

The Development of "Twelve Tone Equal Temperament" and Its Impact on Future Generations-- Bach's Contribution to the Art of Piano

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Abstract: The article analyzes the comprehensive background of the "twelve tone equal temperament" of the masterpiece of piano artist Bach, analyzes the creative origin of the work, artistic background, creative rules, development and influence, and aims at its impact on future generations, the development and progress of the art field, and the piano The development of art and the contribution it has made have been thoroughly studied.

1. Introduction

One of the key factors for the piano to become the "king of Musical Instruments" is its great integration. As a kind of harmony instrument, it can be intimately combined with human voices and all musical instruments to build a beautiful music art. However, the reason why the piano has a wide "integration" is that the piano adopts the "equal temperaments". Bach, a man who has made great achievements in music, is an unparalleled master of music in the history of mankind. He is called "the father of European music" by later generations. His music is one of the major components of human culture in the world. His pioneering research and development of keyboard art first lies in his establishment of the "equal temperaments" in the practice of keyboard art. Then, what is the influence of the equal temperaments on later generations? What contribution did Bach's equal temperaments make to the development of piano art? This paper makes research on the above two points.

2. The Origin, Formation and Development of the Equal Temperaments

2.1. A summary of the temperament

"Temperament" refers to the music produced by living law, while "Temperament" refers to the music system produced by living law. The research of temperament deals with the relationship between sounds. "Temperament" is the most basic unit of law system. In the law system, each unit is called the law. The "note" is the most basic unit of the scale. "Temperament" studies the internal structure of musical pitch system and the category of musical sound movement. In the activity of music, the rhythm restricts the process of music, which runs through music works and is widely applicable.

The equal temperaments is the most widely used law system in the world. As the name suggests, an octave is evenly divided into twelve semitones. An octave with do, re, mi, fa, sol, la, si, do is eight notes, separated by six full notes, or twelve semitones, each half of a tone.

2.2. The origin and formation of the equal temperaments

Historically, the equal temperaments originated in China. The chime bells, which were buried underground in 433 BC, were unearthed in 1978 in Suixian county, Huber province. This set of chime bells consists of 64 bells of different sizes. Each bell can pronounce two tones. Later in the

southern and northern dynasties, Chengtian He^① (AD 370-447) created a "new law", which was the earliest law of twelve mean difference (new law) and was very close to the law of twelve mean difference. However, his new law was not an accurate law of mean difference.

Zaiyu Zhu^②, a scientist and music scholar of Ming dynasty in the 16th century, summed up the achievements of predecessors' law studies, systematically calculated the equal temperaments with mathematics, perfected, integrated and summarized the twelve equal laws, so as to make them scientific and systematic. In 1584, he mentioned the calculation method of the temperament of the twelve averages in his new theory of leg ology, from which the completely accurate law of the equal temperaments appeared.

2.3. The equal temperaments's formation and development in the west

In the west, the practice of using the law of averages began in the 16th century, about 200 years before Bach. Although the modern major and minor tunes were not yet fully formed, a similar system of plucked instruments had emerged. Composers and music theorists Vincenzo Galileo^③ tried to solve the problem of equal temperaments, his system can only be used to calculate the approximate equal temperaments. In 1584 he created *The 24 Dance Suite*, indicating the relevant 12 minor and 12 major, this is the first close to "the equal temperament" of the temperament of music creation practice.

Until the end of the 17th century, western keyboard instruments were basically tuned according to pure temperament^④. As a result, on keyboard instruments of the time, it was difficult to play any key with an elevating key except C major. In view of this situation, many European composers have made a lot of attempts and explorations. In 1702, J.C.F. Johann Caspar Ferdinand Fischer^⑤ (J.C.F. Fischer (1656-1746) wrote and published in 1715 the new organ anthology, which Bach had seen while writing the law of the twelve averages, and had collected and borrowed some of its themes.

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3. The Characteristics of the Equal Temperaments

The interval produced by the equal temperaments can give a distinct sense of pitch difference to the human hearing. Easy to hear, easy to grasp, easy to remember. It's a kind of geometric law. There is no ending. Starting from any one note, it is natural to form any average scale, which gives great freedom to the tone. Compared with the five degree phase law, pure law. The transfer was extended to a degree of extreme freedom. The implementation of the equal temperaments provides great convenience for the making of Musical Instruments. To make keyboard instruments, you do not have to make a number of rows of keyboards like pure Musical Instruments. Correspondingly, the performance of Musical Instruments and the singing of works also play a role of simplification to some extent.

