



The Excavation of Musical Instruments in the Song Dynasty and their Impact on Musical Instruments

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ABSTRACT

In order to dig deeper into the archaeological value of wind instruments, as well as the timbre and melody characteristics, the Song Dynasty musical instruments were analyzed as an example, and the surface characteristics of the orchestral instruments were observed by high-definition microscope, and the dwarf oxide metal content was observed, and their dyed materials and overall structure were analyzed. The 3D scanning device analyzes the surface's sound resonance and the sound's location. The observation results showed that the materials of arterial canal fluid were mainly bronze, bamboo, elm, mahogany, lead, iron, gold, etc., and white materials, iron sulfate, copper sulfate and iron oxide. Metal oxides are formed on its surface, which has good resistance. The instrument's sound position and center of gravity are the same, mainly in the 1/3 and 1/4 of the whole. The structure of the musical instrument is a whistle, a pipe liquid, a vent, etc., and a resonance appendage is formed on its surface to prolong the transmission distance of the sound and improve the loudness of the sound. The structure of the instrument greatly improves the sound effect of its material, produces and maintains the stability of its timbre and melody, and provides inspiration for modern music production.

Keywords: Song Dynasty, Wind Music, Timbre, Melodic Art, Modern Music.

INTRODUCTION

During the Song Dynasty (960~1279 AC), wind music had very unique artistic characteristics and style charm, timbre characteristics, rhythmic characteristics, etc., which made the artistic expression of wind music in the Song Dynasty be recognized. It bloomed in the long history of Song Dynasty music culture, becoming a more popular art form among modern people. The timbre of the Song Dynasty wind music is clear and melodious, crisp and bright, and can show an extremely soulful and long timbre texture. At the same time, it is full of softness and delicacy, sometimes with a little bit of elegance and lightness, and is full of variety, this varied timbre makes it full of uniqueness (Baston, 2010; Cheng, 2017). Based on this, the emotions and artistic conceptions of the music can be expressed through wind playing techniques and unique breath control methods to capture people's hearts better. Song Dynasty wind music has a transparent and bright timbre, which is very penetrating, and can play a role in making the melody more prominent or decorative in the performance of the music. Under this penetrating, transparent and bright timbre, the performance of Song Dynasty wind music can often better convey emotions and resonate with the audience. In the middle and late Song Dynasty (1000~1279 AC), some major wind instruments, such as flute (Cheung, 2015; Ding, 2015), suona, and basket, were widely used in opera accompaniment and poetry singing, which could show the delicacy and elegance of the cultural life of the Song Dynasty society (960~1279 AC). There are many types of wind music instruments in the Song Dynasty, such as flutes, flutes, and pipes, all of which have their own timbre characteristics, which makes the timbre of the Song Dynasty wind music full of diversity and strong expressiveness. Based on this, the wind music of the Song Dynasty was able to develop excellently and occupy a relatively important position in ancient Chinese music. Because the music and art of the Song Dynasty were very developed, and the Song Dynasty wind music was very popular (Fung, 2013; W. B. Zhou, 2017), the Song Dynasty wind instruments continued to develop and achieved many achievements. The Song Dynasty wind music has a profound historical and cultural background, and has won the

favor of the Song Dynasty people with its clear and melodious timbre. At the same time, the melodic art of Song Dynasty wind music is extremely unique, rich in diversity and expressiveness, which makes Song Dynasty wind music play a very important role in the history of Chinese music. This paper mainly discusses the timbre and melodic art of Song Dynasty wind music (Kim, 2019; Li, L. Zhou, & Y. Wang, 2017), and shows the unique charm of Song Dynasty wind music through visualization techniques. This study is of great significance, as it is conducive to deepening the knowledge and understanding of ancient music culture, attracting more people to protect and inherit traditional Chinese music, and at the same time, providing a certain reference for modern music creation. The research in this paper shows that the timbre and melodic art of wind music in the Song Dynasty are unique, cultural, and have a strong musical artistic charm, which has certain significance for the development of modern music (Lin, 2020; Ma, P. Zhou, Liang, & Thompson, 2023). Through the visual exploration of the timbre and melodic art of Song Dynasty wind music, better understand the artistic essence of Song Dynasty wind music and provide a source of inspiration for the further development of modern music. In short, the Song Dynasty wind music has a unique artistic charm and musical value, and through its visual research, it will better protect, inherit and carry forward the Song Dynasty wind music, and provide more space for the integration and innovation of modern music and traditional music. This paper collects domestic and foreign documents, expounds the historical and cultural background of Song Dynasty wind music in detail, and explains the timbre characteristics of Song Dynasty wind music. Then, through microscopes, infrared scanners, and other visualization means, an in-depth exploration of its timbre and melodic art was carried out, and through visual forms such as images and videos, it was uniquely displayed, so that the wind music of the Song Dynasty could be presented more intuitively in front of him. Finally, the research conclusions of this paper are summarized, the influence of Song Dynasty wind music art on modern music is analyzed, and the integration of Song Dynasty music and modern music elements is promoted.

