Chapter 7
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Study Highlights about the Converter System on the Contemporary Accordion Performance in the Second Half of the XX Century

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ABSTRACT

The article pretends to research the evolution path of a singular musical instrument, its fundamental history aspects and social impact in the society. Throughout the body of the article, some references are included to the main brands, composers and pedagogues, as well as to the basic techniques that involve the mechanism in the performance.In the second half of the XX century the accordion experienced significant changes that would change the instrument's destiny, its practice, sound range and potential. One of these changes was the creation of a converter system that opened doors to performance on this instrument, such as: hands independence, polyphony realization, new compositions, technical and artistic development of the performers skills. Just like the Boehm system for the flute invented by Theobald Boehm between 1831 and 1847, Vittorio Mancini invented in 1959 a system for the left hand mechanism that led to the appearance of the accordion in large concert halls, in large auditoriums with orchestra, in chamber music and in the syllabus of higher schools and universities. This article seeks to study the impact of the converter system on the evolution of an instrument with traditional and popular roots that has been increasingly asserting itself as an instrument with transversal capabilities to interpret any genre of music from popular to contemporary.

Keywords: Accordion; converter system; performance; mechanism; contemporary music.

> *"Since the 1950s the pioneers of classical accordion understood that – in order to be recognized by the contemporary music world – they had to rise awareness on the instrumental unexplored potential, and-at the*

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> *same time- accordion education had to measure up to the expected musical development." Claudio Jacomucci* [1].

1. CONVERTER SYSTEM – INTRODUCTION

Several authors addressed the history of the Accordion. Henriques (2019) introduces the accordion with a portable double-reed aerophone. [2] Monichon (1985) carried out historical studies on the evolution of an instrument rooted in French culture. [3] Sachs (1940) looked into the history of the instrument from the Sheng to the first half of the 20th century. XX. [4] Sadie (e.d.) refers to the accordion as a forerunner of the bellows instruments along with the concertina and the bandoneon, extending its history to the present day.[5] However, the great transformation of the accordion came with the creation of the converter system. The Converter System is a system applied to the bass mechanism, activated through a switch or register that allows the transformation of the previously established keyboard into predefined chords for single notes arranged in the same way as the right-hand keyboard (free bass system). Lindgren (2010) adds *"It would be a good thing if there could be established a standardized fixed relationship between the Stradella bass buttons and chromatic melody bass buttons on a converter bass."* [6]

This system allows the instrumentalist to perform several voices simultaneously, for example: Chorals, Preludes and Fugues, Suites, Sonatas and came to establish a new path to follow in the accordion performance, which is still in constant evolution today.

According to Hermosa (2013), the converter system was invented in 1959 by Vittorio Mancini in Castelfidardo (Italy) as a mechanism (Fig. 1) activated by a switch next to the left-hand keyboard, which allows to convert existing buttons, alternating between predefined chords and free bass. [7], Doktorski (1998) comments about the transformation, in Soviet Union, of a popular instrument that extended its roots to the classical music with great success and respect. [8] Lips (2018) appoints this new instrument called "Bayan" as a major instrument that allows to make great transcriptions and arrangements of classical and erudite music. [9] Lindgren (2010) clarifies that the tab redirects the air flow inside the harmonic box, through sliding plates located under the reed blocks.

According to Sérgio Alexandre, about the mechanism construction, the converter accordion can produce standard bass or free bass. [10] Standard bass allow the harmonization of a melody and consist of bass notes in two or three rows of buttons and predefined chords in the remaining four rows, which can be major, minor, dominant seventh and diminished seventh chords. However, it is also possible to create chords by pressing two buttons at the same time, that is, to create an A minor 6 chord, just join the button that produces C major with the button that produces A minor. The end result will be a C, E, G, A, C, E chord.

By pressing the switch on the converter, the four chords rows are transformed into a chromatic scale. In these four rows, the last one corresponds to an auxiliary row that repeats the arrangement of notes of the first row. As Lindgren (2010) points out, the layout of the free bass on the left-hand keyboard becomes a mirror of the layout of the right-hand keyboard (C-griff system).

