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Boehm's flute and its perception by contemporaries

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ABSTRACT: The article is devoted to the issues of T. Boehm's instrumental reform, in the process of which the flutedesign was radically improved. The figure of the outstanding German master and flutist Theobald Boehm and hiscontribution to the development of the mechanical-acoustic system of the instrument in 1847 are considered in thearticle. Emphasis is placed on the importance of Boehm's reform, which was the culmination of the creation of anew flute design and significantly expanded its dynamic and technical resources. Improving the instrument,Theobald Boehmas the basis of the acoustic system of the flute chooses a uniformly tempered system, which allowedhim to achieve a significant improvement in its intonation. It is emphasized that the new sound and technicalcapabilities of the instrument have been the subject of heated debate in conservative circles of German flutists. It isstated that among the opponents who opposed the improved flute model, the most distinguished wereAntonBernhard Furstenau, Wilhelm Barge, Maximilian Schwedler, brothers Karl and Franz DopplerHeinrichHeinemeyer. At the same time, the progressive achievements of T. Boehm were supported by his adherents –E. Prill, S. Karg-Elert and students. It was noted that the significance of T. Boehm achievements for thedevelopment of modern flute performance has been decisive in the further development of flute art performance.

Keywords - T. Boehm, flute performance, flute acoustic system, steady musical tuning system, keys-systemmechanic.

I. INTRODUCTION

The prominent figure of the German master and flutist-virtuoso T. Boehm became decisive in the reform of the instrument in the 20th century. It was he who introduced to the music world a fundamentally new cylindrical flute, which, in contrast to the old models, had a completely different type of acoustic structure, updated mechanics and a more powerful and voluminous sound. The main reason that forced the master to create an instrument was the unsatisfactory intonation of the flutes existing at that time. With the name of the Munich master, a new stage in the development of the sound expression capabilities of not only the flute, but also other wooden wind instruments begins. Boehm's reform contributed to a significant increase in the popularity of the flute as a solo instrument and contributed to the intensification of compositional creativity in the formation of solo and ensemble repertoire.

II. T. BÖHM AS AN INVENTOR OF THE MODERN FLUTE

The 19th century was marked by the most intensive search for the improvement and creation of new models of wooden and brass wind instruments. For a long time, the design of the transverse flute has been continuously improved by performers and masters, who have made various changes in the mechanical and acoustic system of the instrument aimed to ameliorate the sound and convenience to play it. In 1847, the Munich master and flutist T.Boehmintroduced to the world a completely new type of instrument model with a cylindrical body structure and a parabolic head. Changing the old conical shape of the instrument to a cylindrical one significantly improved its sound-dynamic and intonation capabilities. If we characterize the constructions of flutes before T.Boehm's reform, they had numerous imperfections, among which the most vulnerable were unsatisfactory intonation and primitive mechanics. According to the German researcher M. H. Schmidt: "Before T. Boehm, the flute, like all other wind instruments, remained a diatonic instrument,… and was focused on a certain tone" [1]. Consequently, the old models of multi-keys flutes were without strengthening lower register, the most noticeable intonation defects of the instrument were manifested during the performance with piano accompaniment. Therefore, T. Boehmfocusedthe main attention in improving the

design of the instrument on perfecting its intonation qualities and achieving homogeneity of sound of all registers. The master saw the solution of the existing problems in the formation of the acoustic system of the instrument on the basis of steady musical tuning system [2].

