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Research Article

Repair of the tar musical instrument: points to consider and functions of tar parts

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Abstract

This article comprehensively examines the structure, components, material properties, and maintenance-repair methods of the tar, one of Azerbaijan's most important national musical instruments. The tar consists of a large and a small bowl carved from mulberry wood, a neck and head made of walnut wood, and fret and bridge systems reinforced with durable materials such as ebonite and capron. The cow heart membrane (skin) used on the bowl's surface plays a critical role in sound production. The simgir, a hook system, is designed to secure the strings and contains 11 tongues. The article details the impact of the bridge (xərək) structure and material choice on string vibration quality, the advantages of making the plectrum from ebonite, and the contribution of tying the frets with capron thread to playing comfort. It also describes the adjustment of the angle between the neck and the body, methods for correcting neck bends, techniques for attaching strings to the pegs, and the bird bridge system that ensures proper string passage. Protection methods to extend the life of the membrane, such as fish-skin patches, soft leather coverings, and the use of çiriş or RVA adhesives, are also discussed. In conclusion, each component of the tar is of great importance in terms of dimensional ratios, material selection, and assembly technique. Skilled craftsmanship and regular maintenance are essential for preserving sound quality and ensuring the instrument's longevity. This technical knowledge serves as an invaluable resource for preserving the traditional art of tar-making and passing it on to future generations.

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Introduction

The tar musical instrument is one of the masterpieces of the Azerbaijani people, and our nation approaches this instrument with great respect and affection. In general, our national musical instruments are an integral part of our people's culture. Reflecting the daily life, history, and social life of our nation, these national musical instruments serve as evidence of the richness and magnificence of our national music.

A turning point in the development of our national musical instruments began in the second half of the 19th century. It should be noted that development work is still ongoing today at the Scientific Research Laboratory of the Azerbaijan National Conservatory (ANC).

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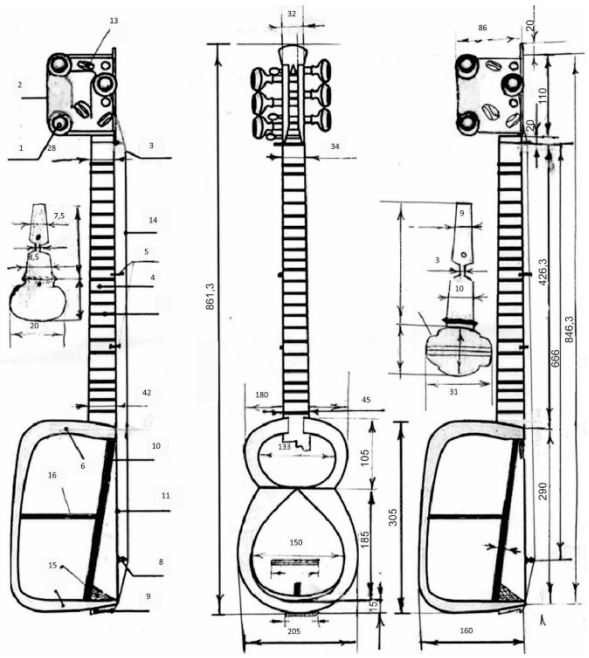

Figure 1. General structure of the *tar* musical instrument – body, neck, and head sections

Photo 1. The body (*bowl*) of the *tar* musical instrument – small and large bowl sections

In this article, we will discuss the repair of the *tar* musical instrument and the functions of its parts.

Body (Bowl): The body of the *tar* is usually made from mulberry wood. It consists of two parts: the small body and the large body.

Photo 2. Adjustment of the angle between the neck and the body (*tar fork*)

The part of the small body that connects to the neck is protruding. This projection is made to ensure a stronger connection between the neck and the body.

The total length of the body is 29 cm (290 mm), and its height is 160 mm. The length of the large body is 185 mm, while the length of the small body is calculated as 290 mm - 185 mm = 105 mm.

