

THE TRADITIONAL AEROPHONE INSTRUMENTS, PAST AND FUTURE

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Abstract

This article presents a research on the evolution and characteristics of traditional aerophone instruments describing the different types of whistle, its varieties and creation methods as preserved by different peoples; these varieties retained the whistle's evolution stages from its primary shape to the one known today, as for example, the way how the sound is produced. People's interest in easing and perfecting their work gave birth to technical installations that astonish everybody to this day because of the ingenuity and the originality of their construction; their creativity and skills was also used to express their joys and sorrows through musical instruments. The antiquity and continuity of traditional aerophone instruments in the people's spiritual life may be analysed from a historical, archaeological and linguistic perspective. Preserving archaic elements but including new technical and scientific discoveries, made by various materials, the whistle is quite popular due to its light timbre as it may be used for any music genre and it may express several feelings and emotions. When creating the whistle there have been many attempts to replace the traditional construction materials (the wood from different trees) with stronger and more efficient materials (inorganic ones).

Keywords: *Traditional instruments; Conservation; Construction; Innovation; Adaptation.*

Introduction

Traditional instruments, similar to the tools that man used for various activities, have been improved continuously over time. However the whistle, a very simple instrument, even if it has many qualities, has managed to successfully face the competition imposed by the other groups of instruments.

The musical expression created by the instruments is well represented in the artistic life. Instrumental music was developed at the same time with the vocal music because of the inner feelings that man experiences when he connects with the musical sound field. The instrument fulfills and diversifies at the same time the rather limited possibilities of musical expression that man has inherited through his voice. The forms of presentation and reception of the musical language have evolved greatly in both written and oral culture and yet, tradition and innovation have managed to coexist in all musical activity.

Surprisingly, the early forms of the whistle have not disappeared. The continuous improvement, the realization of enriched forms and types did not lead to the elimination of those from which they have once evolved. The improvements and various developments that the whistle has undergone are due to the people's desire to adapt this instrument to their needs

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of expression, to the need of adapting its potential to the evolution of the art of music, which, for its part, has developed at the same time with the life of human society.

Evolutionary types and characteristics of the whistle

At the beginning the whistle was made of a single pipe open at both ends, in which an air column vibrated under the action of human breath. The change in the pitch of the sound produced was done by plugging the free end of the tube or by increasing and decreasing the intensity of the breath. Over time [1], many people have noticed that sounds of different heights can be produced not only by joining tubes of different sizes, but also by drilling holes in the wall of a pipe, thus changing the height just by closing and opening these holes with one's fingers (Fig. 1).

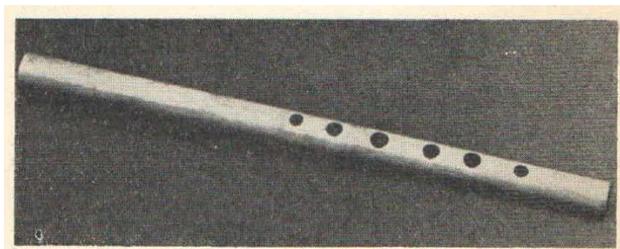


Fig. 1. The whistle

The finger holes appeared due to the need of increasing the number of sounds produced by such an instrument, otherwise adapted to facilitate the production of the sound by blowing air into such pipes. The semi-transverse position of the instrument (its slight right or left tilt) was awkward, and the production of the sound required not only directing the air jet to the wall of the pipe by means of one's lips, but also its processing so as to be transformed in a type of "whistling" that the instrument would amplify and modulate with the help of its holes, according to the musical intentions of the performer. This way of producing sounds required a certain conformation of the oral cavity, more precisely of the teeth and lips, in order to be able to produce that whistle which makes vibrate the air from inside the tube. Those less fortunate, born without such a facial conformation, were deprived of the possibility of using such a tool.

The first solution to this problem was to change the position of the instrument from the semi-transverse position to the transverse one. The end of the air-blowing pipe was blocked, and a new hole was opened near it, aligned with the holes for holding one's fingers. In the new version, the production of sound was significantly easier, if we consider the fact that it was enough to blow an air jet at a certain angle, which could be "guessed" after a few attempts, over the new hole, to obtain the sound, without the need to whistle.

In their attempts to simplify the way they obtain the sound by blowing air into sound tubes, people have found other solutions, as well. One of them is the one discovered by the inhabitants of the Andean regions who created the famous kena whistle which represents an intermediate stage between the corkless whistle and the cork whistle. The kena whistle is made of bamboo. The pipe's inside diameter is large enough and the end through which the air is blown is provided with a hole in which the lower lip of the performer should enter, so as to blow the air jet to a recess where the wall of the pipe is thin so as to split the air and thus, produce the sound. This type of whistle announces a superior stage in the evolution of this instrument because of the development of the version with plug and hole, the missing element, the channel through which the air is blown is replaced by the instrumentalist's lips. The cork whistle, at least in terms of sound production, is accessible to anyone, without requiring special

skills of the performer. In this case, the transformation of the blown air into sound is done with the help of “the hole”.

