



Archaeological Excavations of Percussion Instruments in the Song Dynasty and their Implications for Modern Musical Instruments

He Hao  ^{1*}

¹ Lecturer, School of Music and Dance, Shenzhen University, Shenzhen, China

* **Corresponding Author:** haohe@szu.edu.cn

Citation: Hao, H. (2023). Archaeological excavations of percussion instruments in the Song Dynasty and their enlightenment to modern piano creation. *Mediterranean Archaeology and Archaeometry*, 23(3), 219-229. [10.5281/zenodo.14854106](https://doi.org/10.5281/zenodo.14854106)

ARTICLE INFO

Received: 18 Sept 2023

Accepted: 23 Dec 2023

ABSTRACT

This paper discusses the relationship between percussion instruments and modern piano creation, as well as the archaeological value of percussion instruments, and takes Song Dynasty musical instruments as an example for analysis. First, the materials and surface characteristics of the drums, cymbals and hammers were observed with a high-definition microscope, and their materials were analyzed. The percussion instruments are then tested by an infrared scanner for their vocal position, vocal characteristics, and graphically drawn. Finally, the overall vocal position of percussion instruments such as drums, cymbals and percussion instruments was verified by 3D scanning, and their vocal characteristics were verified. The results showed that the main materials of drums, cymbals and beatings were bronze, brass, iron, tin, lead, etc., as well as pigskin and elm. Among them, the brass content of the copper cymbals is higher, and the bronze content of the striking is higher, so the sound effect is different. There are differences in the vocal characteristics of drums and cymbals, the former mainly expands the vocal range, and the latter concentrates the vocalization, so the vocal characteristics of the two are thick and crisp. In the process of vocalization, the percussion instruments of the Song Dynasty all exhibited homophony and resonance, indicating that the percussion instruments were reasonably designed. In addition, the percussion instruments of the Song Dynasty had insufficient vocal range, single vocal characteristics, and lack of transition, which needed to be combined with the piano, so it had an enlightening effect on the content, connotation, and performance mode of modern piano creation.

Keywords: Song Dynasty Percussion Instruments, Archaeological Excavations, Piano Works, Modern Composition

INTRODUCTION

The Song Dynasty (960~1279AC) was an extremely critical period in Chinese history, and it was divided into two different stages: the Northern Song Dynasty and the Southern Song Dynasty. During this historical period, musical culture developed by leaps and bounds. Among them, percussion instruments, which are indispensable instruments in music performance, are widely used in society (Cheng, 2022; Song, 2016). The Northern Song Dynasty divided it into two different categories: first, the membrane sound instruments, mainly drums, which can be divided into large drums and small drums, etc., and second, the body sound instruments, among which the copper cymbals are particularly common. Whether it is used in religious events, folklore celebrations, or court banquets, these percussion instruments are widely used. For example, at court banquets, different types of musical instruments such as strings and wind instruments are often accompanied by percussion performances to set off a relaxed and cheerful or solemn atmosphere (Karadavut, 2019; Shih-Pe & E. Wang, 2021). Therefore, in the Song Dynasty (960~1279AC), percussion instruments not only played a non-negligible role in music performance, but also were the feedback of the Song Dynasty's historical humanities, social customs and aesthetic values. The in-depth study of percussion instruments in the Song Dynasty will help to thoroughly understand the continuous exploration and innovative spirit of the Northern Song Dynasty on the road of music culture and art,

so that the current public can deepen their awareness of the music culture of the Song Dynasty. Cymbals, percussion and drums were indispensable percussion instruments in the music culture of the Song Dynasty, and they played a role that could not be ignored in the performance of music. Its unique complex and diverse sound characteristics and sound effects, as well as its powerful dynamic rhythm, played an extremely key role in music performance, bringing high aesthetic value and musical expression to the music culture of the Song Dynasty. Understanding the method of using drums in the Song Dynasty and the musical performance achieved by them will help to clearly grasp the development process of Song Dynasty music culture and apply it to the inheritance and innovation of contemporary traditional culture. Cymbals, percussion and drums played a positive role in the music culture of the Song Dynasty, and at the same time were an indispensable part of social life, and were a kind of percussion instruments that were extremely loved and popular. Song percussion instruments, such as cymbals, drums, and cymbals, reflect the popularity of music culture and its importance to social life (Li, 2017). The excavation of archaeological relics can reflect the continuous pursuit of music culture and music performance art. During the Northern Song Dynasty, music culture had been deeply rooted in the hearts of the people of the Song Dynasty, and percussion instruments were highly favored. For example, percussion instruments have become a trend in folk celebrations, religious activities, military honor guards, and even court banquets. In the musical culture of the Song Dynasty, percussion instruments were mainly used to enrich the musical performance of the music, set off the atmosphere of different situations, and highlight the rhythm of the music. During the Song Dynasty (960~1279AC), the archaeological excavations of percussion instruments intuitively presented the artistic pursuit of the Song Dynasty and reflected their interest in the continuous exploration of music culture, which was one of the reasons for the popularity of music culture. This paper collects a large number of literature on percussion instruments in the Song Dynasty and classifies them effectively (Thepsathit & Tangdhanakanond, 2024). At the same time, the surface observation of Song Dynasty musical instruments was carried out with modern equipment, and the material and sound principle were studied, and their sound laws were summarized, and infrared equipment was used to observe the infrared effect of different percussion instruments, as well as the sound points and sound parts, so as to provide support for the later research and analysis (Liu, Chen, & Y. Tian, 2022; Xia & C. Tian, 2022). In addition, the characteristics of percussion instruments in the Song Dynasty are studied in the relationship between them and modern piano music creation, and their enlightening role in the creation process promotes the development of modern pianos. Therefore, the excavated Song Dynasty percussion instruments are combined with modern piano creation to explore the valuable resources of Song Dynasty music culture. In the process of in-depth observation and analysis, we can truly feel the unique aesthetic concept in music performance and music culture, and understand its preferences, which will help future generations to understand and understand its social and humanistic background, and understand the complexity and diversity of the music culture of the Song Dynasty. At the same time, it provides a good understanding of the key position of percussion instruments in the musical culture of the Song Dynasty.

