Inscription

(萬萬春風細，琅琅環佩音。垂帘新燕語，滄海老龍吟)

Source: Wu Zhao, Treasures of the Chinese Guqin , 2018

Tang Dynasty Guqin “Dasheng Yiyin” (大圣遗音), the inscription reads: “Ju he ying qiu, han jiang yin yue, wan lai you you, gu tong sa lie. (巨壑迎秋，寒江印月，万籁悠悠，孤桐飒裂.)” Showing a picture of the cold river and the autumn moon, bright colors, the beauty of the mood of the quiet. (Figure4.21)



Figure 4. 21 Inscription

(巨壑迎秋，寒江印月，万籁悠悠，孤桐飒裂)

Source: Wu Zhao, Treasures of the Chinese Guqin , 2018

Mr. Cha Fuxi has a Guqin from the Tang Dynasty called "YI CHI BO". The inscription reads: "Chun feng chui zhou qi gan qing, di shi dang shi ci ding ming .Ying you you yu zheng chu ting, ceng fan tai ye lang hua sheng .(春风吹绉岂干卿，底事当时此定名。应有游鱼争出听，曾翻太液浪花生。)"Cha Fuxi got the old Guqin and said: "YI CHI BO". (Figure 4.22)



Figure 4. 22 Inscription: YI CHI BO

(春风吹绉岂干卿，底事当时此定名。应有游鱼争出听，曾翻太液浪花生。阜西得旧琴曰：一池波。)

Source:Wu Zhao, Treasures of the Chinese Guqin , 2018

The famous Song dynasty Guqin "Zheng Yin", inscription: "Twenty years of playing Aman do not know the cold, a song of the world to see. When I returned from the South, I was glad to hear that I had learned the ancient tune of Gong Yi. Mr. Gong Yi learned the zither from me, and his skills improved when he returned from abroad. Mr. Gong Yi had learned the qin from me, and his skills had improved since his return from abroad, so I was happy to present him with this qin." (Figure4.23)



Figure 4. 23 Inscription: ZHENG YIN

(廿年操缦不知寒，一曲淋漓世所参。南国归来添喜讯，新辞古调更谁谙。龚一向从予学琴，出国归来而技益进。予故乐以此琴赠之。七五年张正吟赠。)

Source: Wu Zhao, Treasures of the Chinese Guqin , 2018

The China Academy of Art has a Guqin "The Phoenix Comes Singing" (凤凰来鸣), inscription: "Peng lai xian jing you qing , lai feng lai yi qi ming. (蓬莱仙境幽清，来凤来仪齐鸣)" (Figure 4.24)

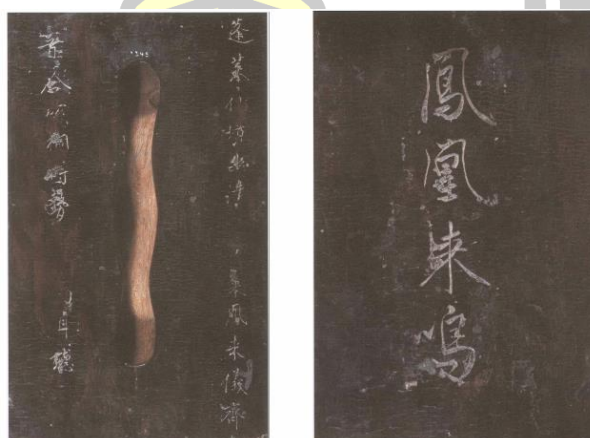


Figure 4. 24 Inscription: FENG HUANG LAI MING

(蓬莱仙境幽清，来凤来仪齐鸣)

Source: Wu Zhao, Treasures of the Chinese Guqin , 2018

In the Palace Museum in Beijing, China, there is a famous Guqin of the Song Dynasty, “Wan He Song”. Inscription: “Jiu de jian quan sheng qing zhong, gu xiang gu se geng yong rong. Shi jian jin you tong ming qi, ren er dang nian wan he song. (九德兼全胜磬钟，古香古色更雍容。世间尽有同名器，认尔当年万壑松)”

To summarize, a high-quality Guqin, the inscription is essential, so that in the process of making Guqin, adding the inscription is also a particularly important work, can not be ignored.

Chinese	Chinese Pinyin
落霞与孤鹜齐飞，秋水共长天一色。	luò xiá yǔ gū wù qí fēi , qiū shuǐ gòng zhǎng tiān yī sè 。
蔼蔼春风细，琅琅环佩音。垂帘新燕语，沧海老龙吟。	ǎi ǎi chūn fēng xì , láng láng huán pèi yīn 。 chuí lián xīn yàn yǔ , cāng hǎi lǎo lóng yín 。
巨壑迎秋，寒江印月，万籁悠悠，孤桐飒裂。	jù hè yíng qiū , hán jiāng yìn yuè , wàn lài yōu yōu , gū tóng sà liè 。
春风吹绉岂干卿，底事当时此定名。应有游鱼争出听，曾翻太液浪花生。	chūn fēng chuī zhòu qǐ gàn qīng , dǐ shì dāng shí cǐ dìng míng 。 yīng yǒu yóu yú zhēng chū tīng , céng fān tài yè làng huā shēng 。
廿年操缦不知寒，一曲淋漓世所参。南国归来添喜讯，新辞古调更谁谙。龚一向从予学琴，出国归来而技益进。予故乐以此琴赠之。七五年张正吟赠。	niàn nián cāo mǎn bù zhī hán , yī qǔ lín lí shì suǒ cān .nán guó guī lái tiān xǐ xùn , xīn cí gǔ diào gèng shuí ān .gōng yī xiàng cóng yǔ xué qín , chū guó guī lái ér jì yì jìn 。 yǔ gù lè yǐ cǐ qín zèng zhī 。 qī wǔ nián zhāng zhèng yín zèng 。
蓬莱仙境幽清，来凤来仪齐鸣。	péng lái xiān jìng yōu qīng , lái fèng lái yí qí míng 。

Chinese	Chinese Pinyin
九德兼全胜磬钟，古香古色更雍容。 世间尽有同名器，认尔当年万壑松。	jiǔ dé jiān quán shèng qìng zhōng , gǔ xiāng gǔ sè gèng yōng róng 。 shì jiān jìn yǒu tóng míng qì , rèn ěr dāng nián wàn hè sōng 。

4.1.7 Broken grain

The Broken Patterns of Guqin are the spontaneous cracks in the lacquer layer on the surface of the body of the Guqin. The Broken Patterns of Guqin give the Guqin a unique experience and aesthetic feeling that forms an indispensable part of the cultural symbols of the Guqin that have been handed down to us. Functionally, The Broken Patterns of Guqin can significantly improve the sound radiation quality constant, acoustic impedance, and acoustic attenuation coefficient of the qin to form a transparent and deep sound effect, and its special blade-like touch of The Broken Patterns of Guqin also gives the player a comfortable tactile enjoyment. In terms of aesthetics, as the heirloom Guqin has the dual attributes of a musical instrument and a heirloom, the historical activities of countless Guqin players playing and restoring the instrument over the course of thousands of years have given The Broken Patterns of Guqin a rich and varied, unique appearance as well as inherent humanistic emotions.

So how do The Broken Patterns of Guqin occur?

The Broken Patterns of Guqin are the result of cracks in the wood and lacquer layers, which have different coefficients of expansion, and which rise and fall under the influence of time and temperature.

The reason is that to make a Guqin, you need to sand the gray tire on the wooden tire and put on the lacquer. The Guqin makes sound due to vibration, and the gray tire and lacquer will inhibit the vibration of the wooden tire, and the appearance of The Broken Patterns of Guqin can appropriately attenuate this inhibition, thus making the Guqin's tone more transparent.

The causes of The Broken Patterns of Guqin are complex, and the choice of wood material, the shape and structure, the choice of lacquer material, and the application of lacquer technology and other complex factors determine the fracture

shape, the cracking state (The Broken Patterns of Guqin), and the effect of pattern organization. The Broken Patterns of Guqin are determined by a variety of complex factors, including the fracture shape, the cracking state (the degree of solidity of The Broken Patterns of Guqin, the degree of protrusion of the "sword blade" at the time of cracking, and the size of the cracks, etc.), as well as the organization of the pattern. These include the texture and grain direction of the wood, the quality of the lacquer ash, the composition and fineness of the ash particles, the composition of the lacquer, the cloth backing of different warp and weft thickness, the presence or absence of a cloth backing, the method of mounting the cloth, the thickness of the lacquer layer, the time of day, and the environmental factors (temperature, humidity, maintenance methods, frequency of playing), etc. The history of the Guqin is the foundation of its heritage.

The history of Guqin transmission is a process of development with twists and turns, and the lacquer surface of Guqin which has lasted for a long time is subjected to local changes in the stress on the defective points of the lacquer layer due to the material decay of the lacquer material caused by the influence of a variety of uncertain man-made or natural factors, which is the key element of the distribution of randomness and diversity of the Broken Patterns of Guqin on the lacquer surface of Guqin. For example, long time hanging in the wall of the Guqin, the face of the bottom and the bottom of the respective amount of ultraviolet light absorbed by the different so that they are in the gray tire gelatinous part and the strength of the paint film.

The Broken Patterns of Guqin are mainly of the type of tortoise-back break (龟背断), ox-hair break (牛毛断), plum blossom break (梅花断), serpent's belly break (蛇腹断), running water break (流水断), ice crack and break (冰裂断), etc. Therefore, its surface is extremely beautiful, and it is deeply cherished by zither makers and collectors. Some of the heirloom Tang qin, The Broken Patterns of Guqin's wonderful beauty, the paint color of the warmth and elegance, like out of the devil's work. See it, no matter what is good or not good, there is no not adore, all can not bear to let go. (Figure 4.25-4.29)



Figure 4. 25 Ice crack and break

Source:Liu Minfei, 2023



Figure 4. 26 Running water break

Source:Liu Minfei, 2023

พหุบัน ปณ จิตโต ชีเว



Figure 4. 27 Plum blossom break

Source:Liu Minfei, 2023



Figure 4. 28 Ox-hair break

Source:Liu Minfei, 2023



Figure 4. 29 Serpent's belly break

Source:Liu Minfei, 2023

It can be said that the Guqin has The Broken Patterns of Guqin nature, which means that it is a high quality Guqin. Nowadays, many Guqin makers intentionally make Guqin with The Broken Patterns of Guqin, but the effect is not particularly good. Therefore, the production of The Broken Patterns of Guqin must need a certain amount of time to form the unique The Broken Patterns of Guqin nature. The Guqin is more beautiful, but also makes the sound of the Guqin more loose and ancient, and the tone is more wonderful.

4.1.8 Strings of Guqin

In the Tang Dynasty, Bai Juyi's "Silk and Tung are combined into a zither, and there is a sound of the ancient times" is a very common description of the material used to make the zither strings, and in this case, the silk is the silk worm. (Fan Yumei, 2013) In addition to the player's technique, the material of the zither body and the strings play an important part in making the zither play beautifully. Even if a zither is made of the best materials and craftsmanship, if the strings are not good, the zither will not be able to produce a wonderful sound. The strings of the Guqin are made of silk, seven strings, one, two, three, four, five, six and seven in order from the

emblematic position from the outside in, the thickness of the strings of the Guqin also changes, the string of the first string is the thickest, to the seven strings of the thinnest, from the first string to the seven strings is a one-time decreasing. The production process of silk thread is quite complex, its material, the requirements of the process is not simpler than the production of zither.

To make the very fine silk into a tough, elastic string that can play beautifully, it is necessary to wrap a lot of silk together, the thinnest seven strings need more than 300 silk and together, while the thickest one string needs thousands of silk. The method of making strings has varied slightly through the ages, and before the Song Dynasty, most zither players were able to make their own strings. This is because different people play the zither, different zither players use, different requirements for the strings, zither players choose to make their own strings in order to make the sound they play perfectly match their character. The famous modern Guqin artist Mr. Guan Pinghu's "Qing Ying" a qin, a string using the string is a green bean thick, although not their own, but certainly special.

The method of making strings recorded in the Northern Song Dynasty's "Book of the Qin" is divided into the method of making strings, the method of cooking strings, and the method of winding strings, which are actually the three processes of making a string. In the string-making method, before making the strings, one needs to choose the best silk, which has clear requirements: bright, white, fine, shiny, even, pure, warm, moist, and fine, and the silk that meets these requirements can only be chosen for making strings. The method of boiling the strings also requires waiting for the right weather "All boiling strings must wait for the weather to be clear before they can be boiled, first of all, you must choose a pot of clear water, and you must not use fat and greasy water to pass the strings." (Fan Yumei, 2013) The weather must be clear before the strings can be boiled, and the fatty water is the water that is not washed clean with animal oil when cooking, so the requirements for water quality are also very strict. Wheat is added to the water when boiling, mainly to determine whether the silk is cooked or not; when the wheat blooms, the silk is cooked. The law of string wrapping introduces the last step of string making, and the weather must be cloudy and moist. When it is cloudy and moist, the air humidity is high, so that the strings will not be too dry and break. After the strings are wound together, they need

to be soaked in special Chinese medicine and glue, and only after this complicated process can the strings be tough and durable and produce a wonderful sound.

Silk strings are extremely easy to break because they are made of silk, the main component of which is protein. In ancient times, you needed to bathe and burn incense before playing the zither, partly as a ritual before playing the zither, and partly because if you didn't wash your hands when playing the zither, the sweaty stains from injuries sustained while playing the zither would fall onto the strings, shortening their life. In modern times, the introduction of western guitars and other stringed instruments has given the Chinese a new understanding of string making. By wrapping steel strings with nylon, the string making process is greatly reduced, and the metal material does not break easily, so the cost of string making is greatly reduced. Although steel strings are easier to make and more flexible, they lose the mellow and friendly flavor of silk strings. Silk strings and steel strings have their own advantages and disadvantages, and the player should choose his favorite strings.

4.1.9 Structure of Guqin

Before describing the process of making Guqin, it is necessary for the researcher to introduce about the structure of Guqin. The Guqin is made up of a top and a bottom. The face of the Guqin is in the shape of an arched arc, representing the roundness of heaven, and the bottom of the Guqin is generally flat, representing the righteousness of a large place. The structure on the body of the Guqin is very similar to that of a human being. The Guqin has a head, tongue, neck, shoulders, and waist. In addition to that, there are also parts such as Yue Shan, Qin Square, Cheng Lu, Strings, Markers, Goose Feet, Dragon Pond, Feng Numa, Dragon Gums, Silver Bracket, Gum, Heavenly Pillar, Earthly Pillar, and the two Nascent Holes. Below is a diagram of the structure of the Guqin:

This is a structural diagram drawn by Zhu Fengjie, a maker of Guqin in the Qing Dynasty, who systematically labeled the various structures of the Guqin. (Figure 4.30)

Through the combing of historical documents, the researcher found that the ancient Guqin makers drew the structure diagram of the Guqin which was not particularly clear and detailed, so the researcher drew a more detailed structure diagram of all the structure parts of the Guqin. (Figure 4.32-4.36)



Figure 4. 32 Zhongni style of Guqin

Source: Yang Fengsheng, 2023

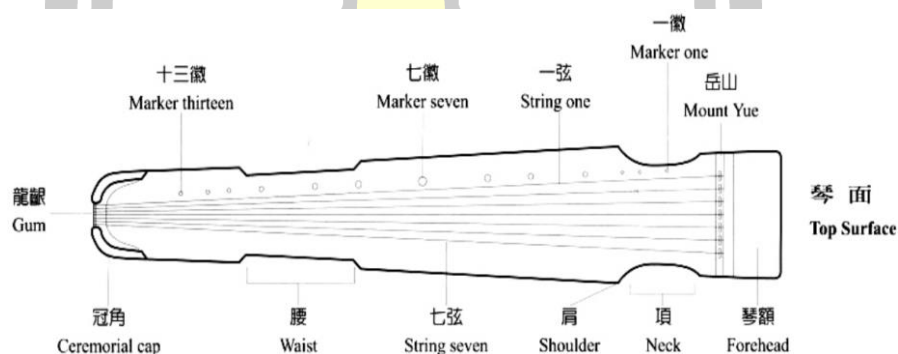


Figure 4. 33 Introduction to Guqin Parts Patterns

Source: Yang Fengsheng, 2023

十三徽: Marker thirteen

七徽: Marker seven

一徽: Marker one

一弦: String one

岳山: Mount or bridge

琴面: Top Surface

龙龈: Gum

冠角: Ceremonial cap

腰: Waist

七弦：string seven

肩：Shoulder

项：Neck

琴头：Forehead



Figure 4. 34 Side part of the Guqin

Source:Yang Fengsheng, 2023

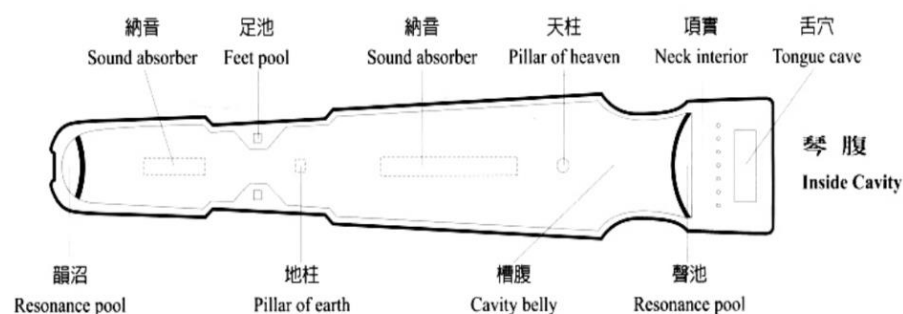


Figure 4. 35 Back of the Guqin

Source:Yang Fengsheng, 2023

纳音：Sound absorber

足池：Feet pool

天柱：Pillar of heaven

项实：Neck interior

舌穴：Tongue cave

韵沼：Resonance pool

地柱：Pillar of Earth

槽腹：Cavity belly

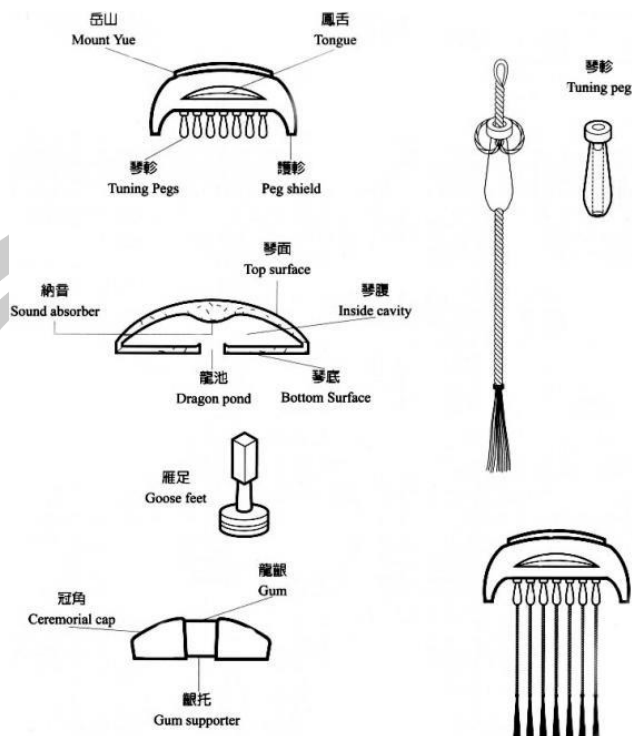


Figure 4. 36 Other parts of the Guqin

Source: Yang Fengsheng, 2023

凤舌: Tongue
 琴轸: Tuning Pegs
 龙池: Dragon pond
 琴底: Bottom Surface
 龈托: Gum supporter

4.2 Tuning System of Guqin

The tuning of the Guqin is generally known to very few people. There are a total of eight tuning methods for the Guqin.