The existence to this day of both cork whistles and corkless ones demonstrates that in this case we do not have a precise boundary between tradition and innovation. The development of the device called “whistle head” (the upper part with stopper, light, hole and tongue) did not remove the primary form of playing (the one without cork) neither from the shepherd’s pipe (called “tilincă” in Romanian language) nor from the usual whistles; these two instruments are different only as regards their areas of usage.

Another important moment in the evolution of the whistle is the adaptation to its sound tube of a special device for vibrating the air column inside, a device known as a reed and consisting of a lamella that vibrates under the pressure of the blown air. This type of whistle was used in ancient Greece (mono and Greek aulos whistle) from where it was taken by the Romans (the Roman tibia). From the aforementioned three forms – the straight whistle (with stopper), the transverse whistle and the reed whistle – modern instruments will evolve: blockflöte and other types of straight whistle found throughout Europe, the classical transverse flute and the instruments with simple reed (clarinet, saxophone, taragot) or double reed (oboe, bassoon). It should also be mentioned that the semi-transverse shape in which the sound tube is only slightly modified (with or without holes for finger) has not completely disappeared; it was preserved by various peoples of southern Europe: Greeks (floyera), Bulgarians (kaval, an end-blown flute) or Romanians (the shepherd’s pipe and the Moldavian woodwind whistle) [2].

In the Middle Ages, the whistle fell into disuse. It is rediscovered in the Renaissance, during which time it is perfected. A noteworthy detail is the placement of the hole on the same side of the tube as the holes for the fingers; in this way, its efficiency is increased so that the sound could be heard from as far away as possible. This modification determined the adaptation of other construction details that would allow the most comfortable use of the instrument. This is how in the 16th century the recorder (flute à bec) appeared [3].

Back to the issue of the discovery of the holes for the fingers, more precisely to their position in relation to the length of the tube and to the evolution of their number, we will analyse different construction types, preserved by different peoples; these types have maintained, as in the case of sound production, various stages of the whistle in its evolution from its primary shape to those well-known today.

Aromanian shepherds from Macedonia still use a simple whistle, with only two holes for fingers, arranged in the upper part of the sound tube, under the slightly modified hole.

Shepherds from the Apuseni Mountains in northern Italy used an ancient whistle with only two holes at the base of the sound tube. This type of whistle was used until the 20th century. A somewhat evolved stage of the Italian version is a type of whistle found today in southern France (Provence) and in northern Spain, in the Basque Country, known as “galoubet” (the tabor pipe). It has two holes at the bottom of the tube, like the Italian version described above, and another on the opposite side, placed slightly above the distance between the two. This kind of whistle, which is played with one hand, allows the performer to be accompanied by a percussion instrument – the tambourine.

The Greek aulos also (Fig. 2) had three holes for fingers which allowed the performer to play two such whistles at the same time. In this case, the whistles were of different sizes and the difference in height was one octave [4].

The “diaulos” whistle performance system was preserved as twin whistles that allow a rudimentary kind of polyphony, one of the whistles playing the song, the other producing an invariable sound, usually the fundamental one. In a Macedonian version, both whistles are provided with holes: one pipe has 4 holes and the second one had 3 holes [5].

The increase number of holes is closely related to the need felt by musicians to enhance the instrument’s possibilities of expression. Most of the contemporary types used by some

performers or bands have 6 holes, but whistles with 7 and even with 8 holes can also be found. The latter ones are industrial and belong to the blockflöte type (a recorder).



Fig. 2. The Greek aulos

Preserving archaic elements but also incorporating more recent discoveries of science and technology, made of various materials: wood, bamboo, cane, metal, plastic, ceramics, etc, the whistle enjoys a certain level of popularity, and it can be used in cultivating any kind of music, contributing through its clear timbre to the expression of the most diverse human feelings. The whistle's simplicity, ease of purchase and small size are just some of the features that have ensured its popularity and diffusion.

In the old religious texts the whistle is mentioned along with other instruments, as follows: "the whistle and organs" in deacon's Coresi Gospel with teachings; "with straps and whistles" in Varlam's Homiliary; "with ear drums and whistles and lutes", in the Bucharest Bible; other texts mention only the whistle, thus in Dosoftei's Life and Party of the Saints: "His whistles which charmed them", or in Pearls: "we whistled like the shepherds' children with a small cane whistle under an oak or poplar". One of the oldest testimonies is the one of the German poet Ioan Sommer, called in Moldova by Despot Voda (1561-1563) to be the headmaster of the high school from Cotnari, where in one of his poems in Latin, he writes that young people glorified the voivode through "whistle songs". The chronicler Ioan Neculce writes in A couple of words that "Gheorghe Ștefan Vodă when he was a great logothete was sitting on his sofa with the whistle in his mouth". And Iordachi Cantacuzino, an old man, a treasurer asked him "What do you say with your whistle logothete?" And he answered, "I call my goats to come down from the mountains and they won't come. He answered in a parable and the others did not understand that he was waiting for the Hungarian troops to come from over the mountains."