One important point is that the thickness of the back part of the body should be 2–3 mm thicker than the wall thickness where the small body connects to the neck. Otherwise, when adjusting the inner neck and the *tar fork* (the angle between the neck and the body), it would not be possible to adjust the angle due to the thinness (weakness) of the back wall of the body. In other words, the neck cannot be moved up or down using the adjustment lever.

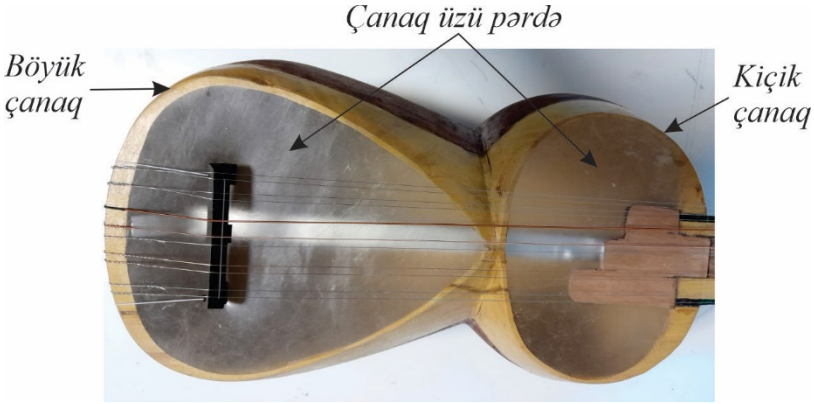

Photo 3. Bowl surface – bovine heart membrane (*membran*)

The surface of the body (*membrane*) is made from the membrane of a cow's heart (Photo 3). The most important point to consider when stretching the membrane over the body is that there should be no depression in the center of the membrane. In other words, when the membrane is stretched over the body, it should form a perfectly flat surface.

The membrane is a tensioned, vibrating surface used in some musical instruments to produce sound. More precisely, when we touch different areas of the membrane with our fingers, we should feel the same level of tension.

A "simgir" (hook) is attached to the back of the body (Photo 4). The function of the simgir is to hold the attached strings. The simgir consists of 11 tongues.

Photo 4. *Simgir* (hook) – the part where the strings are attached

To keep the bridge free, rods are inserted into the right and left tongues (Photo 5), while the remaining nine tongues are used to attach the strings.

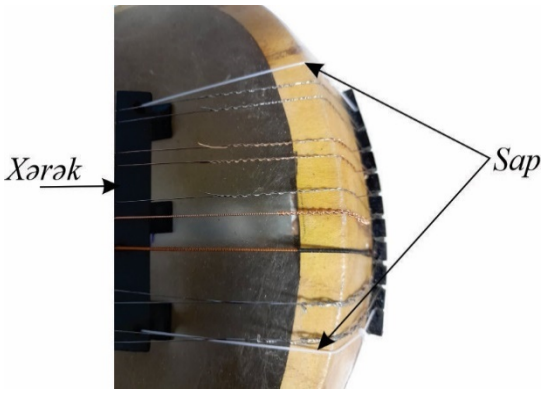

Photo 5. Bridge (***xərək***) – three-legged structure, parts where bass and treble strings rest

The bridge consists of three legs. The distances between the legs differ. The distance (between the legs) where the bass (*zeng*) strings rest is smaller than the distance between the legs where the treble (*ağ*) strings rest, because the pressure of the bass strings is greater (Photo 5).

The height of the bridge is about 16 mm (Photo 5). The angle between the neck and the body is greater than 180 degrees. If this angle is larger or smaller, the height of the bridge may vary. The length of the bridge is approximately 70–75 mm. The bridge is made of ebonite material.

Before using the body surface membrane (*perde*), it must first be cleaned of surface oils (fat layer) and excess tissue. It is recommended to soak the membrane in clean water for 8–10 hours so that any blood stains are completely removed. To make it more shiny (transparent), it should be washed with soap and dried with a very clean cloth. After this, glue is first applied to the part of the large body where the membrane will be attached, and then the membrane is glued onto the large body. The same procedure is then applied to the small body.