4.2.1 C Pentatonic

Orthophonic tuning is the basic method of tuning the Guqin, and many Guqin pieces are played in orthophonic tuning. The first to the seventh strings are C-D-F-G-A-c-d, and the initial tuning is sol-la-do-re-mi-sol-la. According to the twelve laws, the first string is the yellow bell, the third string is the gong, and the first to the seventh strings are called "下徵", "下羽", "宫", "商", "角", "徵", "羽", which is also known as the orthodox tuning, or the orthogonal tuning, which is also

known as the orthogonal tuning of the Guqin. The first to the seventh strings are called "Shimo Zheng, Shimo Yu, Gong, Shang, Horn, Zheng, Yu", which is also known as "Zhonglü Jun". The tuning method for the key of F (the right key):

The first step is to tune one of the strings, usually the fifth string is set to the A note (the base note of 440Hz. International standard tone). You can tune the fifth string first with the help of a tuner, here utilizing a loose tone.

The second step is to tune the seventh string using the fifth string, by tuning the overtones of the fifth emblem of the seventh string to the same height as the overtones of the fourth emblem of the fifth string.

Step 3: Using the seventh string to tune the fourth string, tune the overtones of the five emblems of the fourth string to the same pitch as the overtones of the seven emblems of the seventh string.

Step 4: Using the 4-string to tune the 6-string, tune the overtones of the 6-string 5-emblem to the same pitch as the 4-string 4-emblem.

Step 5: Using the 6-string to tune the 3-string, tune the overtones of the 3-string 5-emblems to the same pitch as the 6-string 7-emblems.

Step 6: Using the 5-string to tune the 2-string, tune the overtones of the 5-string to the same pitch as the overtones of the 5-string and 7-string.

In the seventh step, use the fourth string to tune the first string, and tune the overtones of the five emblems of the first string to the same pitch as the overtones of the seven emblems of the seventh string.

4.2.2 B^b Pentatonic

The lemniscus tuning is a tuning method for the ^bB key (tight fifth string) in which the fifth string is tuned a half degree higher than the normal tuning. The overtone of the fifth string is then tuned to the same pitch as the fourth string. The tuning sequence is: C-D-F-G-^bB-c-d (sol-la-do-re-mi-sol-la).

4.2.3 C Pentatonic

The slow horn tuning is a tuning method for the key of C (slow triad). The fourth overtone of the third string is lowered to the same height as the fifth overtone of the fifth string. The tuning sequence is: C-D-E-G-A-c-d (do-re-mi-sol-la-do-re).

4.2.4 G Pentatonic

Slow Gong Tuning is the tuning method for the key of G (slow 1st, 3rd and 6th). Based on the slow triad, the seven-emblem overtones of the sixth string are lowered to the same height as the five-emblem overtones of the third string, and the four-emblem overtones of the first string are lowered to the same height as the five-emblem overtones of the third string. The order of tuning is: bB -D-E-G-A-B-d (mi-sol-la-do-re-mi-sol).

4.2.5 E^b Pentatonic

Qing Shang tuning is the tuning method of bE tuning (tight 2nd, 5th, and 7th strings). Based on the tight 5th string, the 5th overtones of the 7th string are first raised to the same level as the 4th overtones of the 5th string, and then the 5th overtones of the 2nd string are raised to the same level as the 7th overtones of the 5th string. The order of tuning is: C- bE -F-G-A- bB -c-be (la-do-re-mi-sol-la-do).

4.2.6 F Pentatonic

The Jade Maiden is a tuning method in the key of C. It is based on the slow horn tuning, with the first string lowered by a minor second degree. The tuning order is: bB -D-E-G-A-c-d (si-do-re-mi-sol-la-do-re).

4.2.7 A Pentatonic

The slow harmonic is the tuning of the key of C. The second string is lowered a major second from the normal tuning to the same pitch as the first string. The order of tuning is: C-C-F-G-A-c-d (do-do-fa-sol-la-do-re).

4.2.8 E Pentatonic

The order of tuning is the same as in the Qing Shang tuning: C- bE -F-G-A- bB -c-b-e (la-do-re-mi-sol-la-do).

All of the above tuning methods do not require a tuner, and tuning conversions can be realized through the traditional tuning methods of the Guqin. Currently, many Guqin makers and players are not aware of this tuning method, and most of them use modern tuners for tuning. The researcher thinks that as a Guqin practitioner, it is especially important to master the tuning method, which reflects the professional quality of Guqin.

4.3 Summarize

This chapter is mainly through the interpretation of historical documents, the ancient Chinese Guqin made a clear guideline for the size of the Guqin, the length of the Guqin is about 123cm-130cm. from the point of view of ancient preserved and survived Guqin, basically this size, today's Guqin makers are in accordance with this size to make the Guqin.

There are dozens of styles of Guqin, and the most common ones at present are Zhongni style, Fuxi style, Lianzhu style, Banana Leaf style, Shennong style, and Chaos style. According to the more than one hundred Guqins included in the "Jin Yu Qin Journal" (Jin Yu Qin Society, 2018) and "Chinese Guqin Treasures" (Wu Zhao, 2018), the Zhongni style accounts for 62% of the proportion.

The wood used in the production of the Guqin mainly includes cedar, tung, pine, and zi, and the older the wood, the better, and the older wood is favorable for sound transmission. The Cavity belly is the core of the Guqin production. The reasonable division of the Cavity belly structure and the thickness of the Cavity belly affects the sound of the Guqin, whether it is good or bad.

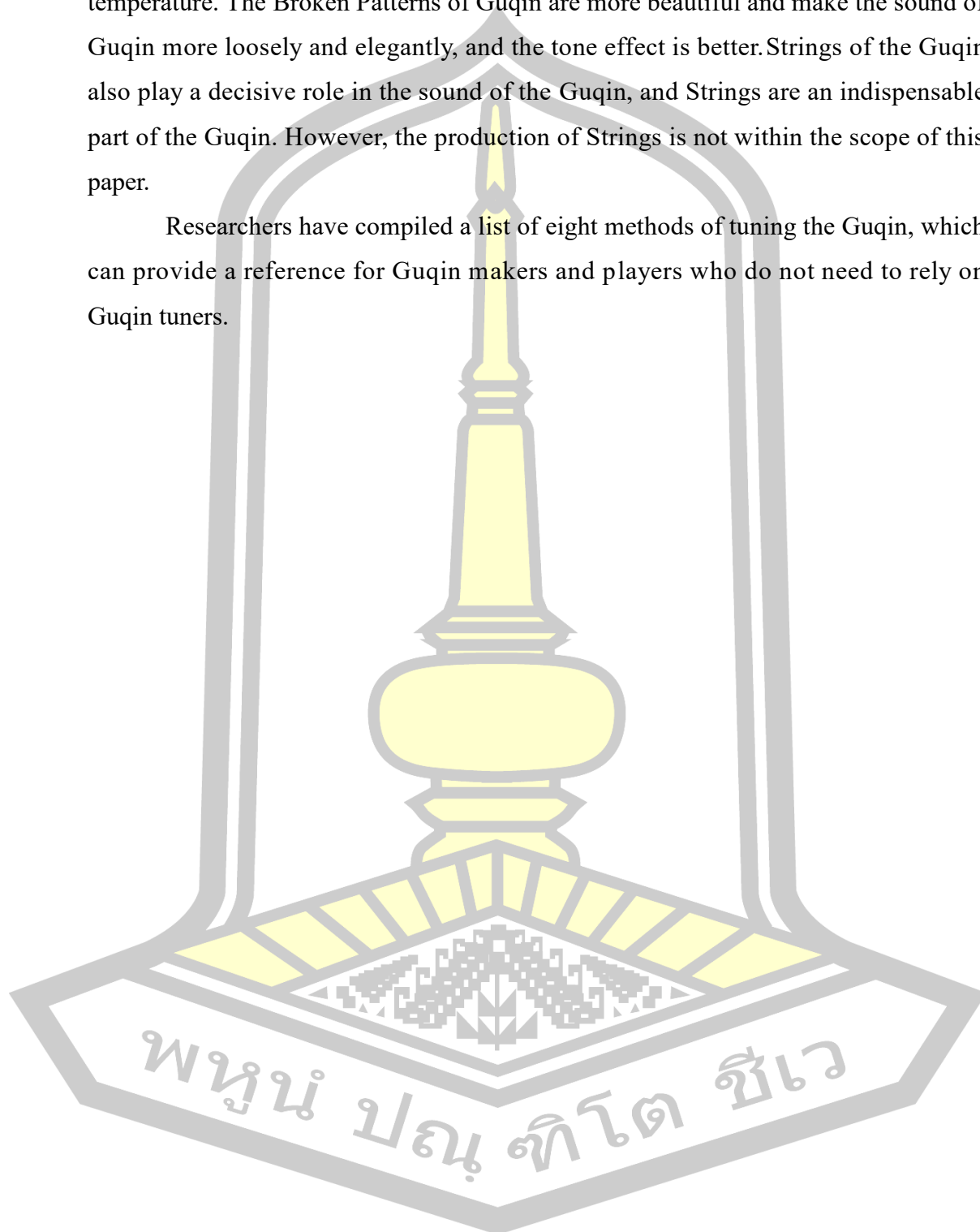
Ancient historical documents document that a quality Guqin must have a good sound. Good sound attributes are : “Fu” (浮) “Shi” (实) “Qing” (清) “Zhuo” (浊) “Jian” (坚) “Liang” (亮) “Song” (松) “Tou” (透) “Hou” (厚) as and on.

In addition, from the point of view of the physical remains of the Guqin, the base plate of the Guqin is engraved with "inscriptions". As we all know, Chinese calligraphy is an important part of traditional Chinese culture. Therefore, the Guqin, together with the inscriptions, better reflects the humanistic charm of the Guqin. Importantly, these inscriptions are not only the names of the makers and collectors, but also many of the inscriptions are Chinese poems and songs, which are engraved on the Guqin, which is aesthetically pleasing and has both cultural and aesthetic significance and value.

The Broken Patterns of Guqin is a sign of a good quality Guqin, The Broken Patterns of Guqin must have been accumulated over a long period of time and cracks appeared in the Guqin panels under the influence of different expansion coefficients

of the wooden plastron and the lacquer layer under the influence of time and temperature. The Broken Patterns of Guqin are more beautiful and make the sound of Guqin more loosely and elegantly, and the tone effect is better. Strings of the Guqin also play a decisive role in the sound of the Guqin, and Strings are an indispensable part of the Guqin. However, the production of Strings is not within the scope of this paper.

Researchers have compiled a list of eight methods of tuning the Guqin, which can provide a reference for Guqin makers and players who do not need to rely on Guqin tuners.



CHAPTER V

The excellent character in terms of physical structures and Tone quality of Guqin plucked.

This chapter focuses on interviews with famous Guqin makers and Guqin players and Guqin experts. Because the Guqin is meant to be played, as the saying goes, "If the shoe fits, the foot knows." Therefore, some views and opinions of Guqin players are equally important. In this article, the researcher has selected three Guqins for the experts to point out the points and shortcomings of the Guqin from their own perspectives.

5.1 Searching Process

5.2 Guqin of Excellent Quality

5.1 Searching Process

The process of searching : interviewing famous zither makers, famous Guqin players and Guqin experts in the Suzhou area to search for information;

Judging by experts, i.e. inviting three qin masters to listen to and evaluate the sound quality of three qins, and to evaluate the one with the best sound quality among the three qins, and to list the reasons or criteria for the best sound quality. (Figure 5.1-5.3)



Figure 5. 1 Guqin (A)

Source:Liu Minfei, 2023



Figure 5. 2 Guqin (B)

Source:Yin Zhifeng, 2023



Figure 5. 3 Guqin (C)

Source:Yang Fengsheng, 2023

5.1.1 Data from Guqin makers

5.1.1.1 Pei Jinbao

Pei Jinbao, born in 1954 in Suzhou, is a Guqin player, Guqin maker, Guqin restoration expert, director of China Kunqu Opera Guqin Research Society, executive director of China Guqin Society, vice president of Jiangsu Province Guqin Society, and one of the founders of Wu Men Guqin Society. He was born in a family of folk music and loved Kunqu Opera, Peking Opera and Jiangnan Silk and Bamboo since he was a child. He studied Guqin under Mr. Wu Zhaoji, and got all the transmission from him. Through long-term practice, in addition to the complete transmission of the simple, strong and harmonious characteristics of the Wu family school of qin, he has also integrated the skills of playing, playing and singing into his Guqin performance, and gradually formed a rigorous, precise and passionate personal style of playing. Mr. Pei Jinbao's playing style is strict, precise and passionate.

Mr. Pei Jinbao's three Guqin pieces, "Autumn Sai Yin" (秋塞吟), "Remembering the Old Man" (忆故人), and "Yangguan Sanjian (阳关三叠), have been recorded in the DVD "Chinese Intangible Cultural Heritage Collection Series I Jing Containing Taikoo (Guqin Volume)", and he has published his own Guqin CD "Autumn Lake Reflecting the Moon" (秋湖映月) and the DVD "Guqin Singing Score", his Guqin compositions, such as "Leaves and Sorrows" (阴阳学说与古琴), "Night Mooring on the Autumn River", "Yangguan Songs", "Night Talks at the Window of a Guest", and other Guqin pieces and Guqin songs have been published by Wu Men Singing Scores and Songs of the Wu Men. His scores of "Li Sao" (离骚), "Night Mooring on the Autumn River" (秋江夜泊), "Yang Guan Qu" (阳关曲), "Night Talks in the Guest Window" (客窗夜话) and other qin pieces as well as Wu Men's scores and qin songs have been recorded by the Central Conservatory of Music and the Beijing Guqin Research Association for permanent preservation. He has written papers such as "Yin and Yang Theory and the Guqin", "The Dragon - Cultural Connotation Giving Sacred Meaning to the Chinese Guqin", and "Notes on the Restoration of the Guqin". Mr. Pei has been invited to Australia,

Germany, Singapore, Taiwan and other countries and regions, Peking University, Fudan University and other colleges and universities, Nanjing Museum, Zhejiang Museum, Qingdao Poly Theatre, Qingdao Museum, Heilongjiang Provincial Library and other venues to hold individual lectures and solo concerts.

Mr. Pei Jinbao has been carving zither for more than 30 years. In addition to making new zither with excellent sound and traditional flavor, his antique The Broken Patterns of Guqin zither is widely acclaimed in the industry. The Broken Patterns of Guqin banana leaf type Guqin "looking at the moon" is the permanent collection of the Suzhou Museum, in 2017, in Suzhou Museum for a month "Su Yi Tian Gong masters series - Pei Jinbao Guqin Exhibition". (Figure 5.4)



Figure 5. 4 Mr. Pei Jinbao Was makingthe Guqin
Source:Yang Fengsheng, 2023

The results of Mr. Pei Jinbao's assessment of the three Guqins (A, B and C):

(1) The dimensions of the three Guqins (A, B and C) meet certain standards and are all between 1230mm-1300mm.

(2) The A Guqin has a history of several hundred years, and the Guqin panels are beautiful with broken lines.

(3) Both A and C Guqins are made from old cedar wood. b Guqin is made using young cedar wood.

(4) Both A and C Guqins use natural lacquer to make the top of the Guqin. B Guqin uses modern chemical lacquer.

(5) A Guqin has the art of Chinese calligraphy, which has certain cultural symbols.

(6) A Guqin has reasonable string paths. B and C Guqins have different spacing of string paths.

(7) The height of the yue-shan of A and C Guqins is reasonable, while the yue-shan of B Guqins is on the high side, which is not conducive to playing.

(8) The seven strings of the B Guqin produce a murmur when it is suitable for playing music, while the A and C Guqins have no murmur.

(9) A and C Guqin appearance is slimmer, suitable for the aesthetic of the Suzhou region. b Guqin appears to be bulky.

(10) The sound resonance effect of the A Guqin is better, and the sound is softer. the resonance effect of the B Guqin is not good, and the sound is thin and has no flavor. the C Guqin's one-string, six-string, and seven-string have insufficient flavor, and the resonance effect is not particularly good.

(11) C The lacquer art of the Guqin is more beautiful.

5.1.1.2 Ni Shiyun

Ni Shiyun, a native of Haimen District, Nantong City, Jiangsu Province, is a famous contemporary Chinese qin master, the fourth generation of the Meian School, the representative transmitter of the intangible cultural heritage of Jiangsu Province "Guqin Art" (Meian School), a member of the China Kun Opera Guqin Research Association, and the executive director of the China Qin Association.

He has loved the Guqin since he was a child, and began to study the production of Guqin in the early 1990s. He took Mr. Wang Yongchang, a Guqin master of the Meian School, as his teacher, and systematically studied the music of the Meian School, and also got his instructions for carving the Guqin.

In the 1990s, she began to make Guqins with her own personal style, and began to customize Guqins according to the characteristics of Guqin practice in Jiangnan.

At the beginning of 2003, Ni Shiyun formally established Haimen Leiying Zither Hacking Workshop, and entered the path of professional zither hacking. His works have been collected by zither players all over the country and in Hong Kong, Taiwan, Japan, Europe, America, Singapore and other places. Her qin has been chosen

by some qin masters as stage performance qin and recording qin. For example, Mr. Wang Duo of Suzhou has made a DVD recording of his Guqin book "Silk Tong Lecture", and Mr. Li Jia'an of Nanjing has made an album of Guqin called "Heavenly Melody". Professor Dai Xiaolian of the Shanghai Conservatory of Music published and distributed the "Ripples" Guqin album using Ni Shiyun's Fuxi style Guqin, which was hacked with cedar wood in the Ming Dynasty in 2008.

In 2006, the Chinese Musical Instrument Association awarded Ni Shiyun the certificate of "Master Guqin Maker". Ni Shiyun's Guqin is known as "Niqin" in the industry. "The lines of Niqin are simple and simple, and the shape is elegant. The most important feature of Niqin is that it feels very good in the hand after falling on the finger, which makes it quite popular among zither players.

"In the early stage of Niqin, due to the strict attitude of carving qin, the workmanship and the production of materials used were quite strict. In order to achieve the sound of gold and jade, the sound color of the early Niqin was slightly resonant, and the shape was thinner than that of the current works. Moreover, the material used for the instrument itself was relatively traditional at that time, so the sound of the instrument was a bit hard. The resonance of the instrument takes a long time to develop. Therefore, it has been regarded as easy to play but difficult to maintain. However, the sound of the instrument is really simple and beautiful. 2000 years later, we started to use the old house beams and other wood materials, and the resonance of the instrument is much better than before. The resonance of the sound is better than before. The resonance of the sound is better than before, and the subtleties are soft and neutral, and the lower fingers are delicate, which has been praised by many Guqin players. (Figure 5.5)





Figure 5. 5 Mr. Ni Shiyun playing the Guqin

Source: Ni Shiyun, 2023

The results of Mr. Ni Shiyun's assessment of the three Guqins (A, B and C):

- (1) The dimensions of the three Guqins (A, B, and C) fully honor the ancient regulations and are all between 1230mm-1300mm.
- (2) A Guqin is from the Song Dynasty, and the Guqin panels have broken grain.
- (3) Both A and C Guqins are made from old cedar wood. b Guqin is made using young cedar wood.
- (4) Both A and C Guqins use natural lacquer for the panels of the Guqin. B Guqin uses modern chemical lacquer.
- (5) A Guqin has an inscription.
- (6) A Guqin has reasonable string paths. B and C Guqins have different spacing of string paths.
- (7) The height of the yakusan of the A and C Guqins is reasonable, while the yakusan of the B Guqin is on the high side, which is not conducive to playing.
- (8) The seven strings of the B Guqin produce noises, while the A and C

Guqins have no noises.

