

The Construction and Significance of "Spatial Thinking" in the Orchestral Music Creation

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Abstract—The orchestral music creation is to give color appearance to each element of music, so that the various elements of music have more expressive space. The article focuses on the "spatial thinking" of orchestral music creation, and aims to discuss the spatial thinking of orchestral music creation from the aspects of vertical structure, horizontal structure and deep thinking of music works, and the relationship between this stereoscopic thinking and the meaning of musical works.

Keywords—Orchestral music creation; spatial thinking; expression meaning

I. INTRODUCTION

The orchestral music creation is a creative technique that gives color appearance to each element of music, allowing the various elements of music to have more expressive space. In general, a composer can construct a three-dimensional thinking space in his ideology according to his own interests and performance intentions, and then let the musical language elements bloom in this space; at the same time, he should consider that the performers and listeners can also stay in this thinking space and resonating, and finally achieve the purpose of emotion expression and information exchange. In addition, the so-called construction is not a rootless wood or water without a source, but the construction based on the previous "experience" summary theory system, such as the interpretation of works famous composers in Baroque, classical and romantic period, and even in the 20th century, aiming to look for hidden laws and aesthetic thinking from these classic works and serve new creative thinking and technical means, such as the orchestral music creation applying the modern scientific and technological means of acoustic principles and spectrum technology. Therefore, the author focuses on the "spatial thinking" of orchestral music creation, and aims to discuss the spatial thinking of orchestral music creation from the aspects of vertical structure, horizontal structure and deep thinking of music works, and the relationship between this stereoscopic thinking and the meaning of musical works.

II. CONSTRUCTION OF THREE-DIMENSIONAL THINKING IN ORCHESTRAL INSTRUMENT

In the art of visual perception, "stereoscopic" often refers to three-dimensional including vertical, horizontal and deep, so the stereoscopic in music can also be represented as

horizontal structure, vertical structure, and deep structure; the difference is that the "stereo" of music is dynamic changes in the process of music.

A. "Vertical" Structure in the Construction of Spatial Thinking

In the orchestral music creation, the longitudinal superposition of the parts is an important factor in establishing the vertical structure of the sound sensation, such as the texture in traditional sense and the "sound block" and "sound bundle" in modern music. Besides, the pitch frequency distribution of the musical elements is also the main basis for judging the vertical structure of the sound sensation. For example, in the two tones that make up the interval, the pre-initial sound is higher than the root in the sense of hearing; if we enhance the high-frequency overtone of the sound of the same pitch, the vertical position seems to be heightened. In addition, the location and scattering direction of the sound source is also the most direct and effective method of sound localization.

In the so-called "generality composing" period of music in the West, scholars often subdivided the multi-voice parts into "homophonic music" and "polyphonic music". Of course, in most cases, it is a combination of vertical structure of two texture construction works, such as the introduction of polyphonic texture or polyphonic thinking on the basis of the homophonic music texture; or directly forming a comprehensive texture from the homophonic texture and the polyphonic texture. Then the texture of the work is composed of melody, counterpoint voice, the harmony layer, the bass layer, and the decorative or emphasis layer. This vertical structure form is most widely used in classical and romantic period. The melody is in the high-pitched area, the harmony is in the mid-range, and the basso is in the bass area, naturally forming the vertical structure sound of the music; then we choose the high musical instrument or the treble area of the instrument to play the melody, use alto or the mid-range of instrument to play the harmony, and use the bass instrument to play the bass voice, so that the vertical structure of the work is established. Of course, the composer often breaks this structural layout according to the needs of musical expression in the creation of orchestral music. For example, if the music image created by the composer is lyrical and feminine, the melody representing the main music emotion can be arranged in the middle area. If it is low and thick, the music can be played by the bass or the bass area of

instrument. In addition, the composer can construct the vertical structure of the work by positioning the texture in the frequency. At this time, the vertical sense of music can only be judged by the frequency distribution. Finally, the vertical structure of the music element is established according to the position of the instrument on the stage and the scattering direction of the sound wave of the instrument, because the high pitch musical instrument in orchestra has obvious directivity. For example, the sound directivity of the violin instrument is vertical to the table, that of brass-wind instrument is consistent with the horn mouth, and the sound directivity of the woodwind instrument is related to the vent hole, which will affect the spatial layout of the sound source.