LITERATURE REVIEW

The Development of Music in the Song Dynasty

The Song Dynasty was the peak era of Chinese cultural development, and its music had great development space. It had very important characteristics in the field of orchestral music, and the timbre and melody were very rich, which was an objective reflection of the social, economic, and cultural development at that time. At the same time, it also had a profound impact on later modern music. Therefore, it can be seen that Song Dynasty music had a significant influence on the development of modern music in the research process. At the same time, archaeological excavation of the characteristics of orchestral music in the Song Dynasty can excavate the orchestral rules, especially the commercial semantics, etc. The content of music melodies has very obvious performance characteristics, among which the clear and melodious factors are the prominent features, mainly used in court music and sales. The timbre of orchestral instruments is very soft and expressive, and they can express emotions more clearly with a clear and transparent silver color. They are widely used in folk music, and in the process of music analysis, archaeological excavation and analysis of data are needed to determine the expressive characteristics of their music.

The Correlation Analysis of Melody

Regarding the multiple studies on the melody and timbre of Song Dynasty music, it has been found that their characteristics are obvious, and in the process of analyzing the overall melody, there are similarities with Western music. It is of great significance to effectively explore the correlation between the two and deeply analyze their corresponding data characteristics. How to effectively use existing tools and archaeological literature to analyze the overall changes in Song Dynasty music with theory is currently a hot research topic. Measuring its archaeological features with modern means is not only beneficial for the protection of archaeological literature, but also plays an important role in enhancing the inheritance of Song Dynasty art by deeply exploring its connotation and value. Overall, comprehensive judgment and analysis of artistic features, as well as research on special points, can be conducted, Can provide necessary support and inspiration for modern literature, analysis, art, and music.

METHODOLOGY

In this paper, wind instruments such as flutes, flutes, and pipes in the Song Dynasty (960~1279 AC) were taken as the research objects, and the sound production was observed by a scanner (1Hz, sound test, produced in Guangdong), an electron microscope (1080P, 2~5 times, produced in Guangdong) to observe the characteristics of material and structure, and a power balancer (2~10kg, left and right balance, Guangdong) to test the balance point of the musical instruments. Among them, the wind music is an imitation, and the observation index is a

literature. Firstly, the observation of archaeological samples is carried out using a microscope to examine their data and characteristic content, especially the historical value elements of music occurrence points and the structural features inside orchestral instruments, as well as material judgment questions. By integrating these value elements, the historical characteristics and cultural connotations can be effectively identified. Then, the frequency of occurrence can be determined through sound testing, software observation, and other forms to quantify the content of archaeological literature and generate higher measurement value. Through multiple multi decibel observations and tests, the characteristics of Song Dynasty musical instruments can be identified. Finally, the characteristics of Song Dynasty musical instruments can be summarized and integrated with modern literature to find the fusion point between the two, providing enlightening significance for the creation of modern music art.

RESULTS AND DISCUSSION

The Structure and Material of the Song Dynasty Wind Music

Compared with the wind instruments such as flute, flute and basket in the Song Dynasty, it is found that the materials of the instruments are mainly bamboo, wood and copper, and the texture is relatively delicate, and the surface has an anti-corrosion layer, as shown in Table 1.

Table 1. Structure and Material of Wind Music

Class	Material	Stain	Structure
Flute	Elm, mahogany, bamboo,	Iron sulfate, iron oxide,	Generators, whistles, blowholes
Flute	bronze, brass, gold, silver,	pine cedar oil, copper	
Baskets	lead, iron	sulfate, alum	

As can be seen from Table 1, the structure of the wind music is mainly composed of three parts, namely the sounder, the whistle and the air cylinder, and its materials are elm, mahogany, bamboo and bronze, which are mainly to realize the sound resonance of the whole instrument and enhance the vocal distance of the instrument. The construction of wind instruments mainly achieves the resonance of sound and whistle through the transmission of breath. The observation results of the wind band surface are shown in Figure 1.