The first descriptions of several types of peasants' whistles are from Franz Joseph Sulzer (1782); he argues that the Romanians use three types of whistles, with which they can play either dance songs or just beautiful songs to listen to. The first and largest is called the big whistle, and in Moldova the kaval. It is big and thick like a well-grown reed and it has no stopper so that the air must be caught sideways, like blowing into a key. The second one has a stopper it is smaller and is called "trișcă" – a kind of short pipe. The third type of whistle, called "tilincă", has no stopper or holes (for fingers) and is made of willow bark; it gives the desired sounds depending on how much or how little the performer covers the opening (bottom of the pipe) with his finger". From "the great shepherd's whistle called the kaval, made of a long perforated stick, sang with great devotion the ruler of Moldavia Constantin Cantemir (1685-1693), the father of Dimitrie Cantemir, as Sulzer says that he learnt from a page of the ruler, that because he was disgusted by the schemes of the boyars who wanted to get rich, he used to play the kaval longing for the youth he spent in the bosom of nature".

Sheep grazing (Fig. 3) has been practiced since ancient times throughout Romania, it develops along the Carpathian arc, thanks to the extensive alpine pastures and fields in the hilly area near the mountains, this occupation taking place unevenly in this space. The whistle, an instrument intimately related to the life of shepherds, has defied time, the oldest whistles dating from the middle of the 19th century; these instruments, kept inside some museums and being able to be examined, allowed the reconstruction of the evolution of the shepherd's whistle, which is nothing but the whistle with stopper and six holes for fingers, with some characteristics (dimensions, material from which it is built, way of ornamentation, means of consolidation to ensure physical endurance, etc.) which distinguish it from the whistle with plug and six finger holes, found in other regions of the country.



Fig. 3. Sheep grazing

Most of these whistles fall, by their size, into the category of large whistles (55-75cm), the length of such whistles can reach up to 80 cm, but few people can play such whistles, given the distance between the holes. Long whistles were preferred (in Țara Hațegului they are called “fluieroaie” – very big whistles), for their serious sound, suitable for giving voice to the longings and heartfelt wishes in the shepherd's soul. The sound volume of these instruments is generally small, and shepherds increase it by accompanying the sound with a thud produced by the throat, partially obstructing the hole and intensifying the breath.

The whistles made in the 7th and 8th decades of the 19th century have some peculiarities that betray the fact that the development of some industrial activities in the space we are dealing with did not remain without consequences regarding the construction of this instrument. These whistles were made of plum or cherry wood, the tube being obtained by making a hole with a drill (auger), and the inner surface is free of roughness, a detail that is explained by the quality of the tool used or some other abrasive materials. In the case of another whistle, the builder no longer used the cherry bark to strengthen the ends of the instrument, but strips of thin brass sheet. Such strips are arranged from place to place along the entire length of the whistle, to prevent it from breaking and at the same time to have decorative value. It should be mentioned that the year 1878 is inscribed on the brass strip that protects the end of the stopper. The careful way in which this instrument was created betrays the fact that its maker was not on the first try and leaves room for the assumption that such instruments were intended for sale. The quality of the execution of such whistles is the undoubted result of an experience gained over time, by making them in series, due to the constant demand for instruments with good musical qualities, which increasingly replace those made with their own possibilities by shepherds. As some old

builders from Vaideeni and from other villages in the area argue, it appears that in the last decades of the 19th century, the making of whistles flourished in several villages in Jiu Valley, in Mărginimea Sibiului (the villages around the town Sibiu) or in the villages in the north of Oltenia, the builders selling their products throughout the area. Gradually, this craft also appears at the foot of Mount Parâng or in the vicinity of Horez.

Several innovations, of great importance for the destiny of the shepherd's whistle, appear in the following decades:

- using the metric system in sizing the whistles by preferring the multiples of 5 (45, 50, 55, 60, 65, 70, 75 and sometimes 80 cm);

- the instruments used in making the whistles are significantly enriched by using, in addition to the drill and the sable, their carpentry tools: planers, chisels, abrasive materials (sandpaper), they came up with tools meant to allow the application of brass foil;

- filling the space between the groups of finger holes and the plug end of the whistle with brass strips or a long, narrow strip wrapped around the tube, known as a "serpentine";

Thus, the whistle has reached the form in which it is known today, its main characteristics being the suppleness of the tube made of plum wood, the volume and accuracy of sound due to the precision with which the hole and the plug are made and last but not least the mastery of the board brass that gives the whistle a special aesthetic appearance, which varies depending on the areas of construction.

In remote places, especially in the sheep grazing area, the instruments are still being worked on following the traditional procedures. Shepherds and traditional artists know how to build their whistles, but they rarely do so, preferring to keep their instruments sacred, or get them from other older artists. For a shepherd, the whistle would be the last object he would give away, most of these people use various means of protecting the instruments: to be less vulnerable to weather conditions, they are boiled in milk or oil; some are kept in lime juice to change colour, others are smeared with lard or sheep's tallow; many are protected at the ends with metal rings (once the rings were made of cherry peel).