(9) The A and C Guqins have a slimmer appearance, which suits the aesthetics of the Suzhou region. the B Guqin is bulky.

(10) The sound resonance effect of the A Guqin is better, and the sound is softer. the resonance effect of the B Guqin is not good, and the sound is thin and has no flavor. the C Guqin's one-string, six-string, and seven-string have insufficient flavor, and the resonance effect is average.

(11) C The lacquer art of the Guqin is exquisite.

5.1.2 Data from Guqin players

5.1.2.1 Chen Weihua

Chen Yuhua, a native of Changshu, Jiangsu Province, is a famous Guqin Player in Suzhou and a representative transmitter of the intangible cultural heritage of Suzhou. He studied under Weng Thin Cang and Wu Jingliu, and was introduced by Mr. Fan Boyan to learn the qin from Zhang Ziqian and Gong Yi. He is also a good pipa player. In 2008, he founded the "Yin Yige" Guqin Workshop, which integrates exhibition, training, research and exchange. (Figure 5.6)



Figure 5. 6 Chen Weihua was playing the Guqin

Soure: Yang Fengsheng, 2023

Ms. Chen Weihua's rating of the three Guqins (A, B and C):

(1) The three Guqins A and C look more aesthetically pleasing, while the B

Guqin has a large width and is less aesthetically pleasing.

(2) A Guqin is from the Song Dynasty, the Guqin panel has broken grain phenomenon, and the music played is bright.

(3) A and C Guqin yue shan height is suitable for playing. b Guqin playing appears to resist fingers.

(4) The string path of A Guqin is reasonable. The spacing of the string paths of B and C Guqins is inconsistent.

(5) The soprano of A Guqin is round, bright, penetrating and full, while the bass is thick, low and long.

(6) B The soprano range of the Guqin is not rounded and penetrating, and the bass range is not too thick and has no aftertone.

(7) The soprano range of the C Guqin is more rounded, with uneven sound in the soprano range of the first and second strings.

(8) The seven strings of the B Guqin produce a murmur, while the A and C Guqins have no murmur.

(9) The lacquer art of the C Guqin is exquisite.

5.1.2.2 Wangfeng

Born in 1979, a native of Suzhou. Contemporary heir to the Yushan school of qin, famous Guqin player in Suzhou. transmitter of the intangible cultural heritage of Suzhou. He is a member of the China Qin Society and a director of the Yushan Qin Society. Under the tutelage of Mr. Zhu Hei, a national non-hereditary hereditary person and vice-president of the China Qin Society, he has deeply learned the essence of the Yushan School. His style of qin music is ancient and far-reaching. She has been engaged in teaching Guqin for more than twenty years, and now teaches at the Yushan School Guqin Art Museum, Changshu Senior Citizens' University, Changshu Shimei Primary School, and Changshu Television Art Training Center. Her teaching characteristics are distinctive, tailored to the characteristics of different students, with remarkable results. Many of her students have won gold medals and other awards in various domestic Guqin competitions. Over the years, she has participated in large-scale Guqin art demonstrations, non-heritage into universities, Guqin art feature film shooting and other performances, which have won the affirmation of the leaders at all levels and wide acclaim from all walks of life. (Figure 5.7)



Figure 5. 7 Wangfeng was playing the Guqin

Soure : Yang Fengsheng, 2023

Ms. Wang Feng's rating of the three Guqins (A, B and C):

- (1) The three Guqins A and C look more aesthetically pleasing, and the lacquer art of the C Guqin is exquisite.
- (2) A Guqin has broken grain on the top and plays bright music.
- (3) The B Guqin has anti-fingering in playing. the A and C Guqins have the same height of yue shan, and no anti-fingering in playing.
- (4) The string path of A Guqin is reasonable, while the spacing of the string paths of B and C Guqins is inconsistent.
- (5) The high register of the A Guqin is round, bright and full. The low register is thick, low and long. The resonance effect is good.
- (6) B Guqin's soprano range is not round and penetrating, and the bass range is not very thick and has no aftertone.
- (7) The high register of the C Guqin is more rounded and not as good as that of the A Guqin. The high notes of the first and second strings are uneven.
- (8) The seven strings of the B Guqin produce a murmur, while the A and C Guqins have no murmur.

5.1.3 Data from Guqin Experts

5.1.3.1 Yongjie Gu

Gu Yongjie, Ph.D., Chinese Academy of Sciences, is a professor at Suzhou Normal College. He is the head of the Research Center for Guqin Production at Suzhou Normal College, and is an expert in Chinese Guqin production. He is dedicated to the Transmission of the art of Guqin making and is one of the important promoters of the art of good Guqin in Jiangsu. (Figure 5.8)



Figure 5. 8 Prof. Yongjie Gu

Soure : Yongjie Gu,2023

(1) A, B, and C Guqin look more aesthetically pleasing and are all of uniform size.

(2) A Guqin panel has broken grain, giving it a cultural aesthetic effect.

(3) A Guqin has Song Dynasty calligraphy art, giving it aesthetic value.

(4) A Guqin has reasonable string paths, while B and C Guqins have inconsistent spacing of string paths.

(5) The chemical lacquer of B Guqin is too thick, with an unpleasant smell, which is also unfavorable for sound transmission.

(6) B Guqin has a rounded and penetrating treble area, and a less mellow bass area with no aftertone.

(7) B Guqin is not round and penetrating in the soprano region, not too thick in the bass region, and has no aftertone.

(8) The high register of the C Guqin is more rounded and not as effective as that of the A Guqin. The high notes of the first and second strings are uneven.

(9) The seven strings of the B Guqin produce a murmur, while the A and C Guqins have no murmur.

5.1.3.2 Liu Minfei

A native of Suzhou, born in 1980. He is a producer and performer of Guqin of the Wu school, an transmitter of the Guqin art in Jiangsu Province, and a doctor of musicology. He is the executive director of the China Guqin Society, the director and expert member of the Musical Instrument Manufacturing Committee, and the chief expert on Guqin culture of the China Society for Cultural Management. 2000, Liu Minfei set up the Qinyuanju Guqin Workshop, specializing in the development of the Guqin, and has been carving more than a thousand pieces of Guqins so far. In recent years, he began to try to use different materials to make Guqin, the ancient seven-stringed zither under his hands, showing an extraordinary style. (Figure 5.9)



Figure 5. 9 Dr. Liu Minfei

Soure : Liu Minfei,2023

(1) A, B, and C Guqin look more aesthetically pleasing.

(2) A Guqin panel has broken grain phenomenon, and the sound effect of playing is very good. In addition, A Guqin has the art of calligraphy and has some cultural value.

(3) The groove structure of A Guqin is reasonable, while the groove structure of B Guqin is not so reasonable, so the sound effect is not good. the groove structure of C Guqin is more reasonable, and the treble position of the first and second strings are not so reasonable.

(4) The spacing of the strings of the Guqin is inconsistent in C. The strings of the Guqin in A are reasonable.

(5) The chemical lacquer of Guqin B is too thick, with an unpleasant smell, which is not conducive to sound transmission.

(6) B Guqin has a rounded, penetrating treble clef and a less mellow bass clef with no aftertone.

(7) B Guqin is not round and penetrating in the soprano region, not too thick in the bass region, and has no aftertone.

(8) The high register of the C Guqin is more rounded and not as effective as that of the A Guqin. The high notes of the first and second strings are uneven.

(9) The seven strings of the B Guqin produce noises, while the A and C Guqins have no noises.

To summarize, the researcher conducted targeted interviews with the above three famous Guqin makers, and then transcribed the voice data obtained from the interviews into text. The three Guqin makers basically made the same process of making Guqin, and they all followed the procedures that the ancients used to make them. The only difference is their concept of making Guqin, such as Pei Jinbao is different from the other two Guqin makers in the audition procedure. Pei Jinbao first wrapped and lacquered and finally auditioned the sound. The other two makers auditioned first, then wrapped and lacquered. The researcher thought that Pei Jinbao's production concept was more appropriate. Because only when the thickness of the Guqin is determined can the sound be tested accurately. If the sound is tested first, and then wrapped and lacquered, then the panel of the Guqin will be thickened, which will inevitably affect the sound, and then the previously tested sound will be inaccurate, which is especially important. In addition, except for Liu Yang, the materials they use

to make Guqin are cedar, tung and catalpa. Liu Yang is trying to make Guqin with other materials. All three of them made Guqins of the same size. The researcher also found that they all have certain insights on the groove and belly structure. Each one's slot belly structure is not quite the same.

5.2 Guqin of Excellent Quality

5.2.1 Exquisite style

There are dozens of styles of Guqin, it is not necessary to respond to the public's aesthetics, about the choice of Guqin style, everyone has their own aesthetics, as long as they like it, that is the beauty of the A, B, C, three Guqin are the public's preferred style.

5.2.2 Excellent wood

In the selection of wood, it is important to pick the wood that is long time old, elastic and with smooth grain lines, which is one of the important conditions for the formation of a quality Guqin. the wood selected for A and C is long time old, and the B Guqin is the wood of the last few years, which has a large amount of water content within the wood, which is not conducive to the conduction of the sound.

5.2.3 Stability of Natural Lacquer

In the process of Guqin production, the use of natural lacquer allows the Guqin panel to form a good, hard protective film, so that the sound will be clearer and softer. B Guqin uses chemical synthetic lacquer, for the Guqin maker, long-term exposure to the health of the maker will affect his health, and is also not conducive to the sound transmission. The only advantage is: chemical synthetic lacquer is cheaper.

5.2.4 Broken grain

The broken grain of Guqin usually takes hundreds of years to accumulate. It can be said that the Guqin with broken grain is basically a high-quality Guqin. However, nothing is absolute, and a Guqin with broken lines is not necessarily of high quality. Nowadays, many Guqin makers imitate Guqins with broken lines, and according to the researcher's understanding, there are very few successful cases. The researcher is not in favor of imitating the broken grain.

5.2.5 Reasonable production process of Guqin

The production process of high quality Guqin must be regular. For example,

Mr. Pei Jinbao is different from the other two Guqin makers in the procedure of testing the qin. Mr. Pei Jinbao first wraps the cloth and puts on the lacquer, and finally tries the sound. While the other two qin makers test the sound first, then wrap the cloth and put on the lacquer. Researchers believe that Pei Jinbao's production concept is more appropriate. Because only after determining the thickness of the Guqin, can we accurately test the sound. If the sound is auditioned first and then wrapped and lacquered, then the panel of the Guqin will be thickened, which will inevitably affect the tone, and then the tone previously auditioned will be inaccurate, which is especially important.

5.2.6 The height of Yue Shan should be moderate

The height of the B Guqin's yakuzan is 23mm, so when playing, there will be a hard phenomenon, that is, "anti-finger". The optimum height is 18mm.

5.2.7 Reasonable Cavity Belt Structure of Guqin

High-quality Guqin can not be separated from a reasonable cavity belly structure; there is no fixed structure for the cavity belly, and it is necessary to make comprehensive considerations according to the style of the Guqin, the wood and other aspects, so as to finally form a cavity belly structure that belongs to this Guqin. a. The groove belly structure of the Guqin is reasonable. b. The Guqin has poor sound, and the structure of the groove belly is not reasonable. c. The structure of the Guqin's local groove belly is not reasonable. C. The partial cavity belly structure of the Guqin is not reasonable.

5.2.8 The Guqin maker has certain professional skills and cultural cultivation.

If the Guqin maker does not have professional skills and cultural cultivation, it is impossible to produce high-quality Guqins, just like the Guqin factories, which produce Guqins mechanically and in a fixed way, and the quality of the Guqins produced is very poor. Professional skills refer to the process of making Guqin and Guqin playing skills. Cultural cultivation is worth the cultivation of humanistic aesthetics.

5.2.9 The Need for Performance Aesthetics

Finally, the performer re-emphasizes that a high-quality Guqin can be made on the basis of the above condition factors. However, everyone's aesthetic standard is not the same, so once again the basis also need to respond to their own aesthetics. As one of the above Guqin players said, "One Guqin cannot be suitable for all types of Guqin

music. The researcher strongly agrees with them. For example, to play the Guqin pieces "High Mountain" and "Flowing Water," one cannot use a Guqin with a small sound. Therefore, a Guqin made of paulownia wood is very suitable for playing these two Guqin pieces. In addition, the groove belly of the Guqin must be larger so that the sound will be loud. Similarly, quieter Guqin pieces are not suitable to be penetrated with pine wood, such as the Guqin piece "Good Night Leader", which is not suitable to be played with a loud Guqin because the sound is too loud, which will affect the aesthetic mood of the Guqin piece. Therefore, there is no absolute standard for the tone of the Guqin, and the most important thing is to look at the aesthetic quality of the Guqin maker and the Guqin player." Most Guqin players in Suzhou prefer a mellow and not particularly loud Guqin, which is determined by the humanistic environment and aesthetic needs of the Suzhou region. The main characteristics of Suzhou's music are fine, clear, light, soft and quiet, so most of the Guqins made in the Suzhou region are based on these aesthetic characteristics.

Summarize

To summarize, the researcher selected three Guqins and had them examined by Guqin makers, Guqin players, and Guqin experts. Based on their evaluation of the three Guqins, the researcher asked them to list the good features of the Guqins one by one. Based on the characteristics they summarized, the researchers will make the Guqins themselves and try to produce high-quality Guqins.

In addition, the quality of the sound of the Guqin also depends on the artistic aesthetics of the local culture and the pursuit of personal aesthetics. All of the above experts prefer a quiet sound, and none of them like a loud sounding Guqin. That would be inconsistent with the cultural aesthetic pursuits of the Suzhou region.

พหุ ประเด็น ชีว

CHAPTER VI

A new Guqin plucked Zither

In this chapter, the researcher mainly summarizes the characteristics of a superb Guqin through the contents of the first two chapters, and produces a new Guqin based on these characteristics, in terms of beauty and tone quality, to match the modeled one.

6.1 Preparing Tools

6.2 Preparing Materials

6.3 Making Process

6.4 Summarize

6.1 Preparing Tools

6.1.1 Drawing Tools

1. Ruler: 1500mm long ruler, used to draw the center axis of the body of the Guqin. 1000mm long ruler, used to draw the long lines of the body of the Guqin and to measure the strings (strings: the routes of the seven strings on the surface of the Guqin). 300mm long ruler, used to draw the general straight lines. 150mm, used to draw short lines.

2. Angle Ruler: 100mm-500mm Angle Ruler (Japanese "SHINWA" brand), used to draw vertical lines in the plane and three-dimensional direction. (Figure 6.1)

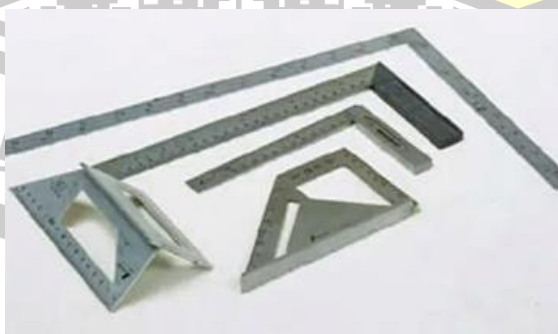


Figure 6. 1 Various types of feet

Source: Yang Fengsheng, 2023

3. Circle gauge: used to draw vertical bisectors.

4. Pen: pencil, signing pen. Pencils are used for sketching, and signing pens are used for drawing formal lines. Water-based signature pens must be used when drawing on wood.

6.1.2 Woodworking tools

1. Saws: including coarse and fine teeth. (Figure 6.2)



Figure 6. 2 Various types of saws

Source: Yang Fengsheng, 2023

2. varmint knives: for Guqin panels and base plates, various sizes (91mm, 612mm-333mm long). (Figure 6.3)



Figure 6. 3 Various types of varmint knives

Source: Yang Fengsheng, 2023

3. Chisels: including various sizes (6mm-30mm) of flat chisels and round chisels, used for digging and chiseling the face of the Guqin, Cavity belly, and the

body of the Guqin attached to the grooves, depending on the angle of the different, there is a choice of flat chisels and round chisels.

4. Files. Atmosphere triangle file and tiger stone file, including 81mm, 42mm, 304mm, 563mm and other different sizes, used to file the Guqin panel, base plate and other parts. (Figure 6.4)



Figure 6. 4 Various types of chisels.

Source:Yang Fengsheng, 2023

6.1.3 Lacquer Tools

- 1.Prepare a container for mixing natural paint
2. Lacquer scraper: Used to apply the sticky lacquer dust on the Guqin panel. (Figure 6.5)

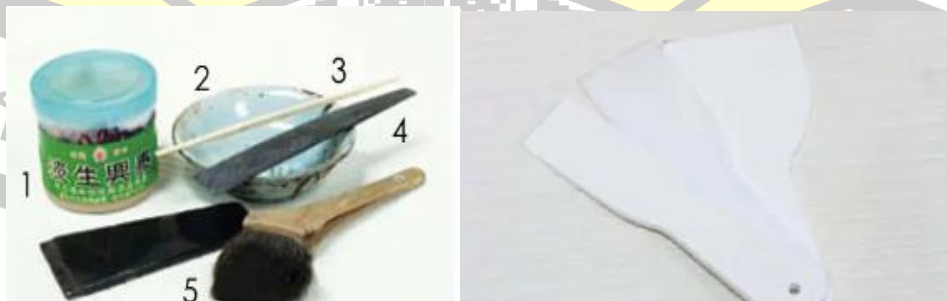


Figure 6. 5 Lacquer scraper

Source:Yang Fengsheng, 2023

6.1.4 Other tools

1. Sandpaper: There are different coarse and fine numbers, which are used to grind the surface of the Guqin finely, so that the Guqin reaches a smooth degree. (Figure 6.6)



Figure 6. 6 Various types of sandpaper

Source:Yang Fengsheng, 2023

2. Grinding stone: There are different thicknesses of grinding stones, which are used to dip into water and grind the larger area of the surface of the Guqin to make it smooth. (Figure 6.7)



Figure 6. 7 Grinding stone

Source:Yang Fengsheng, 2023

6.2 Preparing Materials

6.2.1 woods

The best choice for making Guqin has always been the wood of old age. Ancient China has always emphasized the choice of materials, and high-quality materials have an absolute influence on the sound effect of the Guqin, so if you want to make a high-quality Guqin, you must choose high-quality wood. The function of Guqin panel and base plate is different. When playing Guqin, the panel first vibrates and generates sound, and conducts the sound wave to the Cavity belly resonance box, so the panel needs to be made of sound transmitting, resonating effect, soft and flexible wood. The base plate of the Guqin has the function of reflecting the sound. After the sound is formed, it is dispersed from the two sound holes at the bottom of the Guqin, so the base plate of the Guqin must be made of solid and elastic wood with good sound reflection effect, which will not hinder the transmission of the sound.