Bronze Members



Bamboo Components

Figure 1. Structure of the Wind Surface

As can be seen from Figure 1, oxides of copper sulfate and copper hydroxide have been formed on the surface of the bronze component, which has a certain corrosion resistance, while the surface of the bamboo component has formed grease wax, which also further improves the oxidation resistance of the component. Therefore, the construction of wind music in the Song Dynasty paid great attention to the oxidation treatment of the surface to prolong its use time. During the Song Dynasty (960~1279 AC), there were many types of wind instruments, each of which had its own unique timbre and performance characteristics, so it was necessary to carry out antioxidant treatment on its components to ensure its timbre. The flute is one of the most representative wind instruments of the Song Dynasty and one of the wind instruments made of bamboo. The Song Dynasty's "Taiping Yulan" discussed the flute, which mentioned: "The flute, Di, Qiu Zhong made." It can cleanse the evil spirit and raise the righteous voice. Therefore, the column is good at blowing, and the sound of the twelve should be lawful. According to the three feet of two tunes, Xun Xun asked to cut the frost of the cloud dream and the strange rhyme of the magic dragon. The three holes are the gong, the dance is persistent, and the people blow it. The five holes are the flute, and the Zhou master is in charge. The six holes are flutes, and the Qiang people blow them. Seven holes are lowered, and the Han Department is used. It must be a tune, and the balance of Zhong Chi is combined, each with a short and long length. It should be the degree of the law, and it is used in the Yale Department. "In this way, the sound of the flute is very crisp and melodious, it can play a smooth melody, and it is very expressive, and its surface is mainly oxidized by wax. At the same time, the timbre of the flute is very pure and positive, and it can be played on various occasions, whether it is a solo or, accompaniment, or an ensemble; the timbre of the flute is crisp and moving, which can interpret a pure and translucent beauty, which makes the flute music more pure and more washy. They are generally made of bamboo. Its timbre is characterized by deep and rounded, with strong penetrating power, which can add the richness of the bass part to the orchestra performance, improve the depth of the bass, and the surface of its bronze components forms copper oxide, as well as lead oxide, which has corrosion resistance; In the Song Dynasty (960~1279 AC), the flute was often used to play the lyrical part of the music, and was suitable for some pieces related to natural scenes, and the suona was an important instrument in the Song Dynasty wind music. The characteristic of suona is that it is a wind instrument of double reed wood, which has a strong expressive power, the sound is very loud, high-pitched, and penetrating, so it is mainly made of brass and lead, and antioxidants such as lead oxide are formed on the surface. During the Song Dynasty (960~1279 AC), suona was often used in some military and folk ceremonies and religious activities. With the improvement of the ritual music system in the Song Dynasty and the renewal of materials, wind instruments have been technically developed and perfected, and their artistic expression has begun to change, and has become more diverse, more perfect, and more resistant to corrosion, as shown in Figure 2.

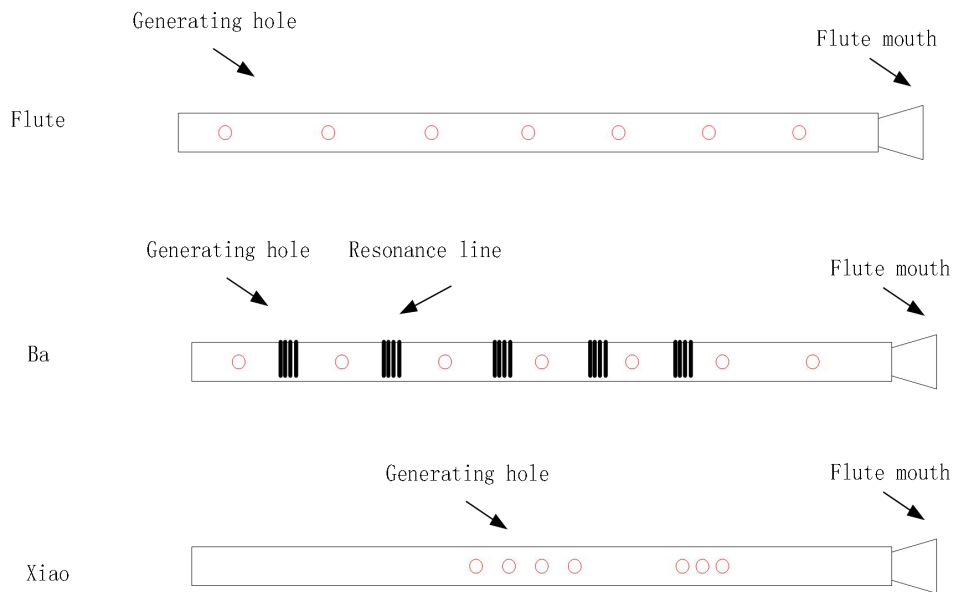
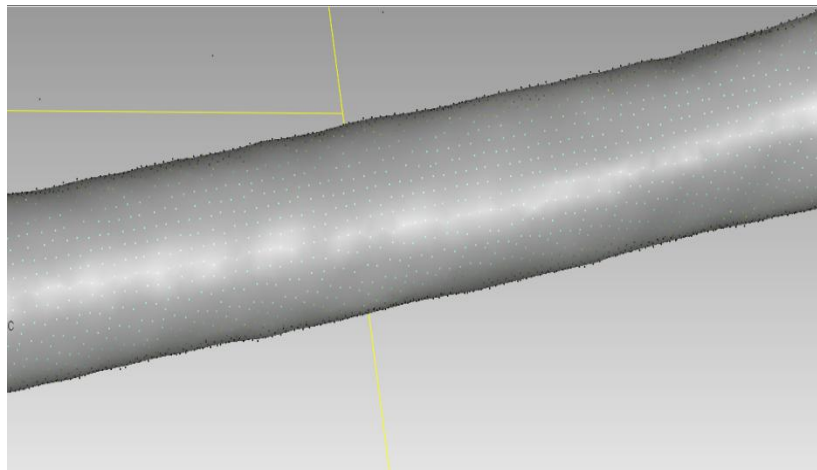