There are also some tools that have a dual use. The "whistle in the shepherds' bat" is at the same time an instrument and a useful bat (an indispensable object for the shepherd); such instruments are found in Apuseni Mountains and are built in a small settlement called Junc.

Generally, the constructive changes made to the whistle are not significant; the innovations brought to the traditional models are more related to intonation problems. Therefore, it is important to mention the design of whistles and kavals cut into two pieces, so that variable tube lengths are obtained, a process by which a much more correct tuning is achieved. There are also sets of sectioned whistles which have a single whistle head that can be mounted on several whistle "bodies" of different sizes, depending on the "body" of the tubes and their length, and this aspect leads to them playing in different "tonalities".

Tiberiu Alexandru, addressing the issue of constructive changes, mentions [6] along with the sectioned whistles, the whistle models used by Iustin Sora which have the 7th hole (for the octave) "at the back of the pipe, above the others." This model, with an extra hole, did not spread in the whistles' musical practice. The hole on the opposite side is more common with aerophone instruments with a reed (the bagpipe).

Currently, no significant constructive improvements are foreseen in the oral practice, because the whistles' traditional model is successfully coping with the exigencies imposed by the interpreters and this is proved by their refusal to use the metal whistles built in the factories from Western Europe.

In case of whistles, there have been made attempts to replace traditional building materials (wood of different tree species) with more durable or more efficient (inorganic) materials. Prefabricated tubes made of brass, aluminium, iron, stainless steel and plastic are used because in addition to being more durable they can be easier processed than wood which is moulded traditionally. The inner lustre of the tubes and the homogeneous processing of the wall

thicknesses are the two construction qualities that give the new materials extra efficiency and musical accuracy. Instruments made of these materials, however, lose a lot in terms of timbre by replacing wood and using other dimensions.

There is an essential difference between the tools occasionally built by people not specialized in this field and the traditional craftsmen who aim to obtain an income from this craft. The construction of a large number of tools involves an organized work of manufacturing type which begins with the purchase of wood and its processing with specialized tools, following the pattern in factories. Thus, unique, performance tools are developed. These tools may have some technical innovations depending on the ingenuity of the manufacturer, in most cases old manufacturing principles are made, but they are somewhat updated depending on the new technologies. Along with the traditional knife or hand drill appear wood lathe, electric drilling machine, calliper, wood protection varnish and dyes. Most of these instruments are bought by performers of folk ensembles; they have to meet quality standards imposed by the fiddle environment.

The construction changes made to the whistle are not significant and the innovations brought to the traditional models are related to intonation aspects. The attempts to emancipate the instrument remained only in the phase of unique experiences in Romanian organology, but the tendency to perfect the models of existing traditional musical instruments will continue, even if maybe there will be no spectacular results in this field. These preoccupations of the master craftsmen within the traditional culture are part of the natural aspiration for progress that all individuals have in their field of activity.

Starting with the sixth decade of the 20th century, with the appearance of professional folk music groups and with the affirmation of the amateur artistic activity, the use of the shepherds' whistle flourishes [7]. Due to its introduction in folk music orchestras and its use as an accompaniment instrument for vocal ensembles, the demand for whistles increases, but it also raises some issues for builders; for example, tuning which refers to the process of making the ancient shepherds' instrument tune with instruments of industrial origin or with the cultivated voices of choirs or vocal groups.

The changes that the country experienced after the events in December 1989 negatively influenced the practice of sheep grazing. Difficulties related to the use of specific products, especially wool, to finding places for wintering and to moving herds to them have led to a worrying decrease in the number of sheep in the areas with a grazing tradition. These are felt in the decrease in spiritual life by alternating the traditions and in the disappearance of some essential components. Only sometimes is the song of the whistle heard at the sheepfold, its place being taken by radios or cassette players. In such conditions, the demand for shepherds' whistles decreased, their makers disappeared, leaving no descendants behind.

Types of whistles, construction features

Founded until recently, on ancient occupations, such as agriculture and grazing, the life of the traditional Romanian village has preserved and perpetuated over time customs, beliefs, traditions and a rich dowry of songs and dances inherited from ancestors, all together representing evidence indisputable of the sensitivity of the Romanian people, of their love for beauty and harmony.

The occupations of the inhabitants, almost unchanged by the passage of time, were closely related to the succession of seasons, a phenomenon that was also marked by the most beautiful age, childhood. Children's souls vibrate in everything around them, making them feel a part of the world and thus, participate in it, with the help of the game joining the outpouring of voices that delighted them - the chirping of birds, the song of the cuckoo, the trembling of nature, the whistling of blackbirds, etc. - so that they build their own musical toys, similar to whistles, with which they can mime different creatures. The simplest musical toy they were

lucky enough to find among the rotten leaves was *the squirrel-drilled walnut* (Fig. 4) through which the children whistled. The older children knew that if another hole is made in the nut, it would mime the “cuckoo”. The sound produced is harsh, hissing, but the satisfaction is great, because the toy was made with your own means, and by closing and opening the free hole with one finger, you can imitate the cuckoo or play simple songs based on various rhythmic formulas, to the amusement of the children in your group of friends.