The researcher mainly used the old fir wood with a long history. When the researcher purchased this piece of wood, according to the seller who disclosed to the researcher, this piece of old fir wood is already one hundred years old, and was removed from the beams of the house. It was cut with a cutting machine, using both "radial" and "chordal" cuts. When a tree trunk is cut down, you can see the growth rings from the cut surface. There are three methods of cutting wood, each of which is described below: (Figure 6.8)

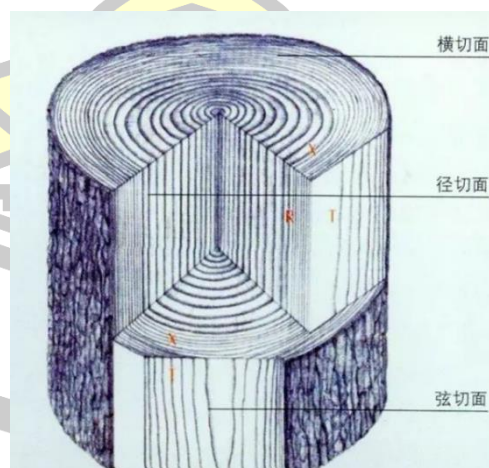


Figure 6. 8 Wood cutting type:

Source: Yang Fengsheng, 2023



Figure 6. 9 Wood finish cutting

Source:Yang Fengsheng, 2023

Selection of wood first to visually inspect the integrity of the wood, including grain straight, symmetrical, no breakage, no insects, while avoiding the parts of the scar. And then knock with your hand to listen to hear, select the best resonance effect of the wood. (Figure 6.9)

6.2.3 Natural Lacquer : It is a natural resin secreted by the lacquer tree, which is a grayish-white to yellowish milky sap with a certain degree of toxicity, and may lead to allergy, redness, swelling, and itching after staining. The lacquer turns black-brown after drying, hard and glossy, and can protect the Guqin. (Figure 6.10)



Figure 6. 10 Natural lacquered

Source:Yang Fengsheng, 2023

6.2.4 Antler cream: the antlers will be boiled to remove the bone marrow, impurities left after the white part, ground into powder called antler cream. Lujiang Shuang mixed Natural lacquered mix, known as “Antler Grey”. (Figure 6.11)



Figure 6. 11 Antler Grey

Source: Yang Fengsheng, 2023

6.2.5 Attachments and Fittings for the Body of the Guqin

The so-called accessories of the body of the Guqin refer to the parts that are inlaid into the body of the Guqin and become a part of it, including Mount Yue, Chenglu, Ceremonial cap, Gum, Jiaowei Xiazhi sticker, and Qin Marker, while the accessories are the parts that can be removed and replaced after the completion of the production, including Goose feet, Tuning pegs, and strings. Mount Yue, Chenglu, Ceremony

Mount Yue, Cheng Lu, Ceremonial cap, Gum, Gum supporter, and Jiao tail underparts are mainly made of ebony, rosewood, and other hard woods, while peg shields are made of ebony, nanmu, and other medium-hard woods. The Marker is made of shells, Goose feet and Tuning pegs are made of hardwood, ivory or jade.

6.3.1 Attachments on the Body of the Guqin

1. Mount Yue: Inlaid with the head of the Guqin, it is the highest part of the Guqin, mainly used to support the String. 150-185mm long, about 10mm thick, about 31mm high, curved. (Figure 6.12)



Figure 6. 12 Mount Yue
Source:Zhu Fengjie, 2022

2. Cheng Lu,: inlaid in the head of the Guqin, and Mount Yue close to the Mount Yue, about 150-185mm long, about 22mm thick, about 10mm high, there are seven round holes on the top, String from the round holes through the Mount Yue and Cheng Lu, generally separate production. (Figure 6.13)



Figure 6. 13 Cheng Lu
Source:Zhu Fengjie, 2022

3. Ceremorial cap: inlaid on the end of the Guqin, left and right symmetrical, with a certain aesthetic and protective effect. Its size and form can be set according to personal preference, and its thickness is about 13mm. (Figure 6.4)

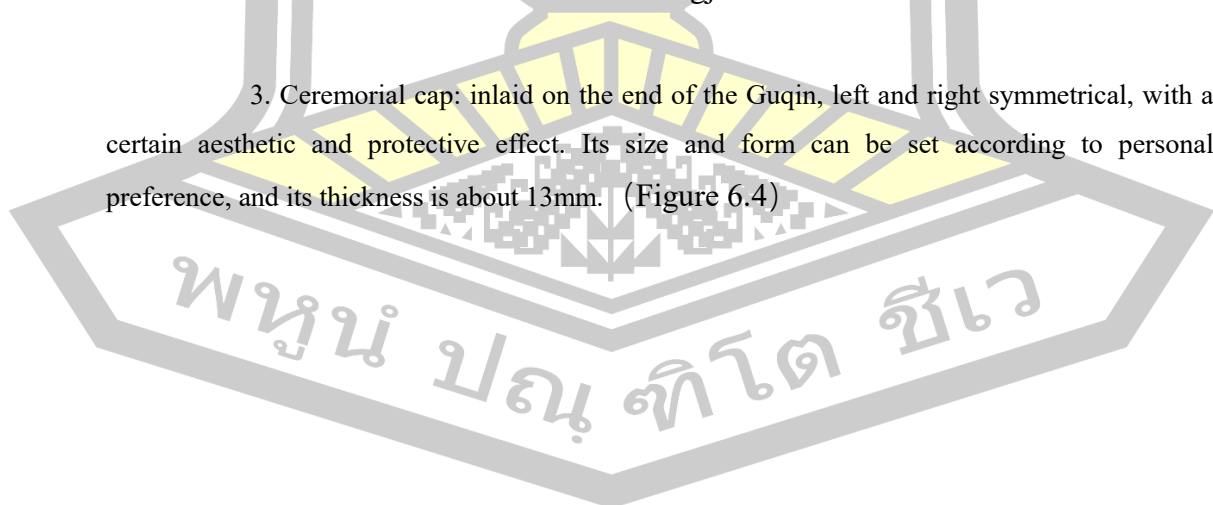




Figure 6. 14 Ceremonial cap

Source:Zhu Fengjie, 2022

4. Gum: set between two Ceremonial caps, located in the center of the tail of the Guqin, through which the strings of the Guqin pass. The length is about 37mm, width is about 32mm, thickness is about 10mm, and the Ceremonial cap and Gum can be designed according to the shape of the Guqin. (Figure 6.15)

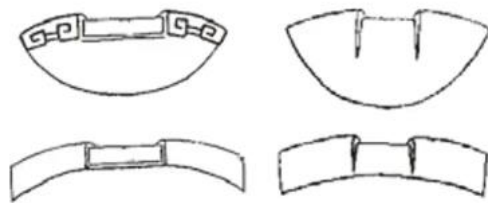


Figure 6. 15 Gum

Source:Zhu Fengjie, 2022

5. Marker: made of shells, gold, jade, ivory, etc., inlaid in the Guqin panel on the outside of a string, a total of thirteen dots, the Guqin head at a Marker, the Guqin tail for the thirteen Marker. seven Marker diameter is the largest. (Figure 6.16)

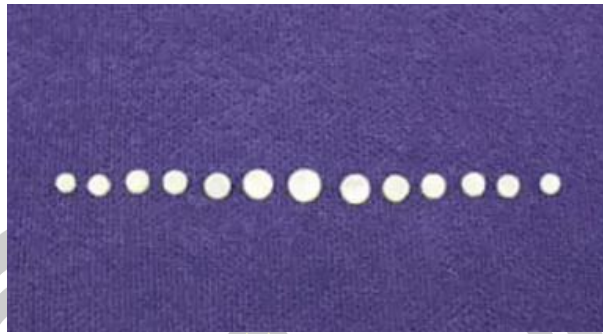


Figure 6. 16 Marker made of seashells

Source:Zhu Fengjie, 2022

6. pegs shield: located at both ends of the head of the Guqin, about 40mm in length and width, square, about 32mm in height, mainly for the protection of the Guqin, avoiding collision of the fit to be destroyed. (Figure 6.17)

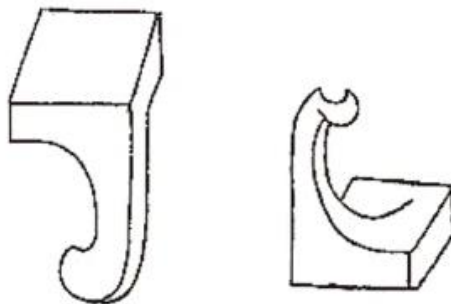


Figure 6. 17 Pegs shield

Source:Zhu Fengjie, 2022

7. The bottom of the peg pool: a piece of wood glued to the bottom of the peg pool of the Guqin, mostly made of hardwood, the main purpose is to avoid the bottom of the square pool of the Guqin's timber, due to Tuning pegs long-term rotation and damage. The size is the same as the square pegs, about 140mm long, 21mm wide and 3mm thick. (Figure 6.18)

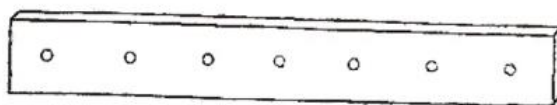


Figure 6. 18 The bottom of the peg pool

Source:Zhu Fengjie, 2022

8. Goose feet: located at the bottom of the Guqin, fixed in the Goose feet holes, the main role in the eating support Guqin body and fixed String. (Figure 6.19)

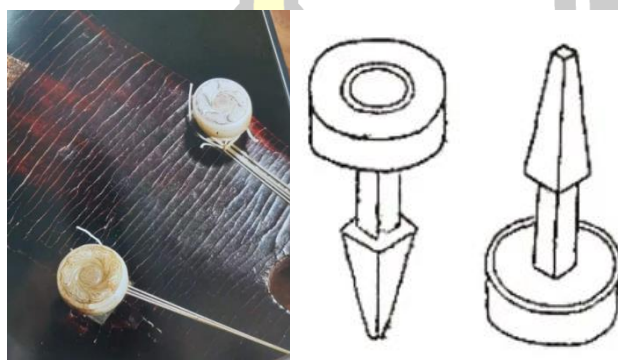


Figure 6. 19 Goose feet

Source:Zhu Fengjie, 2022

9. Tuning pegs: Located at the bottom of the Guqin, a set of seven pegs, about 50mm long, with the tuning pegs threaded through the center and passing through the string holes to the Mount Yue to fix the String, and the tuning pegs can be adjusted by turning the tuning pegs to adjust the pitch. (Figure 6.20)

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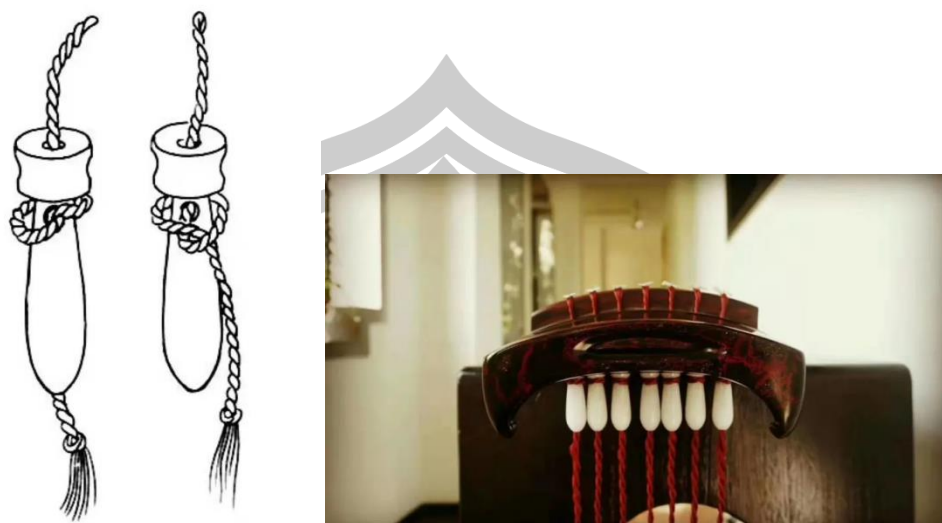


Figure 6. 20 Tuning pegs

Source:Zhu Fengjie and Yang Fengsheng, 2022

10. Strings: There are two kinds of strings: wire strings and silk strings. Starting from Mount Yue, it goes through the top of the Guqin, folds down at the Gum, and is tied to the Goose feet. (Figure 6.21)



Figure 6. 21 Strings of Guqin

Source:Yang Fengsheng, 2023

6.3 Making Process

6.3.1 Drafting

1. Check the condition of the timber, avoiding knots and broken areas, and then decide on the location as well as the extent of the take.
2. Draw the center line of the wood.
3. Draw the head line of the Guqin perpendicular to the center line by using a circular ruler with a vertical bisector.
4. Draw a Mount Yue line perpendicular to the center line at 90-100mm from the head line of the Guqin.
5. Calculate the position of Thirteen Marker and draw it.
6. Draw the positions of the Dragon Pond, Feng Pool and the two Sound absorbers.
7. Draw the tail line of the Guqin.
8. Draw the Goose feet position.
9. Decide on the head, shoulder and tail of the Guqin and draw the shape. (Because there are various styles and shapes of Guqin, its basic dimensions are more or less the same. You can refer to the literature and atlases of the past dynasties and choose your favorite style to draw) (Figure 6.22-6.23)



Figure 6. 22 Drafting

Source: Yang Fengsheng, 2023

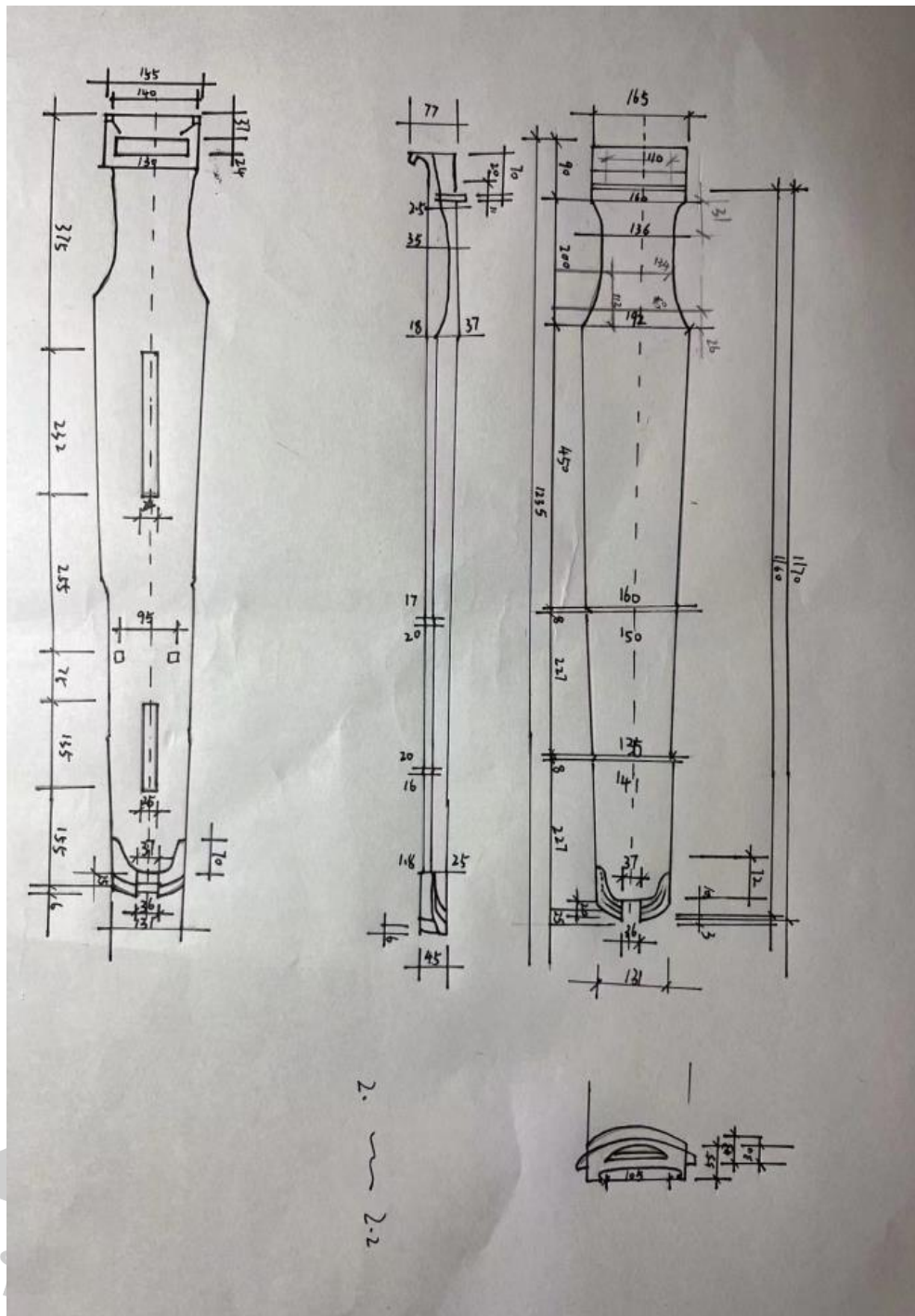


Figure 6. 23 Completion of drafting

Source: Yang Fengsheng, 2023

This is the researcher's drawing of the dimensions of the various parts of the Guqin, this is the process of making the Guqin, an indispensable part of the process.

