

THE DEVELOPMENT OF STEREOPHONIC SOUND IN SLOVAKIA

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The development of stereophonic sound in Slovakia in the late sixties had a profound impact on the quality of recorded music in all areas of artificial and non-artificial music and it also played an important role in composing music for radio plays. However, the Czechoslovak Radio in Bratislava was at that time the only technically equipped institute in Slovakia where a stereophonic record could be created. Therefore our research studies have particularly been concerned with examining the archives of this institution as well as the valuable information on implementation of the recordings we have collected through interviews with the former staff of the broadcasting organization. Our research focuses for the first time on the period of the beginnings of stereophonic sound in Slovakia, hence the purpose of this article is to summarize the research results.

Key words: stereophonic sound, broadcasting

1 INTRODUCTION

The fundamentals of stereophonic sound as we know it today were laid down by two prominent world scientists, Dr. Harvey C. Fletcher of Bell Telephone Laboratories and Alan D. Blumlein, working then for EMI, Ltd.. Both worked on stereo research simultaneously for almost 30 years at the beginning of the twentieth century [1]. Initially, however, stereo was not accepted, especially by major publishers. Bruce Swedien in his book *Make Mine Music* even mentions an utterance of an important representative of a big publishing house “Stereo is like taking a shower with two shower heads — and you would not take a shower with two shower heads, would you?” [2]. From a historical perspective the way to stereo was not only difficult in the U.S. Central and Eastern European countries worked strenuously to foster the interest in stereo, mainly through passionate people who wanted to improve the quality of audio recording and its reproduction. The first attempts to create a stereo recording in Slovakia were made in the studios of the Czechoslovak Radio in Bratislava. The attempts can be divided into three phases according to the departments in which they were carried out. The first successful attempt to create a stereo recording was made by the Experimental Studio, followed by the Classical Music Editorial Department and lastly the Fun Music Editorial Department. Exploring the development of stereo in Slovakia is a less frequent area of study and we have tried to describe and analyze the specific sound recordings for the first time in conjunction with the statements of the people involved in their implementation. The most comprehensive information was provided to us by the music composer, arranger and producer

Paul Zelenay as well as the sound master Vladimír Marko who were present at the birth of stereo recording in Slovakia. The memories of the sound masters Peter Hubka, Zdeno Halamík, Peter Janík as well as the Head of the Czechoslovak Radio Sound Archive Miroslava Čaputová also made a valuable contribution to create a coherent image, for which we are extremely grateful to them. The Experimental Studio made a first attempt to create a stereo recording at the end of the year 1966 when the sound master Ing. Peter Janík produced a stereo version of an autonomous electroacoustic Jozef Malovec’s composition entitled *Orthogenesis* [3]. Since this piece was created and recorded in mono format, it consisted of reworking the original sound recording. The Experimental Studio did not as yet have a professional studio equipment capable of processing a stereo signal, so the recording was created by synchronizing four strips from mono tape recorders with the addition of reverb, while each mono track was located at a constant stereo base point and the resulting signal was recorded on a commercial tape recorder Philips RK 56. The audio recording made in this way was only a so-called pseudostereo. A real stereo version of *Orthogenesis* was made on 13th March 1967 by Ing. Peter Janík using a multi-track tape recorder Studer C 37 and a stereo mixing desk Tesla SRK. It was carried out at the Radio and Television Research Institute in Prague, with which the Czechoslovak Radio cooperated intensively [4]. At that time the Experimental Studio also had a four-track recorder Studer J 37 and a new multi-track mixing console Tesla ESR/S 186 thanks to which a quadraphonic version of *Orthogenesis* could be accomplished (premiere in 1968 in Florence) [5].