LITERATURE REVIEW

Classification and value of percussion instruments in the Song Dynasty

The development of musical instruments in the Song Dynasty shifted from orchestral instruments to percussion instruments, with the aim of showcasing different musical styles and performance techniques. Through the study of percussion instruments, in-depth analysis of their social, cultural, and aesthetic changes can be conducted, and the value of traditional music culture can be deeply understood. The overall changes of percussion instruments can be identified through their shapes, decorative styles, and forms, and support can be provided for modern music design. By analyzing the comparative rhythms and melodic rhythms of percussion instruments, the overall performance process and collaborative effects of Song Dynasty percussion instruments can be discovered. Through the comprehensive judgment of percussion instruments, more expressive techniques can be displayed, the performance patterns of Song Dynasty music can be understood, and the cultural connotations can be explored.

Analysis of Song Dynasty percussion instruments on modern piano

In the Song Dynasty, percussion instruments placed great emphasis on the balance between rhythm and melody, providing more display techniques for piano creation. By using the performance form, ethnic characteristics, and melody of percussion instruments, the overall value of percussion instruments can be enhanced, providing corresponding inspiration for modern piano creation. In addition, by combining piano creation theory with the creative connotation of percussion instruments, the overall integration of percussion instruments can be achieved, providing support for the development of percussion instruments and music, including composition techniques and language, achieving cross-cultural, cross regional, and cross month music creation, and realizing the diversified development of modern piano. In addition, exploring the cultural

connotation and intrinsic quality of percussion instruments in the Song Dynasty to understand their emotional colors can provide support for modern piano creation and the resumption of ancient music classes. In depth research on percussion instruments can also be conducted, It can provide more cases for archaeological excavation, expand the scope of archaeological excavation, and enhance the practical value of archaeological excavation research. Through in-depth analysis of Song Dynasty percussion instruments and the reproduction of ancient music, more delicate emotions can be expressed, and the diversification of percussion instruments and the broadening of piano creation can be achieved.

METHODOLOGY

In the Song Dynasty (960~1279AC) percussion instruments as the research object, such as drums, cymbals, etc., and the use of a microscope (HD,2~8 times, Qingdao, Shandong) to observe the surface of percussion instruments, use the Internet to collect the material data of percussion instruments in the Song Dynasty, and classify them. Then, observe the vocal position of the instrument through an infrared scanner (2~3Hz, temperature 10~35°, Guangdong, Dongguan). Finally, a 3D scanner (400 times/min, USA) was used to obtain the overall structure of the percussion and test its vocal effect. Among them, the test sample is a imitation product, so it belongs to the non-contact test. Firstly, the surface material and shape of the percussion instruments from the Song Dynasty were observed using a microscope, and the preliminary situation of the entire material was drawn. Then, an infrared scanner was used for temperature testing to identify the location, point, and force point of occurrence through temperature changes, and to determine the force situation. Finally, a simulation model was established to achieve the overall change in force situation, and a comprehensive judgment was made on each force situation to form effective force analysis points. At the same time, existing data was combined to summarize the research questions in this article, providing corresponding support for modern design and analysis research, forming theoretical design schemes and results, and integrating the research results into existing theories to provide support for archaeological analysis.

RESULTS

Materials and Construction of Percussion Instruments

Comparing the materials and structures of percussion instruments in the Song Dynasty, it is found that the materials are mainly bronze, brass, iron, tin, lead and other metals, as shown in [Table 1](#).

Table 1. Materials of Percussion Instruments

Musical Instrument	Material	Main Ingredients	Principle of Vocalization
Drum	Pigskin, Elm, Iron, Copper	Pigskin, Elm	Pigskin Vibrates
Copper Cymbals	Brass, Iron, Tin, Lead	Brass	Resonance, Resonance
Strike	Bronze, Iron, Tin, Lead	Bronze	Resonance