When the *tar* is played with a plectrum (*mızrap*), the plectrum slides from the string and strikes the membrane, causing the membrane on the body surface to tear prematurely. The plectrum is also made of ebonite, a material with high density (Photo 6).

Figure 6. Plectrum (***mızrap***) – playing tool made of ebonite

For this reason, the performer is often forced to replace the membrane (*perde*). To eliminate this problem, a patch made of fish skin is applied to the area where the plectrum continuously strikes; this allows the membrane to be used for a much longer period (Photo 7).

In another case, the area of the body where the wrist comes into contact during performance is exposed to sweat. As a result, the membrane becomes wet, which leads to its rapid deterioration.

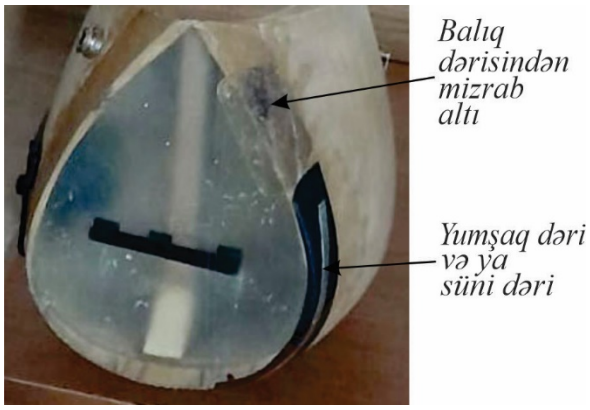

Photo 7. Fish-skin patch – protecting the area where the plectrum strikes

To solve this problem, a piece of soft leather or thin and flexible synthetic leather is glued to the relevant area. This method prevents the membrane (*perde*) on the body surface from wearing out quickly. Glue or RVA-type adhesives are generally preferred for attaching the membrane to the body. High-quality glue obtained from the *çiriş* plant is commonly used in our country to secure the membrane of the tar instrument.

After the membrane is glued onto the body, damp paper is placed over the adhesion points. This ensures that the body surface dries slowly from the glued areas. Otherwise, if the surface dries too quickly, excessive tension and slipping may occur along the glued edges, which can cause the membrane on the body surface to loosen.

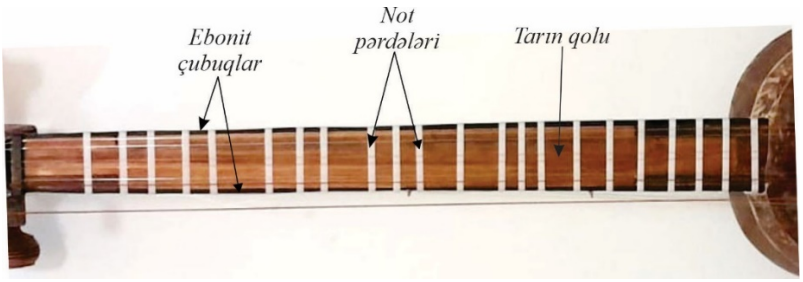

Photo 8. Professional tar neck – ebonite rods and fret ties

The length of the neck of a professional tar is 1.47×290 mm=426.3 mm1.47 \times 290\ \text{mm} = 426.3\ \text{mm}1.47×290 mm=426.3 mm and it is made of walnut wood. Ebonite rods are inserted along the edges of the neck to allow the fret ties on the neck to slide easily (Photo 8). There are 22 fret ties on the neck, made of capron (*jilka*) material. The number of windings is usually 7–8 turns, and the diameter of the capron string is 0.4–0.5 mm. Some performers may increase the number of frets according to their performance requirements. At the point where the neck connects to the body, its width is 4.5 mm and its height is 42 mm.