Fig. 4. The squirrel-drilled walnut

From a twig of willow, walnut, linden or hemlock with rare knots, to make the instrument as long as possible, the children used to make *a small whistle*, their sound being largely similar to that produced by the walnut. If the whistle was long enough, a few more holes were made for the fingers, so that simple songs could be improvised on it. The pitch of the sounds and the intervals are absolutely random, but the child is proud and satisfied by his creative effort.

From hemlock or pumpkin leaves whose stalks were hollow and quite long, children could make a “mulberry” (*a sort of straw whistle*). Only the tail of the leaf was preserved, on which a 2-3cm incision was made with a small knife, the air was blown through it, and by rubbing it on the edges of the incision a sound was produced whose height depended on the length of the pipe and the incision. Depending on the length of the “mulberry”, finger holes could also be made. The timbre of the sound produced resembled that of the bagpipe.

In the south of Romania, in Mehedinți County, as in the case of the small hemlock whistle, “fifa” - *a traditional plant whistle* (Fig. 5), as the toy is called, is also used by women working in the fields to have fun and forget about tiredness.



Fig. 5. The fifa

“Fifa”, as the organological studies show, is a simple whistle with a notched mouth in the category of labial instruments, whose tube is cylindrical, closed, without finger holes, that is natural. Leaving aside the perishable construction material and an extremely simple construction technology, these features prove how basic the hemlock whistle is, as “fifa” is also called. Of the three sounds that make up the range of this instrument, the performers (women usually play this whistle) use a single sound that is interspersed with vocal sounds produced by the falsetto with a set head voice. “Fifa” (the hemlock whistle) imposes a position of the lips similar to that used in the case of the transverse whistle, when the lower lip is pushed forward in such a way so as to create the space through which the breath is directed towards the edge of the tube (excitatory element). This space is much larger here than in the case of whistles with a stopper and even in case of those without a stopper.

Although the way from musical toys to whistles is long, its importance in paving it cannot be questioned. With their help, children become familiar with how to blow, with the possibility of changing the pitch of the sound by covering and uncovering the holes for the fingers. At traditional fairs or various religious holidays, children had the opportunity to enjoy the live shows and buy various objects and toys. The older ones gathered around a whistleblower who sang to attract buyers. Enchanted by the song and the beauty of the whistle, which was different from the hemlock whistle or the “mulberry” because it had six holes and it played beautifully, children bought one, so that in the following days the village resounded of whistles and children who could not afford to buy one tried to build a similar model from the young elder stem. The cork was carved with a small knife and the finger holes were made with a nail burned in the fire. Such a whistle would please the child and the experience could be repeated until the child was satisfied with the result of his work.

The experience of musical toys is a useful means available to children in villages through which they get into the world of musical sounds that enriches the universe of knowledge and prepares them for understanding and practicing music.

One of the most famous and at the same time simple whistles [6] *the shepherd's pipe* (called “*tilincă*” in Romanian) it is very old and has been preserved as a relic to this day, bringing with it that particular form of interpretation specific to primitive music. As a musical toy it is spread over a fairly large space and it is played by children for fun. Moreover, as such it is found in many areas of the country where especially the children from the countryside played with it, perfecting their skill and musical sense (Fig. 6).



Fig. 6. The shepherd's pipe

The shepherd's pipe has the shape of a tube that is made of elder wood, maple or osier drilled with a length of 65 centimetres and a thickness of 66 millimetres. Its use as a musical instrument in itself is very limited: northern Moldova and northern Transylvania.

The timbre of this instrument is very similar to that of the flute, but it is a little harsher and accompanied by a slight rustling.

Playing the shepherd's pipe is difficult and it involves a very close relationship between the performer and the instrument. In this case we are dealing with the instrument man (the oral cavity and the finger are involved) and the simple tube. The sounds are obtained by blowing at the narrow end of the tube and moving the index finger of the right hand at the bottom of the pipe, the position of the instrument being semi-transverse. Due to the fact that it is the most flawed of all the whistles because of its simplicity of construction the sounds produced are a bit sharp and lacking in clarity.

The shepherd's pipe is part of the category of aerophone instruments that produce the so-called “whistle sounds”. The principle of formation of these sounds is based on the sound effects that appear from the splitting of a column of air emitted with pressure. Due to this pressure, the trajectory of the column takes on a slightly twisted shape. It is directed towards a sharp edge which is placed as an obstacle in its path. In contact with the edge, the air column breaks alternately, dripping sometimes inside a tube, sometimes outside it, generating periodic vortices, noticed by our ear distinctly depending on the frequency.

We must point out that in our country there are two construction variants for the shepherd's pipe: the simple model without plug and the model with plug. In the case of the one

without a plug, the brim is at the very edge of the tube which is slightly thinner and the air column will be directed with the lips towards this edge.