As can be seen from [Table 1](#), the materials of percussion instruments are mainly copper, bronze and pigskin, and their sound principle is to produce resonance and resonance through percussion, so the Song Dynasty has mastered the principle of resonance and resonance, and produced a variety of percussion instruments. Bronze cymbals, percussion strings, and drums were all common percussion instruments in the Song Dynasty. The cymbals are characterized by their pleasant sound, lightness and brightness, and this percussion instrument is widely used in folk celebrations and court banquets, and its bright timbre and beautiful sound quality will delight the listener. Striking ropes, which have been around for a long time, have a very sharp and harsh timbre, and are often used in folk celebrations and wedding scenes. Drums, on the other hand, have a strong rhythm and strong vibrations, and the sound produced during performance is full of power, so it is generally used to enhance the sense of rhythm (Ng, 2017; Yang & Dai, 2023). The common denominator of these different percussion instruments is that they are made in a sophisticated way, the materials consumed are more sophisticated, and they are well-made, which have been passed down to this day as a traditional craft. In addition to being widely used in folk events and court banquets, percussion instruments are often used in traditional folk music performances. The cymbal is made of two copper-made discs, with a rope running through them to connect them, and it is one of the most commonly used membranous instruments in Song Dynasty music. When playing a cymbal, if you hit its pivot or edge, the tone it produces will be different. Moreover, its penetrating timbre, heavy and pleasing to the ear, and strong resonance, made it a very important place in the music performance culture of

the Song Dynasty, and its thin edges can produce high tones, as shown in [Figure 1](#).

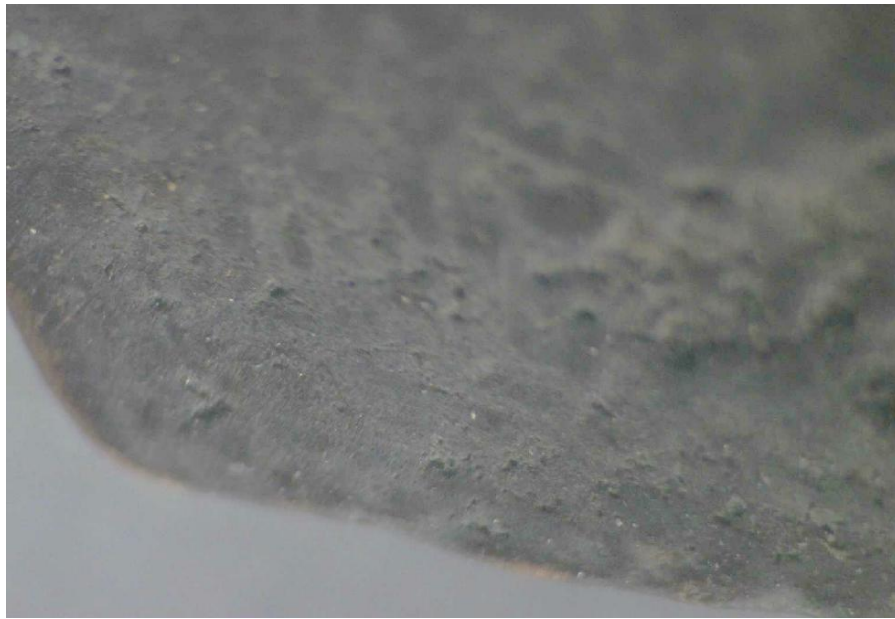
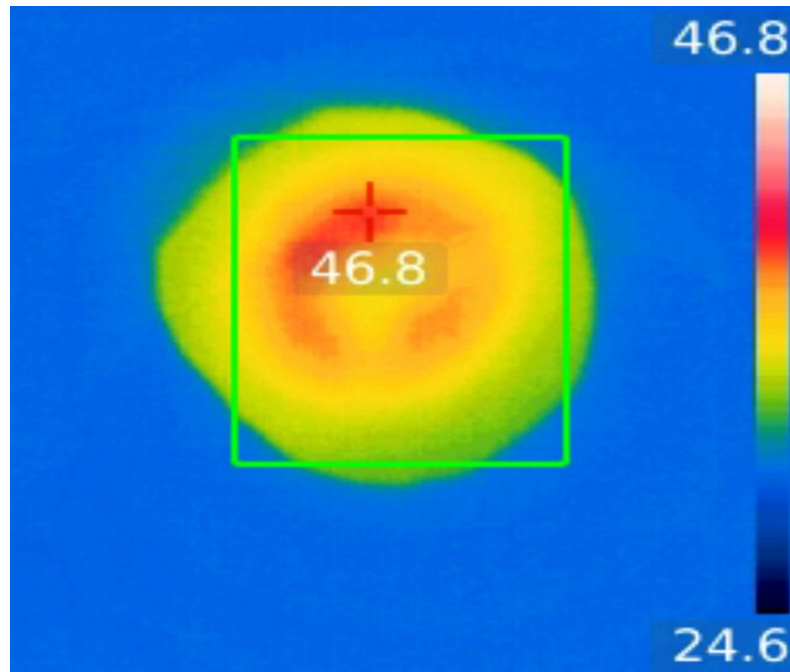