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Fig. 1. On the left – AB stereo microphone technique with 30° to 40° sideways-facing, on the right – AB and XY technique combination

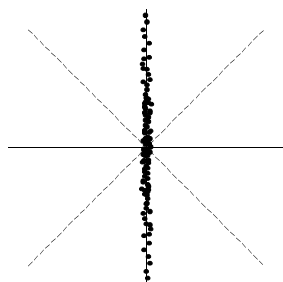


Fig. 2. Oscilloscope particles come together only around the central axis, it is a mono signal

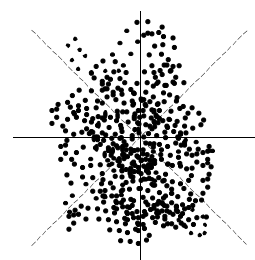


Fig. 3. Oscilloscope particle dispersion confirms the distribution of sound in the stereo panorama

2 CLASSICAL MUSIC EDITORIAL DEPARTMENT

In the second phase it was the sound masters Vladimír Marko and František Bombík who began to experiment with the stereo recording in the Classical Music Editorial Department at the former Concert Hall of the Czechoslovak Radio in Bratislava. By that time the Department had already had in its possession for several years a double-track tape recorder and a mixing desk capable of processing a stereo signal, though all recordings were made in mono format. The sound masters probably did not have enough information about the stereo recording possibilities and therefore, they did not attempt its implementation. In Vladimír Marko's words the resolution to implement the first stereo recording was made in 1967 [6]. The actual recording was preceded by preparations associated with the correct connection of all the recording equipment (microphones – mixing desk – amplifier – loudspeakers). Emphasis had to be placed mainly on the proper integration of phases. Following the interview with Vladimír Marko and reviewing the Slovak Radio Sound Archive in Bratislava, we believe that the first stereo recordings made in the Classical Music Editorial Department were not preserved, inasmuch as one of the first recordings, according to Vladimír Marko, was a recording of the symphony orchestra, whereas the oldest archived recording is a mixed choir composition entitled *Dve piesne pre miešaný zbor (Zajali mi kone, Hrdá dievčina)* by Ján Valaštan-Dolinský and Milan Lichard. It was Vladimír Slujka and the sound master František Bombík who were editorially involved in this recording interpreted by Žilina Mixed Choir under the baton of Anton Kállay [7].

We failed to contact Mr. Bombík, so we asked the sound master Zdeno Halamík, another former worker of the Classical Music Editorial Department, for more detailed information from the beginnings of choral recording in stereo format. He stated that the choral ensembles in the early stages would record by means of the AB stereo microphone technique, which supplied the recording with the necessary surround sound. The distance between the microphones was 3–4 metres with 30° to 40° sideways-facing, depending on the size of the choir. The XY stereo microphone technique was used only sporadically. It would offer a higher level of mono compatibility, but it did not provide the desired stereo space (Fig. 1). Therefore, if a recording was to be carried out in the way of the XY configuration, it was necessary to set the microphones at an angle of 130° instead of the standard 90° . Later it became common to record choirs using AB and XY technique combination, which contributed to adequate spaciousness of sound while maintaining an acceptable mono compatibility [8]. After analyzing the recording *Dve piesne pre miešaný zbor (Zajali mi kone, Hrdá dievčina)* we can conclude that the soundtrack does not meet the stereo parameters and it seems almost like a perfect mono, as confirmed by the Oscilloscope Phase Shift Measurement (Fig. 2).

There may be various reasons why the recording is archived under the name of stereo. We suppose, however, that the tape roll is likely to have been labelled wrongly. In the period of stereo recording, a red-and-white striped leading band would be placed at the start of a soundtrack to distinguish stereo recordings from mono ones. The mono recordings were labelled with green leading stripes and in Miroslava Čaputová's words (the Head of the Czechoslovak Radio Sound Archive) it was common-