One of the main achievements of the master was the creation of an optimized system of the key mechanism, which helped to increase the technical capabilities of the instrument [2]. T. Boehmreplaced the conical bore with a cylindrical one, as the optimal form of flute construction, improved the quality and clarity of sound, and expanded the diapason of the instrument to more than three full octaves. He arranged the sound holes in exact accordance with the acoustic calculations and significantly expanded their diameter compared to the old models. The use of plate-like keys-covers and innovative mechanics in order to determine the size and placement of the tone-holesallowed to achieve equality of sound and the ability to more easily perform various types of passages, trills, tremolo. It was easy to play large intervals in an octave. A simple and convenient system of keys mechanics allows to control the closing and opening of several holes simultaneously. Boehmfocused all his efforts not only on improving the intonation of the instrument as well asameliorating its sound-dynamic characteristics, but also on creating a convenient keys mechanics that would allow the performer to develop virtuoso technique. In the process of working on the new design, T. Boehmtested numerous materials for the production of flutes, using various types of wood, alloys of silver, gold, nickel, and others. [3]. For many years he worked hard, experimenting with different designs, testing acoustic calculations in search of a better sounding instrument. Owing personal solo and orchestral performance experience he was able to makeconstantly some adjustments to the design in order to improve the technical capabilities of the flute.

To make profound mechanical and acoustic transformations of the instrument, Theobald Boehmconstantly deepens his knowledge in the field of fundamental acoustics. It is worth noting that in 1846-1847 he studied acoustics with the professor of physics Karl Emil von Schafhautl (1803-1890) in Munich, after what he affirmed that the scientific principles were at the core of his new model of the flute in 1847 [1]. In 1871 theoretical and practical results of his research T.Boehmpublished in the manual "Flute and flute playing" (Die Flöte und das Flötenspiel), which outlined the whole process of improving the instrument and revealed the main methodological aspects of playing it [4].

To this day, the novelty of the mechanical and acoustic system of the Boehm'sinstrument created in 1847 remains unsurpassed. It was he who found fundamentally new ways to improve the instrument, which all flutists use now. He gave a modern look to the transverse flute, also he created a comfortable and easy-to-perform model, which, thanks to its excellent sound-dynamic and technical capabilities, significantly surpassed the old designs. Now the flute could be easily used to play in all tones, its sound became much clearer and more voluminous. Also, a new fingering system and improved acoustic parameters of the instrument led to better intonation and enriched the timbre of the flute. The final discovery of the master was the creation of a silver flute, which in the era of wooden instruments was perceived ambiguously and could not receive general recognition.

The result of the reform of T.Boehmsignificantly and cardinally affected the change of timbre and sound dynamics of the flute. This, in turn, was the reason that the flutists of that time were unprepared to accept the novelty of the sound capabilities of the instrument. According to V.Kachmarchyk, performers who were brought up in the acoustic environment of multi-keys wooden instruments were unable for a short time to reorient to a completely different sound of silver structures. It also took time to master the new fingering system and to get used to the dynamic diversity. All this became the main reasons for the ambiguous attitude to the reform of Boehm[2].

Given the fact that in Germany Boehm's flute was perceived quite critically and cautiously, and its introduction into performing practice was slow, flutists often remained adherents of the old models and had no desire or motivation to master the modern instrument, which differed in timbre in the orchestra, as its sound was much more powerful, which was not always perceived positively. It is also worth noting that the high price of Boehm's flutes, as well as the confusion caused by the large number of competing instrument systems, often hindered its popularization among performers in the late nineteenth century. As a result, Boehm's flutes did not receive adequate support from flutists [6], which significantly affected the process of spreading of the new instrument design among professional performers and among student youth of music schools.

Boehm's reform provoked mixed reactions from the flute community and did not immediately gain recognition. Nevertheless, many professional musicians in England, Italy and France quickly adopted Boehm's flute. However, for many years this instrument did not receive adequate support among compatriots in his native Germany.