The shepherd's pipe (Fig. 7) with a plug uses a traditional sound production device called "a whistle head" and its role is very well established. A negligent construction can have the effect of blurring sounds (accompanied by hissing) or in other cases there can be problems related to the vocal range (the ambitus), especially in the upper part of the instrumental register. The whistle head has a small slot made between the edge of the tube and the inner plug. It usually has a trapezoidal shape and the length is 1.5-2.0 cm (as long as the length of the stopper). The size of the slot is also determined by the way the performer wants to play (to blow harder or easier). In this sense, several plugs are tried, thus adjusting the way of playing. The whistle must "turn" well depending on the individual (it must respond correctly to different air pressures) [8, 9].



Fig. 7. The shepherd's pipe with a plug

Viewed through the hole at the opposite end of the tube, this slot appears to us as a faint beam of light. For this reason, the craftsmen named it the light of the whistle. The role of the slot is very important in the correct production of sounds because it directs the air on a precise trajectory and creates the necessary pressure for the column. A square opening is made on the edge of the tube, next to the slot. It is called a window or a hole. One side of this square is thin (the one on the opposite side of the light) and the craftsmen named it tongue. The tongue acts as the edge and divides the air column formed at the end of the light.

The whistle head device is by construction dimensioned to give maximum sound efficiency.

In case of the shepherd's pipe without a plug this is achieved by the special positioning of the tube on the lips. The way of producing sounds with this pipe without a plug is an intuitive improvisation and its overall efficiency is low. Thus, the sounds heard are similar to a little whistling and while playing the lips have variable shapes. In fact, the most important issue with sound production is how the lips manage to place the air column on the edge of the tube. However, the hardest thing to do is the whistle head. Here every millimetre counts enormously, even blocking the formation of sounds in certain cases, when the execution is not done correctly. This is even more difficult to achieve in case of the shepherd's pipe without a plug and to play well the performer is obliged to possess some special practical-intuitive qualities.

Small construction and interpretation problems can arise in case of this type of whistle. Thus, if the edge of the tube (in case of the whistle without a plug) is less sharp, the playing is clearer, the whistling disappears partially, but the high-pitched sounds will be emitted quite hard and in a much smaller number (the ambitus of the instrument may be reduced).

If for playing the instrumentalist uses a smaller angle of inclination of the tube to the lips while at the same time reducing the opening of the tube, all sounds will be performed about a quarter of a tone lower than the height at which it is usually played.

The way the sounds are produced is quite difficult to explain. The shepherd's pipe tube has a double role: it is primarily a vibration selector and at the same time a sound resonator. Through its length the tube will transmit a fundamental sound, the following being its superior harmonic sounds. Differentiated production of several heights with the same length of the tube is done by changing the pressure of the air column.

The whistle similar to the shepherd's pipe is made of wood, regardless of its type and size. In Romanian, there is a general type of whistle that has quite small differences in construction from one area to another, depending on the model reached by successive attempts, based on the experience gained over time. We find differences in the dimensions of the instrument and the wood from which it is made; here in addition to the preferences of the performers it should also be added the easiness or difficulty with which the wood is found. The experience gained over time by traditional instrument makers has led to the selection of several species of fruit trees, but also trees whose good quality wood (hardwood) ensures resonance, strength and a pleasant appearance, for example: the plum, the sour cherry, the cherry, the apricot tree, the ash, the maple, the beech and the cornels.

The craftsmen find their wood in the geographical area in which they live, those living in the hills and mountains have no problems because they find almost all the mentioned species while the craftsmen who live in the plain use the ash wood. Most builders believe that wood should not be harvested at random; the best time is thought to be when the sap stops circulating in the trunk of the tree.

"The wood for the whistle is cut in winter: it must have the most suitable dimensions, so that the branch shouldn't be thinned. The branch can be of maple, cherry, hazelnut, beech, elm, rowan tree, pear tree, sour cherry or elder tree.

The whistle is made of a green branch because if we let the wood dry first when working with it, it cracks much easier. We wrap the green branch with a strong string, from one end to the other, as tight as possible. Then with the spoon-shaped drill we drill it straight into the heart. We must not forget that after five or six turns we must take out the drill to remove the sawdust from the whistle [9, 10].

After we have finished drilling, we unwind the string and remove the bark from the wood" [10]:

Therefore, if we make a classification according to the construction material, we will notice whistles made of:

- wood
- metal (brass or iron)
- bone (very rare in Romanian)
- plastics (very common lately)

From a constructive point of view, the two most widespread models are the following: the whistle with the stopper and the one without a stopper, these having 6 or, less often, 7 holes. Like the shepherd's pipe, the whistle uses the principle of splitting the air column with a sharp edge to produce sound. According to the principle of mouth construction, there are two types of whistles, with transverse mouth and side mouth, and according to the number of sound tubes, we have simple whistles and twin whistles.

From the point of view of the execution position there are three types of whistles: straight, semi-transverse and transverse.

The whistles without a stopper are frequently found in the northern part of Moldova and in the neighbouring lands and many of them are made of metal tubes (brass, copper).