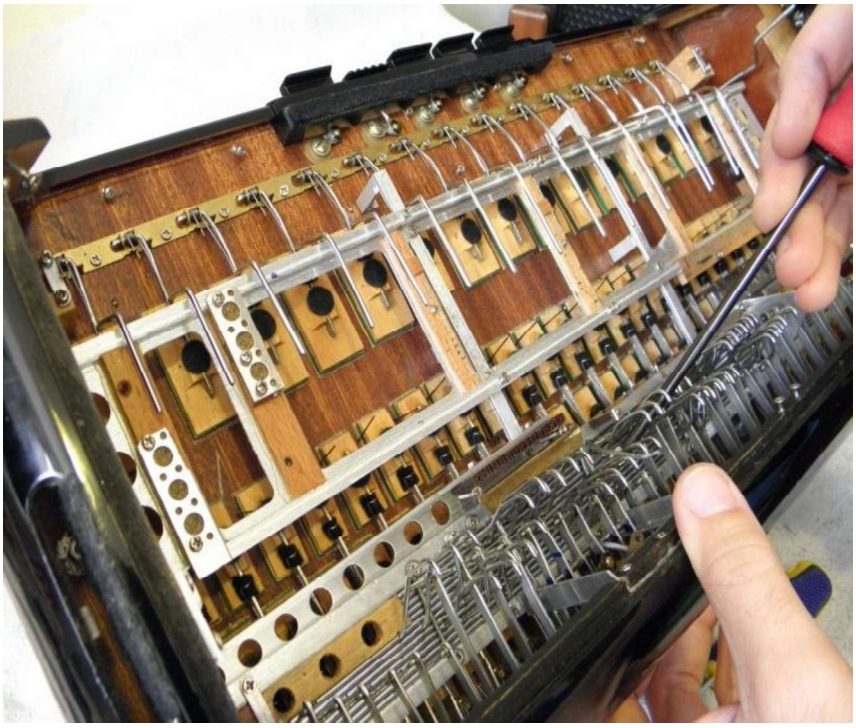


Fig. 1. Converter system mechanism

The arrangement of notes on the keyboards shown in Fig. 2 corresponds to the system that is more used in Europe (C system - griff), in which the low notes on the left-hand keyboard are on the upper buttons and the middle C on the right hand keyboard is in the 1st row. On the contrary, in Eastern Countries the system B - griff was generalized, in which the low notes on the left-hand keyboard are located in the lower buttons and the middle C on the right-hand keyboard is located in the 3rd row.

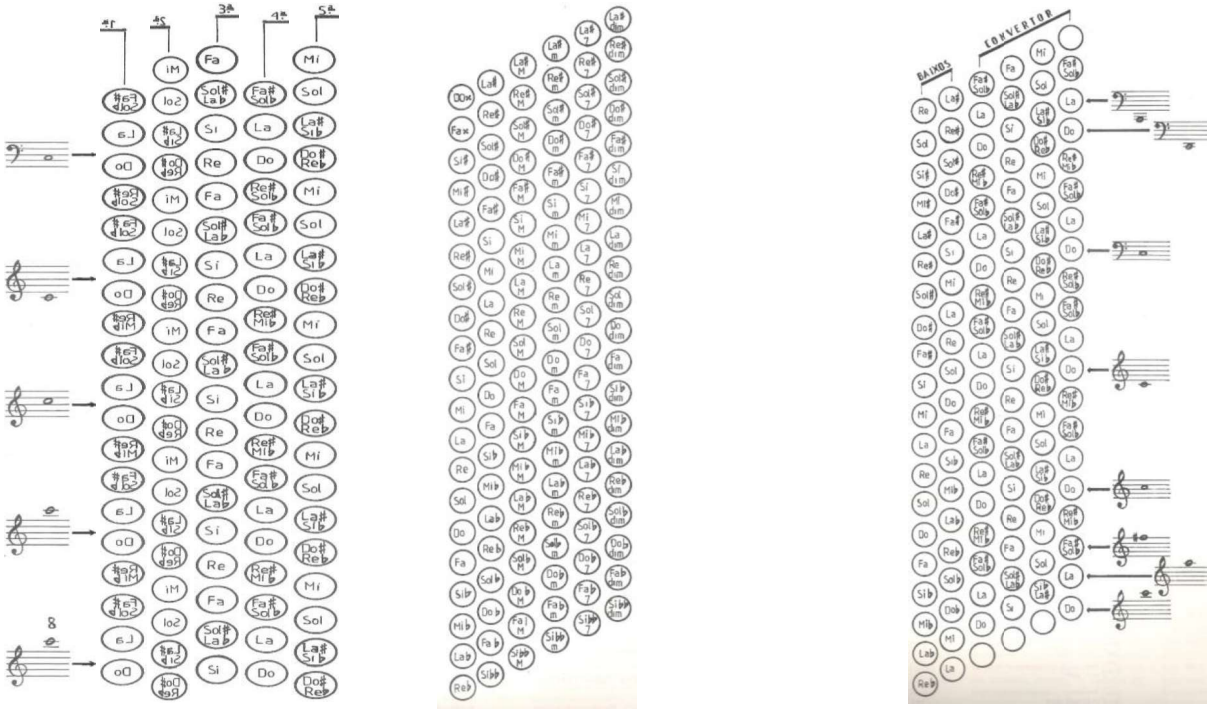


Fig. 2. Right-hand keyboard; left-hand keyboard with standard basses and free basses (converter system) C – griff system