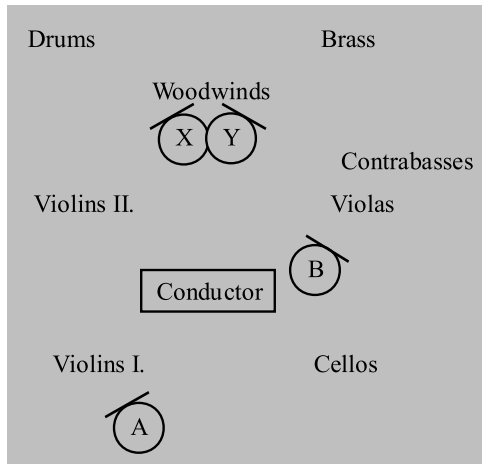


Fig. 4. Microphone placement at the symphony orchestra stereo recording. The location of the AB technique is not standard because it does not correspond with the axis of the XY technique

place that the leading stripes were damaged by handling and were replaced by the other type in some cases. It could thus lead to erroneous inclusion of the aforementioned recording in the stereo category. We have therefore decided to analyze the second oldest Sound Archive stereo recording, also a work for mixed choir by František Pražil — *Čože ma je po ňom . . .*. The recording was completed on 11th December 1967 under the duo's baton of Brožová – Marko. The editorial work was done by Etela Čárska and František Bombík was the audio master [9]. The analysis confirmed that the recording is actually in stereo format (Fig. 3) and that the AB stereo microphone technology was used in its implementation, since the effect of empty centre can be markedly heard.

According to Vladimír Marko, the concept of symphony orchestra stereo recording does not vary significantly from the recording in mono format. Even in mono shooting the orchestra was recorded from three points. Condenser microphones with cardioid polar pattern from different manufacturers (Neumann, AKG, Shure) were used for this purpose. The first microphone was located to the left of the conductor and was directed to the first violin. The second microphone was placed between the viola and cello section and it was swivelled to double basses. The third microphone, placed in front of the woodwind section, served only to give a fine shading to the section as it was sufficiently scanned already by the first and second microphone. For stereo recording only one change was carried out, *ie* replacement of the third microphone by the XY stereo technique. Working with the first two microphones was similar to working with the AB technique, though the difference was that the individual microphone signals were placed to the edge of the panorama. All four microphones were placed at a height from 2.5 to 3 metres above the orchestra [10] (Fig. 4).

2 FUN MUSIC EDITORIAL DEPARTMENT

The Fun Music Editorial Department of the Czechoslovak Radio in Bratislava also had the ambition to create a recording by the new stereo technique. The project was promoted mainly by Pavol Zelenay, the Fun Music Editorial Department's manager at that time, on the grounds that it was necessary to start making stereo recordings before the radio broadcast with stereophonic sound. In 1968, when the first pop music recording was made, the Fun Music Editorial Department was not even technically suited to stereo recording. A comprehensive reconstruction into a stereo department was performed about 1975. The only option was therefore to use the studio in the government building. Despite the enormous workload of the studio, which served not only for recording purposes but also for ensemble rehearsals, the recording was produced on 10th January 1968. It was an instrumental song entitled *Starý známy* by Ivan Horváth, recorded by the Czechoslovak Radio Dance Orchestra in Bratislava under the baton of Miroslav Brož, assisted by the author of the song. The production crew consisted of the music director Leoš Komárek, sound master Vladimír Marko and the technician Zdeno Halamík. Pop music was still recorded in mono format, and occasionally in stereo format if the studio in the government building was available. The stereo recording was quite often used by the composer Alois Bouda. In addition to the studio inside the government building, the Czechoslovak Radio Studio in Brno could also be used to create stereo recording. In the latter studio the Fun Music Department editors would arrange recording compositions with the Gustáv Brom Orchestra. These primarily represented a renewal of old songs which already existed in mono format. Another reason to carry out the recordings in Brno was that the Gustáv Brom Orchestra did not have to undergo long-distance transport. The first brass band files in stereo format were recorded in March 1969 and the recording of a series of orchestral compositions in stereo format entitled *Snívajte s nami* was completed on 8th May 1969. The recording was released on vinyl LP records by OPUS publishing house. Representatives of the Slovak jazz scene also exercised the option of stereo recording and the first jazz recordings with Mária Hajnalová (Kendrovská) singing, accompanied by Ján Hajnal Trio arose in June 1969. Stereo recording was not avoided by the big-beat scene either; the first stereo recordings with Prúdy music band and singer Pavol Hammel were created in September 1969. The recording of a series of Gejza Dusík operetta melodies entitled *Elena Kittnárová & Andrej Kucharský spievajú operetné melódie Gejzu Dusíka* was completed in April 1971. The recording was petitioned by the Fun Music Editorial Department's manager Pavol Zelenay who asked the composer Jiří Hudec to rearrange Dusík's songs to more modern arrangements and to conduct the Chamber Orchestra, which was about to record this series of operetta melodies. The record was released by OPUS on vinyl LP records. Cooperation between the Czechoslovak Radio and OPUS