10. Calculation of the thirteen Marker positions of the Guqin

Marker	Calculation method
1Marker	One-eighth
2Marker	One-sixth
3Marker	One-fifth
4Marker	One-fourth
5Marker	One-third
6Marker	Two-fifths
7Marker	One-half
8Marker	Three-fifths
9Marker	Two-thirds
10Marker	Three-quarters
11Marker	Four-fifths
12Marker	Five-sixths
13Marker	Seven-eighths

6.3.2 Making a Guqin Profile

1. First, using a saw or chainsaw, cut the straight profile of the Guqin.

(Figure 6.24)

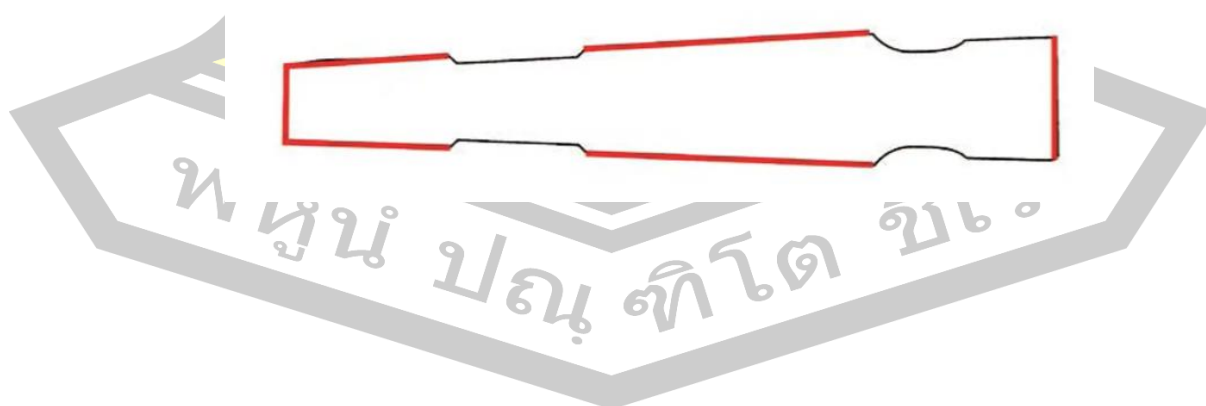




Figure 6. 24 Cutting the shape of a straight line of Guqin

Source:Yang Fengsheng, 2023

2. Then use the saw to make a straight vertical line along the curved section (Figure 6.25)



Figure 6. 25 Cutting the shape of a straight line of Guqin

Source:Yang Fengsheng, 2023

3. Use mallet and chisel to remove the sawed out wood strips, and then use chisel and file to repair the arc of the head of the Guqin. The making of the gouqin's waist waist is the same method as the making of the gouqin's head. (Figure 6.26)



Figure 6. 26 Waist way of making Guqin

Source:Yang Fengsheng, 2023

6.3.3 Cavity belly of Guqin panel

1. According to the design drawing, leave the sound absorber and Feet pool inside the Cavity belly of the Guqin panel, and keep the edge about 2cm wide, then remove the rest of the wood with a chisel. (Figure 6.27)

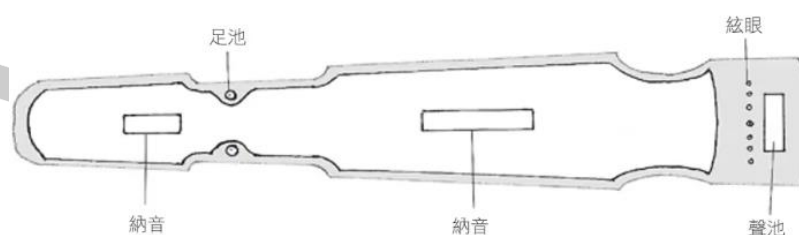


Figure 6. 27 Structure of Cavity belly

Source:Zhu Fengjie, 2022

Based on the properties of the wood, the researcher made this Guqin with such a grooved belly structure. (Figure 6.28-6.30)



Figure 6. 28 CT image of Cavity belly

Source:Yang Fengsheng, 2023



Figure 6. 29 Cavity belly digs

Source:Yang Fengsheng, 2023



Figure 6. 30 Cavity belly digs

Source:Yang Fengsheng, 2023

6.3.4 Guqin Panel Trimming Shapes

1. Draw the side thickness line with a long ruler, about 10mm.
2. From the third Marker (approximately at the shoulder of the Guqin) forward to the forehead of the Guqin, the height should be gently lowered by about 12mm to become the "Sloping head". (Figure 6.31)



Figure 6. 31 Sloping head

Source:Zhu Fengjie, 2022

3. Use the modeling board again to draw the curvature of the head of the Guqin and the tail of the Guqin.
4. Remove the excess wood on both sides with a tool to make the Guqin panel curved.
5. Then use a file to make the fine details of finishing, is the Guqin surface of a smooth arc.
6. Draw the position of "Xianlu" on the surface of the Guqin.
7. Then use a long ruler to check whether it is straight or not.

6.3.5 Applying Antler Ash to Guqin Panels

Applying ash is the process of applying antler ash, which is made by mixing Natural lacquered and antler cream, to the Guqin panel.

1. First, the Natural lacquered is first filtered to get the impurities out of it. (Figure 6.32)





Figure 6. 32 Stir in antler cream

Source:Yang Fengsheng, 2023

2. Then mix Natural lacquered with 80 mesh Antler Cream, and then use a brush to paint the whole antique piano surface evenly. (Figure 6.33)



Figure 6. 33 Apply Antler Cream

Source:Yang Fengsheng, 2023

6.3.6 Water Polishing

1. After the antler ash on the surface of the Guqin dries, sand the surface of the Guqin with sandpaper of No. 320 moistened with water to smooth the surface.
2. Repeat the above application process three times after leveling before proceeding to the next process step. (Figure 6.34)



Figure 6. 34 Watermill Photos

Source:Yang Fengsheng, 2023

6.3.7 Installing the Cheng Lu.

1. Use a pencil to draw the Mount Yue position on the Guqin panel.
2. Use a saw to cut out the Mount Yue edge line, then use a chisel to dig out the groove for the Mount Yue, which is about 13. deep.
3. Then draw the location of Cheng Lu, and use a chisel to dig out the edge line of Cheng Lu, about 7mm deep. (Figure 6.36)

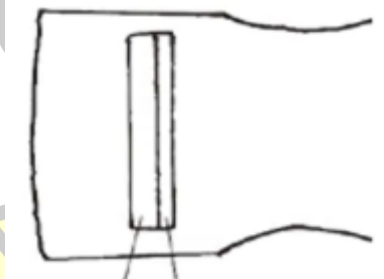


Figure 6. 35 Cheng Lu

Source:Zhu Fengjie, 2022

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Figure 6. 36 The process of making Cheng Lu

Source:Yang Fengsheng, 2023

4. Coat the Cheng Lu, as well as the contact surface of the Cheng Lu, with antler ash, and then stick the Cheng Lu, into the groove, with an exposed height of 2mm.

5. Put Mount Yue into the Mount Yue slot and fix the position of Cheng Lu. (Figure 6.37)



Figure 6. 37 Installation of Mount Yue

Source:Yang Fengsheng, 2023

6.3.8 Making string holes

1. Use an electric drill to make seven string holes on the Cheng Lu, spaced 19mm apart.

2. Using a 4mm drill bit, thread 4 to the very bottom with an electric drill.
(Figure 6.38-6.39)



Figure 6. 38 Cheng Lu
Source:Zhu Fengjie, 2022

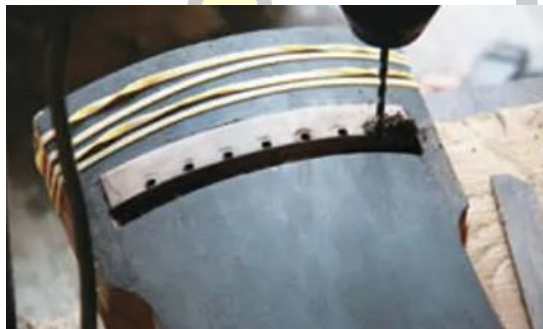


Figure 6. 39 Making string holes
Source:Yang Fengsheng, 2023

6.3.9 Mount Yue Installation

1. Apply an even coat of antler dust to the Mount Yue recess and to the Mount Yue contact surfaces.
2. Set the Mount Yue into the groove with the Mount Yue 18mm high.

(Figure 6.40)



Figure 6. 40 Mount Yue Installation
Source:Yang Fengsheng, 2023

6.3.10 Mounting the Marker Position

1. Draw the position of the first string first.
2. Using the first string as a reference, make a mark 7mm out from each of the one Marker and the thirteen Markers, and a mark 10mm out from the seven Markers, then connect the three points in a line.
3. Punch the thirteen Marker locations with an electric drill.
4. Set the thirteen Markers into the small grooves and glue them with antler gray. (Figure 6.41)



Figure 6. 41 Mounting the Marker Position

Source: Yang Fengsheng, 2023

6.3.11 Installing the Gum, Ceremorial cap

1. Trace the shape of the Gum on the end of the Guqin, dig a groove (9mm deep) with a chisel, and glue the Gum into the groove with antler ash. (1mm above the top)
2. Trace the shape of the Ceremorial cap on the end of the Guqin, and dig the groove with a chisel. (About 9mm deep)
3. Glue the Ceremorial cap into the groove with antler ash. (Figure 6.42)



Figure 6. 42 Installing the Gum
Source:Yang Fengsheng, 2023

6.3.12 Making the Dragon Pool and Feng Pool for the Guqin Base Plate

1. Draw the positions of the dragon pond and the Feng Pool according to the design drawing.
2. Use a burin to burin out the dragon pond and Feng Pool. (Figure 6.43)



Figure 6. 43 Sound absorber
Source:Yang Fengsheng, 2023

6.3.13 Making Goose feet holes

1. according to the design drawing, draw a 15mm by 15mm square in the center of the Goose feet.
2. Use a burin to plunge the two holes and make the two holes into squares.

6.3.14 Cavity belly for making baseboard

1. According to the design drawing, the head and tail inside the Cavity belly of the Guqin are retained, and the edge is retained about 20mm wide, and then the rest of the wood is removed with a burin.
2. The Cavity belly of the base plate of the Guqin is chiseled into a concave curved shape, and the thickness of the deepest part is about 22mm. (Figure 6.44-6.45)



Figure 6. 44 Cavity belly on the bottom plate

Source:Zhu Fengjie, 2022



Figure 6. 45 Cavity belly for making the baseboard

Source:Yang Fengsheng, 2023

6.3.15 Square Pool

1. Using the line of the string holes as a centerline, draw a rectangle about 140mm long and 21mm wide.
2. Burin the rectangle into a groove about 11mm deep.

6.4.17 Resinance pool

1. Draw a rectangle about 114mm long and 36mm wide at the head of the inner belly of the Guqin panel, 30mm from Mount Yue.
2. Use a burin to burin the rectangle into a groove about 6mm deep on both sides and 12mm deep in the center, with right-angled edges. (Figure 6.46)



Figure 6. 46 Making a square pool

Source: Yang Fengsheng, 2023

6.3.16 Sound Test

1. Fix the top and bottom of the Guqin with rubber bands first.
2. String the Cavity Belly in turn and play the music to hear the resonance effect and whether the sound reaches the level of the Cavity Belly.
3. According to the result of the audition, selectively adjust the Cavity belly according to your personal preference. (Figure 6.47)

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Figure 6. 47 Sound Test

Source:Yang Fengsheng, 2023

6.3.17 Two planks merged

1. Before this, tape the two Sound absorber ports on the bottom board of the Guqin, and water penetrates them when imitating the water mill.
2. Use wood glue to merge the two boards together and tie them with string. (Figure 6.48)



Figure 6. 48 Two planks merged

Source:Yang Fengsheng, 2023

6.3.18 Making the Tongue

1. Draw the tongue on the 12mm center of the head of the Guqin, about 109mm wide.
2. Engrave the tongue with a burin. (Figure 6.50)

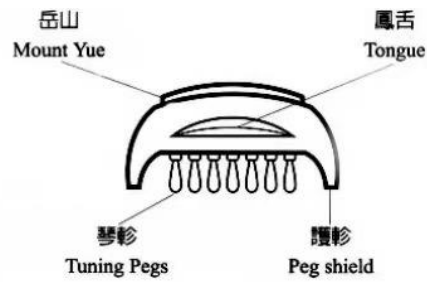


Figure 6. 49 Tongue's location

Source: Yang Fengsheng, 2023



Figure 6. 50 Making Tongue

Source: Yang Fengsheng, 2023

6.3.19 Peg shield

1. Draw the position of the peg shield on the head of the base plate.
2. Use a burin to plunge a groove about 9mm deep.
3. Coat the peg shield groove and the contact surface of the peg shield evenly with antler gray. (Figure 6.51)



Figure 6. 51 Making Tongue

Source: Yang Fengsheng, 2023

6.3.20 Installing the Gum Supporter and Focusing on the Tailpiece

1. Trace the shape of the gum supporter at the end of the base plate.
2. Use a burin to carve a groove for the gum supporter, about 9mm deep.
3. Then trace the shape of the lower post of the tail.
4. Use a burin to carve out the groove of the lower post of the tail, about 9mm deep.
5. Use antler ash to glue the undercut and the gum supporter into the groove. (Figure 6.52)



Figure 6. 52 Installing the Gum Supporter and Focusing on the Tailpiece

Source:Yang Fengsheng, 2023

6.3.21 Guggenheim Tail Finishing

1. At the end of the Guqin, file a curved bevel between the Gum and Ceremorial cap to the Gum supporter and the lower post of the Jiao tail on the Guqin base plate.
2. Extend the edges of the Gum and Gum supporter and draw two lines on the Guqin tail.
3. Saw out the edges of the lines with a saw and remove the wood about 4mm deep with a burin. (Figure 6.53)



Figure 6. 53 Guggenheim Tail Finishing

Source: Yang Fengsheng, 2023

6.3.22 Apply antler gray to the base, sides, head, and tail of the Guqin.
(The above application has already been described and will not be described here.)

6.3.23 Cooked natural lacquer

1. Mix Cooked natural lacquer with turpentine in the ratio of 1:1.2. Spread cotton on the meow, pour in the lacquer, and strain the Cooked natural lacquer with a twisting motion.
2. Then in the lacquer brush on the body of the Guqin for uniform application.
3. After completion, 24 hours later, with 600 sandpaper for water abrasion, repeat the application of Cooked natural lacquer, know the Guqin panel smooth until.

6.3.24 Annealing and Pushing the Gloss

1. Water-sand with No. 5000 grit sandpaper to achieve consistent paint gloss. (Annealing)
2. Use hemp oil mixed with antler cream and mix well. Pinch the cotton cloth into a ball shape, smear the blended hemp oil, and evenly coat the whole body of the Guqin to achieve a bright luster. (Figure 6.54)



Figure 6. 54 Annealing and Pushing the Gloss

Source:Yang Fengsheng, 2023

6.3.25 Installing strings

1. Set the Goose feet into the Goose feet holes, the exposed part is about 18mm long. (Figure 6.55)



Figure 6. 55 Installation of Goose Feet

Source:Yang Fengsheng, 2023

2. Thread the fleece head through the Tuning pegs. (Figure 6.56)

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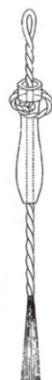


Figure 6. 56 Tuning Peg

Source:Zhu Fengjie, 2022

3. Tie a fly at the end of each String. (Figure 6.57)

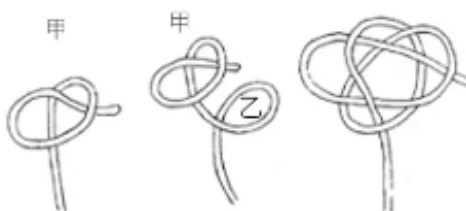


Figure 6. 57 Procedure for tying the head of the rope

Source:Zhu Fengjie, 2022

4. Pass seven Tuning pegs through the eyelets and secure them at Cheng Lu. (Figure 6.58)



Figure 6. 58 Procedure for tying the head of the rope

Source:Yang Fengsheng, 2023

5. Stringing order: the 5th, 6th and 7th strings are tied to Goose feet A, and the rest are tied to Goose feet B. (Figure 6.59)

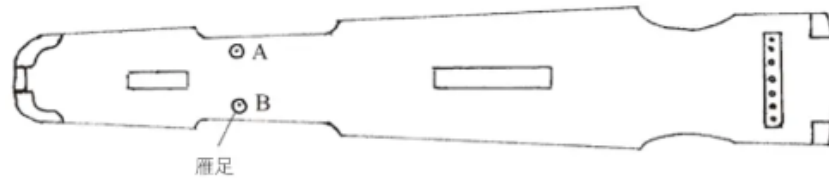


Figure 6. 59 Position of wild goose's feet

Source:Zhu Fengjie, 2022

6. Experts Tested the Guqin

After the successful production of the Guqin, the researcher invited Wei Wei, a famous contemporary Chinese Guqin player, to test and play the Guqin. Wei Wei was very satisfied with the Guqin, she thought that the sound of the Guqin was sweet and the resonance effect was very good, which reached the demand of performance. (Figure 6.60)



Figure 6. 60 Guqin player Wei Wei playing the finished Guqin

Source:Yang Fengsheng, 2023

She found this Guqin to be of fine style and relatively even sound. The low and middle voices are relatively good, which suits the aesthetic pursuit of the Jiangnan region. It should work well especially for playing more quiet Guqin music.

The results of her test were:

- (1) The Guqin style is classic and beautiful.
- (2) The overall sound of the Guqin is relatively good for playing soft Guqin music.

(3) The height of the yueqin is accurate.

(4) The lacquer craftsmanship of the Guqin is exquisite.

In addition, the researcher let invite Mr. Pei Jinbao to conduct a live test on this Guqin, and he thought that this one has a sweet tone and good resonance, which can satisfy the needs of Guqin players. (Figure 6.61)



Figure 6. 61 Mr. Pei Jinbao testing the quality of the Guqin

Source: Yang Fengsheng, 2023

The results of his test were:

(1) The Guqin style is Zhongni style, which is very much in line with the public's aesthetics.

(2) The overall sound of the Guqin is relatively good, and there is still room for improvement in the high register.

(3) The height of the yue shan is accurate.

(4) The lacquer work of the Guqin is exquisite.

(5) If this Guqin is often played by the eye, the sound will reach a satisfactory level in the future.

The results of Prof. Gu Yongjie's examination are:

(1) The silhouette of the Guqin is relatively beautiful and fully reflects the classical Zhongni style of modeling.

(2) The lacquer process is relatively perfect, and it would be better if some artistic elements were added.

(3) The overall sound resonance pen of the Guqin is better.

(4) All accessory parts of the Guqin are relatively perfect.

(5) The production process is precise.

6.3.26 Write an inscription.



Figure 6. 62 Zhongni-style Guqin "Qiyu"

Source: Yang Fengsheng, 2023

6.3.27 Testing the acoustics of the Guqin

In addition, the researcher again used the presently made Guqin and the previously made Guqin for comparison. The previously made Guqin is called "Guqin A" and the presently made Guqin is called "Guqin B". This paper analyzes the sound characteristics of the two Guqins by playing the Guqin piece "Remembering the Old Man (忆故人)." and analyzes the sound aesthetics required for each section of the piece.

1. The Guqin Song "Remembering the Old Man" (忆故人)

"Remembering the Old Man" (忆故人), also known as "Thinking of the Old Man in the Mountain" (山中思故人) or "Remembering the Old Man in the Empty

Mountain" (空山忆故人), is said to have been composed by Cai Yong of the Eastern Han Dynasty. It is said to have been composed by Cai Yong of the Eastern Han Dynasty. See in the Ming Dynasty Zhu Quan "magical secret score", Ming Dynasty Gong Jing "Zhe Yin Shuo Zi Zi Qin", Ming Dynasty Yang Table Zheng "re repair the true transmission of the qin spectrum", the Qing Dynasty Kong Xing lure "qinyuan Xin Fu full editorial", and the Republic of China in 1937 published the publication of the "Jin Yu qin publication" and Gu Meijiang "qin study preparation," etc.. (Wang Rutong, 2014).

The Guqin sheet music used by the researcher is the version of the "Jin Yu Qin Journal (今虞琴刊)". According to the "Jinyu qin journal" (今虞琴刊), this version was handed down by Mr. Peng Zhiqing, whose Fengweng was a governor of the Manchurian Qing Dynasty; after the fall of the Qing Dynasty, he lived in seclusion to play the Guqin, and he only played this piece, "Remembering the Old Man". Mr. Hi-Qing's family has a long history of learning, and this piece has its own unique characteristics. When he made friends with his friends on the Guqin, he occasionally played this piece and was so enchanted by it that he asked Mr. Peng to leave the score of this piece to be passed on to the rest of the world. After many years, Peng Zhiqing felt that the piece had been passed around and gradually lost its authenticity, so he and Mr. Zhang Ziqian worked together to revise the score, which was included in the "Jin Yu Qin Journal" (今虞琴刊). The score is divided into six sections, with elegant rhythms and full of flavor, and the main meaning of the piece is that before the longing for the deceased, it appears in the rhythms and resonates with people's emotions and voices.

The reason why the researcher "remembering the deceased" this Guqin piece, on the one hand, the researcher always play this piece, more skillful as well as personal favorite. On the other hand, because this piece of Guqin music has both sound and flavor, both beginning and end, and each pitch is present, all aspects of musical expression are quite complete, so it is very appropriate to use it as a piece of music for research and analysis. Importantly, the researcher also consulted the famous contemporary Guqin virtuoso Wei Wei, who also found this Guqin piece very appropriate.