Figure 2. Schematic Diagram of the Vocalizations of Different Wind Instruments

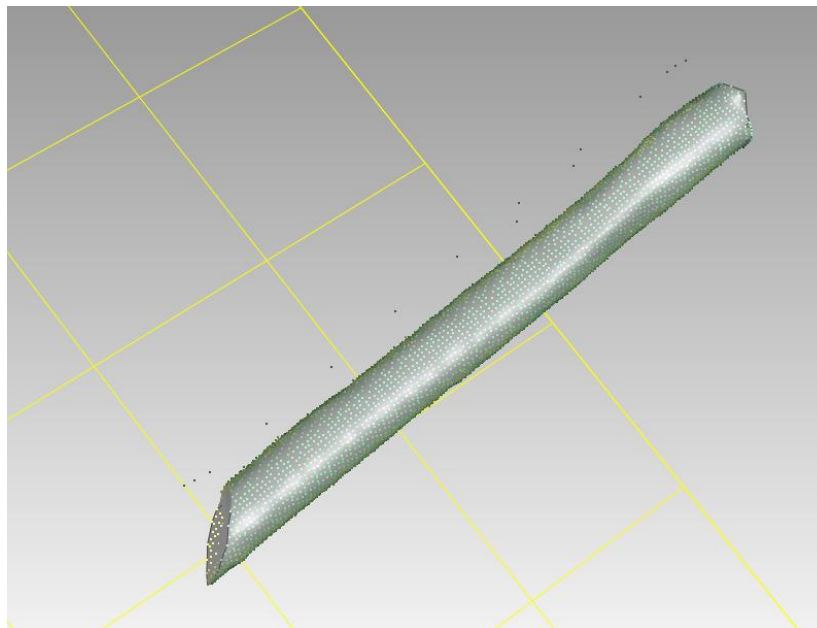
As can be seen from Figure 2, the occurrence of the flute and the flute is similar, but the sound port is more concentrated, so the sound principle of the orchestral instrument is basically the same, mainly through the air outlet and the formation of resonance on the surface, so as to prolong the distance of occurrence. During the Song Dynasty (960~1279 AC), wind instruments have always played an important role and multiple roles. First of all, status. Wind music in the Song Dynasty had a certain application in court music and was an indispensable part of the court culture at that time. In general, the performer of the wind instrument has a certain status and is highly respected, and his skill level and expressive ability can influence the performance quality of court music. In social celebrations, such as sacrificial ceremonies and ceremonial activities, wind instruments have a good position, their timbre is solemn, and the expression is in line with the ceremony's needs, which can add a grand atmosphere to the ceremony. In addition, in various fields such as theatrical and opera performances, Song Dynasty wind instruments were used for solo and accompaniment, adding a unique musical atmosphere and emotional expression to the performance activities. Wind instruments can play a role in emotional expression in music performance through their unique timbre and expression. For example, through a variety of techniques, musicians can convey different emotions and moods. In ensemble, the role of wind instruments is to control the rhythm and tempo, making the music more stable and unified as a whole. Through a reasonable division of labor and coordination, this can make the ensemble of the orchestra more harmonious and smooth (Qi, Huang, Li, & Wan, 2020; F. Wang, 2016). Third, the acoustic effect. Wind instruments can produce very different sound effects and can be changed at any time. They can also play a role in setting the mood and enhancing entertainment in different situations. Its crisp and melodious timbre, deep and heavy, etc., which can bring good audio-visual enjoyment.