III. PERCEPTION OF BÖHM'S FLUTE BY PERFORMERS

Despite the active interest in Boehm's metal flute in Europe, in Germany orchestral soloists and students don't hurry to master the new model. The German flutists of the time, who played flutes of old designs, usually turned out to be famous performers and influential musicians so they created a negative atmosphere

around the inventor's instrument. Among them is the Dresden flutist-virtuoso and composer, a prominent representative of the German romantic school – Anton Bernhard Furstenau. He remained an adherent of the old multi-keys flute, which helped him gain the fame of an unsurpassed artist. The high level of performing art and pedagogical talent allowed Furstenau to gain a reputation as one of the most authoritative teachers in Germany. Despite the significant advantages of the Boehm's flute, A. Furstenau did not see the need to use a new model. It was him who rejected his fellow flutists from Boehm's flute, creating a negative reputation for Boehmin German music circles. Furstenau's disappointing verdict on the new instrument, even after the musician's death, was used for many years by many German flutists as an argument against it. Among the opponents of Boehmwere such well-known performers and representatives of German schools as Wilhelm Barge,Maximilian Schwedler, brothers Karl and Franz Doppler, Heinrich Heinemeyer and other performers [2].

Gewandhaus soloist Wilhelm Barge was one of the first flute teachers to be invited to the Leipzig Conservatory. He saw Boehm's new flute as a kind of simplified instrument design for performers with mediocre musical abilities who failed to achieve the required level of skill on the old model. Its main shortcomings, he and his colleague from Dresden Anton Bernhard Furstenau, saw in the lack of "softness and transparency of timbre" and limited ability to correct intonation defects [6].

Another opponent of Boehm's flute among Leipzig flutists was Maximilian Schwedler, Gewandhaus soloist, teacher at the Leipzig Conservatory. He remained one of the last members of the German flute school refusing to accept the new instrument model. Like many German flutists, he did not believe that a "true artist" could make a strong impression on a spectator by playing anything other than a conical wooden flute with its more flexible sound [7]. Schwedler was not only an authoritative flutist, but also a musician. From 1885, he began making instruments himself. He had his own ideas for ways to improve the old model. Like many German musicians of the time, Schwedler highly valued the history and traditions of music that he had inherited from his predecessors, so he tried to preserve the traditional sound of the instrument, which contradicted the sound of the Boehm's flute.

M.Schwedler's main argument in the confrontation with his opponents was the idea of the need to preserve the acoustic characteristics of the old structure on the new instrument, which he considered more acceptable in orchestral and solo performance. He did not like the sound of Boehm's flute against the background of the orchestra, and he was convinced that the timbre of the flute should be more saturated, and the sound of the instrument should merge with the sound of a brass band. Schwedler believed that the fingering system of the old model should be preserved as much as possible [7]. It is worth noting that the negative attitude of the Gewandhaus soloist to Boehm's flute was the reason why it was not used in the orchestra for a long time. However, with the entry of a new generation of performers who mastered Boehm's flute, Schwedler did not receive the necessary support from the orchestra and the administration of the orchestra. All this forced him to leave the famous orchestra after a while he focused on teaching at the Leipzig Conservatory [2].

Conservative musicians believed that Boehm's instrument caused the loss of a specific flute timbre, so many German performers did not see it as one of their priorities.

However, among the young performers we find adherents of the Boehm's flute, who considered it more perfect than the old designs. Among the artists who supported the instrument of his compatriot was the soloist of Gevandhaus, Carl Bartuzat, who replaced Schwedler. He has a decisive role in the introduction of the Boehm's flute in orchestral practice. From 1915, Bartuzat's name appeared in the headlines of German newspapers because he strongly and openly supported the spread of Boehm's flute, despite fierce resistance. Of course, all this deeply outraged Schwedler and other opponents, which led to conflicts with Bartuzat [2]. However, thanks to the persistent work of K. Bartuzat, Boehm's instrument increasingly won the favor of local flutists with progressive views.

Among the famous German flutists who unquestioningly supported Boehm's flutes model was E. Prill. Thanks to his active actions and his own example, the improved instrument was increasingly heard in Germany. E. Prill, who worked for some time in Russia and Ukraine, had no doubts about the choice of Boehm's design. His "School for the Boehm's Flute" (Schule fur die Flote. Op. 7) was the result of many years of performing and teaching experience. The musician did not limit himself to creating traditional teaching aids and collections of etudes, as well as published "Orchestral Difficulties", which became a new type of instructional and artistic material designed to train a professional flute musician using the T. Boehm's flute [8].