At the head of the neck, the width is 34 mm and the height is 28 mm. At the junction between the neck and the head, there is a “top nut” (sometimes called a “bird nut”), named so because its shape sometimes resembles a deer’s or bird’s head (Photo 9). The function of this nut is to guide the strings coming from the tuning pegs and direct them parallel over the neck to the body. The distance between the strings exiting the bird nut and the neck should be minimal to avoid putting excessive pressure on the fingers during performance. The cross-section of the neck is triangular in shape (Photo 10).

Photo 9. Bird nut (*quş xərək*) – the component that adjusts the distance between the neck and the strings

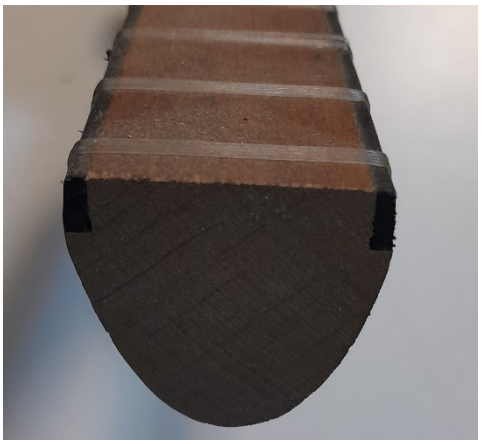

Photo 10. Triangular cross-section of the neck

The cross-section is shown in Photo 10. From the part where the neck connects to the body, a protrusion (tongue) extends toward the direction of the small body (Photo 11).

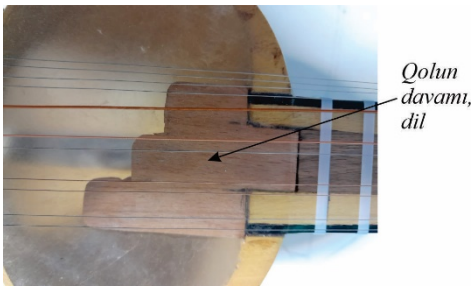

Photo 11. The tongue of the neck extended toward the small bowl

The length of the tongue may vary. In some cases, it extends all the way to the large body. The purpose of this extension is to increase the instrument's tonal range.

Eliminating the weakness between the neck and the body (Figure 2).

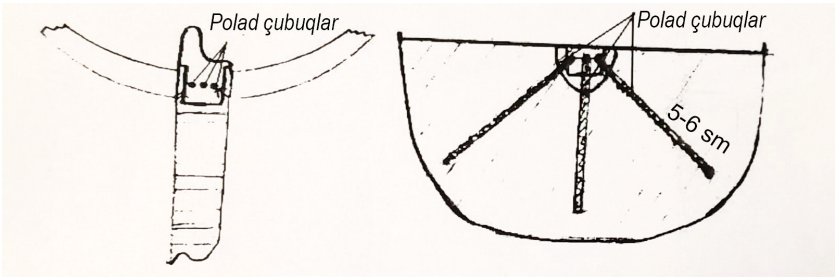

Figure 2. Method of eliminating the weakness between the neck and the body (bowl)

Eliminating problems that may occur in the neck (Figure 3)

In some cases, the neck of the tar instrument may become warped. To correct this curvature, we have developed a mechanism. This system is very important for both plain and mother-of-pearl (*sedef*) tar instruments. Previously, when the neck of a mother-of-pearl tar bent, we had to remove the inlays, plane the neck to straighten it, and then reinstall the inlays.

With this new system, the neck curvature can be corrected without removing the inlays. If one or two inlays become dislodged during the correction process, they can be reattached with adhesive afterward.