The piece "Remembering the Old Man" (忆故人) is a piece played in the "Correct key", using CDFGAc for the tone, but not slowing down the three tones, so the fixed tones are CDFGAc. The whole piece is divided into four major parts, namely, "starting, carrying on, turning, and merging". The first five overtones of the first section of the "slow work" are used as a guide, and the simple overtones are used to bring in the left hand's dexterous and melodious "scattering plate" as the "start". The second section of the melody is the second part of the tune and the third part of the melody, which can be sung in the tune, with the melody of the second part as the main theme and the development and extension. The "Turning" section is more special, it is the exciting part of the piece, or the complicated section with fingering changes. The third section of the fourth section is also the shadow of the fourth section, except that most of the melody is the same as that of the third section, and the fingerings repeatedly use the "handful", using the seven-marker doubling to meet the four-marker, and from the four-marker through the five- and seven-marker to the nine-marker, and then to the nine-marker, and then to the nine-marker. Marker, and then in the nine Marker slow on the seven Marker, lively and smooth, finger without stagnation, highlighting a one-two punch, continuous musical performance, but also the most classic section of this song. Because the same melodic variation is used from the second section onwards, traditional musical techniques such as "changing the head", "merging the tail", "adding flowers", "subtracting words", etc. are used. Therefore, traditional music techniques such as "change the head", "merge the tail", "add flowers", "subtract words" are used to avoid the repetition of the same melody. The beginning melody of the fifth section is the melody of the second section, the second to the fourth sections have the same ending phrase, and the end of the fifth section echoes the end of the fourth section, which has a lingering flavor. The sixth section of the piece is a "slow closing" to smooth out the mood of the piece, and the piece moves "slowly" into the "main key" of four phrases, and then ends. The overtones of the sixth section match those of the first section, and the musical expression is similar to that of the first overtones, utilizing the technique of "rounding" to introduce a melody that

echoes the “beginning”. The “rounding” technique leads to a melody that echoes the “beginning”, the beginning and the end.

2 Aesthetic Representation of the Guqin and Sound Analysis of Guqin

The Guqin performance as well as the analysis of “Remembering the Old Man”. The following is a comparison of the researcher's selection of important sections to be analyzed according to their required aesthetic performance and the sound characteristics of the two Guqins.

(1).Qi (起)

忆 故 人

(1) $\text{♩} = 36$ (渐快)

整理琴谱
顾梅羹演奏
许健记谱

Source: The Guqin Collection, 2003

The overtones of the first section mainly express the light and pure atmosphere, and create the effect of curling aftertone, unfolding a story.

Guqin A: The overtones are more direct, clean and clear, bright and resonant.

Guqin B: The overtones are more resonant, sweet and moist, like bells in the wind.

Source: The Guqin Collection, 2003

This section is the fifth phrase of the first section, which mainly expresses the depth of longing and the sighing of memories, and emphasizes the beauty of the



Source: The Guqin Collection, 2003

This is the first phrase, second phrase and third phrase of the fourth section, which expresses memories as well as the stirring emotions of a friend who is either happy or sad in double tones, so you can test the expressive power of the double tones of the Guqin.

Guqin A: The high notes are clear and bright.

Guqin B: The treble is more prominent, the treble and bass tones are even, and the resonance and aftertone effects are better.

(4).He(合)



Source: The Guqin Collection, 2003

This section is the fourth, fifth and sixth phrases of the sixth section. The mood returns to deep longing and murmuring sighs, and the bass in this section is ancient, deep, old and vaguely subdued, which is the focus of the expression of emotion.

Guqin A: The lowest notes do not resonate well and are not thick enough.

Guqin B: good resonance, thick bass.

6.4 Modern Acoustic Test

In order to achieve an accurate judgment of the sound effect, the researcher also utilizes modern acoustic testing instruments to conduct on-site tests on the present and previous Guqins. The main test in this paper is the degree of sound effect of the Guqin, i.e, the "resonance peak" data test. (Figure 6.63-6.64)

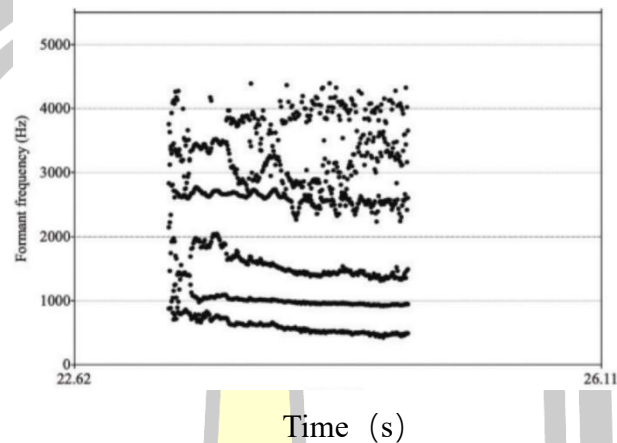


Figure 6. 63 Previously made Guqin
Source:Feng Zhuohui, 2023

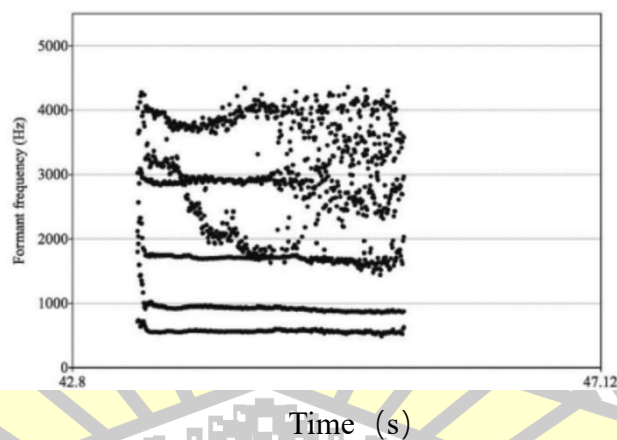


Figure 6. 64 Made Guqin now
Source:Feng Zhuohui, 2023

Resonance peaks are regions of sound that are more concentrated in the frequency domain range and are usually determined by the resonance properties of the resonator. This study introduces this analytical tool to study the resonance peaks of the Guqin, which can reflect the resonance characteristics of the Guqin to a certain extent. In the Guqin strings are subjected to tension, tension, the whole body of the Guqin will a sentence of its own resonance characteristics to give the frequency

degree of change. In this paper, two Guqins will be tested in the same environment, Guqin strings, Guqin players and other aspects of the same conditions. The horizontal axis indicates is the time, and the vertical axis is the frequency region.

By testing the resonance peaks of the two Guqins, the sound effect of the Guqin made now is better than the sound effect of the Guqin made before. This is because the resonance density of the second Guqin is significantly better than that of the previously made Guqin. (Figure 6.65)

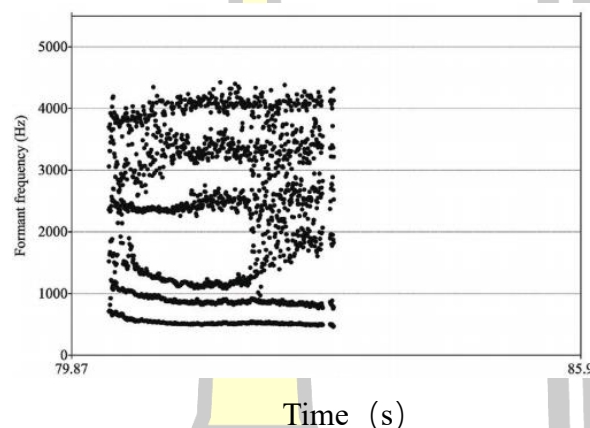


Figure 6. 65 Guqin made now
Source:Feng Zhuohui, 2023

In addition, the researcher played the Guqin repeatedly for a long time, and surprisingly found that the resonance peak density was better than that of the previous one. This suggests that the sound effect at the beginning of a successful Guqin production does not represent its earliest sound quality, and it needs to be utilized for a long time in order to play to the best sound effect.

6.4 Summarize

This chapter is mainly based on Chapters 4 and 5, based on the records of ancient literature and the methods and experiences of famous contemporary Guqin makers, and finally by making the Guqin by oneself. For re-examination by experts. Test result: it can be used as a performance instrument. Sound resonance effect is good. In addition, the researcher selected a previously made Guqin to compare with the presently made Guqin. The two instruments played the same Guqin song together, and finally found that the sound of the newly made Guqin was more perfect.

CHAPTER VII

Conclusions, discussion and suggestions

By thinking and summarizing this thesis for more than one year, I finally finished the present work. One year ago, Prof. Jarernchai Chonpairot knew that I could play the Guqin, and initially he suggested that I study the spread of the Guqin by using the theory of communication, and then he found out that I could make the Guqin, and then he decisively asked me to study the topic of "Arts of Guqin Making in Suzhou, China", and I started this research with his encouragement and guidance. I started this research under his encouragement and guidance.

This paper is centered on three main research objectives:

7.1 To Investigate the Physical Structure and Its tuning System of Guqin Plucked Zither

Researchers through the interpretation of historical documents, the ancient Chinese made a clear guideline for the size of the Guqin, the total length of the Guqin is about 123cm-130cm. from the ancient preservation of the Guqin survived to see, basically this is the size of the Guqin, today's Guqin manufacturers are in accordance with the size of the Guqin to make the Guqin. This size is suitable for the tone of the Guqin.

There are dozens of styles of the Guqin, and the most common ones we see today are the Zhongni style, Fuxi style, Lianzhu style, Banana Leaf style, Shennong style, and Chaos style. According to the more than one hundred Guqins included in the "Jin Yu Qin Journal" (Jin Yu Qin Society, 2018) and "Chinese Guqin Treasures" (Wu Zhao, 2018), the Zhongni style accounts for 62% of the proportion. The researcher believes that the Zhongni style Guqin has a simple structure, is easy to make, and meets the aesthetic needs of the public.

Generally, the timber used in the production of Guqin mainly includes cedar, tung, pine and catalpa, and the older the timber is, the better it is, and the older the timber is favorable for sound conduction. Because, the moisture and resin in the old wood has been fully evaporated, leaving the pore space just to become an excellent

resonance body, made into a Guqin, the resonance effect is often better than the new wood. Of course, nowadays some Guqin makers are trying to use new materials to make Guqin, which is also a kind of innovation, some people can accept it, and some people can't accept it. Cavity belly is the core of Guqin production, and the reasonable division of the structure of the cavity belly as well as its thickness affects the sound of the Guqin, whether it is good or bad. In the process of making Guqin, researchers have found that there is no fixed framework for the structure of the cavity belly. The properties of each wood are different, and it depends on the sound of the wood itself.

In ancient historical documents, a good quality Guqin must have a good sound. Good sound attributes are “Fu” (浮) “Shi” (实) “Qing” (清) “Zhuo” (浊) “Jian” (坚) “Liang” (亮) “Song” (松) “Tou” (透) “Hou” (厚) and so on. Of course, everyone's evaluation standard is different, some people like the Guqin with big sound, while some people like the Guqin with small sound. It is difficult for a zither to satisfy many of the above conditions.

In addition, from the point of view of the historical Guqin objects, the base plate of the Guqin is engraved with “inscriptions”. As we all know, Chinese calligraphy is an important part of traditional Chinese culture. Therefore, the Guqin, together with the inscriptions, can better reflect the humanistic charm of the Guqin. Importantly, these inscriptions are not only the names of the maker and the collector, but also many of them are Chinese poems and songs, which are engraved on the Guqin, which is aesthetically pleasing and also has both cultural and aesthetic significance and value. It should be emphasized here that I did not seal-engage the inscriptions on this Guqin, mainly because I do not have the ability to do so. The previous Guqins were made with Chinese characters engraved by a seal carver.

The Broken Patterns of Guqin is a sign of a good quality Guqin, the Broken Patterns of Guqin must be accumulated over a long period of time and cracks appear when the wood and lacquer layers of Guqin panels with different coefficients of expansion and contraction occur under the influence of time and temperature. The Broken Patterns of Guqin make the Guqin more beautiful, and make the sound of the Guqin more loosely and elegantly, and the tone effect is better. The Broken Patterns of Guqin are very precious, and they are loved by the Guqin players. The Broken

Patterns of Guqin are very precious and are loved by Guqin players, but nowadays, it is impossible for Guqin makers to make a regular The Broken Patterns of Guqin, and nowadays, traders are borrowing “The Broken Patterns of Guqin” and making fake “The Broken Patterns of Guqin”. Nowadays, traders borrow “The Broken Patterns of Guqin” and make fake “The Broken Patterns of Guqin” for the purpose of selling more money.

Researchers have compiled a list of eight methods of tuning the Guqin, providing Guqin makers and players with a reference that does not rely on Guqin tuners. It can be said that the other seven tunings are converted from the orthodox tuning.

7.2 To search for the excellent characters in terms of physical structures and tone quality of Guqin plucked zither to be used as the Guqin model for Guqin Making

The researcher chose famous Guqin artists, Guqin players, and Guqin experts in the Suzhou area to conduct targeted interviews, and selected three Guqins and asked them to point out which one was the best. And the information was transcribed into text based on the voice materials obtained from the interviews. The process of making Guqin is basically the same, and all of them follow the ancient production procedures. The only difference is their philosophy of making the Guqin. For example, Pei Jinbao is different from the other two Guqin makers in the process of trying out the Guqin. Pei Jinbao first wrapped the cloth and varnished it, and finally tried the sound. The other two qin makers test the sound first, then wrap the cloth and put on the lacquer. What's more, Mr. Pei Jinbao, who is over seventy years old, has touched a large number of Guqins left over from ancient times and restored them, so he has also summed up the characteristics of ancient Guqins. The Guqin made by him has a good reputation in Suzhou. Therefore, the researcher thinks that Pei Jinbao's production concept is more appropriate. Because only when the thickness of the Guqin is determined, the audition will be accurate. It is especially important that if the sound is auditioned first, and then the lacquer is wrapped, then the panel of the Guqin will be thickened, which will surely affect the tone, and then the tone that was auditioned before will not be accurate.

In addition, the researcher also invited six Guqin experts to listen to and evaluate the sound quality of the three Guqins, and made a judgment on the best sound quality of the three Guqins, and listed the best reasons or standards, and finally concluded that the sound quality of the Ming dynasty Guqin is the best.

Final conclusion The Guqin of excellent quality mainly has the following conditions: exquisite style, excellent wood, stable lacquer color, clear texture, reasonable production process, reasonable structure of the belly, and certain professional skills and cultural cultivation of the zither maker.

7.3 To make a new Guqin plucked zither that match the quality of the given model

The completion of a high-quality Guqin, from its modeling, selection of materials, wrapping, lacquering, Cavity belly digging chisel, and the completion of the procedures such as closing the qin, requires the Guqin maker a long time of dedication at the same time, but also requires prudent and rigorous thinking, and coupled with excellent craftsmanship and a wealth of experience in the production of the material and the characteristics of the shape of the system to give full play to the impact of the Guqin's resonance factors to a minimum degree, thus making the beauty of the sound from the Guqin to play to the fullest extent. This will minimize the factors affecting the resonance of the Guqin, and thus maximize the beauty of the sound emitted by the Guqin. This chapter is mainly based on Chapters 4 and 5, based on the records of ancient literature and the methods and experiences of famous contemporary Guqin makers, and finally by making the Guqin by oneself. It is then re-examined by experts. Inspection result: it can be used as a performance instrument. The sound resonance effect is good. In addition, the researcher selected a previously made Guqin and a presently made Guqin for comparison. The two instruments played the same Guqin song together, and in the end, it was found that the sound of the newly made Guqin was more perfect. The previous Guqin used new cedar wood, which was not too old, while the researcher used several hundred years old cedar wood, which had a sweeter tone, a steady bass and a "rhythmic" sound compared to the previous Guqin. The most important factor is to play the Guqin while making it.

Nowadays, many Guqin makers do not play the Guqin, they only produce the appearance of the Guqin, they do not pay attention to the sound effect of the Guqin. The three Guqin makers interviewed by the researcher of this paper, all of them can play the Guqin, of course, the researcher himself can also play the Guqin. Therefore, in the process of making the Guqin, the "quality of sound" is an important goal. This is important because the Guqin is made to be played, not like a sculpture for others to see.

7.4 Discussion

(1) To study the Physical Structure and Tuning System of Guqin Plucked Zither ;

In this research work, there has been a study of the physical structures of this musical instrument. From the study, the researcher has found that the various structural characteristics are both the same and different, consistent with various documents. Below what the researcher has done.

Article Wang, Hwa-Ying Zhang (2005) The book "The Guqin" describes the history of the Guqin and roughly depicts the body structure of the Guqin.

Lindsley, Sweden (2019) The book "The Guqin" describes the structure of the Guqin with mythological stories.

Gerfeld (2014), The Guqin in Famous Paintings, lists ancient paintings of the Guqin, but does not label the body structure.

Zheng Minzhong (2010), The Guqin Atlas of the Forbidden City, describes in detail the Guqin left behind in ancient China, and lists the dimensions of the Guqin in comparative detail based on the physical Guqin.

Lin Chen (2009) roughly depicted the body structure of the Guqin in his book The Guqin.

Wu Zhao (2018) "Chinese Guqin Rare Atlas" mainly includes 108 Guqins left over from past generations, and its detailed introduction.

It is a pity that these research results do not explain the entire structure of the Guqin's body in detail, and this study is able to make up for this deficiency. In addition, with regard to the tuning system of the Guqin, the researcher has not found

any researcher who has studied this field. Therefore, this study lists eight tuning methods.

This research is therefore a research study that has discovered the characteristics of the 8 customization methods that have been presented.

(2) To search for the excellent characters in terms of physical structures and tone quality of Guqin plucked zither to be used as the Guqin model for Guqin Making;

For the study of Guqin makers, there is currently Guo Jinmo (2018), "Study of Guqin Maker Mao Yi", which focuses on Shandong's famous Guqin maker Mao Yi as a case study, which is mainly characterized by his dual identity in terms of his qualities and as a Guqin player; the second part of the article is by describing Mao Yi's daily practice sessions of Guqin making. Zhang Zhenrui's (2017) article "Body and Qin: A Cultural Interpretation of the Physical Practices of a Monk Thought to Carve the Qin" takes the monk's practice as the object of investigation, and attempts to describe and elaborate the cultural meaning space generated by the monk in the process of Guqin production in a holographic manner with anthropological methodology, taking his experience and sense of body as the point of entry. They all focus on the "human" as the center of attention, neglecting the details of Guqin making.

Yuyang Xu , "Research on the Transmission Activities of Chen Yimin, the Provincial Representative transmitter of Lingnan Guqin Hacking Technique", mainly takes Chen Yimin, the Lingnan zither hacker, as the object of research, and describes Chen Yimin's concept of Guqin production, dissemination and Transmission activities, as well as dissemination effects, and the researcher utilizes the theories of communication to illustrate the operation mechanism of the dissemination of the production of the Guqin in the Lingnan region, which provides a referable paradigm for the dissemination and Transmission of traditional music. (Xu Yuyang (2022),The researcher utilizes communication theories to explain the operation mechanism of Guqin production and dissemination in the Lingnan region, providing a model for traditional music dissemination and transmission. The only shortcoming is that the researcher only focuses on the superficial description of the transmission and Transmission, but lacks the deeper investigation on the theoretical level.The book

Contemporary Guqin Masters in China by the Music Research Institute of the China Academy of Art and the Beijing Musical Instrument Society (2020) records 172 representative contemporary masters of the Guqin, and its content is mainly a biography of Guqin production.