Figure 1. Observation of the Edge of a Copper Cymbal

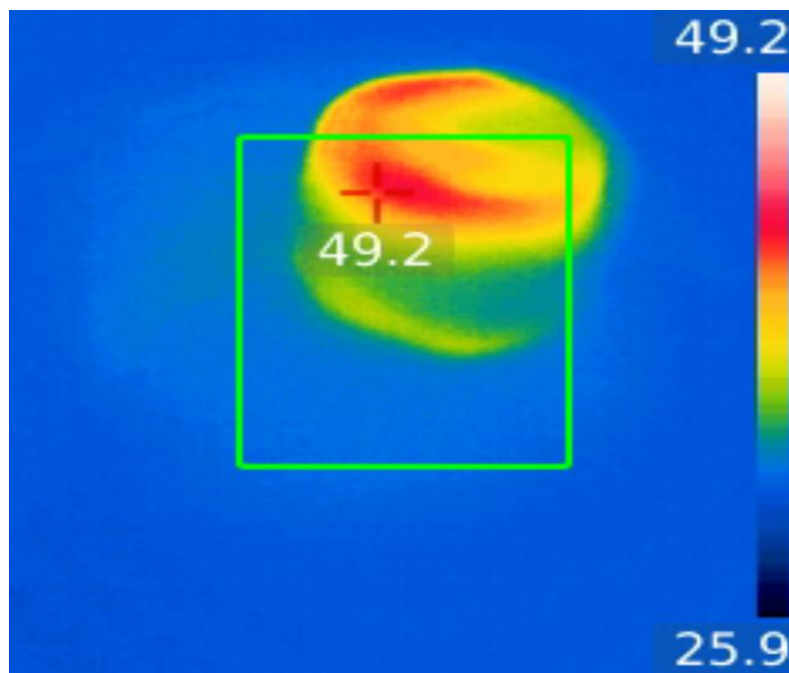
As can be seen from the observations in [Figure 1](#), the edge of the cymbal is in the form of a blade, so it can generate high-frequency vibrations and improve its sound effect. Sharp edges need to be made of metals with high hardness such as brass, so copper cymbals contain metals with high hardness such as brass and iron. As a percussion instrument, the cymbal is mainly used to enrich the rhythm of the music during the performance, making it rich in layering, when the performer hits the cymbal, the music is integrated into its unique timbre, adding vitality and dynamism to the performance. At the same time, its sound is often very resonant, which will enhance the sound quality of the whole piece and enrich the diversity of the whole performance. In this way, when encountering a specific scene, the cymbals are often used to set off the atmosphere. The unique mellow and resonant sound effect of the cymbal can bring different atmospheres such as solemnity and solemnity to the music, and in this way, it will add a musical performance with a great sense of spiritual resonance to the performance. The drum is a widely used membrane instrument in the music culture of the Song Dynasty (D'Amario et al., 2023). Its sound characteristics and sound effects are unique. For example, the eardrum and the material of the drum body can determine the sound effect it makes. Generally speaking, the bass drum has a deep and heavy tone, while the snare drum has a bright and sharp tone. When you start performing a piece, hitting the drum will cause it to play a variety of rhythms and tones. The many changes in the sound effects make the sound texture of the whole performance more diverse. In the Song Dynasty (960~1279AC), drums were used in various musical performances to highlight their sense of rhythm, enrich their dynamics, and enrich their musical expression (Kavaliauskaite, Gulrez, & Mansell, 2024). The main function of the percussion is to highlight the rhythmic tonality of the piece and give it a clear, solid and stable rhythmic base. Continuous percussion of the reels allows the different instruments in the performance to find a regular beat that is consistent with the player. In addition, the regular and controlled hitting of the striking can make it more distinct and musical. In short, the timbre is bright and clear, which will make the music full of vitality and variety of colors, and thirdly, the effect of hitting the strings in the performance. It can enrich the musicality of the performance, and is conducive to the creation of different situations and atmospheres. When the percussion is used in the performance of music, as long as the musician grasps it properly, its musicality will be more diverse, and the dynamics will be richer, so that its musical expression will be sublimated. Its bright timbre and orderly rhythm can enrich the emotional resonance of the music and add new vitality. If you encounter a specific scene, then playing the percussion will create a unique atmosphere and highlight the characteristics of the scene. For example, percussion is often used to accentuate a specific situation and give it a sense of dynamism because of its clarity and clarity.

The Position of the Percussion Instrument

Through infrared testing, it was found that the sound of the percussion instrument was mainly on the surface, and the results are shown in [Figure 2](#).



Copper Cymbals



Drum

Figure 2. Infrared Observation of Cymbals and Drums

As can be seen from Figure 2, the sound principle between the cymbal and the drum is the same, mainly in the middle position, so its internal infrared signal is high. In addition, the sound position of the drum is the edge, which means that it produces resonance, causing the sound position to change to the edge. The structure of the cymbal is different from that of the drum, so its sound is mainly concentrated in its interior, and it is characterized by a strong intermediate infrared signal. The specific vocal position is shown in Figure 3.