2. THE CONVERTER SYSTEM POSSIBILITIES IN THE PERFORMANCE

One of the main converter system possibilities in the performance it is the independence of hands. For example, the melody that is produced on the right-hand keyboard is now also possible on the left-hand keyboard, even by choosing the appropriate octave in the performance. Harmony is built and produced note by note. There is also the possibility of performing polyphony (multiple voices). The combination of the four rows of free bass with the other two rows of basses (left-hand keyboard) allows to achieve wide sound ranges and also to combine very high sounds with very low sounds at the same time, which is a unique characteristic of the accordion with converter system. Through the use of registers and articulation, it becomes possible to highlight a melody performed on any keyboard. In this sense, the repertoire may include works such as: Preludes and Fugues from the Well-Tempered Clavier books by Johann Sebastian Bach or the Preludes and Fugues by Dmitri Shostakovich, Sonatas by Domenico Scarlatti, pieces adapted from the organistic repertoire and harpsichord (Jean Philippe Rameau, François Couperin, Dietrich Buxtheude, César Franck, among others, to the original works composed for the instrument. The player, when choosing the registers to use in the piece interpretation plays a certain role of orchestrator. The right registers choose is even more relevant in the execution of works transcribed for the accordion.

According to Lips (2000), in this matter there is an approximation with the work of registers selection similar to the organ players [11]. According to Dmitriev (2001), fingering is one of the most important aspects to be taken into account by the performer, as it allows better understanding of the text and comfort in the execution (Fig. 3). [12] For the instrumentalist, it is necessary to start working very early on fingers 4 and 5, which physically correspond to fingers that are weaker in terms of pressure in the keyboard. The logical and natural execution order should be fingering with fingers 2, 3, 4, 5 or vice versa, avoiding rotations in the hand position and allowing better comfort in execution. The reduced distance between buttons on keyboards allows two or more buttons to be pressed simultaneously with the same finger (ex. chord with six or more notes).

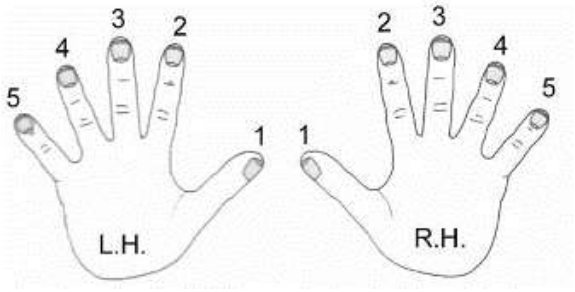


Fig. 3. Digital matching for accordion fingering

According to Dmitriev (2001), in the accordion with converter system, the auxiliary rows, composed of two rows in the right keyboard-hand and one row in the left keyboard-hand, allows several execution options. It is not desirable to repeat the same finger on different notes, however, in a texture with several voices, sometimes the thumb takes on this function. Accordinfg to Lips (2004), the opening part of Sonata No. 1 by composer Anatoly Kusyakov (b. 1945) is an example of this (Fig. 4) [13].

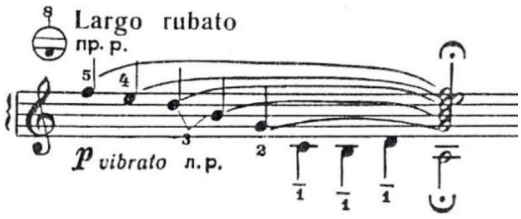


Fig. 4. Anatoli Kusyakov, first sonata (using the thumb)

However, Farmen (2009) underlines the importance to include the thumb in fingering with the same relevance as the other fingers through a new system with the first row in the left keyboard lowered [14].

3. THE POSSIBILITIES OF THE CONVERTING SYSTEM IN INTERPRETATION

In the accordion with the converter system, articulation is extremely important, as it allows, for example, highlighting the main melody, a certain phrase or notes or creating a certain environment for preparing the following material. The most regular articulations are: legato, staccato and tenuto. However, within these three articulations there is a great diversity of other articulations, for example: legatíssimo, pizzicato and detaché.

In the work *Fantasia 84* by composer Jürgen Ganzer (b. 1950) it is possible, through the combination of registers and tenuto articulation in both hands, to highlight the main melody performed in legato (Fig. 5).

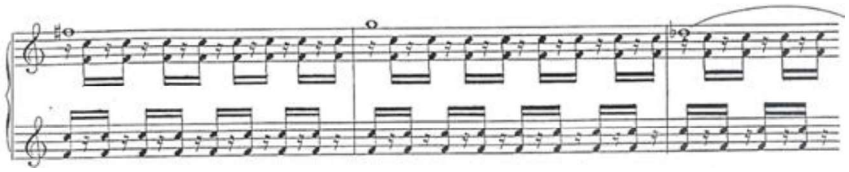


Fig. 5. Jürgen Ganzer, Fantasia 84 (highlighting melody through articulation)

In the Well-Tempered Clavier Fugas by J. S. Bach (1685-1750) the importance of the articulation used in the theme, counter-theme, response or episode becomes evident. Also, with the long extension of left-hand keyboard, this kind of pieces are very usefull exercises for the accordion performance.