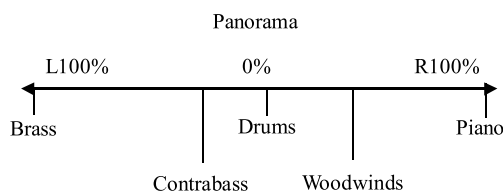


Fig. 5. Graphical representation of musical instruments panorama distribution

publishing house as the first publisher in Slovakia continued in subsequent years too, since the only technical equipment to create stereo recordings was located in the government building. However, the Czechoslovak Radio Sound Archive also cooperated with other publishers, such as Supraphon and Panton, from which it took over the recordings to extend its archive. Stereo recordings were still in the minority at that time. The turning point came in 1974 when the recordings were exclusively made in stereo format and mono format recordings were rather an exception [11].

3 "STARÝ ZNÁMY" RECORDING IMPLEMENTATION

In 1968 the recording studio in the government building underwent a major refurbishment, being adapted to work in stereo format. A stereo tape recorder Studer and a mixing desk Tesla SRK were installed in the management section. The Czechoslovak Radio Dance Orchestra in Bratislava recorded the composition *Starý známy* in the arrangement [12] as follows: woodwind instruments section (alto flute, alto saxophone), brass section (two horns, four trumpets, three trombones and one bass trombone), rhythm section (piano, double bass, percussion instruments). In the words of Pavol Zelenay, the orchestra did not have permanent players in the brass section, hence external players were invited for the recording. Zdeno Halamík mentions that the entire production staff approached the challenge of realizing the first pop music stereo recording with interest as well as respect to something new. The orchestral body was recorded simultaneously without the use of overdub techniques. The placement of microphones was therefore an important step towards achieving a fully balanced stereo recording without undesirable phase overlaps. The sound crew had several types of microphones at their disposal from world-renowned manufacturers such as AKG, Neumann, RCA and Shure. Each of the brass sections of the orchestra was captured on one microphone, whereas the guitar, piano and double bass were captured by separate microphones. The percussion instruments were recorded using three microphones, the first microphone panned the hi-hat cymbal, the second one recorded the big drum and third one was used for the kettledrum. The absence of the use of stereo microphone techniques heralded that a true stereo sound recording ultimately could not be created,

but rather a mixing of several mono tracks appropriately distributed in the panorama. The development of mixing consoles even in the phase of the first stereo recordings in Slovakia created an artificial panorama from a single mono track by means of cardioids which reduced the volume on the requested channel so as to put the sound in different panorama positions. This method of creating stereo is relevant and is often used nowadays. The recording *Starý známy* [13] is probably the very first musical recording where the aforementioned principle was used. Inasmuch as accurate data on the distribution of individual instruments and sections in the panorama was not preserved, we tried to roughly identify the instruments by way of an audio analysis. The percussion sound comes to the listener only from the panorama centre (position 0%), although multiple microphones were simultaneously used to record it. The production team started out from their knowledge of classical mono recording, in which a larger number of microphones would be used. Evidently, the individually scanned percussion sets could not be spread in the panorama because the rhythmic component of the music would be fragmented. Hence, a solution would be to capture the drums by the AB or XY stereo technique, which would maintain the integrity of the sound. The piano sound comes only from the right channel (P100%) with mild crosstalk from the other microphones scanning the instruments. The bass sound is the only rhythm section that is distributed in the panorama and comes mostly from the left channel in the approximate position of L20% to L25%. The woodwind instrument section shows the position of predominantly the right side of the channel in the approximate position P30%, while the brass sound section comes exclusively from the left channel (position L100%) (Fig. 5).