Balance of Shape and Mechanics of Wind Music

The results of the 3D scanning of the wind instruments show that the workmanship of the wind instruments in the Song Dynasty is very reasonable, the overall power distribution is uniform, and the center of gravity is moving downward, as shown in Figure 3.



A Closer Look



Look at it Holistically

Figure 3. The point of Occurrence After 3D Scanning

As can be seen from the scan results in Figure 3, a large sound point is formed on the surface of the wind instrument, forming a resonance. When depicting the timbre and melodic art of the Song Dynasty dizi piece "Butterfly Loves Flowers", it is necessary to draw its waveform diagram, spectrogram and spectrum, and use visualization technology to show the musical images and videos of this flute music. Then, through color rendering, the visual effect is enhanced to a certain extent, so as to facilitate the audience's understanding so that the audience can integrate into the whole piece of music and feel the charm of the music. First, draw the waveform diagram and the spectrogram and spectra. First of all, the audio processing software was used to directly convert the flute performance audio of "Butterfly Love Flower" into a waveform diagram. In the waveform diagram, you can see that the amplitude of the sound changes over time, forming a curve. In addition, it can also show the timbre characteristics of this music, the change of melody rhythm, the strength of the beat, etc (Xiaodun & Schoenberger, 2019; Liu & Mozgot, 2020). Through the spectrum analysis software, the audio of the Song Dynasty music "Butterfly Loves Flowers" played by Dizi can be converted into a spectrogram. In this spectrogram, you can see that the different frequency components are distributed along with the melody. Based on this, it is possible to see the pitch performance and the proportion of sound elements in the music. Then, draw the spectrum. The "Butterfly Love Flower" score can be drawn using note recognition software or performing manual marking operations directly. As can be seen from the score, on the timeline, different notes have their own arrangement and show different timbre characteristics and melody senses, based on which the structure and rhythm, timbre performance, and rhythm of the whole piece can be recognized. Second, visual display. First, the presentation of dynamic videos. Through dynamic visualization technology, the previously drawn waveform

diagram, spectrogram, spectra, etc. can be turned into a dynamic video, and the audience can follow the track's melody to feel the specific changes of the sound elements of wind music on the timeline and understand their interactive relationship. Secondly, the 3D stereoscopic effect. Through the use of 3D modeling technology, the Song Dynasty dizi song "Butterfly Loves Flowers" can be converted into a 3D stereoscopic effect video, and with audio, it can be presented. In this way, 360-degree rotation and zooming in and out can be realized, allowing the audience to have an immersive experience to better help them feel the characteristics of Song Dynasty wind music (B. Zhang, 2023; Z. Zhou, J. Kang & Jin, 2014). Since the perception of timbre is subjective, it is difficult to present it in the form of images and charts. However, some image analysis elements can be used to better feel the timbre charm of the Song Dynasty wind music to provide a visual reference. Audio processing software was used to complete the spectrum analysis of the Song Dynasty wind music repertoire and make it into a spectral chart. Different instruments will have different distributions on the spectrogram, which can reflect their timbre characteristics. Taking the flute as an example, spectrum analysis can help to better recognize and understand the timbre of some Song Dynasty dizi pieces, so as to understand the timbre characteristics of Song Dynasty wind music. In short, the spectrum chart can show the intensity and distribution of specific frequency components in the Song Dynasty wind repertoire, so as to express the timbre characteristics of the Song Dynasty dizi wind music, reflecting the melodious and delicate, clear and soft characteristics and the waveform diagram can be used to show the waveform changes of the Song Dynasty wind instruments in the performance. Different shapes and amplitude waveforms can reflect different timbre characteristics. It is also possible to compare the differences in waveform of different wind instruments when playing the same piece, thus revealing their unique timbre, colour, and texture. You can design some abstract artistic works, and based on the inspiration brought by the wind music of the Song Dynasty, through different styles such as colorful, smooth, solemn, rough, etc., to express the timbre characteristics of various wind instruments. For example, the clear and melodious timbre of the Song Dynasty flute music "Butterfly Loves Flowers" can be simulated through texture, light and shadow effects, etc., and its softness and delicacy can be expressed, so as to reflect this similar auditory feeling through visual expression; fourth, mood and atmosphere. Illustrations and photographs can also be used to express the unique mood and atmosphere brought by the timbre of the Song Dynasty wind music. For example, through characters or scenes, light and shadow elements, etc., to convey the clear and melodious timbre and soft and beautiful atmosphere of the Song Dynasty dizi repertoire "Butterfly Love Flower". For example, you can design a series of visual works for the Song Dynasty wind music work (flute) "Butterfly Loves Flowers", and integrate your understanding of the song into it to show extraordinary charm and unique atmosphere. In short, from the above analysis, it can be seen that the timbre charm of the Song Dynasty wind music can be depicted through graphics and images, so that the complex information in the real auditory experience can be expressed through a series of visual elements, thus triggering the thinking and imagination of modern people. In addition, the center of gravity of the wind instrument is in a lower center position, so it is more flexible during playing, and the specific results are shown in Table 2.