Regarding the use of dynamics, for Lips (2000), the dynamics obtained in the accordion with converter system is directly associated with the pressure on the bellows. Controlling this pressure (left arm) allows for sounds from *ppp* to *fff.* By the action of the bellows and the registers options, it is also possible to create different musical atmospheres, especially increasing and decreasing the sound, playing sforzandos, researching new sonorities, among others.. Due to the limitation of the bellows extension (to open / to close), it is necessary to understand the musical phrase in order to avoid an undesirable turning movement of the bellows in the middle of the phrase. For Leeuw (2001), one of the important factors in the musical performance of the accordion with converter system has to do with the balance between the instrumentalist's breathing and the turning of the bellows, both opening and closing [15].

The accent movement can occur through the sudden movement of the bellows, the action of the body or the impulse of the hand or leg. To play poliphony with converter system accordion it allows to make the accent with one hand while the other performs a different text. It is important for the interpreter to choose the most effective technique to perform the accents.

4. THE POSSIBILITIES OF THE CONVERTER SYSTEM IN THE CONTEMPORARY COMPOSITIONS

After an understanding of the mechanisms and aspects related to the performance in the converter system, this section discusses some techniques and way of writing those techniques in contemporary composition. The cluster, as a sound cluster, is widely used in contemporary music (Fig. 6). On the button keyboard it is possible to perform this effect covering a large number of notes due to the keyboard layout. Cluster can be played on both accordion keyboards. The way to execute a cluster can be with the closed hand (restricted group of notes) or with the open hand (wider number of notes). Generally, the range and the interval between the notes in which the cluster must be executed is appointed in the score.

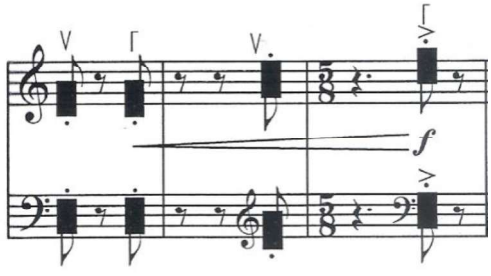


Fig. 6. Sofia Gubaidulina, Sonata Et expecto (cluster execution)

Glissando is a technique widely used in contemporary writing for accordion (Fig. 7). In the accordion with a button keyboard, taking into account the arrangement of notes, the glissando is performed in minor third intervals. However, other types of glissando may appear: chromatic (sliding fingers 2, 3 and 4 simultaneously on the three rows of buttons), in chords (sliding two or more fingers in the same interval), in cluster (sliding the wrist or hand), percussed (sliding the nails only through the buttons). The glissando can be performed ascending or descending and on both keyboards, although on the left side keyboard, due to the hand position, it is not comfortable to perform this effect (Lips, 2000).

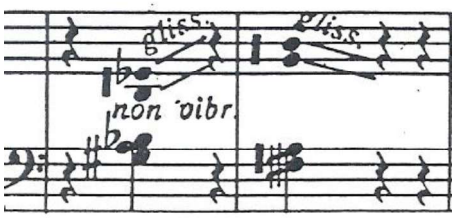


Fig. 7. Sofia Gubaidulina, de profundis (execution of glissandi in clusters)

According to Lips (2000), all techniques related to the bellows derive from the basic movements of opening and closing the bellows and their different combinations. The bellow shake is a technique used in the accordion that translates into a quick (open and close) and regular movement of the bellows. The bellows joint should have the same sound both when opening and closing. The movements should be performed as relaxed as possible. There are several notations used for the opening and closing movement of the bellows, the most common being represented by the following signs: To open ⩛ / To close ⊓

There are several examples of bellow shake technique variants.

1) Normal movement ⩛ ⊓ (Fig. 8)

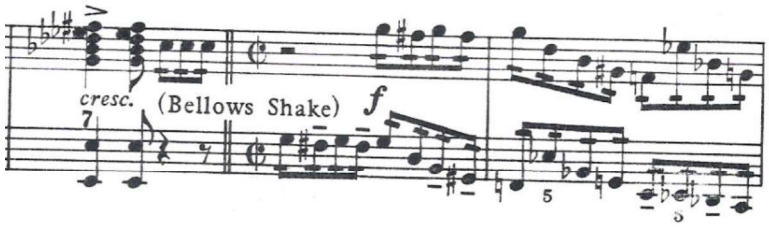


Fig. 8. Ole Schmidt, toccata n. 1st op. 24 (normal bellow shake)

2) Fast movement over repeated notes ⩛ ⊓ ⩛ ⊓ (Fig. 9)