4. Bach's Contribution to the Application of "Equal Temperaments"

Johann Sebastian Bach (1685-1750), a German composer and organist, created *The Well-Tempered Clavier* books 1 and 2 from 1722 to 1742. Each volume systematically used twelve major and twelve minor keys to write "prelude" and "fugue". These two volumes give full play to the free modulation characteristics of the twelve average temperament.

The Well-Tempered Clavier is according to the equal temperaments, the twelve tones within the octave law of equal to half, so although abandoned the chords sound soft (compared to the pure law), but expand the tonal, can make the theme on the arbitrary adjustable, composer to lift, no

longer after the sound of deviation, the composer of tonal pull away from the bondage of the pure law of thinking. The strict and orderly tonal layout and the charm of tonal changes brought about by *The Well-Tempered Clavier* have been highlighted. The development and drama of music have been practiced and realized, making music artistic and thoughtful, and greatly enriching the expressive force of music. As another important factor of structural music, tonal layout is highlighted.

The Well-Tempered Clavier can play all of the 24 major, minor, music composer may, in accordance with the emotional characteristics of selecting the appropriate character of tonality to constitute a music works, make music and tonal corresponds to, not only the tonal character get more performance, and the composer's own colour are also released, aesthetic psychology satisfied. Because of Bach's praise for the equal temperaments, he created and proved its superiority. Only then could the equal temperaments be used and finally accepted universally.

5. Conclusion

The invention of the equal temperaments is a new breakthrough in the study of temperament and a significant contribution in the history of Chinese temperament, which has laid a solid foundation for the development of world music and exerted a profound influence on the study of the history of world music. Because of the convenience of this transfer, it opens up a very broad road for the development of composition technology. The implementation of the equal temperaments reduces many technical difficulties, greatly shortens the process of learning to play and sing, and accelerates the improvement of other performance abilities.

Bach through the creation of *The Well-Tempered Clavier*, will lay the foundation of western law system of equal temperaments with the core, adopt the law of the system, you can free choose 24 tunes and free transfer, many of the world's famous composer, such as Beethoven, Mozart, Schumann, Chopin, etc, from Bach and its works for reference, absorbs the music style, features, they have been careful and meticulous understanding of the works of Bach and use. *The Well-Tempered Clavier* for the development of western music after open the door, opened a new era of music, it not only summarizes the advantages of music before, also combined with the new elements in the new era, become the most important resource of modern music, make western music to the colorful world, at the same time, it indicates the great expectations of keyboard instrument.

After the adoption of the twelve equal temperation, its significance for the development of piano art itself is extraordinary. Gives the piano a great sense of fusion and universality that no other instrument (except the organ) has. An octave within the adoption of twelve average equal half tone, not only can be freely from the tune, but also can be convenient to apply harmony skills, so that the piano in the music world can be free and unimpeded. In a word, the equal temperaments endows the piano with a characteristic unmatched by any other musical instrument, which also makes the piano more widely used than other Musical Instruments. All this is attributed to Bach's establishment of equal temperaments in his creation practice.

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Appendix

Chengtian He(370-447), a native of Min County, Donghai County (now northwest of Shandong Yucheng), a mathematician, astronomer, historian, and thinker in the Northern and Southern Dynasties.

Zaiyu Zhu (1536 - 1611), the word Bo Qin, the number of the sentence of the mountain people. The Emperor's Room Zheng Gongwang Zhu Houxuan was born in Huaiqing (now in Fuyang, Henan). After the second son of Ming Renzong, Zheng Jing Wang Zhu Zhanqi, the ancestors of the Ming Dynasty ancestor Zhu Yuanzhang. Ming Dynasty music scholars, musicians, mathematicians, dancers, musical instrument makers, physicists, astronomers, and songwriters, pioneered the famous twelve-average law.

Vincenzo Galilei was a pioneering figure in the late Renaissance music career and made an important contribution to the music revolution that began in the Baroque era. In the study of pitch and string tension, Galileo may have made the first nonlinear mathematical description of historically known natural phenomena.

The theory of pure law was originally proposed by the ancient Greek mathematician, philosopher, and music theorist Pythagoras, and the twelve equal and five degrees of the law are the three main laws of music. It determines the pitch of each note in the scale by a combination of major third and pure fifth. In this scale, the relationship between the main sound and other sounds is purely musical, so the human ear sounds harmonious and has a pure law.

John Kaspar Ferdinand Fischer (German: Johann Caspar Ferdinand Fischer, JCF Fischer; 1656 - August 27, 1746), German Baroque music composer, early 19th century music theorist John Nicholas Focker rated him as one of the most outstanding keyboard composers of his time.