Table 2. The Center of Gravity of Wind Instruments

Class	Vocal Position	Center of Gravity
Flute,	2/3	2/3
Shark	1/2	1/2
Hsiang-hsien	1/4	1/4
class	Vocal Position	Center of Gravity
Flute,	2/3	2/3
Shark	1/2	1/2
Hsiang-Hsien	1/4	1/4

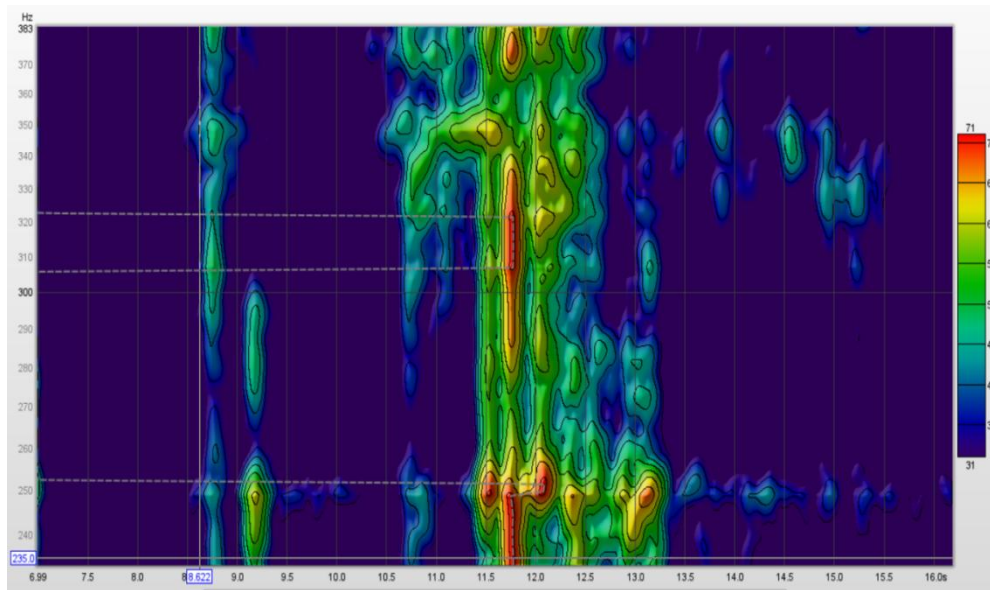


Figure 4. Flute Scan Results of "Butterfly Love Flower"

From Figure 4, know the melody and timbre change process of "Butterfly Love Flower", where the color represents the melody (amplitude) and the ordinate represents the timbre (frequency), indicating that the flute's voice is high, and "Butterfly Love Flower" has a fast rhythm and melodious melody. The visualization technique can be applied to the exploration of the timbre and melodic art of the Song Dynasty wind music to help better visualize the characteristics and expression of its musical melody. Here's how this article analyzes it: First, the waveform. Through the use of waveform diagrams, you can clearly see the ups and downs of the audio signal (waveform changes), and thus witness the timbre changes of the music and the ups and downs, development and changes of the melody. When depicting the timbre and melodic art of Song Dynasty wind music, the use of waveform diagrams can be used to show the sound ripples in the performance of different Song Dynasty wind instruments, so as to understand their fluctuations and recognize the relationship, coherence and variation between different notes. The spectrogram displayed by the REW2.0 software can show the signal distribution of different frequency components of the Song Dynasty wind music, so that people can better analyze the frequencies of different sound elements in the Song Dynasty wind music, and then better understand the timbre, melodic art and changes of the Song Dynasty wind music. In the process of depicting the timbre and melodic art of wind music in the Song Dynasty, the spectrogram can be used to show the sound frequency range and intensity of different wind instruments, the timbre performance or frequency changes of different melodic passages. Wind instruments were a key part of the traditional music culture of the Song Dynasty, and at the same time, they played an active role in the further development of traditional Chinese music culture. In the process of music development during the Song Dynasty, wind music was constantly developing, innovating, and practicing, which played a key role in the stable continuation and lasting development of the Chinese classical music tradition. During the Song Dynasty (960~1279 AC), wind music always had a good influence and continued to develop in practice; First of all, cultural inheritance and development. For the development of music culture and modern music in the Song Dynasty, the influence of the Song Dynasty wind music is extremely far-reaching, in particular, the Song Dynasty wind music also provided very valuable experience and inspiration for the improvement of the diversity of music in later generations. Secondly, the improvement of social status. In the music of the Song Dynasty, wind music was a relatively elegant art form, based on this, it was welcomed by people from the court, folk people, and religious personnel, and played an extremely important role in related activities.