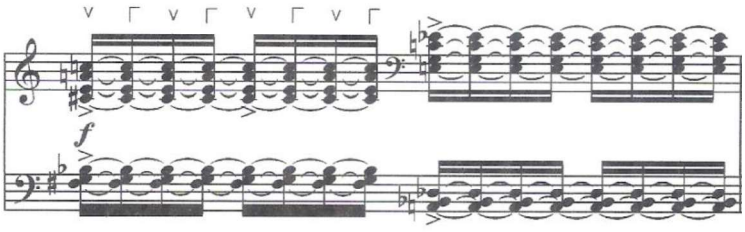
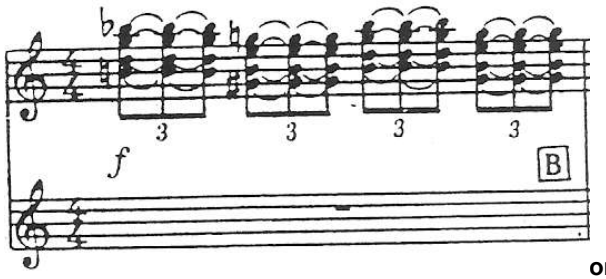


Fig. 9. Efrem Podgaits, concerto n. 2 "Viva Voce" (bellow shake - repeated chords)

3) Triolet (three pulses - triplets) **–** normal opening and closing movement of the bellows with slight accentuation in the first of every three pulses (Fig. 10). The bellows can continue to open and close or start the first pulse in the same way every time (open the bellows).



or

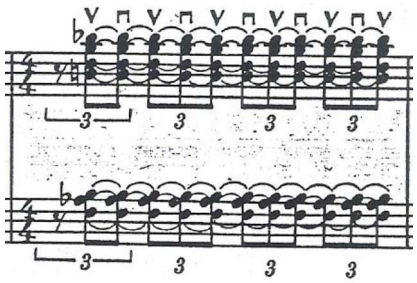


Fig. 10. Viktor Vlassov, suite (bellow shake in triplets)

4) Triolet ricochet **–** This movement consists of three impulses, the third impulse being made in the upper part of the bellows (Fig. 11).

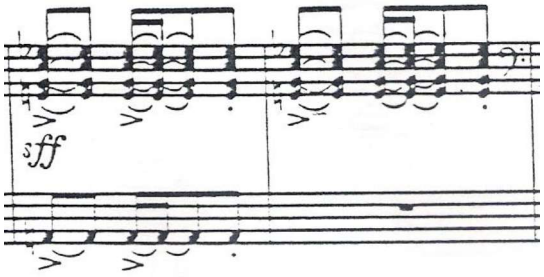


Fig. 11. Viatcheslav Semionov, Sonata n.º 1 (triolet ricochet)

5) Ricochet (4 sixteenth)  Similar to the triolet ricochet but with a fourth thrust, i.e. it opens, closes, closes at the top and lets the bellows fall. The next thrust will be bellows opening again.

6) Ricochet with five figures - Similar to the normal ricochet but with an additional fifth thrust (Fig. 12).

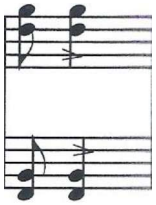


Fig. 12. Sofia Gubaidulina, Et expecto (fifht thrust ricochet)

According to Lips (2000), the accordion bellows has the same function as a violin bow. Thus, these various bellows techniques allow for great expressiveness in the works interpretation. The instrument and bellows proximity to the player's body allows for a variety of vibratos to be performed on the accordion. This effect consists of oscillating the continuous sound, also increasing the expressiveness of the performance. It can be executed in dynamics (from *ppp* to *fff*), in *crescendo* or *decrescendo* dinamics. This technical aspect can be carried out in different ways: in contact with the buttons, with hands or legs on the keyboards, with open hands and a short distance from the keyboards, among others. According to Lips (2000), the execution form depends on the required interpretation, the performer technical competence or the technical circumstances of the work or instrument.

1) Right-hand vibrato on the keyboard (Fig. 13)

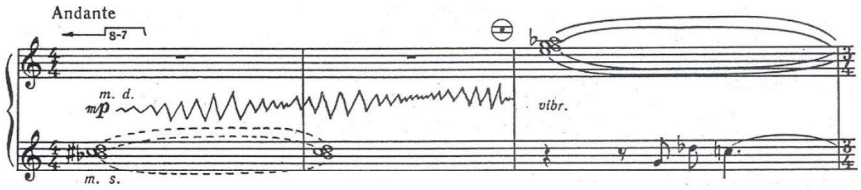


Fig. 13. Viktor Vlassov, suite (right-hand vibrato)

2) Left-hand vibrato on the keyboard (Fig. 14)