B. "Horizontal" Structure in the Construction of Spatial Thinking

The horizontal structure in musical works involves two aspects: one is the instantaneous horizontal structure and the other is the dynamic horizontal structure. The instantaneous horizontal structure refers to the acoustic "section" of the music that is fixed at a certain point in time. The dynamic horizontal structure is a logical sense of hearing formed in the audience's memory during a series of "sections" fixed at different points in time during the music process. When an orchestra plays a certain musical element (sound, interval or chord), the acoustic "section" will be formed at a certain time point, and the composition of the acoustic "section" is distributed to different instruments to form the instantaneous structure of a musical piece. The instantaneous structure is often associated with the real stage, such as the violin on the left side of the stage, the cello on the right side, and so on. When the audience listens to music through the audio device, the corresponding instrument is also heard from the left or right side of the stereo, which is exactly what they expect.

The music structure in dynamic changes has timeliness and logic. Composers often make their works have a certain logical structure for the audience to remember or distinguish the horizontal structure of music in a short time. When we freeze the dynamic structure of the structure, it is the musical structure of musical works. Of course, the logical structure of the work is based on certain structural principles, such as the principle of reciprocity with the principle of dichotomy, the principle of reconciliation that is contrastive and unified, the principle of connection that is suitable for expressing contradictions and conflicts, and the principle of sonata with philosophy. With this logic thread, the horizontal structure of musical works can be constructed through changes in musical language.

III. THE "DEPTH" STRUCTURE IN THE CONSTRUCTION OF SPATIAL THINKING

The depth structure can be simply understood as the distant view, medium view and close view in the sound picture. The acoustic space constructed by ideology is accomplished by visual perception. The music elements of different characteristics are placed in the location of the "sound stage" to form the depth structure in the music work. This is like a photo, as the main body of the picture; human portraits are often in the most prominent places, with

mountains, water, trees in the middle and blue sky and white clouds in the distance. The depth structure of music can also be refined into close view, medium view and distant view in the stereoscopic space, while the main factors affecting the "depth" structure of spatial thinking are dynamics layer, frequency distribution and pronunciation position of the sound source.

The first factor of the deep structure constructed by spatial thinking is judged according to the volume of the sound source. The louder the sound is, the closer the sound source is. The smaller the sound is, the farther the distance is. The distance or dynamic change of the source can be simulated through the conversion or gradual change of volume. Based on the nature of the sound, composers often use velocity stratification to lay out the depth structure of the musical elements. Generally, audio equipment is not used in the professional concert hall. The concert hall is the place built based on acoustic requirements to accurately interpret the spatial thinking of music works. At this time, the deep structure of music is based on the imagination of the composer and the second interpretation of the conductor. Today, with the high development of audio technology, the sound engineer completes the process through the sound console according to the performance intention of the composer; most of the CD recording is the subjective judgment of the sound engineer in the late stage of audio, or depth layout simulating the live performance of composer and conductor.

The second factor related to the depth structure of music is the problem of frequency distribution. In the sense of hearing, the high-frequency high pitch is in the front of the low-frequency sound, and the middle frequency sound is in the middle. If there is no directivity of stage position, the sense of direction of directional low-frequency sound is not strong. The composer often lays out the depth structure of the work according to the frequency characteristics of different instruments and different sound zones; the "dodging" effect can also be achieved by using the frequency distribution characteristics. A complete orchestra has dozens of instruments, and nearly a hundred people playing dozens of parts. If each player plays each texture layer in the same frequency range at the same time and the same intensity, there will be countless "tone walls", making musical elements hidden behind the "tone wall". According to the needs of performance, if you want a music element to be in the front position, you can let other instruments in the same band rest or play at other frequencies, so that the music element will be clearly expressed. Of course, on the stage, the position of the instrument can also visually compose front and back contrast. There was composer who let the trumpet player play a solo piece in the background to render the distant feeling, which also constitutes the depth effect.

Building the three-dimensional spatial thinking of music is to let the audience perceive the music from all aspects, which also provides more space for the composer. As the saying goes, "everything written on paper is audible." Because of the differences in style, genre, and performance intentions, composers have different ideas for spatial layout. It is important that composers must know what they want

and what they want to express when creating or arranging instrument, which is the key to building spatial thinking.

IV. THE EXPRESSION MEANING OF "SPATIAL THINKING" STRUCTURE OF ORCHESTRAL MUSIC CREATION

The difference between music art and painting art and architecture art is that music art is both space art and time art, because the spatial structure of music will change with time to form the so-called "four-dimensional" space — vertical, horizontal, depth and temporal changes. Therefore, the construction of orchestral stereoscopic thinking is much more complicated than other static art forms. Generally speaking, it can be considered from the perspectives of stereoscopic thinking, historical style, subject matter and genre.

A. Spatial Structure and Performance Intention of Musical Works

The goal of music activities is to express expressions. The creation of orchestral music should also be completed according to the performance intentions of music activities, such as the emotions to express, the music image to create, artistic conception to describe or music ideas to express.