The above research results only stay on the surface, basically focusing on the life history of Guqin makers. While there is no data about Guqin making, this study collects data from three makers about the process of Guqin making and finally draws conclusions.

(3) To make a new Guqin plucked zither that match the quality of the given

Meng Jianjun's (2016) article, "The Process of Golden Rhythm Musical Instrument Imperial Workshop," focuses on describing the entire process of Guqin production. Zhu Huipeng (2011) "hacking qin French style" book using contemporary language expression on the Guqin production techniques in great detail, Tao Yuncheng (2014) "Guqin production method", Wang Dong (2011) "hacking Tong set", Gu Yongjie (2022) "traditional Guqin hacking technology process" and other research results of the Guqin production technology have some simple introduction, the overall idea and the ancients The general idea is the same as that of the ancients.

Yang Wen (2008), "Folk Workshops and the Craft of Qin Carving," focuses on Xu Fulin's qin-making workshop in Lankao, Henan Province, as a case study, investigating Xu Fulin's qin-carving process, the workshop's mode of operation, and finally comparing it with the ancients and contemporary qin-carving masters in an attempt to explore the differences between Xu Fulin's workshop and his. The researcher focuses only on the operation mechanism of a qin-making workshop and lacks an overall macroscopic perspective, which confines the article to the situation of "only seeing the trees, not seeing the forest".

From the point of view of the process of Guqin production, the above research results are rather general, concise, and not particularly detailed. This researcher obtains first-hand data through fieldwork, and then carries out a very detailed description and interpretation. And on the basis of tradition, they have made innovations and improvements, which are different from the above researchers in this respect, and this is also a new discovery of this study.

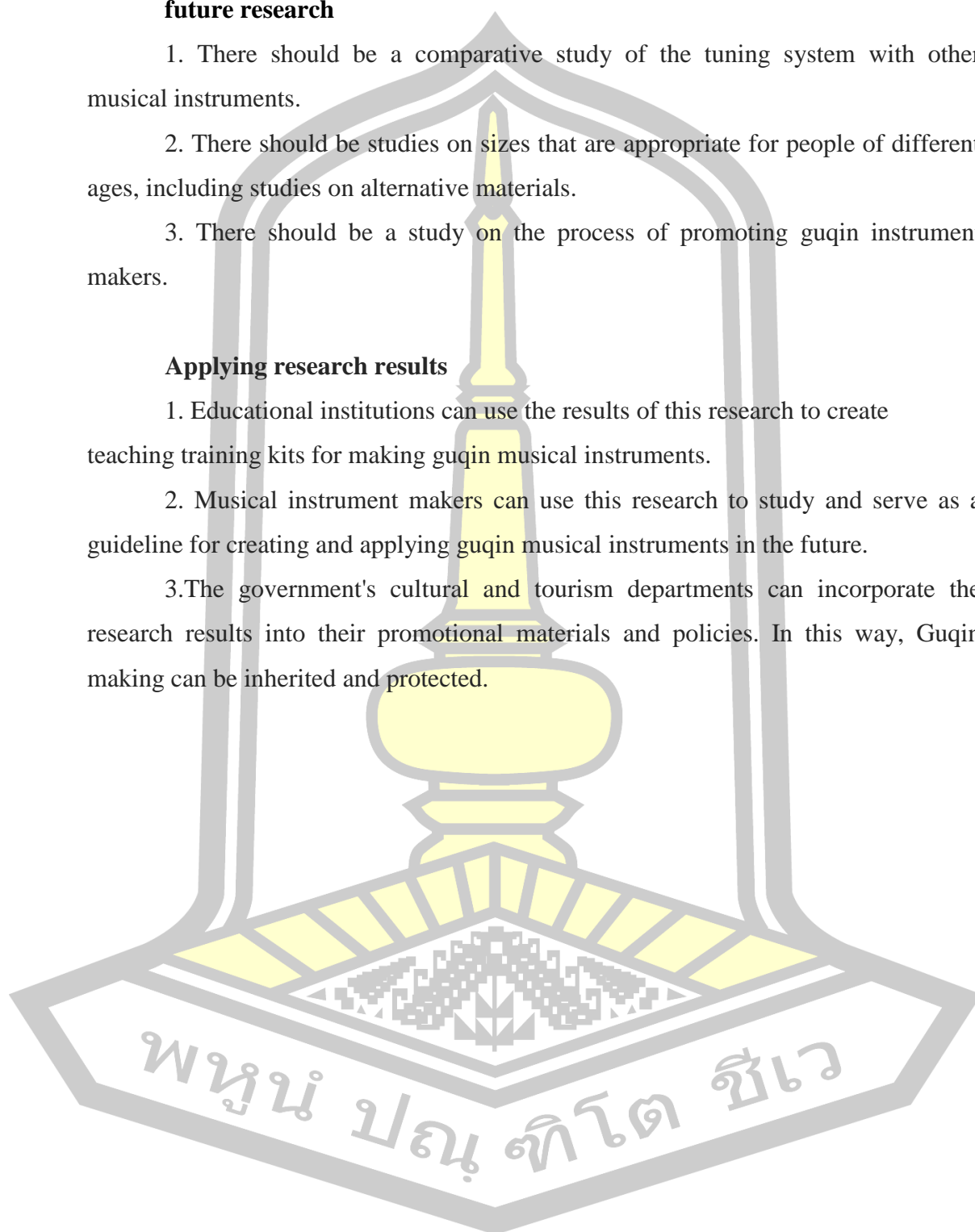
7.5 Suggestions

future research

1. There should be a comparative study of the tuning system with other musical instruments.
2. There should be studies on sizes that are appropriate for people of different ages, including studies on alternative materials.
3. There should be a study on the process of promoting guqin instrument makers.

Applying research results

1. Educational institutions can use the results of this research to create teaching training kits for making guqin musical instruments.
2. Musical instrument makers can use this research to study and serve as a guideline for creating and applying guqin musical instruments in the future.
3. The government's cultural and tourism departments can incorporate the research results into their promotional materials and policies. In this way, Guqin making can be inherited and protected.



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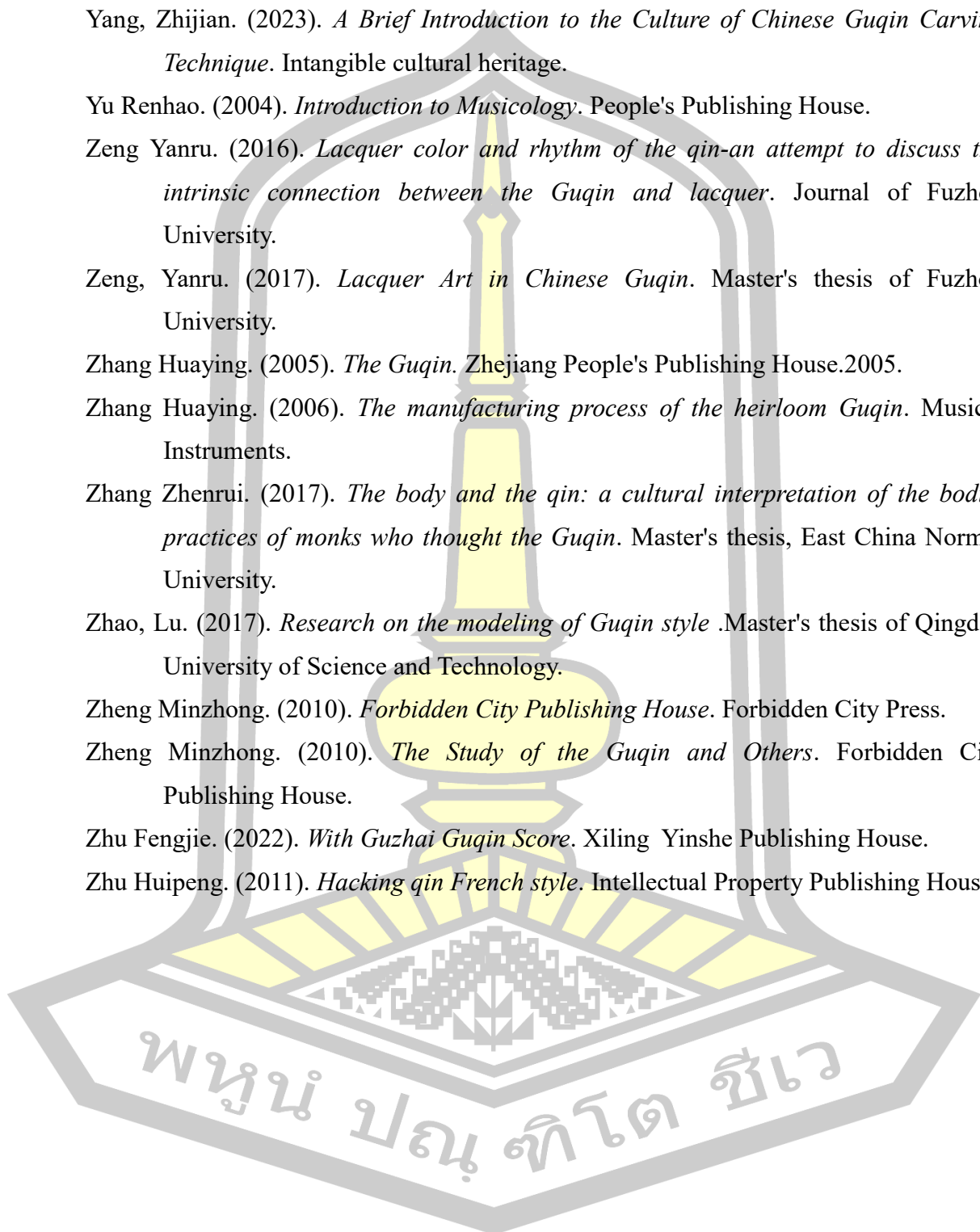
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APPENDIX

Appendix I: Guqin musical score (减字谱)

太簇商調徵音寄黃鍾
凡六段理琴軒舊藏本

調彈不慢三絃
彭慶壽

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六
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伏
凶
伏
五
仁
五
仁
五

向六
翬六
爲你
勾伍
也伏

勾伍
六紅
勾伍
六紅

五伍
向你
翬你
爲一
勾伏
勾伍
也伍

廬仁侯
 越侯一
 甸六
 甸五
 山侯
 甸侯
 越侯一
 正
 甸易容舉上七
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 上二 下八 上四 上五 上六 上七 上八 上九 上十 上十一 上十二 上十三 上十四 上十五 上十六 上十七 上十八 上十九 上二十 上二十一 上二十二 上二十三 上二十四 上二十五 上二十六 上二十七 上二十八 上二十九 上三十 上三十一 上三十二 上三十三 上三十四 上三十五 上三十六 上三十七 上三十八 上三十九 上四十 上四十一 上四十二 上四十三 上四十四 上四十五 上四十六 上四十七 上四十八 上四十九 上五十 上五十一 上五十二 上五十三 上五十四 上五十五 上五十六 上五十七 上五十八 上五十九 上六十 上六十一 上六十二 上六十三 上六十四 上六十五 上六十六 上六十七 上六十八 上六十九 上七十 上七十一 上七十二 上七十三 上七十四 上七十五 上七十六 上七十七 上七十八 上七十九 上八十 上八十一 上八十二 上八十三 上八十四 上八十五 上八十六 上八十七 上八十八 上八十九 上九十 上九十一 上九十二 上九十三 上九十四 上九十五 上九十六 上九十七 上九十八 上九十九 上一百

今虞琴刊
曲操

第一九三頁

五
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 八十八
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 一百

第三段

[illegible]

牙^一 過^一 色^一 過^一 弓^一 同^一 過^一 無^一 兵^一 過^一 弓^一 六^一 向^一 過^一 弓^一
 五^一 也^一 屬^一 過^一 向^一 弓^一 也^一 過^一 六^一 弓^一 也^一 向^一 也^一 交^一
 三^一 弓^一 也^一 屬^一 過^一 向^一 弓^一 也^一 向^一 也^一 交^一
 三^一 弓^一 也^一 屬^一 過^一 向^一 弓^一 也^一 向^一 也^一 交^一

三^一 弓^一 也^一 屬^一 過^一 向^一 弓^一 也^一 向^一 也^一 交^一

憶故人亦名山中思故人或云望山憶故人傳為蔡中郎作
 趙邪利琴規言蔡氏五弄寄清調中彈側聲故皆以清殺
 此操借正調以彈慢三弦之調當屬黃鍾宮然曲中低聲
 祇用及一弦徽外虛散音而不用^{推本不}實為太簇商蓋
 寄高於宮者也商調宜以商音起畢今茲乃用徵音而
 於末段收音轉入正調使微變為商以從本調與側聲

清越之法止合則信手幽居秋思之流也原本僅註徽音不載均調今為考定以此杜工部句云老去漸於詩律細余於琴也亦然

本操用律取音謹嚴有法韻收微音輔之以商即於其位用吟而取操於剛角宮聲暗藏句中不露起結注音首尾相應前沒踢宕兩用懈行且頗有情入調沒節奏停勻層不迭三段兩畧節短音長四段自以徽引上四徽又自四徽貫下九徽一氣流轉指無滯機乃徽帶音緩上振尾朝宗尤為著力五段前四句兩疊纏綿佳優不盡依之當求弦外之音方得曲中之趣他本於其沒妄增一段按之腔韻終不相入顯為贅疣芟去可也先清太守似香公最精

此操晚年他曲屏不復彈而此獨不去手人以此為
 范庵霜慶壽髯齡趨庭待受指法重而習之
 三十年未敢或忘癸酉博游京國止於吳門甲戌又
 客武林與舊社友查阜西顧梅堦及吳越知音
 琴尊酬唱輒相累月臨別鐸寫數本留贈
 時故宅琴書已燬天涯竊伯乘興為家撫弦
 初操有不勝今昔之感已

廬陵彭慶壽識

此曲彭祉卿先生重時受自趙庭所精三十年
 未嘗間斷故述詣獨深含先德雖不遇傳人
 自前歲漫遊江浙偶一接弄弦者神移事請
 留譜於是大江南北流傳浙廣惟賴轉抄唱

今虞琴刊 曲操

第二頁

浸失其真或竟自是其是先生輒引為憾將復
 秘之余既於去秋與先生訂交琴尊酬唱輒相
 追陪一年末敢就學而未敢以清言自以知
 乎先生之志也今幸得而承教矣且盡待
 先生之與矣而於先生之志惡可以不書雖然
 抱璞守真責原在我循規絜矩遠莫以
 人

乙亥冬月真州張子謙識

Appendix II: Guqin musical score

忆 故 人

谱 琴 轩 理
奏 虞 梅
记 许 健

(1) ♩ = 36 (渐快)



色 荷 句 也 荷 楚。 句 达 句 达 五 句 楚。 荷 句 也 句 达 句 达 句



句 楚。 荷 句 也 屈 楚。 荷 句 也 荷 楚。 止



烧 淘 上 七 色 荷 色 楚 色 荷 荷。 楚 良 自 下 七 六 烧 上 七 楚 句 下 七 九 荷 上 七 荷 上 七 下 七



烧 淘 上 七 下 七 九 抽 曲。 烧 淘 上 七 色 荷 色 楚 色 荷 荷。 楚 烧 楚 上 七 六



荷 下 七 九 烧 上 七 荷 句 句 句 句 上 七 荷 下 七 九 荷 上 七 荷 上 七 下 七



烧 淘 上 七 下 七 九 抽 曲。 烧 淘 上 七 良 自 荷 句 也 下 七 六 烧 上 七 楚 良 自 下 七 九



烧 淘 上 七 楚 下 七 九 烧 上 七 荷 下 七 九 荷 上 七 荷 良 自 下 七 六 烧 上 七 下 七 九 抽 曲。

(2) ♩ = 56 (渐快)



楚 下 七 楚 上 七 六 楚 楚 良 自 楚 上 七 色 荷 荷。 恰 楚 色 荷

筑。 恰 筑 也 也 苗 筑 也 苗 午 艮 自 恰 筑 恰



统 也 苗 族 裕 统 也 苗 族 也 族 上五六
 志 巴 苗 族 志 巴 苗 族 志 巴 苗 族 上六四


木_七 木_七 下六_四 槌_七 下六_四 然_七 荷_七 檐_六。 寫_并 勾_尺 自_目 然_七 然_七 荷_七


 黄河 壶 壶 壶 壶 壶 壶 壶 壶

(3) $\text{♩} = 60$ (渐快)

秋木 上六 上五六 芭 荀。 梧 上五 曲 柳木 木下 也 豆 荀 芭

[illegible]



然也 廿四 然 樓 良 首 下六四 簫 簫 下七 簫 簫 勾 良 首 廿四 然也



 苟 筑 裕 筑 也 苟 筑 裕 筑 也 苟 筑 也 苟。

(4) ♩ = 66 (渐快)

[illegible]

(5) $\text{♩} = 72$ (渐慢)

焚 燔 立 焚 燔 下九 焚 燔 燔 上七 焚 然 苞 焚 燔 立

 焚 燔 上六 焚 燔 燔 上七 焚 然 苞 然 裕 然 苞 苞

 然 裕 然 苞 苞 然 然 苞 然 苞 然 苞 然 苞 然 苞 然 苞

Appendix III: Interview with Guqin makers



Figure 1. Interview with a Guqin maker



Figure 2. Interview with a Guqin maker



Figure 3. Guqin Making Research Center



Figure 4. Interview with a Guqin maker

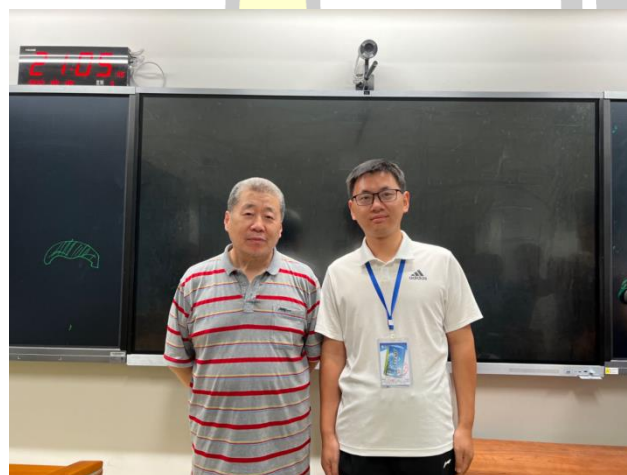


Figure 5. Interview with a Guqin maker



Figure 5. Lacquer Specialist



Figure 6. Machine-made Guqin



Figure 7. Machine-made Guqin



Figure 8. Wood for the Guqin



Figure 9. The researcher with a Guqin of his own making



Figure 10. The researcher with a Guqin of his own making



Figure 11. Two experts evaluating the Guqin made by the researcher



Figure 12. Interview with a Guqin maker



Figure 13. The researcher and Mr. Liu Yang



Figure 14. Researcher makes test Guqin



Figure 15. The researcher is making a Guqin



Figure 16. Group photo with thirty Guqin makers



Figure 17. The researcher is playing the Guqin



Figure 18. The Guqin I made



Figure 19. The researcher and Ms. Chen Weihua



Figure 20. Interview with Guqin makers and Guqin expert



Figure 19. The researcher and Ms. Wangfeng

Appendix IV: Interview with Guqin makers, experts, players

(1) Interview data of Mr. Pei Jinbao

Date of interview	June 20, 2023
Content of the interviews	Guqin Making Processes and Procedures
Place of interview	Suzhou prefecture level city in Jiangsu
Subject of the interview	Mr. Pei Jinbao
Time	9:00 a.m. - 12:00 p.m.
Recorder	Yang Fengsheng
Remark	This interview only needs to address the issues of selecting materials for the Guqin making process, choosing a Guqin style, and Cavity belly lacquer art.
Contents	<p>1. Question: What kind of wood do you use to make Guqin?</p> <p>Answer: Selection of wood is an ancient topic, and the story of Cai Yong, who knew good wood to make the Jiaowei zither in the Eastern Han Dynasty, has been passed down as a good story. Any kind of wood (or metal) can be used to make a zither, and even if the wood is poor, even if it is poorly made, it will not be impossible to play the sound when the strings are taut, but the quality of the sound is very different. How to get good sound quality, material selection is an important link. The ancients took tung wood (yang) and catalpa (yin) to make the zither, with the softness of tung and the rigidity of catalpa, so that the yin and the yang of the material would be compatible with the sound of the rigidity and the flexibility of the zither. However, the zither is not necessarily confined to the selection of materials on the tung under the zi, a good fir is better than the general tung, a good hardwood is also better than the zi wood. Although it is difficult to find good materials nowadays, but always keep</p>

an eye on it, you will find something. That's why I usually use cedar for my Guqin, and less for tung.