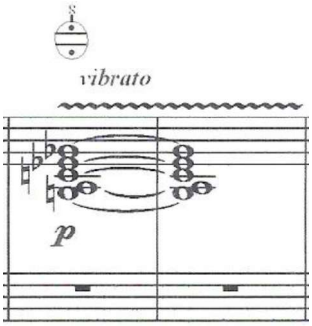


Fig. 14. Efrem Podgaits, concerto n. º 2 "Viva Voce" (left-hand vibrato)

3) Vibrato of both hands in contact with the playing note or chord (Fig. 15)

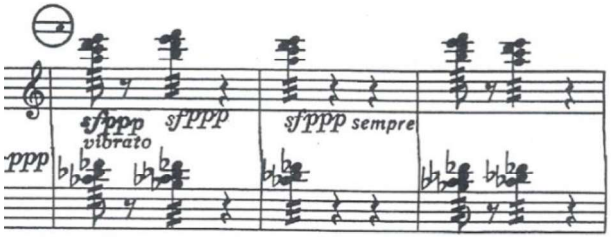


Fig. 15. Sofia Gubaidulina, de profundis (vibrato with both hands)

4) Vibrato with the fist on the outside of the keyboard - right hand (Fig. 16)

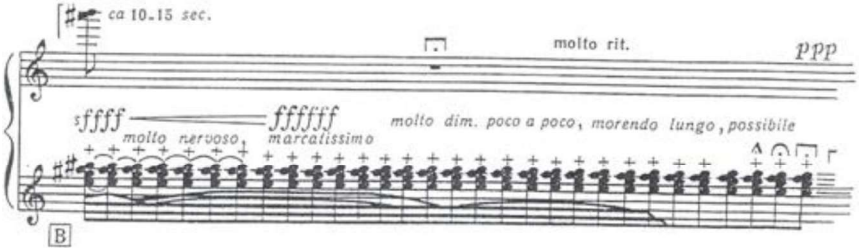


Fig. 16. Vladimir Zubitsky, sonata n.º 2 (vibrato with the fist closed on the keyboard outside – right hand)

5) Vibrato with leg thrust (Fig. 17)

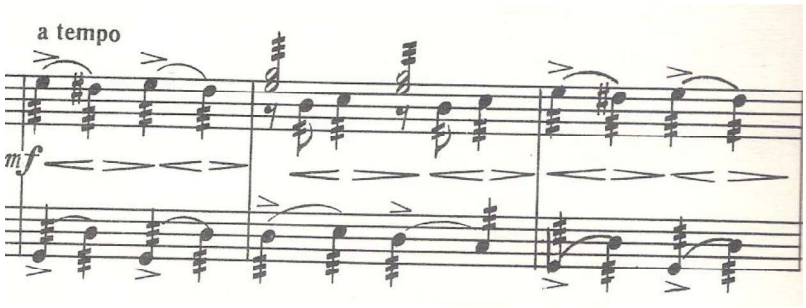


Fig. 17. Vladislav Zolotaryev, first children's suite (vibrato with leg)

Portamento is also a technique of the accordion used in contemporary composition. This effect makes it possible to lower the frequency of any note and is obtained by lightly pressing the button, aided by a bellows movement (Fig. 18). It can be performed with one, two or three notes at the same time and is usually produced by the right-hand keyboard. According to Lips (2000), the frequency of the note is modified because a great tension in the bellows forces a great amount of air to enter a valve that is only slightly open, so the reed emits an out-of-tune sound. Draugsvoll & Højsgaard (2011) add that it is rare to achieve a modification greater than half a tone in the high registers and greater than one tone in the low registers. They also note that effect performance becomes problematic above the frequency of D 2 on the right-hand keyboard and C1 on the left-hand keyboard. Actually, with converter system, it is possible also to make portamento in left-hand keyboard [16].

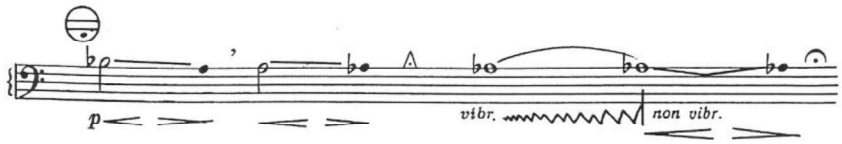


Fig. 18. Sofia Gubaidulina, de profundis (portamento)

Some contemporary compositions also incorporate percussion effects. In aesthetic terms, these effects enrich the performance and open up new paths in interpretation. Draugsvoll & Højsgaard (2011) group these effects into four types: sound air, button noise, bellows tapping and register noise. As the bellows consists of a hollow cardboard box, you can find several timbres exploring different areas of the bellows.