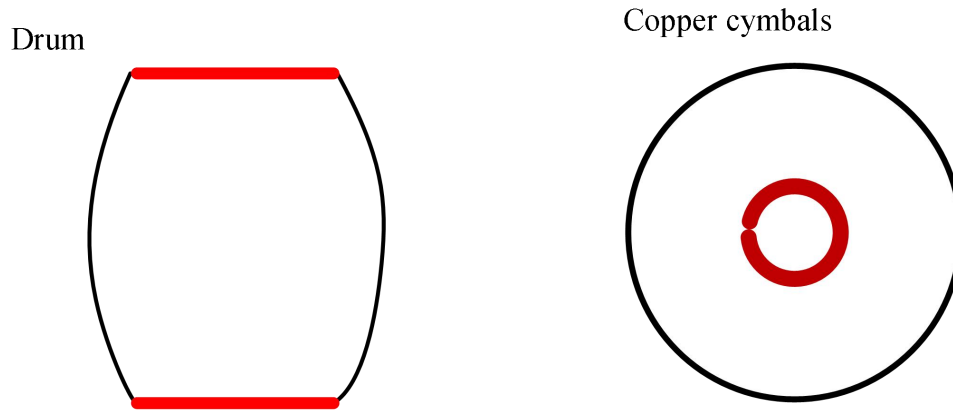


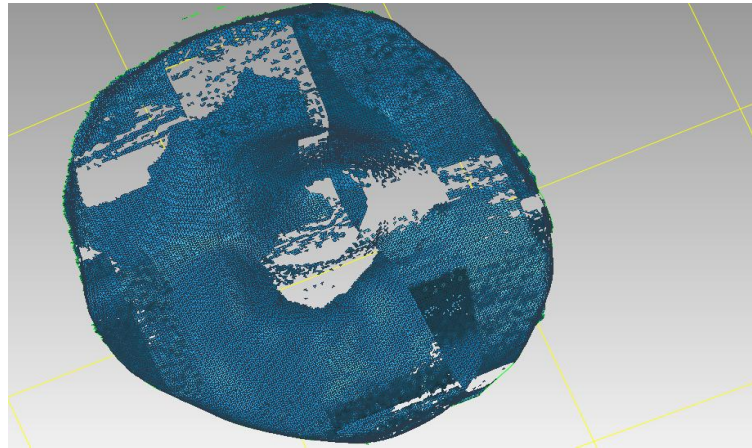
Figure 3. The Position of the Cymbals and Drums

As can be seen from Figure 3, the resonance position of the cymbal is mainly in the middle, and the resonance position of the drum is the edge of the upper and lower sides, so the transmission range of the drum is wide, and the sound transmission of the cymbal is directional. The cymbal is a common percussion instrument in the musical culture of the Song Dynasty, and the presence of the cymbal is indispensable when playing the instrument. Its unique mellow timbre, with a high sense of resonance, is pleasant and solemn, which can enhance the diversity of the sound effect of the music, and the directional sound transmission makes it have a strong sense of rhythm, so that the level of the music is rich (Sieber et al., 2021; S. Wang, Sun, Osanlou, & Excell, 2015)

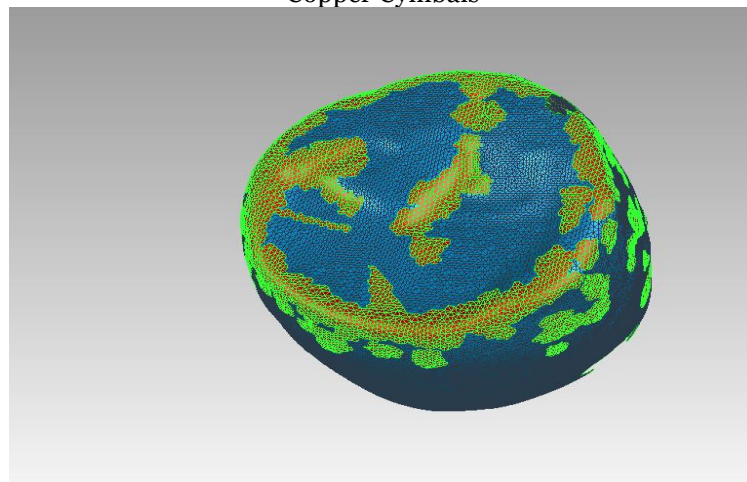
At the same time, it also helps to shape different musical atmospheres. Based on this, this article needs to strive to inherit and improve traditional Chinese culture, and at the same time, in the process, it is necessary to study the cymbals and their related historical and cultural content in depth, so as to promote the inheritance of traditional Chinese culture. The bass drum acts as a cornerstone, setting a solid tone for the rhythm and delivering a solid and powerful beat over a wide area, while the snare drum can highlight key details and enhance the delicate sense of the piece when played, or enrich the musical expression with the continuous beating of the musician. The big, medium and small drums can be used very skillfully and naturally, and the effects of their music performances are dynamic, rich and diverse. For example, in the Song Dynasty court, when there was a large banquet or celebration, different types of drums would be frequently used in musical performances. It is recorded in the history books that during the court banquets of the Northern Song Dynasty, percussion instruments of different sizes such as percussion and war drums were often played to create a lively atmosphere. It is not difficult to see from historical records that during the Song Dynasty (960~1279AC), drums of different musical culture categories had a great impact on the sound texture of court music performances, and their importance is self-evident. The drums are dynamic and rhythmic, and the drums are struck to produce a layered beat and a powerful rhythm. When performing a piece, the addition of drums brings the performance to life, allowing the other instruments to follow a uniform and stable beat and work with the player. This makes it an indispensable presence in musical performances and is deeply loved, secondly, its musical expressiveness is diverse, and the drum as a percussion instrument has unique sound characteristics and sound effects, and when the player hits various parts of it, the sound it produces has rhythmic and tonal differences. With such a variety of sound effects, it can easily exist as an auxiliary instrument, and make the music performance more dynamic, and at the same time, enrich the layers of the musical work.

Structure of Percussion Instruments

Percussion instruments such as drums and cymbals produce a comprehensive performance effect, which is closely related to their own structure, and the test results are shown in Figure 4.