The distribution of musical instruments in the recording is not an accidental phenomenon and the production team sound masters were in its creation inspired by already existing recordings from abroad. In the 60's and 70's it was quite common in the rest of the world that the instruments were positioned in the panorama in a radical way, so that they were present in only one channel. However, if any recording were made in a radical placement of instruments, we could not talk about pure stereophonic sound. For example, if the percussion instruments sound came only from the left channel and the double bass sound only from the right one, we could then talk about a perfect mono recording. The concept of stereophonic sound leads from the double-microphone scanning technique and is defined by the ratio of presence in the left and right channels. The signal coming from the 0% position can also be described as mono. In the recording *Starý známy* the three sound sources are placed in positions of mono, hence only the position of the double bass and woodwind instruments section makes it a real stereophonic sound recording.

4 CONCLUSION

After examining the development in Slovakia we reached the conclusion that the basic stereo microphone techniques AB and XY were of crucial importance in the origins of the first stereo recordings. Pavol Zelenay mentions that the first interest in the sound direction came primarily from sound masters whose requirements, though, were not always met in terms of educational materials or technical equipment. Peter Hubka, who worked in the Fun Music Editorial Department as a sound master, states that in consequence of the political détente some sound masters were allowed to travel to the Federal Republic of Germany in 1969, where they could attend the prestigious sound masters' association Tonmeistertagung [14]. The beginnings of the use of stereo techniques can be taken largely as an experiment just because of the lack of relevant information. The development of stereophonics in Slovakia was closely associated with the development of the Czechoslovak Radio Experimental Studio in Bratislava. As one of the most prestigious studios in Europe it was quite capable of responding rapidly to new global trends, whether in terms of technical innovation, or in the area of innovative approaches to creating an audio recording. Although the time lag from implementation of the first stereo recording by A.C. Keller and Malovcová's stereo version of *Orthogenesis* accounts for over 30 years, we can be proud of the fact that the Czechoslovak Radio had workers who wanted to keep abreast of the development in the world despite a bleak period, in which they operated. Experimenting with stereophonic sound, however, had undoubtedly a positive impact on the development of stereo in Slovakia. The sound masters, thanks to their enormous efforts to achieve the best possible outcome, formed kind their own original style of sound image. This is seen not only in music records but also in radio plays. The latter, however, became the domain of the Czechoslovak Radio for a long time. The sound development was performed especially by Peter Janík and Vladimír Marko. Successful solutions in stereo were subsequently presented at many scientific research seminars and workshops (eg Nationwide Workshop on Stereophonics in Plze on 26th–28th October 1981; Methodical Research Seminar of the Czechoslovak Radio Board in Bratislava 1975). Stereo was thus in full use even in the implementation of radio plays. The studio in the government building as the only department customized to stereo sound recording served to form the first stereophonic radio play under the baton of Vladimír Rusko entitled *Andromeda a Perseus*. The sound master was Vladimír Marko. This piece of work took three months and was introduced on 6th April 1969. In the same year another stereo modification of the play *Lovecká sezóna* by Vojislav Kuzmanovič came into existence (12th September 1969). It already contained a sophisticated stereo architecture, presenting dynamic stereo for the first time (smooth sound source movement along the panorama)

[15]. Certainly, the research into the issue does not end with the initial analysis of several stereo recordings and it is necessary to pursue an intensive further study. We see the need to examine further recordings, especially the symphony orchestra recordings which were created in the manner as described by Vladimír Marko. Furthermore, we should focus on the creation of radio plays which used the stereo possibilities most. As for all areas based on tradition, it is also true for stereo that it is important to know its genesis and principles for its further successful development and quality.

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