Referring to the types of whistles, Tiberiu Alexandru makes the following classification [6]:

"The whistles used by our people are distinguished by:

1. Sound construction: with transverse mouth or with lateral mouth: with or without plug; without finger openings or with 5, 6, 7 or more openings; single (single tube) or double (two tube);

2. Sound tube shape: slightly conical or cylindrical;

3. How they are held during the execution: straight (those with stopper), semi-transverse (those without stopper) and transverse (those with side mouth);

4. The material from which they are made: wood (various essences: ash, mountain osier, plum, cornel, hazelnut, elder, cherry, sour cherry, maple, sea buckthorn, etc.) and - very rarely - bone;

5. Size: small (up to 35 cm.), medium (35-50 cm) and large (from 50 cm upwards)”.

Most of the whistles made by the current builders are of medium size (between 30-50 cm long) and small (up to 30 cm long), the large ones (over 50 cm long) are quite rarely used, the size preference being related firstly to the convenience with which they play and the musical qualities of the sounds obtained.

By tradition, each area has its own whistle type and its special way of being worked, the differences are related to how the component parts are dimensioned, the wood used and its preparation. Most whistles are made of willow, but the most appreciated by performers are still the plum whistles.

The traditional tools used to build whistles are rudimentary that is, the manual wooden drill, the sharp-tipped penknife, the “spoon” for homogenizing the inner profile, a thin chip of hardwood meant to widen the air gap in the stopper and for some whistles in Țara Moșilor the holes are made with red iron so as not to crack the wood.

Whistle plugs are usually made of hardwood so as not to change their volume too much by wetting it when playing because moisture is the main destructive factor.

Regarding the whistles without plugs, the ethnomusicological research undertaken in the distribution area of this type of whistle have identified two construction variants: small whistles (“little whistles”) and large whistles. In most cases, the size of the whistle is set according to the preferences of the user.

In the family of aerophone instruments [11], the construction of twin whistles (Fig. 5) is not accidental. The advantage that these instruments have in the musical practice is that they do not depend on a tuning that involves a standard sound and do not need any other form of accompaniment. With the help of the ison (“accompaniment or tonic note”) the twin whistles offer when playing them, by simple means, a plain, unique way of singing which contrasts with the current forms of presentation of traditional folk music. The repertoire of these instruments consists of somewhat special songs because not every kind of folk song can be sung with ison. However, we cannot say that there is a special repertoire created for twin whistles. From the multitude of songs played on the whistle, some can also be performed on twin whistles. In these cases, the construction of the melodic line avoids as much as possible the dissonances vertically with the ison.



Fig. 8. Twin whistles

The kaval (Fig. 9), widespread in Oltenia, Muntenia, Dobrogea and partly in Moldova is an aerophone instrument with a stopper, provided with five finger holes. In Transylvania and

Banat it is not used, although in these regions there are some songs suitable for the scale developed for kaval [12].



Fig. 9. The kaval

In the family of whistles, the (Romanian) kaval occupies a special place: it is a large instrument, built to develop a totally different sound structure compared to the one currently used in case of aerophone instruments.

This instrument is made of the same wood as the whistle, and there is no preference for the wood used. As regards the kaval, the inner profile of the tube is always perfectly cylindrical (without a terminal neck), unlike the whistle's one. At some instruments, at the end, there is a small pavilion open to the outside, similar to the clarinet. The inner diameter of the tube is quite large, about 18-22mm and this construction detail has a major impact on the behaviour of the tube, which from an acoustic point of view has a warm, pleasant, unmistakable timbre in any of its registers.

The instrument is made of a single wooden tube due to its length, but there are some models made of two tubes joined in the middle. The kaval made of two pieces has the advantage of being tuned by matching the lengths of the two tubes, at the joint, in case of temperature differences. Most of the models built by folk craftsmen have as fundamental sounds: do, si, la, sol.

This instrument is also widespread in the Balkans and it is well represented in Bulgaria (with another type of fingering and without a stopper) and in Macedonia. In most dictionaries of musical instruments, it is referred to as the „qawal”, a straight flute related to the European kaval, widespread in Morocco and Egypt [13].

The songs played with the kaval are performed especially in the rhythmic rubato system and a minor musical scale is usually used but the traditional folk songs played in shows are not excluded from the local repertoire. As in the case of whistles, there is also a relative approach to the quality of the intervals used and for this reason the scales of some instruments have small tolerances compared to the traditional gamut.

One of the problems of the kaval is the relatively large distance between the finger holes and this is why many performers place their whole fingers on the kaval's holes and not only their fingertips. From case to case, the finger is kept almost straight, not curved, covering the orifice of the instrument in the most comfortable position, even near the second phalanx.

As far as the fingering is concerned there are some small differences from the whistle, but this does not prevent the performers to easily play both types of instruments after a few hours of practice.

In case of aerophone instruments the location of the holes is directly proportional to the length of the tube and each type of instrument has its own dimensions. In the case of longer instruments the distance between the holes will have to be increased to obtain from the audible point of view the conventional intervals of tone or semitone. For the practical realization of this aspect the kaval uses a construction trick which results in a very different gamut from that of the whistle because it uses a compromise between the practical way of obtaining sound combinations that correspond to certain gamuts used in folklore and the possibilities of playing that can be offered to a large instrument. It has been reached a construction variant in which the kaval is forced to use only five holes; the model gives up the narrowing of the inner diameter of the final end and the profile of the tube remains cylindrical along its entire length.