The dynamic change of music art in space perception is like a hurtling train. When the train is flying in front of you, the shape of the train can only be retained in your memory. The orchestral music creation is also the process of constructing the "horizontal" structure — musical form of the works according to the dynamic changes of the musical works. In the history of music development, especially the so-called "generality composing" period, the horizontal structure — musical form of the musical works has a certain typicality, which also formed some well-recognized structures. Just like "there are no two identical leaves in the world", it is difficult to find out two works with exactly the same structure in the existing music literature, and at least they are different in some parameters. However, the commonality is that the same type of structural form has same expression, or as long as you have a clear intention to express, you can construct the corresponding musical structure. For the creation of orchestral music, the ability to choose a musical structure that fits the performance intent is the first step in constructing spatial thinking; when you construct the appropriate logical structure, you can give the audience the most wonderful artistic presentation, which is like leading the audience to roam the fairyland. Those beautiful pictures are what the audience expects, and they are unexpected. These beautiful artistic conceptions finally form a memory curve in the brain of the audience, and draw a beautiful dynamic picture.

B. Spatial Structure and Style of Musical Works

In the interpretation of the history of orchestral music, it is not difficult to find that the development of orchestral music has a strong characteristic of the times. From the vocal music accompaniment in budding period as an independent instrumental genre on the stage, and later the double-tube and three-tube compilation, to today's personalized

development, etc., all marked by the historical style. On the other hand, even in the same historical period, the structure of each work is different due to the different musical images or the artistic conception.

The music of the classical period has a sketch style, and then the spatial thinking of the music constructed in the classical period should be clear, normative, real and elegant. The music of the romantic period has a strong color. When constructing the music space, it should be grotesque and splendid. When composing an orchestral music work, the composer should construct the structural framework of the work according to the performance intention and historical style of the work, arrange the spatial layout suitable for the performance intention, and then use different instruments or the same instrument in different sound zones to reproduce it. The style of the music works corresponds to the performance of the works. Different music feelings correspond to different time and space layouts. For example, the lyric soft music style requires a slow and linear spatial structure; the music of march and anthem needs modularity and contrast spatial structure; dramatic and philosophical music should be complex, gradual spatial thinking construction.

C. The Structure and Genre of Spatial Structure and Musical Works

The theme and genre of music are also the main basis for constructing spatial thinking. The spatial thinking structures corresponding to different genres and themes are naturally different.

For secular dance style or film and television music, the composer of orchestral music should pay attention to the spatial layout corresponding to this style and genre. If the dance music involves the plot or the shaping of the characters, the composer will complete it with a piece of musical instrument or two instruments shuttling back and forth in the space constructed by the whole orchestra. The main function of the film and television music is the depiction of the artistic conception and the appearance of the character image. In the spatial layout, we should consider leaving the frequency space for the dialogue or sound effect. At this time, the sense of the picture of the work and the sense of space constructed by the music must be unified. For the dramatic and philosophical music, the construction of spatial thinking is obviously more complicated. For example, with the development of contradictions, the intensification of contradictions, and the resolution of contradictions, different spatial contrasts are constructed, from simple to complex, reflecting the development process of "gradual change". Opera music is relatively special. In the process of constructing spatial thinking, it is not only necessary to consider the time and space layout of the band, but also consider the spatial layout of the human voice. Since vocals are also dynamically changing in music, whether it is solo or multi-vocal chorus, it will build its own "sound field" space, and this sound field must be in contrast or unified relationship with the sound field of the band music, which requires the composer of orchestral music creates two sound fields at the same time, then seek balance between the two,

and build contrast and unity of contradiction through the different sound field conversion.

V. CONCLUSION

In short, it is the original intention of the composer of the orchestral music to build a "thinking" sound field space for the audience to understand and resonate with. The creation of orchestral music has experienced spontaneous period, conscious period, systematic period, and acoustic interpretation. Until today, it constructs a thinking space of people's ideology. This is a process of gradual development and growth, rather than a process of replacement. As an orchestral orchestrator, it is necessary to inherit the tradition, apply the knowledge of acoustics, and construct a thinking space that fits the performance intention of the work in space and time to express emotion through works.

REFERENCES

- [1] (America) Samuel Adler. The Study of Orchestration, Trans. Jing Ping. Beijing: Central Conservatory of Music Press, 2011, 1. (in Chinese)
- [2] Yang Liqing. Orchestration Course, Shanghai Music Publishing House, 2012. (in Chinese)
- [3] Gardner Read: Style and Orchestration, by Schirmer Books a Division of Macmillan publishing Co.Inc(1979).