Copper Cymbals



Drum

Figure 4. The Position of Percussion Sounds

As can be seen from Figure 4, the sound position of the drum and the cymbal is relatively concentrated, the drum is mainly for diffusion, and the cymbal is mainly for sound concentration, so the two are used differently. A similar piece of music to drums and cymbals is the percussion instrument, which has a long history and is very ancient. It is made mainly of metal and ceramic. In a musical performance, as long as you hit it gently, it will make a bright and crisp sound. When it comes to the sound characteristics of the strigae and its effect on the musical performance of the Song Dynasty, it can be summarized as follows (Xu, 2022; Ye & E. Wang, 2021). First, the characteristics of the sound and the sound effect. As a commonly used percussion instrument in the Song Dynasty, the sound produced by the percussion is light and translucent, which can resonate with people. When struck on it, the music it produces is bright, clear, pleasing and impactful. During the performance of the piece, it will produce a unique, orderly and orderly striking sound, and with each blow, it will produce a bright and crisp timbre, so that the continuous and organic sound effect will inject vitality and dynamism into the music, making the performance more engaging, and secondly, the impact on the performance of the piece. In a word, the percussion instrument was a highly influential percussion instrument in the music culture of the Song Dynasty and played a key role in the performance of music. Its sound characteristics are bright and clear, the rhythm of the sound effect is orderly, in the performance, it can give the music performance a certain vitality and beat, so that the musicality of the music is diverse and rich, and the sense of rhythm is good, especially it can also help the music to play, create a unique atmosphere, so as to set off the emotion, feel the strong musicality and artistic sense from the music, so as to realize the positive role of the music performance. Major discoveries involving the archaeology of percussion instruments in the Song Dynasty (Zhang & Chen, 2023), including percussion instruments such as wooden fish, cymbals and drums, played a key role in the music culture of the Song Dynasty, and they were widely used in the performance of various music, making the performance sound more layered and dynamic. In other words, the widespread use of percussion instruments had many influences on the music culture of the Song Dynasty and the sound effects of music performances. The first is court music, in order to make it look very dignified and solemn

in court celebrations and banquet scenes, percussion instruments will be used to create a solemn atmosphere, such as the use of cymbals and drums, etc., to highlight the dynamics and rhythm of the music, enhance the expressiveness of the music, so as to create a solemn atmosphere, and the second is folk music. Percussion instruments are often used in many folk celebrations, such as festivals and weddings. In the Song Dynasty (960~1279AC), percussion instruments such as the wooden fish were used to enliven the atmosphere and bring vitality to folk music. In addition, it is applied to theatrical music. For example, cymbals and drums are added to dance or opera accompaniment to enhance the tension and rhythm of opera music, so that the drama performance becomes richer and more varied, so as to improve its ornamental value. Percussion instruments such as wooden fish and cymbals generally appear frequently in the Yajing, and their main role is to enrich the diversity of performances and make them more distinctive. Therefore, for the music culture of the Song Dynasty, percussion instruments have always played a key role. However, the melody and loudness of percussion are insufficient, and the piano needs to be matched with the high and low tones of the piano, and the integration of the piano makes the musical works with different styles obtain rich musical expression and have a distinct dynamic rhythm. In this way, the use of percussion instruments can be used to bring out different musical atmospheres and give the music a vigorous vitality.

DISCUSSION

Enrich the Style of Piano Composition

The percussion music of the Song Dynasty has the characteristics of the Chinese nation, which can be integrated into the creation of modern piano and enrich the style of the piano. For example: In modern piano creation, on the premise of not destroying the traditional style, it is possible to create new and innovative works. Based on this, it can bring different vitality and musical temperament to the work. For example, composers can add traditional elements of percussion instruments in the Song Dynasty to piano creation, so that their rich rhythmic layers and timbre can be displayed in piano performances, adding the temperament and charm of traditional music to their works. In addition, in the process of innovating traditional elements, modern music concepts can be combined with current new technologies, so that the piano creation can be infused with traditional musical colors while retaining the artistic expression and aesthetic value of modern thinking. In addition, in terms of performance creativity, piano creators can integrate new ideas into the arrangement mode and performance, integrate traditional elements with modern elements, and integrate the strong rhythm and strong dynamic characteristics of percussion instruments into the performance, so as to make the style more varied and bring high musicality to the work. At the same time, it can strengthen the integration of the two cultures and enable cross-cultural dialogue. Combining the elements of ancient classical percussion music into piano creation allows musicians to experience the uniqueness and artistic sense of percussion instruments in the Song Dynasty. Based on this, they can broaden the horizon of music creation and enrich their own creative concepts, while bringing new and varied musical experiences to modern music audiences. Thirdly, this can enhance the artistic value of the work and greatly enhance its charm. Incorporating traditional musical elements into modern music, making it both modern and traditional, can change the tone of a piano work, give it a new brilliance, give it a new style, and at the same time, enhance its artistry. The exchange between tradition and modernity can rejuvenate modern piano works and open up new creative thinking for creators, and at the same time, broaden their thinking. Moreover, it will allow modern music to react to traditional music, so that traditional percussion instruments can be used universally, and traditional music can be preserved and inherited. In short, the percussion instruments of the Song Dynasty have a good archaeological value, and after excavating their archaeological value, it is necessary to realize that the percussion instruments of the Song Dynasty have a certain influence on modern piano creation. To this end, it is necessary to integrate its relevant elements into the creation of modern piano, so as to protect traditional culture and promote modern music to a better future.