Contrary to the whistle, the craftsmen did not design a traditional model for the kaval; it is usually built by copying the dimensions and by groping.

Studying the gamut according to which the kaval plays one can say that it results from an intelligent compromise made in favour of the possibilities offered by its construction.

The sound material of the kaval has a range of about three octaves, its intonation performance, as in case of other instruments in the family of whistles, depends on the correctness with which the whistle head is built and the homogeneity of the diameter of the interior walls. The position of the holes also has intonation implications, determining certain tolerances as to the gamut model initially proposed.

Due to changes in construction, the kaval develops a minor gamut with the fourth step raised (depending on the model) to a semitone and between the third and fourth steps, most often, it has an increased second interval. As with the whistle, in the low register the seventh step is missing, the sounds from the lower octave become fundamental for those emitted in the continuation of the scale and the last two octaves are built from the upper harmonics obtained in this way. The absence of the sixth orifice makes the fingering a little different from the one the whistle has so that by a new increase in air pressure other sounds that complete the initial scale are obtained in the same register of the middle octave.

It is rarely used to cover the hole partially, but as with the whistle, they can complete the original scale by lowering the basic sounds by a semitone. The songs played on kaval follow in most cases the musical scale imposed by the construction and the process of partial coverage is employed to raise or lower a sound while playing with a glissando effect.

Most traditional folk performers who play the whistle know how to play other related aerophone instruments, so the same playing procedures and conventional interpretation techniques that are used for the kaval are also common to other aerophone instruments. The differences in their use during playing are more related to the performers' preference for some procedures and the frequency of their use during the songs. In case of the kaval the low register, the specific timbre and a more difficult position of the fingers require the use of these techniques in a somewhat particular manner [14].

By classifying all the instruments that are similar to the whistle we determine that there are [6]:

- The simple shepherd's pipe which is made of wood, it is large; it has a cylindrical tube and a transverse mouth. It has no plug and no finger openings;
- The shepherd's pipe with a simple plug which is usually made of wood (rarely of metal or bone), it is large; it has a cylindrical tube and a transverse mouth. It has a plug and no finger openings;
- The simple whistle from Moldavia which is made of wood or metal, it is both small and large; it has a cylindrical tube and a transverse mouth. It has no plug and has 6 finger openings;

- The simple whistle from Dobrogea (Dobruja) which is made of wood or small and medium cane, it has a transverse mouth, no plug and 7 finger openings;
- The simple Bulgarian kaval which is made of bone-bound wood, it is large in size, it has three pieces and a transverse mouth. It has no plug, but it has 8 finger openings;
- The simple kaval, which is built of wood, it is large in size, it has a truncated cone shaped tube and a transverse mouth; it has a plug and 5 finger openings;
- The simple whistle which is made of wood is small, medium and large, it has a truncated cone shaped tube and a transverse mouth; it has a plug and 6 finger openings;
- The twin whistle with equal pipes is made of wood; it is small and medium in size and it has a transverse mouth. It has a plug and 6 finger openings;
- The twin whistle with equal pipes is made of wood; it is small and medium in size and it has a transverse mouth. It has a plug and 7 finger openings;
- The twin whistle with short ison pipe is made of wood; it is small and medium in size and it has a transverse mouth. It has a plug and 6 finger openings;
- The simple whistle which is made of wood is small in size and it has a transverse mouth. It has a plug and 7 finger openings;
- The traditional, simple whistle which is made of wood is small and large and it has a side mouth. It is transverse and it has 6 finger openings.

Conclusions

In the study of traditional aerophone instruments, special importance must be given to the period in which they were built. Old instruments, due to the practice of playing in homophone style were mainly used as singular instruments. Even if they were accompanied, the musical discourse was in fact a monody accompanied by the help of tuneable chord instruments (the kobza, the tambourine, the violin, etc.). In the current practice the situation is radically changed and they are more frequently encountered in group formations. The new form of interpretation forces performers to play instruments with somewhat homogeneous scales, encouraging the production of uniform instruments. This use of the whistle and of some instruments tuned in the temperate system (accordion) in traditional folk music ensembles had a major impact on the construction level. In this case, the scene forces the popular aerophone instrument to comply with some construction requirements in order to be somewhat compatible with the temperate instruments that accompany it. Many of today's whistles are built by specialized folk craftsmen, and even if they do not know basic notions of acoustics and work more mechanically (they have fixed dimensions, templates) they still produce instruments taking as a musical model the tempered musical scale and the most used standard is the accordion.

There is a fundamental difference in the organization of the sound material between the old and current aerophone instruments because of the rapid evolution of the forms of interpretation that occurred in instrumental music. The changes in the way of playing, the association of aerophone instruments with the new high-performance instruments, the entry into a very tough competition that calls into question their very existence, hastened the process of evolution of the remaining instruments.

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