1) Press the air bellows button (Fig. 19)

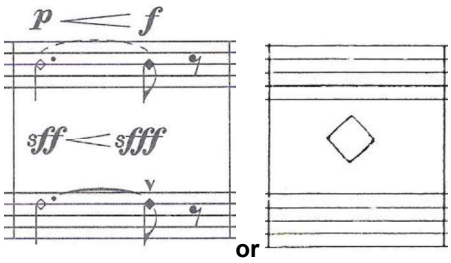


Fig. 19. Vladimir Zubitsky, partita concertante n.º 2 (effect with the use of the bellows)

2) Slide your fingers on the keyboard (Fig. 20)

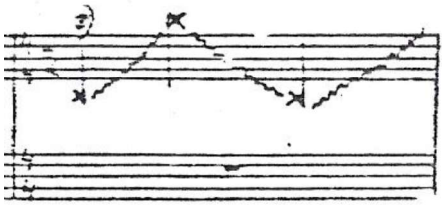


Fig. 20. Viktor Vlassov, steps (sliding fingers on keyboard with percussive effect only)

3) Beats in the bellows (Fig. 21)

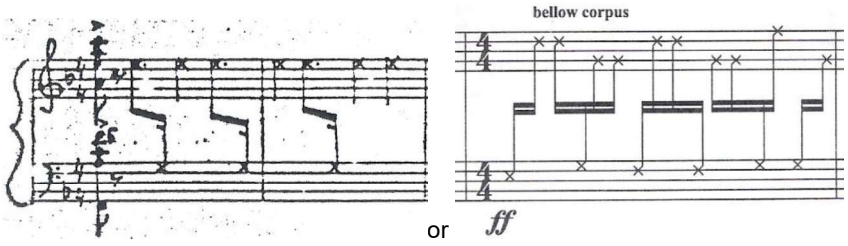


Fig. 21. Viktor Vlassov, steps; and Vladimir Zubitsky, partita concertante n.º 2 (knocking in the bellows)

4) Percussion through the registers (Fig. 22)

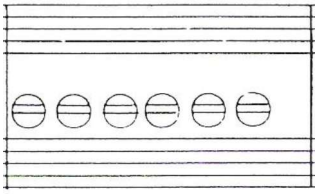


Fig. 22. Alexander Schurbin, sonata no. 2 (percussion through the registers)

The various combinations of registers, the types of articulation, the forms of accentuation and the effects produced in an accordion with a converter system offer the performer and composers a wide range of expressive possibilities, which are increasingly required in contemporary writing for the instrument. Taking into account the composer's creativity, the technical characteristics of the accordion with converter system and the high level of performance nowadays, naturally the possibilities and possible effects to be realized are not limited to the examples described above. In this matter, Draugsvoll & Højsgaard (2011) state that new and improved techniques are constantly under development. However, these authors also warn that the original writing for accordion lacks its own graphics and is also uniform among composers. This issue becomes even more pressing in the case of notation that are unique to the accordion. The different notation in the writing for accordion sometimes makes it difficult for the player to understand the score easily.

5. LIMITATIONS OF THE ACCORDION WITH CONVERTER SYSTEM

In terms of the current limitations of the accordion with a converter system, we can point out some physical characteristics of the instrument that affect the player's performance. One of the limitations of the converter system resides in the noise produced by the mechanism that activates the converter, that is, a noise when the lever is pressed down and another noise when the lever is released. Despite being known and described the best way and the best moment in the execution of a piece to activate the converter system, as described by Lips (2000), in most situations the noise overlaps and disturbs the sound material. Another limitation is the size and location of the tab that drives the converter. The tab is large (lengthwise it corresponds to almost a row of buttons) and is located next to the inner row of buttons on the left-hand keyboard. This physical characteristic requires a greater range of movement on the part of the left hand to effect its activation, and this dislocation may affect execution, especially in fast passages. The current construction of the left-hand keyboard, in which the buttons in the six rows are on the same level to be pressed, makes it difficult to use the thumb beyond the first row of buttons. Although other keyboard layout alternatives have already been produced, as is the case with Anders Grøthe's invention with lowered first and second rows (Farmen, 2009), the ideal solution to use the left hand in the accordion with converter system has not yet been found.

As mentioned by Draugsvoll & Højsgaard (2011), the left hand is attached to the belt for handling the bellows, which makes it less agile than the right hand, particularly when performing large intervals and virtuosic passages. The adjustment of the belt for handling the bellows prevents the progression of fingers and left hand on the keyboard. According to Draugsvoll & Højsgaard (2011), the existence of two keyboards controlled by a single bellows conditions the production of different dynamics simultaneously in the right and left hands. The sound balance between the two keyboards is only partially achieved through an appropriate use of registers and demands from the player greater attention in the choice of articulation and accentuation. The internal characteristics of the instrument's construction bring limitations to the level of sound production. The intensity of the dynamics differs considerably depending on the number of voices (reed blocks used) or voice combinations (registers) selected. A register that uses four voices produces the greatest fortissimo volume and the opposite applies to a register that uses only one voice. If the performer wants to achieve the same balance, he will have to adequately increase the pressure on the bellows (Lips, 2000).