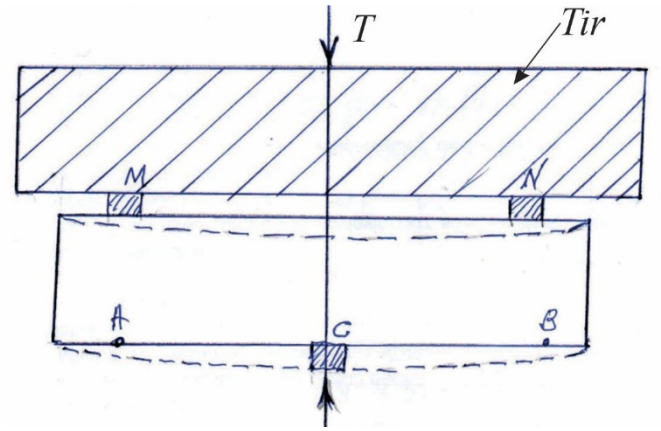

Figure 3. Mechanism for correcting neck curvature

First, the distance between points (A) and (B) is moistened (Figure 3). Then, wooden cushions (M) and (N) are placed on the neck. On top of these cushions, a beam thicker than the neck itself is positioned. Cushion (C) is placed on the back side of the neck and tightened in the direction of (C, T). The tightening process continues until the curvature is observed to shift in the opposite direction. The instrument should remain in this state until the neck dries completely. This process may take about 2–3 days. The head of the tar instrument is made of walnut wood (Figure 12).

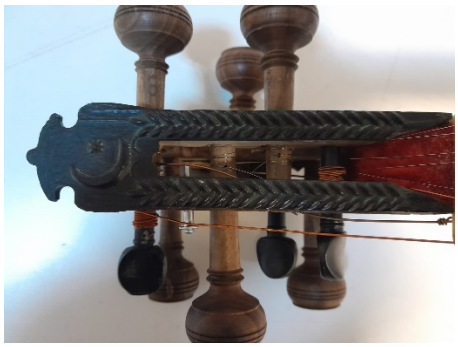

Figure 12. Tar head – front surface covered with ebonite, made of walnut wood

The head consists of two parts: the right and left sides (Figure 4). The protrusions at points (A) and (B) are designed to connect the neck and the head more securely.

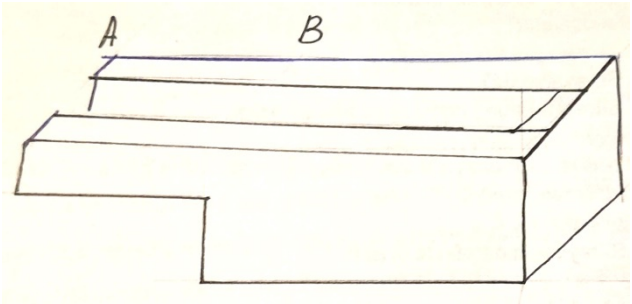

Figure 4. Tar head – structure and connection of the right and left parts

Both sides of the head are fixed together from three directions using walnut wood to ensure that there is no movement between the parts when the tuning pegs are installed (Photo 14). The tar's head contains a total of 9 tuning pegs: 6 large ones and 3 small ones. Two of the large pegs are used to adjust the *zeng* (bass) strings, keeping 4 strings in tune (Photo 13).

Photo 13. Securing the head body – structure reinforced with walnut pieces

The strings are wound onto the tuning pegs via the string wire (*tros*). See Figure 5.

- In case (A), the string passes through a hole drilled in the string wire and then goes to the *simgir* (hook).
- In case (B), the string passes over a pulley (*rolik*) placed at the end of the string wire before reaching the *simgir*.

Tuning the strings is much easier in option (B), because in case (A), the strings become deformed, making the tuning process more difficult. In option (B), the string slides smoothly over the pulley, allowing for easy tuning.

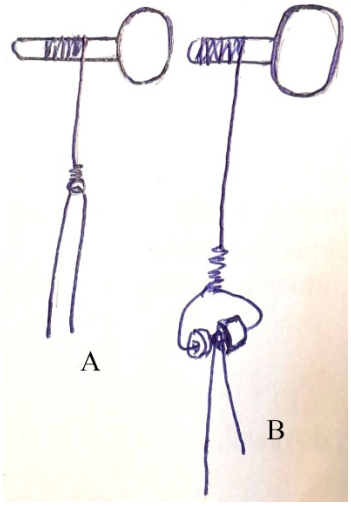

Figure 5. Methods of attaching the strings to the tuning pegs (Type A and Type B connections)

The strings are threaded through the holes prepared at the ends of the string wires, passed under the frets of the neck, and secured to the *simgir* (hook) on the back of the body by passing over the *zeng* (bass string) bridge. The tapered diameters of the tuning pegs are 10–9 mm for the large pegs and 8.5–7.5 mm for the small pegs.