Of course, Boehm's students also actively supported the teacher and comprehensively promoted the new instrument. According to the master, he had at least a hundred students, including well-known and leading soloists of orchestras of the late 19th - early 20th centuries.

Considering the perception of Boehm's flute among composers, one of those who criticized and even negatively perceived the new construction was R.Wagner. It is known that the composer maintained friendly relations with Anton Bernhard Furstenau, who to some extent influenced Wagner's perception of the improved model. Some historical facts related to the creative work of the German composer indicate an adverse effect on the spread of the Boehm's flute in Germany and in the work of Richard Wagner. In this sense, the episode with

Boehm's pupil, the founder of the Munich flute school Rudolf Tillmetz, who played in the orchestra on Boehm's flute, is often mentioned. Taking part in the premiere of the opera "Parsifal" (1882), the flutist was criticized by R. Wagner for using the instrument of Boehm. The composer did not want the flute to "sound like a cannon" in his work, and demanded the use of a less loud instrument. As R. Tillmetz later wrote in the preface to his textbook on the flute (1890), after much experimentation and reflection, he cameto theconclusion that Wagner was still right [9].

In contrast to Wagner, Boehm's instrument enjoyed considerable support by the eminent French composer G. Berlioz. He was an adherent of Boehm's reform in the early stages of its implementation. The composer quite clearly pointed out the advantages of improved construction in his fundamental theoretical work "Treatise on Instrumentation and Orchestration" (Grand traité d'instrumentation et d'orchestration modernes) (1843) [10]. There he notes: "The flute, which for so many years has been such an imperfect instrument in many respects, has reached such perfection and uniformity with the Boehmrevolution and the influence of the Swiss Master J. Gordon that further improvement cannot be desirable. We owe Theobald Boehm's skill and talent in this fact… With the advent of the flute made by Boehm, trills became possible even on fairly high notes on the scale ... " [10]. Berlioz was convinced that Boehm's flute would replace the old models in a few years. Other prominent composers also supported the active position on the introduction of T.Boehm's flute into orchestral practice. Among them is J. Brahms (1833-1897), who, unlike R. Wagner, remained a fervent supporter of the new construction. This is evidenced by a little-known episode from the composer's creative biography, who noted after the premiere of the Fourth Symphony: "… After the concert I was very pleased not only with the excellent performance, but also with the especially rich, beautiful and powerful timbre of the flute! If your invention has helped you in this, then you should be proud of it and highly recommend it" [7].

The adoption of the Boehm's flute in the musical environment of European capitals was the impetus for the development of flute performance and creativity. Composers began to explore new possibilities of the instrument, to experiment with timbres and more sophisticated means of artistic expression. It becomes clear that the new instrument had great prospects and provided great opportunities – both for composers and performers. As a result of all the improvements, the flute gradually gained recognition in his native Germany. Carl Reinecke, Theodor Blumer, Paul Hindemith, Max Reger impressed by the completely different sound of the instrument, understanding itspotential in revealing the sound-dynamic and technical possibilities, are inspired to create music using its reserves. Leipzig composer Sigfrid Karg-Elert became one of the active successors of T.Boehm's ideas in the search for more perfect sound-expressing and sound-dynamic possibilities of the flute [11].

IV. CONCLUSION

An analysis of Theobald Boehm's reform shows that his revolutionary achievements in acoustics and mechanics have significantly improved the sound, dynamic and technical capabilities of the instrument. Despite the opposition of German flutists, his new model in the second half of the 20th century began to be actively used in both solo and orchestral practice. Undoubtedly, Boehm's new flute was the impetus for more active creative activity of composers, who revived interest in the improved model and they increasingly began to create new opuses, enriching the solo and ensemble repertoire of the instrument.

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