Highlight the Cultural Connotation of Chinese Piano Music

The influence of percussion instruments in the Song Dynasty on modern piano creation also includes the influence on the cultural inheritance thinking of creators. In the process of in-depth exploration and study, modern piano creators, in addition to mastering its unique rhythm and timbre, and mastering how to use it, can also get a glimpse of the profound heritage and temperament of the music culture of the Song Dynasty. At the same time, it will be a profound inspiration for modern piano creators. For example, the timbre of the cymbals is crisp and clear, and the rhythm of the drums is bright and calm, when modern piano creators understand their characteristics, they can integrate related characteristics in the process of creation, in order to achieve similar sound characteristics and rhythmic characteristics in piano creation; For example, you can use the unique sound characteristics and playing methods of the piano to achieve similar sound effects. In this way, modern piano creators can be inspired to provide new artistic energy for their works and draw new inspiration from them. Based

on this, creators can apply it to the creation of their own works, so as to improve the artistry, ornamentation and musicality of their works. In addition, modern piano creators can protect and inherit the traditional Chinese culture by combining traditional elements with modern music. Modern musicians incorporate elements of Song Dynasty percussion instruments such as drums and cymbals into their piano creations, and give their works the unique charm and charm of traditional music, while at the same time, attracting audiences and helping to pass on traditional culture. In addition, modern piano creators can study and imitate the timbre of the percussion, and then use its timbre expressiveness to integrate it in their own musical works, so as to continuously explore, in order to achieve the unique heritage and emotional resonance of traditional music, so that traditional music elements can be integrated into modern music and inject new vitality into it. In this way, we can strive for a certain space for the inheritance of traditional culture. When creating music, creators can use modern technology and music concepts to appropriately draw on traditional music, so as to achieve music creation that integrates the past with the present. For example, composers can integrate the sound characteristics and rhythmic beats of percussion instruments in the Song Dynasty into their performances, accompanied by harmonic techniques, so that their musical works have a unique charm and charm that are compatible with ancient and modern. In this way, the essence of traditional music can be well protected and inherited, and at the same time, modern musical expression can be practiced, reflecting the musical aesthetic concept of contemporary people.

Realize the Innovation of Piano Performance Form

In the Song Dynasty (960~1279AC), the court music and cultural ensemble was a common way of playing, that is, the use of different percussion instruments for linkage performance, to enrich the musical tonality and level of the music, so that it is rich in changeable style, so modern piano music creation can be combined with Song Dynasty percussion. Take, for example, the combination of drums and cymbals. The combination of the two will make the two different timbres blend with each other, and the sound effect of the performance gives people a sense of movement and tranquility and integration. Therefore, in the court activities of the Song Dynasty, the ensemble of drums and cymbals was often used to set off the atmosphere of enthusiasm or solemnity. An ensemble of cymbals and wooden fish is also common. The cymbal timbre is screaming, the timbre of the wooden fish is translucent, the two are blended, both contradictory and conflicting, but also echo each other, with a strong contrast effect, the piano and Song Dynasty percussion ensemble is frequently seen in folk celebrations, such as weddings or festivals, to set off a pleasant, happy, warm and passionate atmosphere. Finally, there is the ensemble of percussion and pan drum, the sound of percussion is clear and loud, and the pan drum makes its rhythm rich and changeable because of its own multi-faceted nature, and the two cooperate to make the musical expression of the work rich and diverse. As a result, they are often used together in folk dance performances or ceremonies to highlight the rhythm and vitality of the music. The ensemble of piano and Song percussion provided an active vitality for folk music and court music. Moreover, its rich elements and strong conflicts will enhance the sound effect and make it extremely appealing, enhancing the variety of playing styles and thus attracting the listener. Ensemble is a very important performance mode in the music culture of the Song Dynasty, which gives the humanistic society an advanced and vibrant musical experience, and can also provide a reference for modern piano music creation. The musical instruments of the Song Dynasty were mainly solo performances, with their skillful and dexterous techniques, to present the changing tones and beats of percussion instruments one by one, but the combination with piano performance can enrich the melody and enhance the scale. Percussion instruments such as wooden fish and cymbals are often used in solo performances, and the clarity of wooden fish and the loud and crisp sound of copper cymbals are easy to attract the attention of listeners. However, the melody of musical instruments such as Muyudu is monotonous, so it is necessary to use the piano for concerto, and the tones and beats produced are often flexible and changeable, and the movement and stillness are suitable and unpredictable. In this way, the combination of the piano and the percussion of the Song Dynasty can not only let the listener intuitively feel the subtlety of its technique, but also allow the listener to understand the special features of the instrument performance, and make it resonate greatly. For the melody of the music, the joint performance will make the temperament of the music become unique and meet the requirements of change, and at the same time, show extraordinary artistic expression, and full of vitality and appeal, percussion instruments with their rich sense of rhythm and musical presentation, to the Song Dynasty music culture to bring great dynamics and vitality, increase the piano performance can improve the flexibility of performance, show more complex melodies. Drums and cymbals are fast-paced percussion instruments that produce an orderly tone when struck, while the crisp sound of the piano gives the music a distinct rhythm. At the same time, when the music is performed, it will bring good sound effects, generally speaking, its sound characteristics are either rich and crisp, or bright and solid, or thick and calm, which can improve the degree of excitement of the performance, and make the music performance full of variety, so as to be fascinating. It creates resonance between the music content and the audience. The percussion instruments of the Song Dynasty have great musical value, and through in-depth archaeological excavation, we can understand and interpret ancient musical instruments and apply them to

modern music creation.