2. Question: May I ask you in the selection of wood suitable, what are the requirements?

Answer: I have six requirements for choosing wood: First, the texture, tung is tung, fir is fir. The second study size, should be large rather than small, should be thick rather than thin. Three study raw material order long (raw material order, that is, the age of tree growth). Four study mature wood order long (mature wood order, that is, the age of trees cut down or made items). Five study wood grain, do not take the water cloud pattern, when taking the wood straight. Six study quality, decay, mold, insect damage, scars, wood heart, sapwood are not selected.

II. Identify the yin and yang of the material

(1) the longitudinal plane of the raw material to identify heaven and earth (yin and yang): the raw material (garden wood) to identify heaven and earth is easier, the fine head (days that is, the top of the tree) for Yang, thick head (ground that is, the roots) for Yin. (2) Timber cross-section to identify yin and yang: look at the annual rings, loose, light-colored for Yang, tight, dark-colored for Yin. (3) wood ends (both sides) to identify the yin and yang.

III. Preparation

Any old wood dissected surface is new, open the piano material embryo in a dry place for a year, to be stable wood, before making.

3. Question: Is it necessary to choose the old timber to make Guqin?

Answer: Actually, it is not so, as long as you choose the right wood. Because, it is not easy to preserve the historic wood.

In addition, historic wood is expensive in terms of price, and I personally don't think it is necessary. When we respect history, we do not just worship what is written in the literature. It is possible to make a high-quality Guqin by using new wood properly.

4. Question: What are the rules for choosing the style of Guqin?

Answer: There are dozens of styles of Guqin, and now the most popular is the "Zhongni style". Generally speaking, the choice of Guqin style is mainly determined by personal preference. However, there is a key that should not be ignored: when choosing a Guqin style, the Guqin maker must see if the wood is suitable for the corresponding style of the Guqin. For example, one must pay attention to the softness, tightness and texture of the material. In this way, you can make your own preferred Guqin, and achieve both beautiful and good sound effects.

5. Is there a fixed Cavity belly structure?

Answer: I personally think that there is no fixed Cavity belly structure. I have been engaged in the production and restoration of Guqin for decades, and from the experience I have summarized over the years, there is no fixed Cavity belly structure for Guqin. There are many factors affecting the sound quality of the Guqin, not only the Cavity belly. Of course, Cavity belly is a crucial part, which should not be neglected.

6. Do you think natural lacquer must be used in making Guqin? Can we use chemical lacquer?

Answer: This is a very good question. In ancient China, ancient people used natural lacquer because natural lacquer has good performance, which is not only conducive to sound

transmission, but also good for preservation. In modernized society, many Guqin makers will use craft lacquer, also known as chemical lacquer. I personally believe that this is part of innovation. Some people are sensitive to natural lacquer, which contains plant enzyme enzymes that are toxic and can cause skin allergies, and those who are allergic to the use of it will turn to chemical lacquer-made Guqins. Therefore, we cannot deny the value of chemical lacquer made Guqin. However, from my personal point of view, I use natural lacquer for all the Guqins I make. Nowadays, many musical instrument factories are producing Guqin with chemical lacquer, because the cycle of Guqin made with chemical lacquer is short and the price is low. It is worth noting that chemical lacquer is extremely dangerous for Guqin makers, because long-term exposure to chemical lacquer is not good for health!

7. What kind of Guqin do you think is still of high quality?

Answer: All the questions you just asked belong to the answer of this question. A high-quality Guqin, from the choice of Guqin style, wood materials, production process, lacquer, tone and so on are very important. However, everyone's aesthetic is different. For example, some people like Guqin with small sound, some people like Guqin with big sound, so there is no definite standard here. The only certainty is that the Guqin produced must be in line with the history and tradition, and not be ostentatious.

8. Do you think the thickness of the lacquer affects the tone of the Guqin?

Answer: Of course it affects the tone. Personally, I don't think the lacquer ash should be too thick, because the sound won't come out if it is too thick. If it is too thick, the sound

	will be very boring because it will annihilate the sound in the Cavity belly of the Guqin. Lacquer ash is too thin also can not be, the Guqin to send out high-quality sound needs a long time precipitation, some Guqin makers make the lacquer ash is very thin, but a long time, the qin will be cracked, which affects the tone of the Guqin.
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(2) Interview data of Prof. Yongjie Gu

Date of interview	July 1, 2023
Content of the interviews	The Arts of Guqin Making
Place of interview	Suzhou Normal University Guqin Making Research Center
Subject of the interview	Prof. Yongjie Gu
Time	13:00-15:00 p.m.
Recorder	Yang Fengsheng
Remark	Prof. Yongjie Gu was the researcher's teaching teacher, and the researcher was inspired while studying Guqin making under him. The Guqin he makes is highly favored by Guqin players.
Contents	<p>1. Do you think the style of Guqin is important?</p> <p>Answer: Very important. Because the first impression is the appearance of the Guqin, and the beauty or ugliness of the appearance directly affects the judgment of its tone. If the first impression is bad, you will subconsciously think that the sound is also bad. For people who just contact with Guqin, they usually judge in this way: beautiful style = high quality sound.</p> <p>2. What do you think is the most beautiful style of Guqin?</p> <p>Answer: Actually, all the Guqin styles handed down through</p>

history are more beautiful. However, it is not easy to conclude which one is the most beautiful. Personally, I like "Fuxi style" and "Zhongni style", so I make more of these two styles. (Researchers also like the "Zhongni style")

3. Do you do the "wrapping" process when you make Guqin?

Answer: I have thought about this question before, some people don't do the "wrapping" process, I didn't test it before, but then the Guqin produced would have cracks, which is not good for the sound transmission. That's why I do it now. In addition, if I don't do the "wrapping" process, the Guqin will also crack when it goes to a dry place. Especially in the north of China, where the climate is dry, it is not possible to make the instrument without "wrapping".

4. Does the thickness of the lacquer gray have a great influence?

Answer: After the Tang Dynasty, the lacquer ash became thinner and thinner. When I make a Guqin, the lacquer ash must be thick, so that the Guqin can produce a good tone only after a few years. A good Guqin needs time to settle down.

5. How many times should I apply the lacquer ash? Is there a difference between thick and thin lacquer?

Answer: The order of my production is coarse ash (20-60), medium ash (60-80), and fine ash (80-200). The coarser the lacquer ash particles, the larger the fine cracks, and the easier the sound is conducted. The finer the ash, the less lacquer there is and the better the sound resonates. Following the order of coarse ash, medium ash, and fine ash, in that order, works best. (He also believes that the more antler cream there is, the faster the resonance effect

and the speed of conducting music.)

6. What kind of material do you use in the production process of the "wrap"?

Answer: I use ordinary burlap, and some people use burlap imported from England. I personally recommend that you pick one with even seams.

7. Is there a certain ratio of natural paint to antler cream?

Answer: There is no certain ratio. The more antler cream the better. The more antler cream there is, the less natural lacquer there will be, and the better the resonance of the Guqin will be.

8. How do I wrap the cloth?

Answer: I would submerge the linen cloth in the natural lacquer and then take the cloth out and wrap it. Before wrapping the cloth, make sure to apply the natural lacquer first, otherwise it won't stick.

9. Does wrapping increase the weight of the instrument?

Answer: Of course it will increase the weight of the instrument, but it is negligible.

10. What is the thickness of the gray paint?

Answer: Not too thin, at least not less than 1.5mm.

11. Why do you like Zhongni style Guqin?

Answer: Zhongni style Guqin is more classic and most Guqin players like it. Personally, I think that the Zhongni style has the most ideal structure and sound, and I make more Zhongni style Guqins. However, everyone has his own aesthetic concept, no matter what style of Guqin, as long as it is made properly, it can achieve the desired effect.

12. Do you make The Broken Patterns of Guqin?

Answer: The Broken Patterns of Guqin can only be found in Guqins with a history of several hundred years, and

	<p>nowadays there are a lot of people imitating The Broken Patterns of Guqin, but I never do so, because the tone will not be affected by that kind of production. I also don't agree with the copying by many Guqin makers nowadays. The Broken Patterns of Guqin is a natural phenomenon, not man-made.</p> <p>13. Do you test the sound first, or do you wrap the cloth and paint it first?</p> <p>Answer: Wrap and paint first, and test the sound last.</p>
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(3) Interview data of Liu Minfei

Date of interview	October 7, 2023
Content of the interviews	The Arts of Guqin Making
Place of interview	Suzhou, Jiangsu Province
Subject of the interview	Liu Minfei
Time	15:00-17:00 p.m.
Recorder	Yang Fengsheng
Contents	<p>1. What kind of wood do you use to make Guqin?</p> <p>Answer: Generally, we use cedar and tung wood. Sometimes pine is also used. The base boards are all made of catalpa. Now I am still trying to make Guqin with other materials. I also use jade and iron to make Guqin, but the sound is not very good.</p> <p>2. Do you use a hairbrush to apply lacquer before and after you close the instrument?</p> <p>Answer: Yes.</p> <p>3. Do you use water polishing or dry polishing for each lacquer?</p> <p>A: Yes, we use water polishing.</p>

	<p>4. Do you always test the sound before applying the next coat of lacquer?</p> <p>A: Yes, we always adjust the inside of the Cavity belly.</p> <p>5. Is there any effect on the sound after each lacquer?</p> <p>Answer: There are some effects.</p> <p>6. When the lacquer has some effect on the sound, is it possible to make the sound transparent by adjusting the thickness of the Cavity belly?</p> <p>Answer: Yes.</p> <p>7. What do you think is the most important factor or inspiring in the process of making Guqin.</p> <p>Answer: I think that making Guqin must have a heart of admiration for history and culture. The Guqin has a history of thousands of years, and it is the crystallization of Chinese wisdom. I treat the Guqin like my own child, because from scratch, from a piece of wood, to the best to become a musical instrument, you have witnessed its birth to growth, so that is to say, I have feelings for every Guqin I make. Although it is a musical instrument, I think it also has someone to give it a soul.</p> <p>8. Do you install "Heavenly Pillar" and "Earthly Pillar"?</p> <p>Answer: I used to install them when I first made the Guqin, but later I thought that installing the "Heavenly Pillar" and "Earthly Pillar" would affect the sound transmission, so I didn't add them later. I did not add the "Heavenly Pillar" and "Earthly Pillar" later on.</p> <p>9. Do you test the sound first, or do you wrap it and paint it first?</p> <p>Answer: Sound test first, then wrap and paint.</p>
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Date of interview	October 9, 2023
Content of the interviews	Guqin making and performance
Place of interview	Suzhou, Jiangsu Province
Subject of the interview	Ms.Chen Weihua
Time	15:00-17:00 p.m.
Recorder	Yang Fengsheng
Contents	<p>Question 1. What kind of Guqin is your favorite?</p> <p>Answer: Undoubtedly, first of all, it should have a good-looking style, craftsmanship, lacquer art and other aspects, because the Guqin also belongs to the plastic arts. I am a female Guqin player and I like beautiful things. That is why the Guqins I use are slimmer and prettier, and these are the factors I like. Next, the sound quality of the Guqin is then examined.</p> <p>Question 2. What kind of sound quality do you like in a Guqin?</p> <p>Answer: I like a Guqin with a smaller sound. If the sound is too loud, the Guqin piece played will sound like noise. Personally, I like quietness and that is one of the main reasons. This is just my personal publication. Some people like fierce and powerful Guqin pieces. I don't think there is an absolute fixed answer to the tone of the Guqin. I have been in touch with the Guqin for more than forty years. I don't think there exists a perfect Guqin in the full sense of the word.</p> <p>Question 3: Do you think that a Guqin can play all kinds of Guqin music?</p> <p>Answer: To a certain extent, a perfect Guqin can play any piece of Guqin music. However, the effect produced is</p>

totally different. For example, I like quiet Guqin pieces, and I don't think it's appropriate to play them with a loud Guqin. Quiet pieces that become unquiet can't produce beauty.

Question 4. How do you think a good sounding Guqin can be made?

Answer: It all depends on the production level of the Guqin maker. For example, the material of the Guqin, the production process, the lacquer process and so on, these are all important aspects.

Question 5. As a Guqin player, what research do you have about Guqin makers?

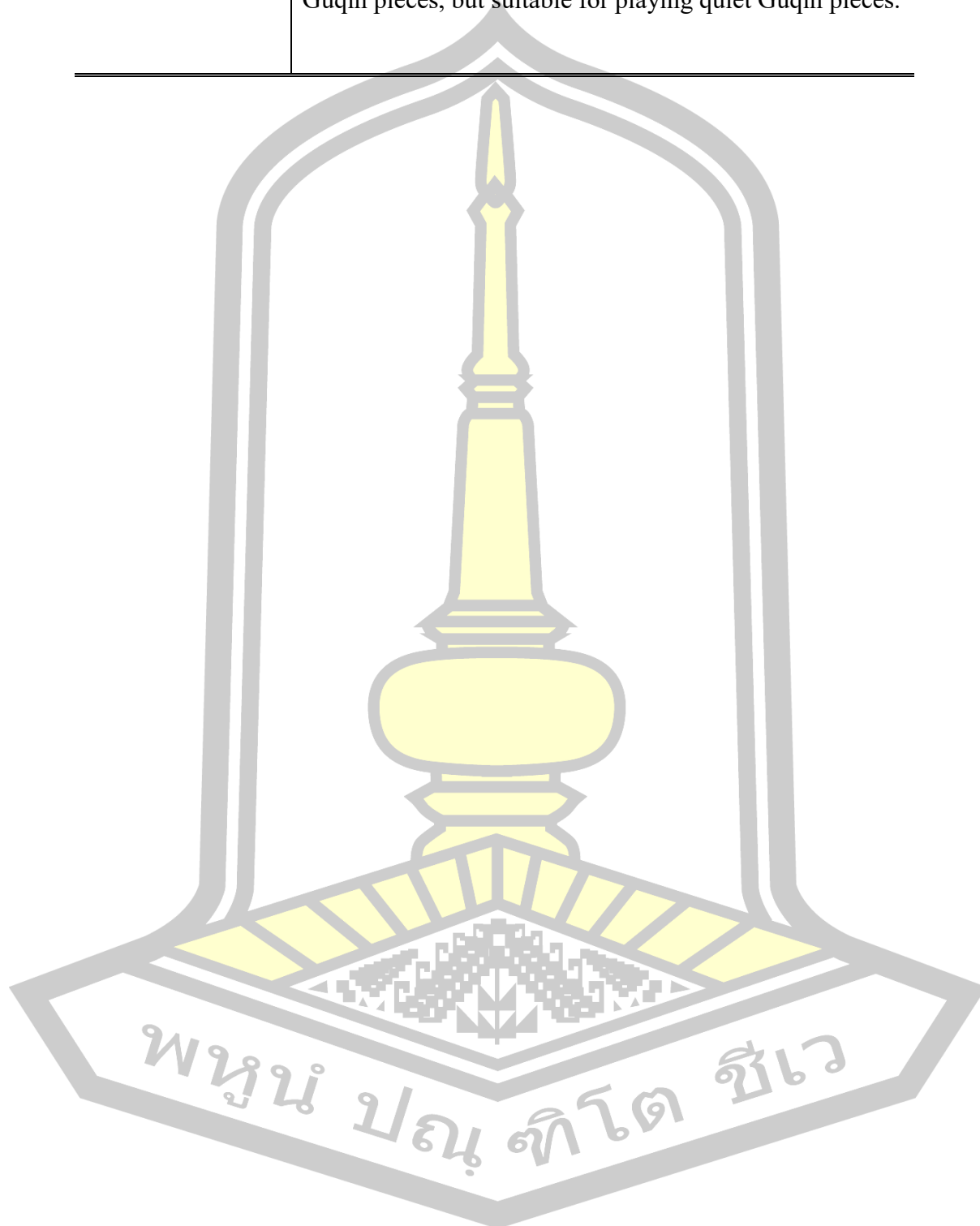
Answer: Chinese Guqin makers, they lack certain communication among themselves. They all think that the Guqin they make is the best, but it is not. This is not conducive to the Transmission and development of Guqin making. In addition, there are many Guqin makers around me who do not know how to play the Guqin at all, and those who do not know how to play the Guqin mean that they do not understand the beauty of the sound, and they do not know how to evaluate the quality of the Guqin that they make. Therefore, it is generally very, very difficult for them to make quality Guqins.

(5) Interview data of Ms. Wangfeng

Date of interview	October 15, 2023
Content of the interviews	Guqin making and performance
Place of interview	Suzhou, Jiangsu Province
Subject of the	Ms.Chen Weihua

interview	
Time	8:00-10:00 a.m.
Recorder	Yang Fengsheng
Contents	<p>Question 1. What kind of Guqin do you think is an excellent Guqin?</p> <p>Answer: The Guqin must be beautiful in form. The sound quality is more perfect. Most Guqin players should think so.</p> <p>Question 2: What do you think affects the sound quality of Guqin?</p> <p>Answer: The materials used in making the Guqin, the structure of the groove, the craftsmanship of the Guqin, and so on. Of course, I think there is another important reason, many Guqin makers they don't have much culture and education, which also leads them to not know what a high quality sound is like. So it comes down to the personal cultural cultivation of the Guqin maker.</p> <p>Question 3: Do you think that a Guqin maker must be able to play the Guqin?</p> <p>Answer: Yes. Because in the process of making Guqin, it is definitely necessary to test the sound, and if one does not know how to play the Guqin, then how can he or she make a superb Guqin? I have heard that many Guqin makers in Suzhou do not know how to play the Guqin.</p> <p>Question 4. Do you think a Guqin can play any style of Guqin music?</p> <p>Answer: I don't think so. Guqins made in Suzhou generally have a small sound, and this has to do with the regional culture. Suzhou people like small things, and so does the Guqin. People like the slim style of the Guqin. I personally think that the Guqin made by Suzhou Guqin</p>

	makers is not suitable for playing fierce and imposing Guqin pieces, but suitable for playing quiet Guqin pieces.
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BIOGRAPHY

NAME	Fengsheng Yang
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