To ensure the strength of the right and left sides of the head, pieces made of walnut wood are used (Photo 14).

Photo 14. Fixing the head body – structure reinforced with walnut pieces

The front surface of the tar's head is decorated with ebonite material to give the head an aesthetic appearance (Photo 12). This decoration can also be made from mother-of-pearl, bone, or plastic materials. The conical shape of the tuning pegs must match the conical shape of the holes drilled in the head to ensure a monolithic connection between the head and the pegs. This way, when the strings are tightened or loosened via the tuning pegs, the tension force of the strings is reliably maintained.

Some notes:

- The bird bridge (*quş xərək*) should hold the tone string at such a height that the strings coming from the *zeng* (bass) string bridge do not come into contact with each other during vibration.
- As the tone string exits the tuning pegs, it rests on top of other pegs, which causes interference during tuning. For this reason, a tone string adjuster is installed (Photo 15), allowing the tone string to pass freely and without obstruction through the bird bridge and the upper bridge of the body before being attached to the *simgir* (hook).

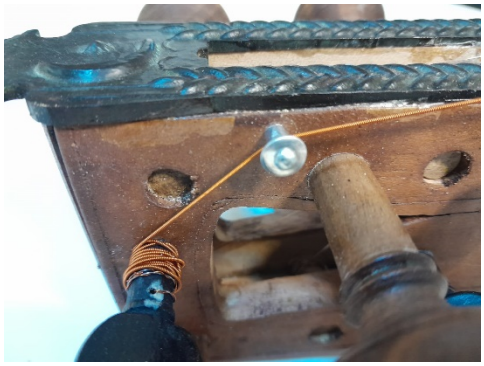

Photo 15. Tone string adjuster – a mechanism that allows the strings to pass through the bird bridge (quş xərək) without obstruction

- A channel with a depth and width of 1 mm is carved on the front side (soundboard) of the neck to make it easier to wrap the fretting ties (note frets) around the neck.
- The distance between the plane of the body and the plane of the neck should be 4–5 mm.

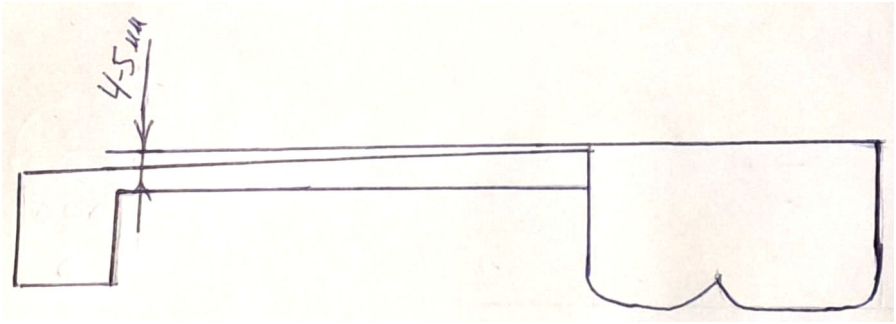

Figure 6. Passing the strings under the neck frets and attaching them to the simgir

Conclusion

The tar is one of Azerbaijan's most valuable national musical instruments, structurally requiring high craftsmanship and delicate workmanship. In this study, through visuals from Figure 1 to Figure 15 and Diagram 1 to Diagram 6, the main components of the tar, the materials used in its construction, assembly techniques, and maintenance-repair methods have been examined in detail. The large and small sections of the bowl carved from mulberry wood, the membrane (pərde) that determines sound quality, and the simgir that holds the strings all have their own specific dimensions and material characteristics. The design of the bridge (xərək) directly affects the tension and vibration quality of the strings, while the plectrum made of ebonite contributes to both durability and tonal color.