CONCLUSION

The percussion instruments of the Song Dynasty are the main stage in the development of Chinese music, and we can understand the connotation and archaeological value of Chinese music culture. The archaeological excavation of ancient percussion instruments can illustrate the society's admiration for the spirit of music and respect for art. At the same time, this provides some enlightenment for the exploration of modern piano music creation. The results show that the percussion instruments of the Song Dynasty were made of bronze, brass, iron, lead and tin, and the drums were mainly made of pigskin and elm. The material of the copper cymbals is mainly brass, which has a directional sound and a concentrated sound. The sound of the drum is scattered, the sound is rich and wide. Song Dynasty musical instruments such as cymbals and drums have deficiencies in vocal range and cannot play complex music, so they can be combined with the piano to promote the improvement of piano music creation level and enrich the content and method of performance. There are some shortcomings in the research results of this paper, mainly because there are few percussion instrument test data, and the relevant research will be further increased in the later stage to enrich its content.

ACKNOWLEDGEMENTS

Guangdong Provincial Department of Education's Characteristic Innovation (Educational Research) "Research on the Creation and Application of Piano Works in New China", Project Number: 2018GXJK153.

REFERENCES

- Cheng, S. D. (2022). "Sounds of nature" and "works of authorship": The formation of two concepts of text production. *Social Sciences in China*, 43(2), 80-97.
- Karadavut, A. (2019). On the words onluk yuzluk of old uighur law documents. *Selcuk Universitesi Turkiyat Arastirmalari Dergisi-Selcuk University Journal of Studies in Turcology*, (47), 115-126.
- Li, Y. (2017). An analysis of the northern song Ya Yue from the perspective of historiography and culturology. *Agro Food Industry Hi-Tech*, 28(3), 1295-1298.
- Liu, Y., Chen, M., & Tian, Y. (2022). Temporal and spatial patterns and influencing factors of intangible cultural heritage: Ancient Qin-Shu roads, Western China. *Heritage Science*, 10(1), 201.
- Ng, K. W. (2017, May). The emergence of chordal accretions in the lute melodies of Tōgaku and its implications for the historical development of the repertory. In *Ethnomusicology Forum*, 26(2), (pp. 215-246). Routledge.
- D'Amario, S., Schmidbauer, H., Roesch, A., Goebel, W., Niemand, A. M., & Bishop, L. (2023). Interperformer coordination in piano-singing duo performances: phrase structure and empathy impact. *Psychological Research-Psychologische Forschung*, 87(8), 2559-2582. doi:10.1007/s00426-023-01818-8.
- Shih-Pe, W., & Wang, E. (2021). Plays within Songs: Sanqu Songs from Literary Refinement (ya) to Popular Appeal (su). *Journal of Chinese Literature and Culture*, 8(2), 307-340.
- Sieber, P., De Grandis, M., Wang, K., Yao, H., Gao, J., McNally, I., . . . Nunes, J. M. (2021). In search of pure sound: Sanqu songs, genre aesthetics, and translation tactics. *Journal of Chinese Literature and Culture*, 8(1), 163-202.
- Song, Y. (2016, July). Music and dance thought of Empress Wu Zetian and its contribution to dance in Tang dynasty. In *2016 5th International Conference on Social Science, Education and Humanities Research (SSEHR 2016)*, (pp. 558-561). Atlantis Press.
- Wang, S., Sun, N., Osanlou, A., & Excell, P. (2015, September). The synthetic display of Yuan blue-and-white porcelain. In *2015 Internet Technologies and Applications (ITA)*, (pp. 339-341). IEEE.
- Xia, X., & Tian, C. (2022). Technology based on interactive theatre performance production and performance platform. *Scientific Programming*, 2022(1), 4239474.
- Xu, J. (2022). The most influential elements of the Chinese traditional music culture before the Ming dynasty in Southeast Asia. *Critical Arts*, 36(5-6), 177-190.
- Yang, S., & Dai, P. (2024). A study on the aesthetic characteristics of ethnic music based on radial basis neural network model. *Applied Mathematics and Nonlinear Sciences*, 9(1).
- Thepsathit, P., & Tangdhanakanond, K. (2024). The development of formative assessment rubrics for enhancing students' performance on Thai percussion instruments. *International Journal of Music Education*, 42(4), 674-690. doi:10.1177/02557614231192189.
- Zhang, H., & Chen, C. (2023). The influence of the "Six precepts of learning songs" of "Gu mislu" on history, art and cultural education. *Herança*, 6(1), 73-83.
- Kavaliauskaite, D., Gulrez, T., & Mansell, W. (2024). What is the relationship between spontaneous interpersonal synchronization and feeling of connectedness? A study of small groups of students using MIDI percussion instruments. *Psychology of Music*, 52(4), 419-437. doi:10.1177/03057356231207049.