On the other hand, the location of several reed blocks in harmonic boxes that do not have resonance results in a significant loss of sound intensity, especially in large concert venues (Draugsvoll & Højsgaard, 2011). This conditioning becomes equally pressing in situations where chamber music is performed with louder instruments or orchestral music, namely symphonic.

According to Lips (2000), the sound intensity is naturally greater when opening the bellows than when closing it, due to a greater pressure of the air that is aspirated. This limitation must be taken into account by the instrumentalist when performing articulations, accents or sound effects. Beyond the mechanism, Rink (2002) includes the importance of the movement and the body in performance. To switch the converter, it’s necessary to prepare the body to be able in time to make the movement like the relation between body and instrument in the performance [17].

6. CONCLUSION

The facts indicate that the creation of a converter system was extremely beneficial for the accordion, especially from the second half of the 20th century onwards. There is still a long way to go, and it is necessary to create a repertoire originally designed and that will serve as a reference for future generations. However, the use of a converter system in the accordion has widened the range of possibilities and, inevitably, made learning this instrument much more interesting, both for the performer and the composer as well as for the listener. With an unforgettable contribution in writing for the instrument, we can highlight composers such as: Sofia Gubaidulina, Edison Denisov, Franco Donatoni, Luciano Berio, Magnus Lindberg, Mauricio Kagel, Toshio Hosokawa, Salvatore Sciarrino, Christopher Bochmann, among others. Also it is necessary to mention the importante role of accordionist / composers in the creation of original works for the accordion, such as: Vladislav Zolotariev, Vatcheslav Semionov, Vladimir

Zubitsky, Franck Angelis, Pettri Makkonen, Gorka Hermosa, among many others. In the field of construction and instrumental improvement, we highlight the factories of Júpiter, Zonta, Pigini, Bugari, Scandalli, among others that have contributed to the modernity and quality of the instrument. The role of pedagogues, such as: Friedrich Lips, V. Besfalminov, A. Dmitriev, Oleg Sharov, Jacques Mornet, Matti Rantanen, Max Bonnay and Owen Murray, among many others, has also been fundamental in the formation of new interpreters. In several countries in the world, many methods were created for accordion with the converter system. In Portugal, Matono (1985) was the responsible for the first original pieces and exercises for this system like Mogens Ellegaard in Denmark [18]. Finally, the inclusion of the accordion with convertor system in concert halls, in chamber music and in programs with symphonic orchestras has been accelerating the process to introduce the accordion in classical music.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Jacomucci Claudio. Modern Accordion Perspectives. Grafica Metelliana editions; 2013
2. Henrique Luis. Instrumentos Musicais, 9ª edição – Fundação Calouste Gulbenkian, Lisboa; 2019.
3. Monichon P. L'Accordeón. Paris: Van de Velde; 1985
4. Sachs C. The History of Musical Instruments. New York: W. W. Norton & Company, Inc; 1940.
5. Sadie S. (Ed.). The grove dictionary of music and musicians. London: Macmillan; 1980.
6. Lindgren D. Convertor Bass; 2010.
   Avalaible:http://nydana.se/accordion.html#convertorbass
   Access on july 10 2023
7. Hermosa G. The Accordion in the 19th Century. Spain: Kattigara; 2013.
8. Doktorski H. The classical bayan. The Classical Free-Reed, Inc; 1998.
   Avalaible:http://www.ksanti.net/free-reed/history/bayan.html
   Access on july 10 2023 ,
9. Lips Friedrich. The art of arranging classic music for accordion. Karthause – Schmülling; 2018
10. Arte de Afinar. Manutenção, montagem e alinhamento mecânico do sistema convertor; 2011.
    Avalaible:http://artedeafinar.webnode.pt/fotos/#p101126-jpg
    Access on july 10 2023
11. Lips, Friedrich. The Art of Bayan playing – Technique, Interpretation and Performance of Playing the accordion artistically, Karthause – Schmülling; 2000.
12. Dmitriev Alexander. The positional fingering for accordion (Right Keyboard-One voice). Publishing House "Union of Artists; 2001"

13. Lips Friedrich (Ed.). Anthology of compositions for button accordion: Part X. Rússia: Muzyka; 2004
14. Farmen Ø. [farmennet]. Steps in the bass on the accordion (Øivind Farmen); 2009 [vídeo].
Avalaible:http://www.youtube.com/watch?v=7RlJ4FiIITc
Access on July 10 2023.
15. Leeuw, Jakob Ter. *Alexander Technique and the Playing of the Accordion* – Interview of Claudio Jacomucci; 2001
16. Draugsvoll G, Højsgaard E. *Handbook on Accordion Notation*. Copenhagen: Andreas Borregaard; 2011.
17. Rink J. Musical performance: A guide to understanding. Cambridge University Press; 2002
18. Matono, Vitorino Matono, Vitorino. *Curso Geral de Acordeão* – II Volume, IVAHM edições musicais; 1985.

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