The Influence of Song Dynasty Wind Music on Modern Music

Standardize the Structure and Style Characteristics of Modern Music

Discover their structural characteristics by studying the scores of specific Song Dynasty wind music pieces. For example, a Song Dynasty wind piece may contain an overture and theme, variations, epilogues, etc., each of which will have a different form of expression and development logic. Second, the arrangement of notes. A detailed analysis of the note arrangement of the Song Dynasty wind music repertoire can be carried out to reveal the melodic characteristics of the repertoire, such as repetition, variation, and counterpoint. It can also show the relationship between the individual notes in the form of charts (D. Zhang, Kong, M. Zhang, & J. Kang, 2022; J. Zhao, Xu, & Ye., 2018), and better reflect the structure and context of the Song Dynasty wind music, and trace the

development and evolution of the Song Dynasty wind music by comparing the Song Dynasty wind music in various periods.

From the early to the late Song Dynasty, the rhythm, range, and motive of the Song Dynasty wind music were changing, and there were different innovations. For example, in the early Song Dynasty (960~1000 AC), the rhythm of wind music was often very fast and lively, while the rhythm of wind music in the later Song Dynasty was relatively slow and often lyrical. Moreover, the early Song Dynasty wind music had a relatively high vocal range, and often used different vocal ranges such as treble and bass to add layers to the music and make it more varied, so its musical expression was stronger. In the later Song Dynasty, the wind music did not have particularly high requirements for the breadth of the vocal range, but paid more attention to the expression of soothing emotions and the inner emotional energy of the wind music. It is possible to study the different genres and styles of wind music in the Song Dynasty so as to reveal the melodic characteristics and styles of wind music in the Song Dynasty. For example, there are clear differences in melodic structures between court music and folk music in the Song Dynasty. In the court music of the Song Dynasty, wind music generally had relatively strict norms, and its melodic structure was more formalized and needed to be carefully designed. In addition, the melodic characteristics of the Song Dynasty wind music are very beautiful and gorgeous, etc., which need to be in line with the court etiquette and norms, and show a sense of solemnity. In contrast, folk music is more earthy. For example, the melody structure of the wind music in the folk music of the Song Dynasty is relatively simple and natural, and the folk music has a deep relationship with the daily life experience, focusing on emotional expression and simplicity, and can reflect the ordinary life and labor scenes, love life, etc., which are more sincere and unrestrained. In terms of melody, court music may be more complex and varied and may show a more refined sense of rhythm, focusing on beauty or not. The melody of the folk wind music of the Song Dynasty is very smooth, natural, simple, and full of affinity, paying great attention to tradition, and its rhythm is very simple and direct, which can quickly capture people's hearts and cause resonance.

Improve the Performance Skills of Modern Music

The time series chart shows wind music's evolution during the Song Dynasty (960~1279 AC). For example, by marking the timeline, the melodic structure and development trend of Song Dynasty wind music in different periods can be displayed. The spectrogram can be used to show the variation of frequency components in different Song Dynasty wind repertoire. In addition, the intensity of the sound frequencies can be judged by the depth of the color on the timeline, so that the frequencies of each part and the differences between them can be better revealed. Based on this, better understand the melodic artistic characteristics and evolution trajectory of wind music in the Song Dynasty. Through this visual method, better grasp the information of Song Dynasty wind music, and provide support for the cultural inheritance and protection of Song Dynasty wind music, and follow-up visualization research. The art of wind music in the Song Dynasty gave many important inspirations to modern musicians and influenced their subsequent creations. Musicians can not only get inspiration from the Song Dynasty wind music, but also understand the musical achievements of the Song Dynasty wind music, and research the performance techniques and harmony processing skills of the Song Dynasty wind music to make better innovations. First of all, innovation in playing techniques. Through in-depth research on the characteristics of different wind instruments, Song Dynasty wind musicians summed up and innovated many different performance techniques. For example, portamento and vibrato expressions are added in flute playing to make the performance expression more natural, smooth, and colorful. Artistic innovations can improve the artistic expression of wind ensembles, and at the same time, provide technical inspiration for the performance of modern symphonies, especially woodwind and brass ensembles. Secondly, harmony processing. Although the Song Dynasty wind music was basically monophonic, in some large-scale activities, the music used in it already had multi-part choruses and ensembles to improve the music's richness and layering. In this way, modern symphonies were influenced and began to use complex harmonies and counterpoint. and finally, the influence on later generations of musicians. Influenced by the innovation of Song Dynasty wind music in performance techniques and harmonic processing, later musicians began to pay more attention to high-level performance and musical expression when composing and arranging works. For example, in the creation of modern symphonic music, in the arrangement of woodwind and brass sections, some musicians will use delicate and complex decorative techniques, or in the composition of symphonies, to construct a harmonious structure with distinct layers and rich variations. At the same time, it is a way to show the diversity of music.