The walnut wood used in the neck, the ebonite rods, and the kapron frets provide long-lasting structure while increasing playing comfort. Special parts such as the bird bridge (quş xərək) ensure proper string alignment and reduce finger pressure during performance. Various techniques shown in the diagrams have been developed to eliminate

weaknesses between the neck and the body, correct neck warping, and ensure proper string attachment. Additionally, methods such as applying a fish skin patch, using soft leather protection, and selecting suitable adhesives are employed to extend the lifespan of the membrane.

In conclusion, every part of the tar is of great importance in terms of material selection, dimensional proportions, and assembly techniques. Master craftsmanship and regular maintenance are the main factors that determine both the sound quality and the longevity of the instrument. This technical knowledge serves as an indispensable guide for preserving traditional tar making and passing it on to future generations.

Biodata of Author

Dr. **Mamedali Mirali Mamedov**, music researcher and musical instrument restorer. Since 2010, he has been working as the head of the "Improvement of National Musical Instruments" (*Milli Musiqi Alətlərinin Təkmilləşdirilməsi*) research laboratory at the Azerbaijan National Conservatory (*Azərbaycan Milli Konservatoriyası*). Over the years, 64 of Mamedali Mamedov's scientific works have been registered with the Copyright and Intellectual Property Agency (*Müəllif Hüquqları və İntellektual Mülkiyyət Agentliyi*), and dozens of scientific articles and conference materials have been published. The ensemble "In the Footsteps of Time" (*Zamanların İzində*), consisting of ancient musical instruments, was founded by Mamedali. Mamedali Mamedov has created a four-cornered drum (*dördguşəli nağara*), a square drum (*kvadrat nağara*), and a "chovgan" (*çovqan*, conductor's baton) for the National Military Band (*Milli Hərbi Orkestr*). In addition, he has developed new musical instruments that produce sounds at different registers and registered them in the database of Azerbaijani musical instruments in collaboration with the Copyright Agency. In 2018, the book "Improvement of Azerbaijani Folk Musical Instruments" (*Azərbaycan Xalq Musiqi Alətlərinin Təkmilləşdirilməsi*) was published.

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References

Haciyev, A. (2010). Azerbaijani musical instruments (*Azerbaycan musiqi alətləri*). Baku: Sharq-Gharb Publishing.

Quliyev, M. (2007). The art of tar and its development history (*Tar sənəti və onun inkişaf tarixi*). Baku: Elm.

Rustemov, R. (2005). Azerbaijani folk musical instruments (*Azərbaycan xalq çalğı alətləri*). Baku: Tehsil Publishing.

During, J. (1991). The art of Persian music (*Fars musiqisi sənəti*). Washington, DC: Mage Publishers.

Mammadov, E. (2018). Structural features and timbre capabilities of the Azerbaijani tar (*Azərbaycan tarının konstruktiv xüsusiyyətləri və tembr imkanları*). Musigi Dunyasi, 2(78), 45-53.

Aliyev, Z. (2015). Methods for conservation and restoration of national musical instruments (*Milli musiqi alətlərinin konservasiyası və bərpası üzrə metodlar*). Azerbaijan National Academy of Sciences, Scientific Articles Collection of the Institute of Architecture and Art.

Azerbaijan National Conservatory (*Azərbaycan Milli Konservatoriyası*). (n.d.). Official website. http://www.conservatory.edu.az

Heydar Aliyev Foundation (*Heydər Əliyev Fondu*). (n.d.). National Musical Instruments (*Milli musiqi alətləri*). https://heydar-aliyev-foundation.org

Azerbaijan State Museum of Musical Culture (*Azərbaycan Musiqi Mədəniyyəti Dövlət Muzeyi*). (n.d.). Official website. http://azmusicmuseum.az

UNESCO. (2012). The art of Azerbaijani tar performance (*Azərbaycan tar ifaçılığı sənəti*). Intangible Cultural Heritage List. https://ich.unesco.org

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