Deepen the Cultural Connotation of the Song Dynasty in Modern Music

The influence of Song Dynasty wind music on modern music creation also includes the influence on modern musicians in terms of emotional expression and artistic conception creation. First, emotional expression. Song Dynasty wind music can convey the protagonist's emotions through the interpretation of music, such as sadness, joy, melancholy, etc. Through the unique timbre of the Song Dynasty wind instruments and the use of artists'

performance techniques, the Song Dynasty wind instruments are often able to touch the heart and express deep and simple emotions directly. This has had a tremendous impact on modern music creators. Modern musicians can learn from this way of expressing emotions and inject extraordinary personal emotions and experiences into their works to make the works' authenticity resonate with the audience. Secondly, the creation of artistic conception. Song Dynasty wind music attaches great importance to the ability of musical expression, especially in the creation of artistic conception, Song Dynasty musicians can use wind music to return to landscape scenery and palace scenes, etc., and from the melody and rhythm and other elements, to create a good atmosphere and scene. Influenced by this, modern music creators can pursue more vivid and imaginative scenes in their works, and use this to express the artistic conception of music to better win listeners' hearts. Finally, enrich the artistic connotation. The Song Dynasty paid attention to the balance between the excavation of people's inner emotions and the external art form. Influenced by this, modern musicians pay more attention to the exploration of their own inner world, and integrate their unique personality into their works, showing a different artistic connotation. can resonate with the audience. Artists can deepen the excavation of the artistic connotation of their works by borrowing from the artistic expression of Song Dynasty wind music, and constantly improve their works, integrating classical and modern elements, so as to better show the artistic connotation of their works and improve the depth of their works. During the Song Dynasty (960~1279 AC), wind music was one of the main forms of musical expression. The wind music of the Song Dynasty absorbed the classic music elements of many regions and nationalities, showing a profound connotation of cultural exchange. This cross-border integration has had a great influence on later composers. To this end, many modern music creators have drawn inspiration from the precedent of cross-border integration and innovation of wind music in the Song Dynasty and mined materials from it to realize the cross-border integration and innovation of music style and arrangement. For example, under the influence of the wind music of the Song Dynasty, modern symphony music integrates musical elements from different regions and nationalities. Based on absorbing classical music elements, it integrates different styles of music, making its genre more diverse and open. Secondly, the arrangement is innovative. There are many things to learn from the arrangement of wind music in the Song Dynasty, for example, the composers of wind music in the Song Dynasty would combine different timbres, rhythms, harmonic elements, etc., to form a new arrangement style. This gives modern musicians a certain amount of inspiration. For example, in the process of arranging their works, modern musicians will try to integrate different elements and rearrange some musical elements, and at the same time, combine their own characteristics and arrangement thinking to carry out arrangement activities, so as to form musical works with cross-border integration and innovation characteristics, personality and sense of the times.

CONCLUSION

The Song Dynasty was a prosperous period for the development of orchestral instruments, and under the influence of Western culture, the music of the Song Dynasty had rich content and complex structure, and its melodies presented diversified characteristics, but the differences in the music of the Song Dynasty were small, and the previous research could not be effective. The results show that the material of the Song Dynasty wind instrument is bronze, with metals such as copper, iron and lead as the main body, and the formation of oxides on the surface can prolong the use time of the instrument and improve its oxidation resistance. Moreover, the piece's overall structure is simple and reasonable, and its position is consistent with its center of gravity, mainly the whistle and orchestral music and the air outlet. Forming an effective resonance on the surface of the orchestral instrument, in order to extend the occurrence distance of the music, increase the vocal frequency of the music, enhance its timbre and melody, and with the assistance of REW2.0 software, you can find the orchestral instrument, the timbre of your melody presents high-pitched and melodious characteristics, and the sound characteristics of bamboo, mahogany, and elm materials are brought into full play. There are also certain deficiencies in my research, mainly samples of orchestral instruments of the Song Dynasty. There are difficulties in analysing and measuring metals, and more research will be carried out in the future to make up for the shortcomings in the research, such as the measurement of metals such as aluminum and magnesium, and the testing of other wind instruments.

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